AGRICULTURAL IMPACT ASSESSMENT FOR RICHCRAFT - ROHLING PROPERTY TOWNSHIP OF CUMBERLAND, CITY OF OTTAWA

Prepared for:
Richcraft Homes Ltd.
Suite # 201, 2280 St. Laurent Boulevard
Ottawa, Ontario, Canada K1G 4K1

Prepared by:

Colville Consulting Inc.
404 Queenston Street,
St. Catharines, Ontario L2P 2Y2

Project Number : C16095
Date: May 30, 2017

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1. INTRODUCTION

In August 2012, Colville Consulting Inc. was retained by Richcraft Homes Ltd (Richcraft) to conduct an Agricultural Impact Assessment (AIA) for a property in the former Township of Cumberland in the City of Ottawa, Ontario. The property, referred to herein as the Subject Lands and Rohling property, lies to the south of the existing urban boundary. The Subject Lands are generally situated west of Cox County Road and south of Old Montreal Road. The Subject Lands are comprised of a single parcel which is approximately 76.0 ha (187.80 acres) in size.

1.1 Background

The City of Ottawa has replaced the 1997 Regional Municipality of Ottawa-Carlton Land Evaluation and Area Review (O-C LEAR) with the adoption of a new LEAR system in December 2016. The LEAR system was used to identify agricultural areas designated as Agricultural Resource Areas. The Subject Lands have been included within the Agricultural Resource Area designation. However, the lands adjacent to the northern portion of the Subject Lands are designated General Rural Area and Rural Natural Features Area. Colville Consulting Inc. was retained to assess the Subject Lands using the new LEAR system and assess the potential impacts to agriculture should the lands be re-designated to General Rural Area.

This AIA considers the agricultural resources on site and on adjacent lands, the land uses and cropping patterns in the Study Area, and the level of agricultural investment in infrastructure and land improvements. The study also assesses the potential conflicts with the surrounding agricultural operation which includes the consideration of the Minimum Distance Separation (MDS) requirements for new development. The AIA also provides recommendations to minimize impacts should the lands be re-designated from Agricultural Resource Area to General Rural Area.

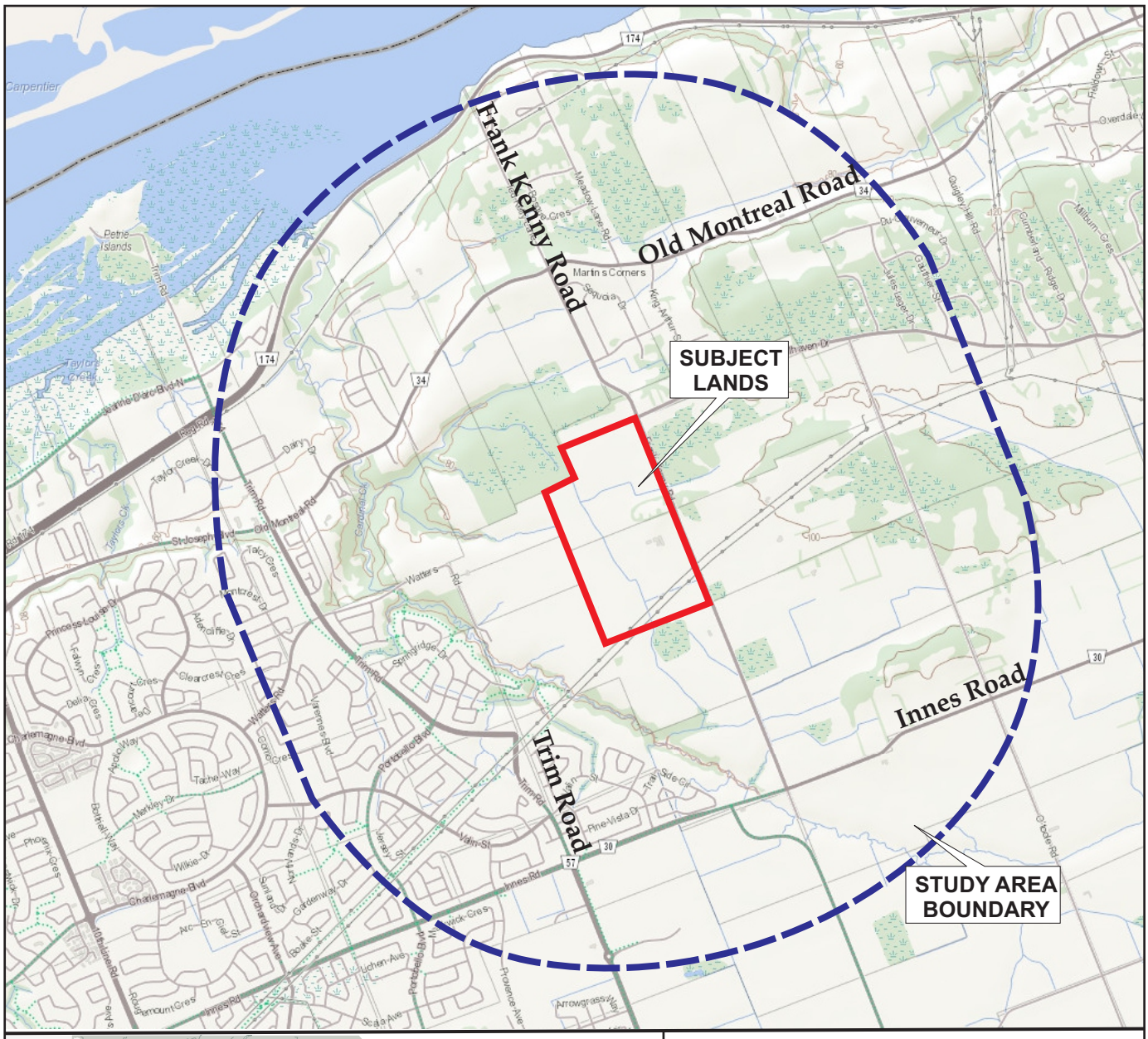
1.2 Study Area

The Study Area includes all lands within approximately two kilometers (2,000m) of the Subject Land boundaries. The Study Area is bounded to the north by Highway 174, the lands between O'Toole and Wishbone Road to the east, the lands south of Innes Road, and Trim Road to the west. This area is shown in Figure 1.

1.3 Scope

The Study includes:

- a soil survey within the Study Area to determine the agricultural capability of the soil on the Subject Lands using the Canada Land Inventory (CLI) classification system;
- a reconnaissance level land use survey to characterize the land uses on and adjacent to the Subject Lands. This includes the types of land uses, both agricultural and non-agricultural, cropping patterns and natural land cover;
- a comparison between the LEAR scores for the Subject Lands and the adjacent lands;
  an assessment of potential conflicts with surrounding agricultural operations including an assessment of the minimum distance separation (MDS I) requirements; and
- a review of the applicable agricultural policies contained in the Provincial Policy Statement (PPS) and the City of Ottawa's Official Plan. The review will include an assessment of the proposal's conformity with these policies.



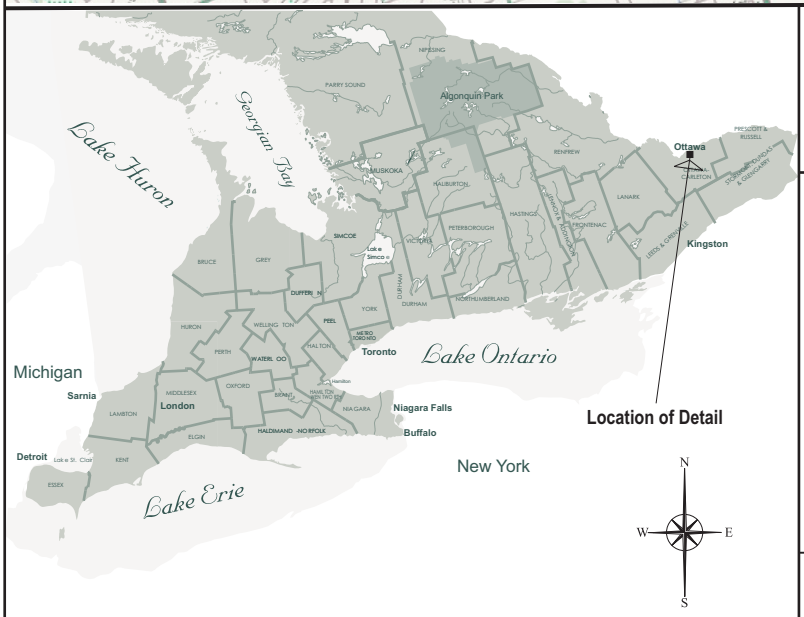


Figure 1

Location of Subject Lands

Prepared for:

RICHCRAFT Group of Companies

Prepared by:

COLVILLE CONSULTING INC.

Date: May 2017	C16095_01

2. METHODOLOGY

The study methodology involved a review of background information and site specific information collected through field inventories conducted on October 12th and 14th, 2012.

2.1 Background Data Collection

The background data collected included information obtained through consultations with planning authorities and planning documents, a review of existing published documents to obtain soil and climate resource and drainage information. LEAR information was provided by the City of Ottawa and included database information for the LEAR evaluation units within the Study Area. The proposal was reviewed to ensure conformity with applicable provincial, regional, and local agricultural policies. Agricultural policy related to this project was obtained from the Provincial Policy Statement (PPS, 2014) and the City of Ottawa Official Plan, Council adopted 2003, Consolidated May 2014, Official Plan Amendment 150 (approved by the Minister of Municipal Affairs and Housing on April 24, 2014), and Official Plan Amendment 180 (Adopted by By-law on January 25th, 2017, awaiting Ministry approval).

The following information sources were reviewed for this study:

- The City of Ottawa Official Plan, Council adopted 2003, Consolidation May 2014. Available Online: (http://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan)
- The Soils of the Regional Municipality of Ottawa-Carleton, Soil Survey No. 58 of the Ontario Institute of Pedology (1987);
- Ortho-rectified, digital aerial photography, City of Ottawa, May 2002, 2011 and 2016 imagery viewed using Google Earth;
- Minimum Distance Separation (MDS) Document, Ontario Ministry of Agriculture, Food and Rural Affairs (2017);
- Land Evaluation and Area Review (LEAR) for Agriculture, Volumes 1 & 2, City of Ottawa, Planning, Infrastructure and Economic Development, 2016;
- Ottawa-Carleton LEAR: Land Evaluation and Area Review for Agriculture (LEAR), Regional Municipality of Ottawa-Carleton Planning and Development Approvals Department, Policy and Infrastructure Division, Pub. #17-11, July 1997; and
- Soils information from OMAFRA's Provincial Soil Resource Database.

A more complete list of materials is provided in the references section of this report.

2.2 Field Inventories

The field inventories included a detailed soil survey of the Subject Lands and a reconnaissance level land use survey of the surrounding area to identify agricultural operations, relative levels of agricultural investment, cropping patterns and mix of land uses.

2.2.1 Soil Survey

The soils present on the Subject Lands and the Canadian Land Inventory (CLI) capability of the property was mapped using information available from the OMAFRA soil resource database. Detailed soil

information was obtained through an on-site soil survey completed on October 12, 2012. The method used to describe the soil profiles was consistent with the Canadian System of Soil Classification (CSSC, Agriculture and Agri-Food Canada, 1982) and the Field Manual for Describing Soils in Ontario (Ontario Centre for Soil Resource Evaluation, 1993).

The Subject Lands were traversed on foot and the soil profile was exposed at twenty-four (24) locations throughout the property using a hand-held Dutch auger. The physical properties of the soil, such as the mode of deposition, soil horizons and horizon depths, soil texture, colour, drainage, and stoniness, were described and recorded in the field on soil data sheets (Appendix A). The slope percentage within the soil polygons was measured using a hand-held clinometer.

The soil mapping of the Subject Lands was refined using the information gathered from the on-site soil survey and the Field Manual for Describing Soils in Ontario. The CLI capability of these soils is clearly defined in the *Soils of the Municipality of Ottawa-Carleton*, Soil Survey No. 58. A refined version of the existing soil and soil capability mapping was created to provide a detailed and accurate mapping of the Subject Lands.

2.2.2 Land Use Survey

A reconnaissance land use survey for the Study Area was carried out on October 14th, 2012. Information gathered during the land use survey included the type of land uses observed (both agricultural and non-agricultural), the land use and cropping patterns observed (i.e. the type of field crops and non-agricultural land cover) and the location and type of farm operations.

The land uses and cropping pattern were checked in 2017 using aerial photography to see whether there were any substantial changes.

2.2.3 MDS Calculation

The Minimum Distance Separation (MDS) Formulae is a land use planning tool used to minimize land use conflicts and nuisance complaints arising from odours generated by livestock operations. The MDS calculation determines a recommended separation distance between a livestock or manure storage and other land use.

There are two separate MDS Formulae: MDS I and MDS II:

- MDS I is the calculation for proposed new development and existing livestock facilities;
- MDS II is the calculation for proposed new, enlarged or remodeled livestock facilities and existing or approved development.

Should the Subject Lands be considered for inclusion within the Urban Area the calculation of the MDS I is required. The information required to complete an MDS I calculation was obtained through a combination of sources. These sources included:

- web sites such as Google Earth through which aerial photography was reviewed and barn dimensions could be calculated; and
- information gathered during the land use survey.

This information was collected for all existing livestock operations including those empty livestock facilities that could potentially be used to house livestock in the future. New MDS Guidelines have been developed by the OMAFRA and came into effect on March 1st, 2017.

3. AGRICULTURAL POLICIES

3.1 Provincial Policy Statement

Land Use Policy and development in the province of Ontario is directed by the Provincial Policy Statement (PPS), which was issued under the authority of Section 3 of the Planning Act and which came into effect on April 30, 2014. Section 3 of the Planning Act states that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act.

3.1.1 Prime Agricultural Areas

Section 2.3 of the PPS specifically deals with agricultural policy. Section 2.3.1 states that "Prime agricultural areas shall be protected for long-term use for agriculture". The PPS defines prime agricultural areas as areas where prime agricultural lands predominate. Prime agricultural lands include specialty crop areas and Canada Land Inventory (CLI) Classes 1, 2 and 3 soils, in this order of priority for protection.

Section 2.3.5.1 states that:

> "Planning authorities may only exclude land from *prime agricultural* areas for expansions of or identification of *settlement areas* in accordance with policy 1.1.3.8."

Section 1.1.3.8 states that:

> "A planning authority may identify a settlement area or allow the expansion of a settlement area boundary only at the time of a comprehensive review and only where it has been demonstrated that:
>
> a) sufficient opportunities for growth are not available through intensification, redevelopment and designated growth areas to accommodate the projected needs over the identified planning horizon;
> b) the infrastructure and public service facilities which are planned or available are suitable for the development over the long term, are financially viable over their life cycle, and protect public health and safety and the natural environment;
> c) in prime agricultural areas:
> 1. the lands do not comprise specialty crop areas;
> 2. alternative locations have been evaluated, and
> i. there are no reasonable alternatives which avoid prime agricultural areas; and
> ii. there are no reasonable alternatives on lower priority agricultural lands in prime agricultural areas;
> d) the new or expanding settlement area is in compliance with the minimum distance separation formulae; and
> e) impacts from new or expanding settlement areas on agricultural operations which are adjacent or close to the settlement area are mitigated to the extent feasible.
>
> In determining the most appropriate direction for expansions to the boundaries of settlement areas or the identification of a settlement area by a planning authority, a planning authority shall

apply the policies of Section 2: Wise Use and Management of Resources and Section 3: Protecting Public Health and Safety."

Section 2.3.6.1 of the PPS states that under certain conditions planning authorities may permit limited, non-agricultural uses in prime agricultural areas. Policy 2.3.6.1 b) states that "limited non-residential uses may be permitted provided that all of the following can be demonstrated:

1. the land does not comprise a specialty crop area;
2. the proposed use complies with the minimum distance separation formulae;
3. there is an identified need within the planning horizon provided for in policy 1.1.2 for additional land to be designated to accommodate the proposed use; and
4. alternative locations have been evaluated, and
    i. there are no reasonable alternative locations which avoid prime agricultural areas; and
    ii. there are no reasonable alternative locations in prime agricultural areas with lower priority agricultural lands."

In addition, Section 2.3.6.2 states that "Impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands are to be mitigated to the extent feasible".

The Subject Lands, as is most of the Study Area, are located in an area which is comprised predominantly of prime agricultural land (Class 3 CLI) and the City of Ottawa has included much of this area within the Agricultural Resource Area. The 2016 LEAR shows that the Subject Lands and some of the surrounding lands exceed the threshold value used to identify potential Agricultural Resource Areas. Based on this LEAR evaluation, the City of Ottawa determined that the lands should remain in the Agricultural Resource Areas.

If the LEAR analysis is correct, these lands can only be removed from the Agricultural Resource Area designation for settlement area expansion (PPS Policy 1.1.3.8.) although some limited non-agricultural uses may be permitted (PPS Policy 2.3.6.1).

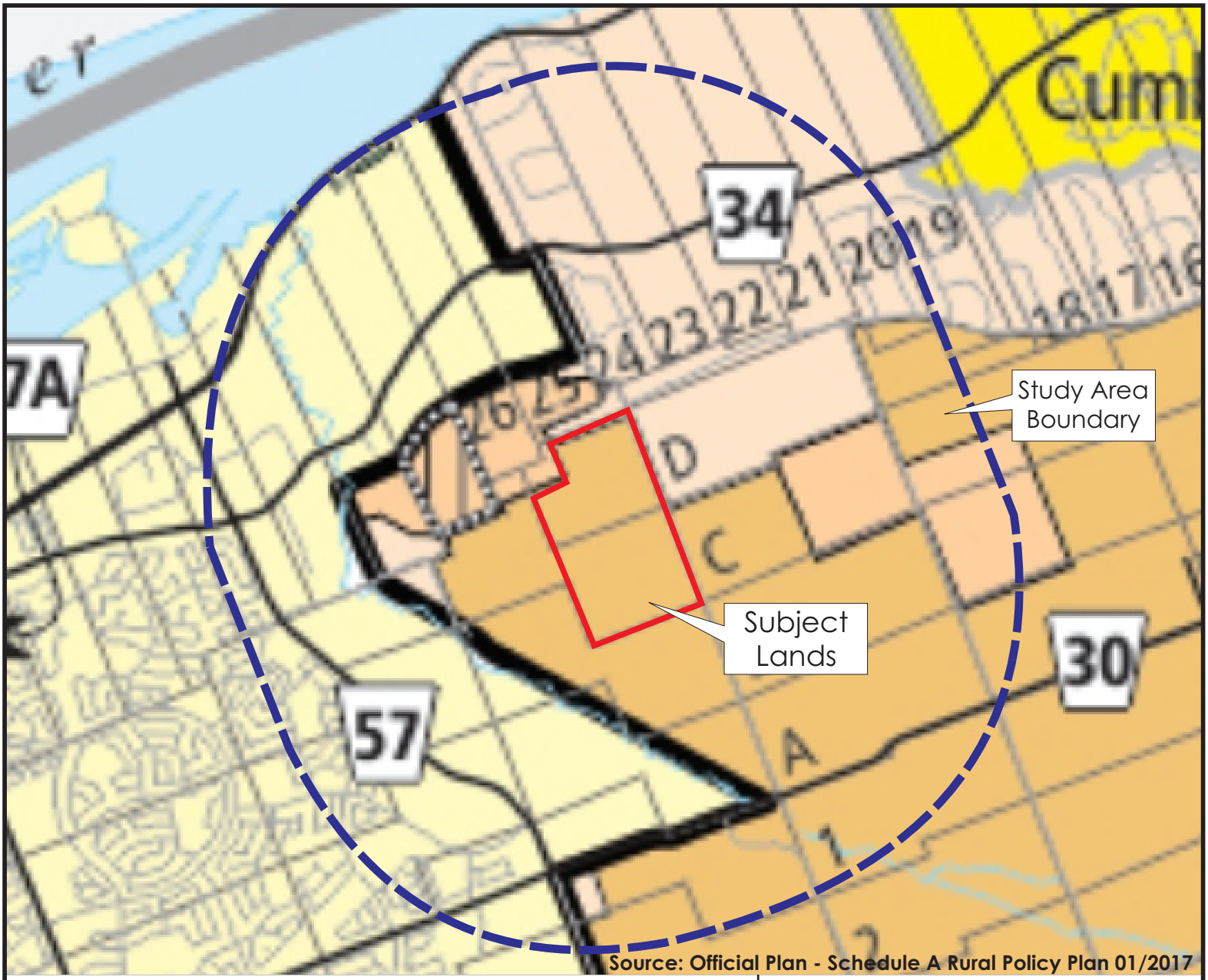
3.2 City of Ottawa Official Plan

The City of Ottawa Official Plan has designated the Subject Lands and much of the surrounding area as Agricultural Resource Area (Figure 2) and are zoned agricultural (AG) lands. The permitted uses in the AG zone include agricultural uses, bed and breakfast, detached dwelling, environmental preserve and education area, equestrian establishment, forestry operation, group home, home based business, home based daycare, kennel and secondary dwelling unit.

The lands immediately north of the Subject Lands are mapped as General Rural Area. Under the General Rural Area designation, the permitted uses are more diverse and include recreational, residential, commercial, industrial and agricultural uses. In addition, the urban boundary is located approximately 500m to the west.

3.2.1 Agricultural Resource Area

Lands designated Agricultural Resource Area represents the City of Ottawa's prime agricultural areas. Section 3.7.3 – Agricultural Resources of the City of Ottawa Official Plan contains the City's agricultural



Legend

- Urban Area Boundary
- City Boundary
- Urban Area
- Urban Expansion Area
- Village
- Agricultural Resource Area
- General Rural Area
- Rural Natural Features Area
- Sand and Gravel Resource Area

Figure 2

Official Plan Designations
For Subject Lands

Prepared for:

RICHCRAFT Group of Companies

Prepared by:

COLVILLE CONSULTING INC.

Date: May 2017

FILE: C16095_02

policies. It is the intent of the agricultural policies to protect "major areas of agricultural and other lands suitable for agriculture from loss to other uses"; and to ensure "that use, which would result in conflicts with agricultural operations, are not established in productive farming areas".

The primary use of these lands will be for agriculture although other uses may also be permitted such as:

- farm residences and residences for farm help;
- forestry and those activities related to conservation or management of the natural environment;
- Secondary Uses such as:
- home-based businesses, home industries, and uses that produce value-added agricultural products;
- farm-related commercial and farm-related industrial uses that are small scale and directly related to the farm operation; and
- market gardens that involve the small scale growing of produce such as fruits, vegetables and flowers as cash crops that are subsequently sold directly to consumers and restaurants; and
- pits, wayside pits and quarries and portable asphalt plants as interim uses.

3.2.2 General Rural Area

There are lands designated General Rural Area to the north of the Study Area. Land in the General Rural Area often contains lower capability agricultural lands and a mix of non-farm land uses. Despite the mix of non-fam land uses, agricultural uses are still one of the main land uses found in the rural area.

The General Rural Area policies provide for a "location for agriculture and for those non-agricultural uses that, due to their land requirements or the nature of their operation, would not be more appropriately located within urban or Village locations; and for "a limited amount of residential and other rural and tourist service uses" that do not conflict with agriculture and other permitted uses.

The uses permitted within the General Rural Area without requiring a zoning by-law amendment include:

- Agricultural uses, forestry and conservation, and natural resource management activities;
- Residential uses on existing lots of record and on new lots created by severance as provided for by this Plan;
- Animal boarding, breeding, and training facilities, including stables;
- Bed and breakfast establishments;
- Open space; and
- Cemeteries.

Other non-farm land uses such as commercial and industrial may be permitted with a zoning by-law amendment.

4.0 STUDY FINDINGS

4.1 Physiography

The Subject Lands are located within the Ottawa Valley clay plains physiographic region. The soils are predominantly glacial lacustrine and/or glacial marine in origin. They are generally comprised of fine textured silt and clay material that have a plastic consistency when wet. The parent material is mildly calcareous to non-calcareous. The topography is generally level and the soils are mostly poorly drained. The Subject Lands are located close to the boundary of the level clay plain. In addition to the glacio-marine materials, morainal till influences the topography in the area. Slopes associated with the till are very gentle to gently undulating. The limestone bedrock which underlies the area is often exposed and near the surface to the north and east of the Subject Lands.

Cardinal Creek is the main tributary that drains the area and flows to the Ottawa River to the north of the Subject Lands. There are small tributaries that flow westwards away from the Subject Lands and southwards through the Subject Lands. The later appears to be a channelized, improved drain to facilitate flow through the agricultural area.

4.2 Climate

Climate data is available through Environment Canada's National Climate Data and Information Archive's online database. Canadian Climate Normals for the Ottawa area (1981-2010) were obtained from the online database.

Ottawa receives an average of 919.5 mm of precipitation annually (Environment Canada website); 755.5mm of rainfall and 175.4cm of snowfall. The daily average temperature ranges from a high of 21.2°C in the month of July to a low -10.2°C in January. According to the OMAFRA Factsheet Freeze Risk During Spring and Autumn in Ontario (Brown, D.M., & A. Bootsma, 1991) the average length of the frost-free period is estimated to be 140 days. The frost-free period ranges from about May15th to September 30th.

The Ottawa area receives annually an average of between 2700 and 2900 accumulated crop heat units (CHU). The crop heat unit ratings are based on the total accumulated CHU for the frost-free growing season (Brown, D. M., and A. Bootsma. 1993). All common field crops can be grown in areas receiving 3100-3200 CHU.

4.3 Soil Resources

4.3.1 Regional Soil Survey

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) soil database provides the most up-to-date soil data. According to the OMAFRA soil database the predominant soil association is the Ste. Rosalie (STA), mapped as a complex soil unit with the Bearbrook (BBO) soil association. These two soil associations are common throughout the Study Area.

Soils of the Ste. Rosalie soil association have developed on level to nearly level sloping marine clay sediments deposited by the Champlain Sea. Surface textures tend to have lower clay content than in the subsoil and most often are clay or silty clay. The parent material of the soil consists of heavy clay textures and usually angular blocky soil structures.

Bearbrook soils have developed on level to very gently sloping areas of clayey material, deposited by the waters of the Champlain Sea. The soils are generally composed reddish brown to brown heavy clay parent material, frequently interbedded layers heavy clay may be present. Occasionally, interbedded layers consisting of fine to medium sand may occur in place of the heavier clay layers. The parent material is generally fine texture, non-calcareous, and do not contain coarse fragments. The majority of the Bearbrook soils are poorly drained, with some areas being imperfectly or very poorly drained.

The other soil associations mapped within the Subject Lands include Farmington (FRM) and Grenville (GVI), mapped as complex soil units; the dominantly Grenville and Farmington polygons are located along the northern and eastern boundary respectively.

Soils of the Grenville association occur in the central portion of Cumberland Township in the ancestral river channel of the Ottawa River, they have developed from stony glacial till. These soils are medium to moderately coarse textured and have considerable coarse fragment content which generally increases with depth. The parent material is commonly sandy loam, with coarse fragment content exceeding 20% by volume, strongly calcareous, and well drained. Within the Subject Lands the Greenville polygons are rated CLI Class 3PT.

Farmington soils are well to rapidly drained and have developed from a thin veneer of glacial drift which overlies the limestone bedrock. Farmington soil materials are moderately coarse to course textured and contain a considerable amount of calcareous material originating form Paleozoic limestone and dolomite rock. The depth of the soil material over the bedrock generally does not exceed 30 cm. The Farmington polygons within the Subject Lands have been given a CLI rating of 6R due to the close proximity of the bedrock.

4.3.2 Detailed Soil Survey

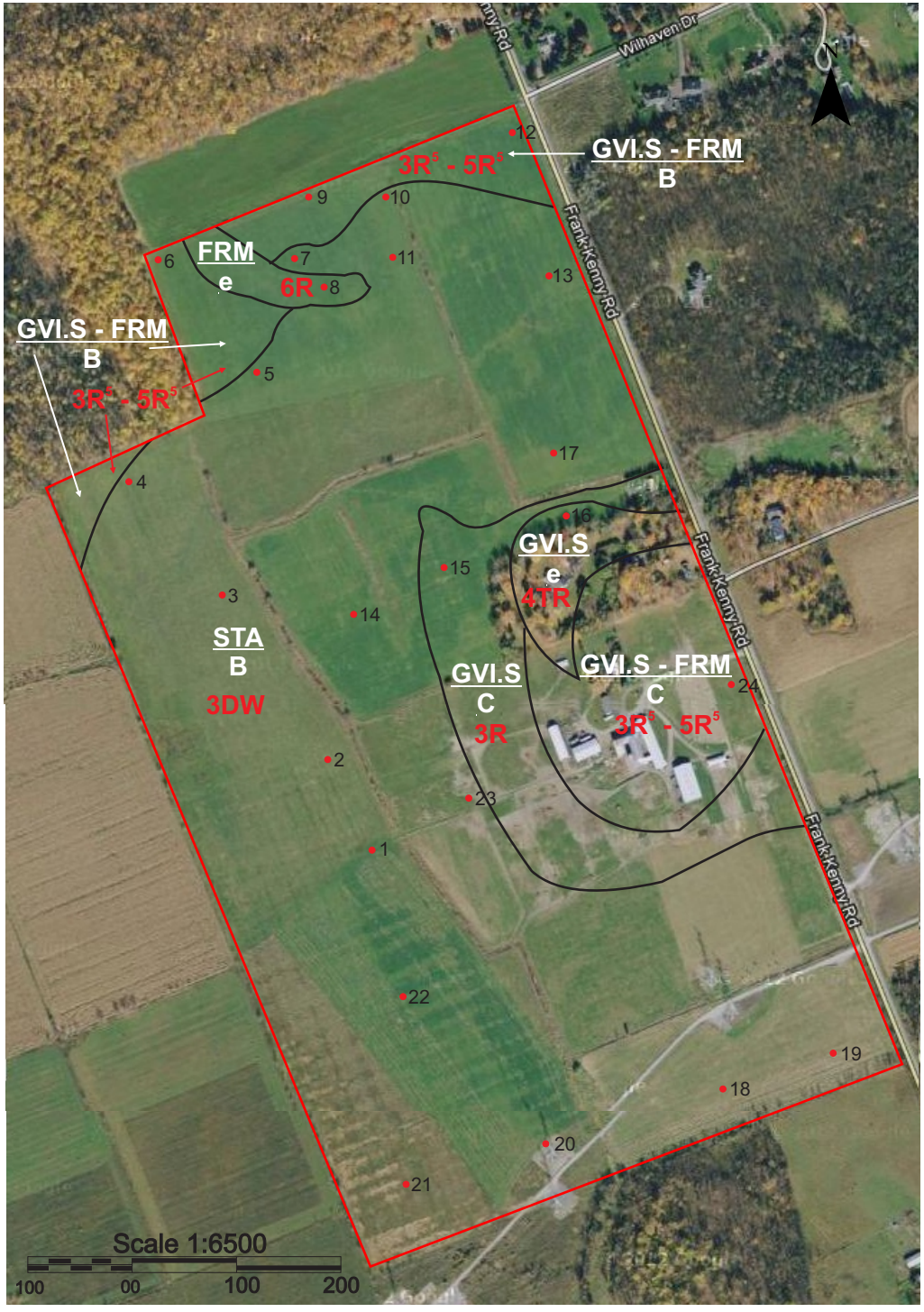
A detailed survey was completed on October 12, 2012 in order to refine the soil mapping associated with the OMAFRA soil resource database. The refined soil mapping is shown in Figure 3 and summarized in Table 1. The soil survey generally confirmed the regional soil mapping as described above, although only members of the Rideau soil association were found on the Subject Lands.

Table 1 - Soils on Subject Lands

Soil Association/Landscape Unit	Soil Series	Area (Ha)	Percentage
STA	Ste. Rosalie	55.90	73.55
GVI.S	Grenville Shallow Phase	13.75	18.09
FRM	Farmington	6.35	8.36
Total		76.0	100%

The soils identified within the Subject Lands included the Ste. Rosalie (STA), Grenville (GVI), and Farmington (FRM) soil associations.

The soil survey confirmed that the Ste. Rosalie (STA) is the most common soil found on the Subject Lands. These soils were mapped on 73.55% (55.90 ha) of the Subject Lands. The soil characteristics within the Ste. Rosalie soil unit were found to be fairly consistent and no Bearbrook soils were identified within the property boundaries. The poorly drained Ste. Rosalie soil was mapped on predominantly very gentle slopes. These soils are non-stony and the parent material was found to be non-calcareous.



Legend

Soil Symbol

Soil Phase → Dominant Soil Name → **GVI.S - FRM** ← Significant Soil Name
Slope Class → **B**

Soil Series

GVI.S **Grenville Shallow Phase:** well drained soils formed in dense till.

FRM **Farmington Loam:** well to rapidly drained and have developed from a thin veneer of glacial drift which overlies the limestone bedrock.

STA **Ste. Rosalie:** Medium and heavy textured soils on Alluvial, Lacustrine and marine deposits.

CLI AGRICULTURAL CAPABILITY CLASSES

CLI 3 Moderately severe limitations that restrict the range of crops or require special conservation practices.

CLI 4 Severe limitations that restrict the range of crops or require special conservation practices.

CLI 5 Unsuitable for annual cultivation. Improvements are possible for the production of perennial forage or pasture.

CLI 6 Soils in this class are capable only of producing perennial forage crops and improvement practices are not feasible.

CLI SUBCLASSES

D Undesirable Structure and/or Low Permeability.
R Shallowness to Consolidated Bedrock.
T Adverse Topography.
W Excess Water.

SLOPE CLASSES(%)

A a Level slopes (0.0 - 0.5%)
B b Nearly level slopes (0.5 - 2.0%)
C c Very Gentle slopes (2.0 - 5.0%)
D d Gentle slopes (5 - 9%)
E e Moderate slopes (9 - 15%)
F f Strong slopes (15 - 30%)
Gg Steep slopes (30 - 45%)

Simple Slopes (uniform, lengths > 50 metres) denoted in upper case
Complex Slopes (short, irregular slopes) denoted in lower case

•1 **Auger hole location**
The number relates to the Field Data Sheet Number

Property Boundary

Figure 3
Soil Series & CLI Capability

Prepared for: RICHCRAFT Group of Companies

Prepared by: COLVILLE CONSULTING INC.

Date: May 2017

C16095_03

Grenville-Farmington complex soil units were identified along the northern and eastern boundary of the property. However, minor adjustments to the OMAFRA soil database include; complex units were mapped as 50% Grenville and 50% Farmington, a ridge along the northern boundary was identified as Farmington, and soil polygons along the eastern boundary were expanded and mapped as Grenville, and complex soil units of Grenville-Farmington.

4.4 Canada Land Inventory Agricultural Capability

4.4.1 CLI Agricultural Land Classification

The Canada Land Inventory (CLI) is an interpretative system for assessing the effects of climate and soil characteristics on the limitations of land for growing common field crops. The CLI system has seven soil classes that descend in quality from Class 1, which has few limitations, to Class 7 soils which have no agricultural capability for common field crops. Class 2 through 7 soils have one or more significant limitations, and each of these are denoted by a capability subclass. There are thirteen subclasses described in CLI Report No. 2 (1971). Eleven of these subclasses have been adapted to Ontario soils. More information regarding the CLI Classification system is provided in Appendix B.

4.4.2 CLI Agricultural Capability

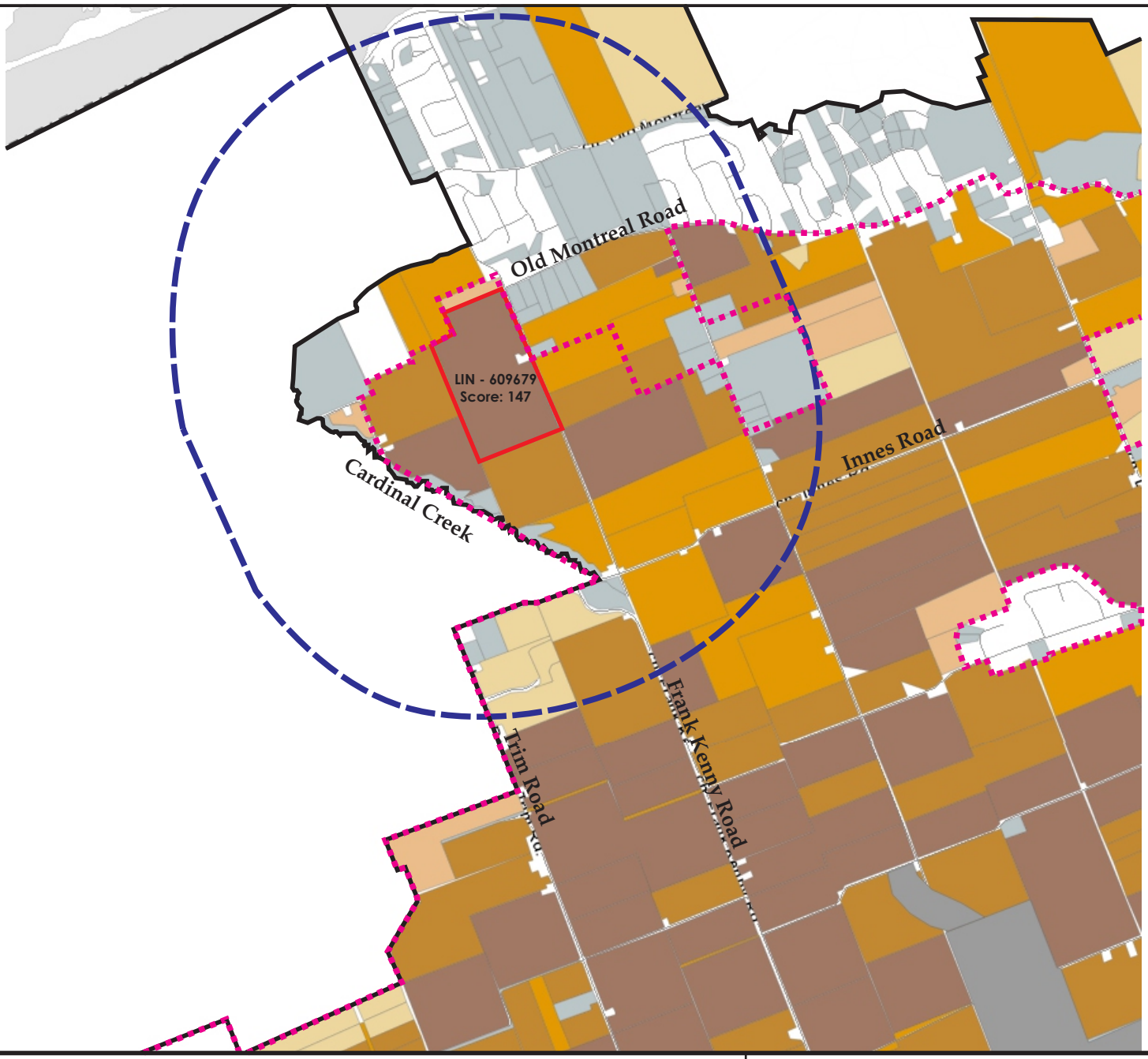
The results of the detailed soil survey were used to update the CLI capability of the Subject Lands. *The Soils of the Regional Municipality of Ottawa-Carleton* (Schut and Wilson, 1987) provides the CLI capability ratings for common field crops in the City of Ottawa. The Ste. Rosalie soil series (STA) is shown as CLI Class 3DW. The Grenville soils (GVI.S) are rated CLI Class 3R and 4TR on the steeper slopes. The Farmington soils (FRM) are rated CLI Class 5R and 6R.

The CLI capability rating for the Subject Lands (Figure 3) and Table 2 shows the distribution of CLI capability within the Subject Lands. This table also shows that the majority of the Subject Lands are considered to be prime agricultural lands. Prime Agricultural Lands include CLI Class 1, 2 and 3.

Table 2 - CLI Soil Capability for Agriculture – Subject Lands

CLI Class	Hectares	Sub-Total (Ha)	% of Subject Lands
3DW	55.90		
3R	11.85		
Total Class 3		67.75	89.14
4TR	1.90		
Total Class 4		1.90	2.50
5R	5.35		
Total Class 5		5.35	7.04
6R	1.00		
Total Class 6		1.00	1.32
Total	**76.00**	**76.00**	**100.0%**

The results show that 67.75 ha or 89.14% of the Subject Lands are comprised of prime agricultural lands. These lands however are CLI Class 3 lands which have the lowest priority for preservation among prime agricultural lands. The remainder of the Subject Lands is comprised of CLI Classes 4 (2.50%), 5 (7.04%) and 6 (1.32%) which totals approximately 8.25 ha or 10.86%.



Legend

- Subject Lands
- Study Area Boundary
- Land Designated for Other Purposes
- Settlement Area Boundary
- Agricultural Resource Area

LEAR Scores

- 175+
- 165+ - 175
- 155+ - 165
- 145+ - 155
- 135+ - 145
- 125+ - 135
- 115+ - 125
- 105+ - 115
- 0 - 105

Figure 4
2016 LEAR Scores

Prepared for:

RICHCRAFT™ Group of Companies

Prepared by:

COLVILLE CONSULTING INC.

Date: May 2017

C16095_04

4.5 Land Use

The mix of land uses and cropping patterns observed within the Study Area were mapped and are shown in Figure 5. The purpose of the land use survey was to identify agricultural and non-agricultural uses in the Study Area and identify agricultural operations that may be sensitive to the introduction of new land uses.

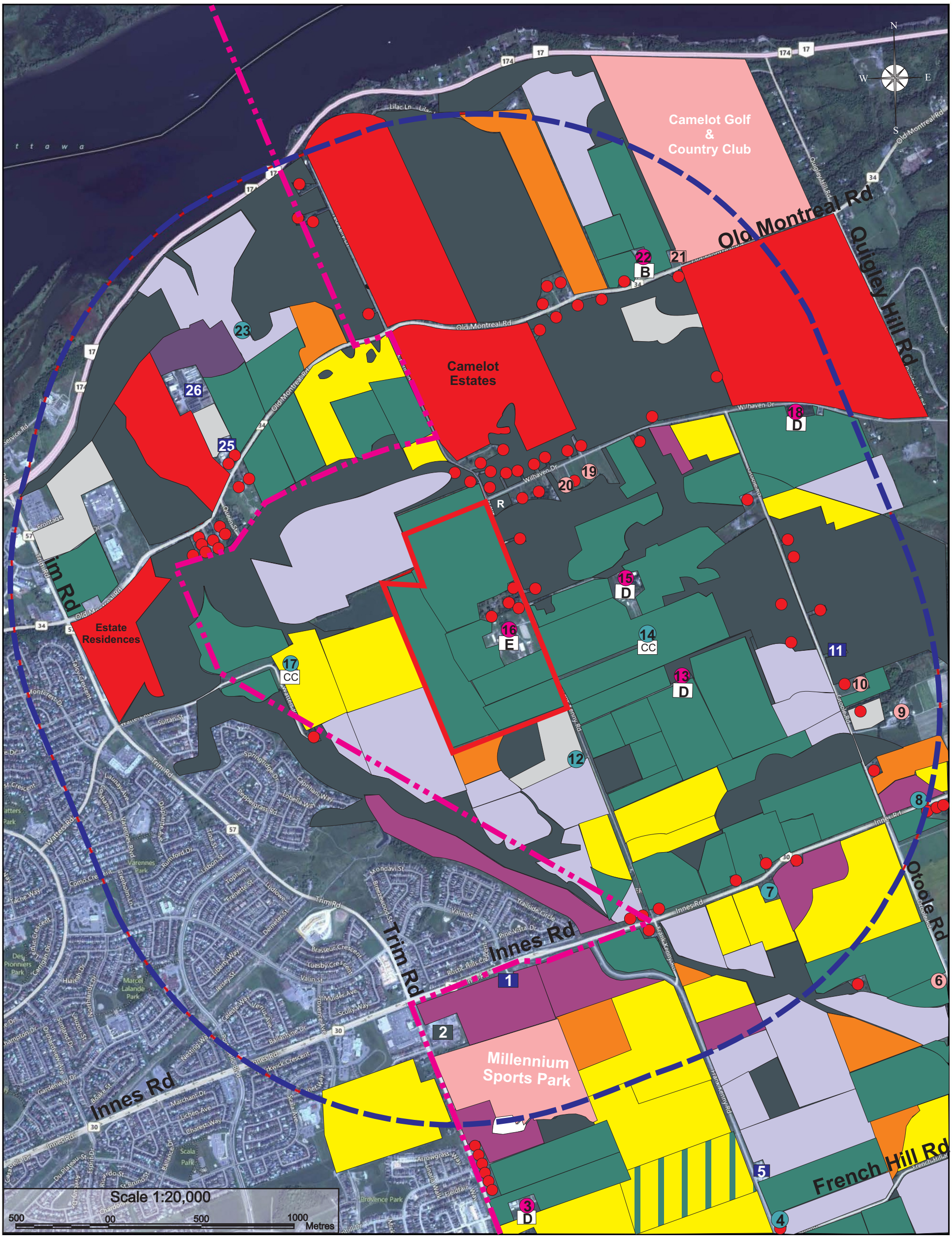
Farm types were noted and identified as either active or inactive (e.g., retired), livestock, cash crop or hobby farms. Livestock operations include poultry, dairy, beef, cow-calf and equestrian operations. Those inactive or retired farm operations were evaluated to determine whether they should be considered as either an empty livestock operation or as a remnant farm. Remnant farms have no infrastructure that is suitable for housing livestock whereas the infrastructure for an empty livestock facility is still in a condition that could permit the keeping of livestock with minimal investment.

Non-farm land uses include non-farm residences, existing and approved residential, recreational, institutional, commercial developments, and aggregate operations.

Crop identification was carried out as follows: corn, soybeans, and silage corn were considered row crops; permanent sod crops such as pasture, hay crops and silage crops (i.e. grass mixes, alfalfa, and clovers) were classified as forage. Areas that were obviously under cultivation but were ploughed at the time of the land use survey or were unidentified were mapped as 'cultivated'. Speciality crops, such as vegetable crops, were also mapped but comprise a very small proportion of the crops being grown in the Study Area. Areas not in agricultural production include idle lands, scrub lands and natural areas (i.e. forested).

Land uses were broken down into the following categories:

- *Cash crop operation:* Building complex and machinery typical of farm operation that concentrates predominantly on the production of common field crops.
- *Hobby Farm:* A residential dwelling, with or without accessory buildings, and includes some crop production for personal consumption or limited sale; and/or small numbers of livestock raised for personal consumption, pleasure or limited sale. A hobby farm normally will generate little or no income.
- *Retired*: A residence with a barn and associated ancillary buildings that are no longer used for agricultural purposes. The farm buildings may be abandoned or used for storage and other non-farm related uses.
- *Idle:* Idle lands are non-forested land that has not been utilised for agricultural crops and now contain old meadow vegetation communities containing very little woody vegetation.
- *Scrubland:* Scrubland is land that has been left idle long enough for woody shrubs and/or young trees to become established.
- *Woodlot:* Woodlot includes forested areas (including plantations and re-forested areas).
- *Residential:* Non-farm residential development includes single dwellings on small lots, estate residential lots and dwellings, subdivisions and urban residential areas.
- *Commercial/Industrial:* Includes both small and large scale commercial and industrial developments and lands designated for these uses.
- *Institutional: Institutional uses commonly include churches & cemeteries, educational facilities, and publically owned facilities.*



Legend

- Subject Lands
- Row Crops
- Idle
- Residential
- Recreational
- Future Development
- Non-farm Residence
- Active Farm Operation
- Study Area
- Specialty Crops
- Scrub
- Pasture/Forage
- Thicket/Forested
- R — Reforested Area
- Mixed Crops
- Mowed
- Hobby Farm
- Retired Farm Operation
- Urban Boundary
- Commercial
- Aggregate Operation
- Recreational
- Institutional
- B — Beef Operation
- E — Equestrian Operation
- D — Dairy Operation
- CC — Cash Crop

FIGURE 5
Land Use Map

Prepared for: RICHCRAFT Group of Companies

Prepared by: COLVILLE CONSULTING INC.

DATE: May 2017

C16095_05

- *Commercial:* Land uses that include non-agricultural commercial operations such as gas stations, automotive repairs, etc.
- *Future Development Area:* Lands that are appear to be under development.
- *Recreational:* Land uses such as golf courses, soccer and baseball fields and public parklands.

The land uses observed in the Study Area are shown in Figure 5 and descriptions are provided in Appendix C.

4.5.1 Land Uses Observed

The land uses in the Study Area are dominated by residential and agricultural uses. The majority of the lands to the east and southeast of the Subject Lands are in common field crop production and most of the area is mapped as forage crop. There are five (5) active livestock operations and six (6) retired or remnant farm operations within two kilometers of the Subject Lands. Of the five active livestock operations, three have dairy cows, though only one (#15) has the infrastructure required for a dairy operation. There is an equestrian operation located on the Subject Lands. Two of the active livestock operations (#13, #14) are within one kilometer of the Subject Lands, Holsteins were observed at both locations.

Four (4) Hobby farms were identified within two kilometers of the Subject Lands. Hobby farms usually include a residential dwelling with some farm related buildings (e.g., small barns, pens, and sheds). A hobby farm may include some crop production (e.g., gardens, small hay fields. etc.) for personal consumption, feed for a small number of animals or for limited sale. It may also include a small numbers of animals (e.g., chickens raised for meat and eggs, beef, or horses) which are likely been raised for personal consumption. A hobby farm normally will generate little or no family income. However, because some hobby farms do have livestock, they have been mapped as livestock facilities.

There are numerous non-farm residences scattered throughout the Study Area, including estate residences, particularly along Old Montreal Road, and Wilhaven Drive.

The land use character observed in the center of the Study Area (including the Subject Lands) is that of high priority agricultural area based on the observed land use and level of investment in farm operations These lands are connected to a larger area of prime agricultural land to the south and exceed 250 ha in total size.

The land use observed within the majority of the Study Area contrasts sharply with the pocket of agricultural uses located on and adjacent to the Subject Lands. There is very little investment in agricultural infrastructure other than the equestrian operation (#16) on the Subject Lands and a dairy operation (#15) located to the east of the Subject Lands.

In addition, the northern half of the Study Area is comprised of primarily residential and forested areas. The northwest portion of the Study Area is under review for inclusion within the urban boundary. The area located adjacent to the northwest corner of the Subject Lands has already been cleared, grubbed and now appears to be in agricultural production. There are areas to the east of the Study Area that is heavily forested due to the presence of lower capability lands (limitations due to shallowness to bedrock). Much of the area to the west is located within the City of Ottawa's urban boundary.

The amount of idle, scrub and forested areas is significantly greater in the southern portion of the Study Area. The idle and scrublands appear to be abandoned farmlands and can result from many factors such as non-local ownership (speculatively held lands), poor soil capability, and retirement of farm operations.

Idle and scrublands, retired farm operations and a lack of recent investment in agricultural infrastructure and land improvements are indicative of agricultural areas which are in decline. These are generally considered to be lower priority agricultural areas.

The level of agricultural activity and the limited (and declining) amount of investment in agricultural infrastructure is not characteristic of a prime agricultural area. It is more characteristic of an agricultural area that is in decline due to marginal productivity of the soil and the extent of potentially conflicting non-farm land uses.

4.5.2 Subject Lands

The Subject Lands are located south of Old Montreal Road, and adjacent to the western side of Cox County Road. An equestrian operation is located on the Subject Lands. There are four non-farm residences located along the eastern boundary. Infrastructure for the equestrian operation includes outdoor riding padlocks, a barn, several outbuildings and an indoor riding stable. The maximum capacity of the farm is approximately 45 horses and manure is stored outside uncovered on a concrete slab. The fields surrounding the buildings are used for pasture and forage crop production.

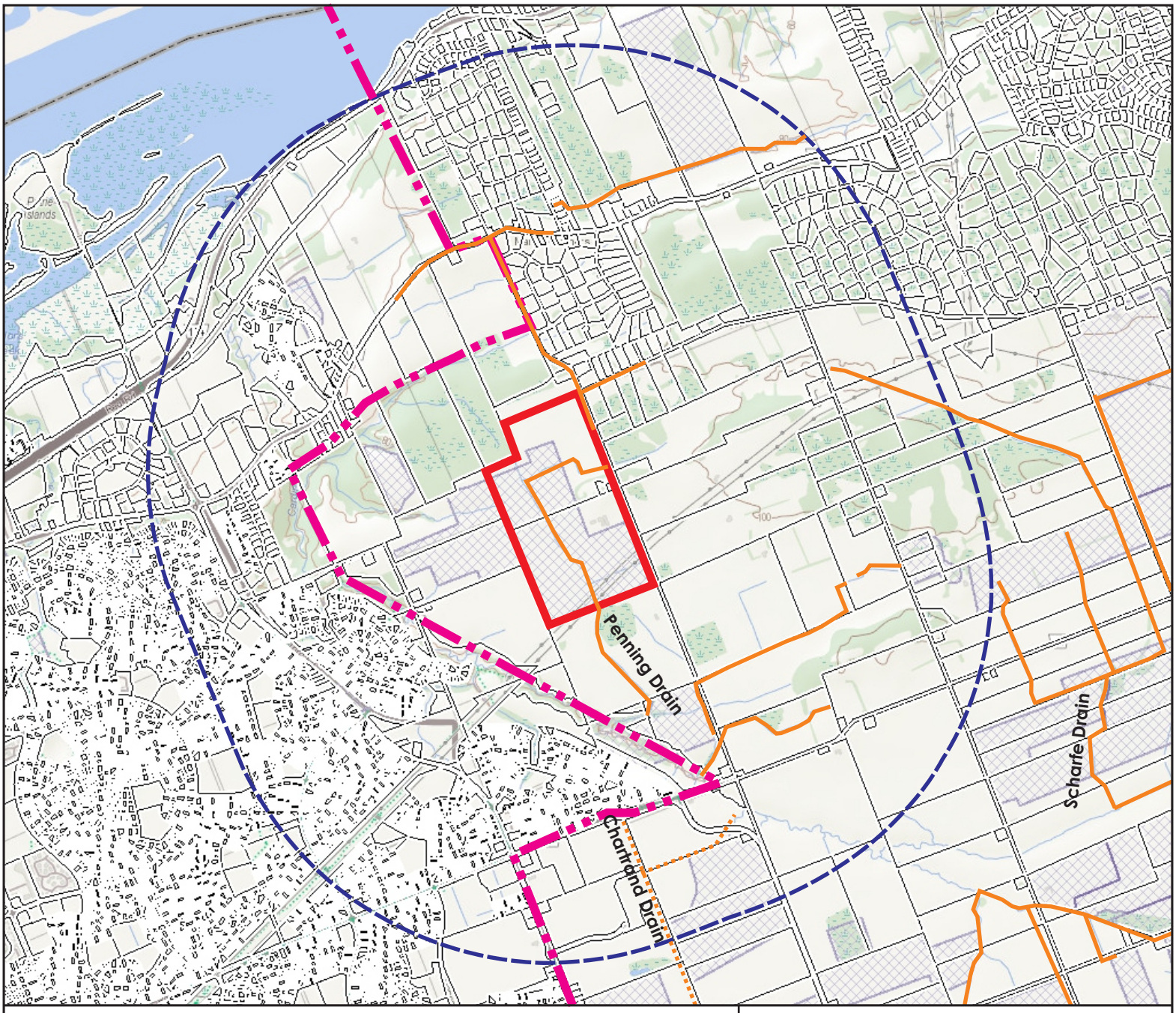
The land immediately surrounding the Subject Lands include row crops to the west and north . Forage crops and livestock operations are located to the east of the Subject Lands, and a retired hobby farm that has been converted to a bed and breakfast to the south. The urban boundary is located approximately 450m to the west and a future expansion area is located to the north west of the Subject Lands. Camelot Estates and several other non-farm residences are located to the north east of the Subject Lands.

There are two active livestock operations within close proximity of the Subject Lands (within 1km). Holsteins were observed at both operations. The northern operation has the infrastructure necessary for a dairy operation; the barn appears to be in fair-good condition. A wooden bank barn in poor condition was observed at the southern dairy operation. Two retired farm operations, two hobby farms, and a retired hobby farm were observed within 1km of the Subject Lands. The retired farm operations do not appear to be capable of housing livestock due to the structurally poor condition.

Non-farm land uses in the immediate vicinity of the Subject Lands include the bed and breakfast to the south, and the residential estate lots to the north.

4.6 Land Improvements

OMAFRA's Agricultural Information Atlas provides artificial drainage mapping for the Province. This online tool was accessed to obtain drainage mapping for the lands within the Study Area. According to this information source, the majority of the Subject Lands are systematically tile drained. There are lands tiled drained immediately to the west and it is also found on farm lands to the south. The Penning Drain, a municipal drain, passes through the Subject Lands from north to south where it drains into Cardinal Creek. Figure 6 shows the locations of tile drained lands and municipal drains within the Study Area.



Legend

- Subject Lands
- Study Area Boundary
- Urban Boundary

Agricultural Tile Drainage - System Type

- Random
- Systematic

Constructed Drain Type

- Closed/Tiled
- Open or Unknown

Figure 6

Agricultural Tile Drainage

Prepared for:

RICHCRAFT Group of Companies

Prepared by:

COLVILLE CONSULTING INC.

Date: May 2017

C16095_06

4.7 Fragmentation of Agricultural Lands

Fragmentation of agricultural lands can have a negative impact on the viability of agricultural lands and its long-term preservation for agricultural purposes. Fragmentation of farm lands generally reduces the economic viability of the area by reducing the efficiency of which lands can be farmed and increasing the operating costs for farms comprised of several small and separated parcels. Larger farm parcels can accommodate a wider range of agricultural activities and ensure long term viability of the property. Whereas, smaller farm parcels cannot offer the same flexibility and are not viable as standalone parcels. They generally cannot support a family farm without there being a second source of income (off farm) that is required to maintain the agricultural operation. Agricultural areas which have been fragmented also often have a higher occurrence of non-farm land uses which in turn means that there is a greater potential for conflict arising between farm and non-farm land uses.

Areas with relatively low levels of fragmentation are considered to be more viable economically for agriculture and they generally have fewer sources of non-farm land use conflicts. In most cases, these areas have a higher priority for protection. Generally speaking, the more fragmentation experienced in an agricultural area the lower the area's agricultural priority.

As seen in Figure 5 and 6 there has been a relatively high degree of fragmentation within the Study Area, particularly along the northern and eastern portion of the Study Area where lands have been designated General Rural. Within the Study Area, less than half of the larger parcels (35 of 78) consist of relatively large farm parcels (20 ha and greater). There are numerous (>100) of severed lots (i.e., 4 ha and smaller) which are more likely to contain potentially conflicting non-farm land uses. The close proximity of the urban boundary and the presence of large rural, estate lot subdivisions and residential development in the area reduce the agricultural priority of the lands within the Study Area.

5. LEAR ASSESSMENT

The City of Ottawa uses the recently adopted 2016 Land Evaluation and Area Review (LEAR) system to identify lands as potential Agricultural Resource Areas. Values for land parcels in the LEAR system can range from 0 to 200. Contiguous areas of agricultural land generally greater than 250 ha in size and with LEAR values of 125 or greater are identified as prime agricultural areas and designated by the City of Ottawa as Agricultural Resource Areas (ARA). The City, through Official Pan Amendment #180 has refined Schedule A and the lands designated ARA. The Subject Lands are located within the ARA designation.

The LEAR system is comprised of two main components; the land evaluation (LE) which relates to the soil's agricultural capability (i.e., the CLI Capability Classes 1-7); and the area review (AR) which, for the City of Ottawa's LEAR, relates to factors influencing agriculture such as land use, fragmentation and conflicting/non-conflicting land uses, etc.). The two components are then combined to obtain a LEAR score.

Figure 4 shows the LEAR mapping for the Study Area and is based on the 2016 LEAR map. As shown in this figure, the parcels to the south east tend to have higher LEAR scores which is indicative of a prime agricultural area. However, there is a clear difference between those parcels to the south (including the Subject Lands), and those parcels to the north and east of the Subject Lands. In general, those parcels or evaluation units (EU) in the southern half of the Study Area have higher LEAR scores than those evaluation units (EU's) in the northern half of the Study Area. This suggests that the southern portion of the Study Area has a higher agricultural priority relative to the northern half.

The Subject Lands are given two separate identification numbers. The Parcel Identification Number (PIN) for the Subject Lands is 145261928 and the LEAR Identification Numbers (LIN) is 609679.

The City's 2016 LEAR score for the Subject Lands is shown in Table 3 below. The Subject Lands have a LEAR score of 147 which exceeds the 125 threshold value for potential ARA lands.

Table 3 - LEAR Score for Subject Lands

LIN	LE Score	Fragmentation	Land Use	Non-Conflicting	AR Score	LEAR Score
609679	89	20	30	8	58	147

To determine the accuracy of the City's LEAR score, we used the refined soils/CLI information collected previously for the site in 2012 to assess the LE component. The AR component was evaluated based on the land use information collected during the site visit, which was supplemented by Schedule A in the City's OP and interpretation of aerial photography. Our evaluation confirmed the City of Ottawa's LEAR score for the Subject Lands of 147. The LEAR calculations are provided in Appendix D.

6. ASSESSMENT OF IMPACTS TO AGRICULTURE

This section of the Study addresses the potential for impacts associated with a redesignation of the lands from Agricultural Resource Area to General Rural. The PPS requires that impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands be mitigated to the extent feasible. A redesignation of the Subject Lands, in and of itself, would not necessarily have an impact on agriculture. A redesignation does not add a new or expanding non-agricultural use to the area. Agricultural uses are still considered the main use in the General Rural designation. As there are no non-farm land uses proposed at this time for the Subject Lands, there would be no direct impact to the agricultural resources and farm operations in the area.

6.1 Direct Impacts

6.1.1 Prime Agricultural Lands

A change in designation to General Rural would not cause there to be a loss of prime agricultural lands. All of the Subject Lands that are currently farmed would still be available for the cultivation of agricultural crops.

6.1.2 Infrastructure

A change in designation to General Rural would not result in the loss of any of the agricultural infrastructure on-site. A redesignation to General Rural would not preclude the use of the barn, indoor riding stable, and the associated outbuildings.

6.1.3 Land Improvements

According to the OMAFRA's Artificial Drainage Systems mapping there is systematic tile drainage on the Subject Lands. A redesignation of the lands to General Rural would not retire this investment.

6.1.4 Minimum Distance Separation

The minimum distance separation (MDS) is a tool used to determine the separation distance between livestock facilities and non-compatible land uses. It was developed to reduce the potential for conflicts arising between farm and non-farm land uses. It deals specifically with odour and does not account for noise, dust or other farm generated products which arise from normal farm practices.

The MDS I formula is applied to all farm operations that have infrastructure reasonably capable of housing livestock. The MDS II formula is used to determine the minimum distance separation for new or expanding livestock facilities from existing or approved development.

The MDS I formula is used to determine the minimum distance separation between existing livestock facilities (including empty livestock facilities) and proposed, new non-agricultural uses and proposed settlement boundary expansion areas. Section 1.1.5.9 of the Provincial Policy Statement (2014) states that "New land uses, including the creation of lots, and new or expanding livestock facilities shall comply with the minimum distance separation formulae."

Although there are no development applications proposed for the Subject Lands, we investigated whether the MDS I formula would be a constraint to any future development proposals. We applied the MDS I formula each of the livestock operations and former livestock operations with infrastructure reasonably capable of housing livestock within two kilometers of the Subject Lands. The information collected during the land use survey was input to the MDS I software developed by OMAFRA. The

factors used in the formula included information such as lot size, the type of livestock, the maximum capacity for livestock within a barn, and the type of manure system. Where information was not obtained directly from the farm operator, the most likely scenario for the farm operation (e.g., type of livestock & manure system) was used in the MDS I calculation. In some cases, building capacity was estimated based on the building dimensions as measured using aerial photography.

Figure 7 shows the MDS I requirements for development should the Subject Lands be included within the urban area. Appendix E provides an MDS I summary report for each of the farm operations identified during the land use survey. The factors used to determine the MDS I requirement are shown in each report.

There are some situations in which the MDS I formula does not apply. For example, MDS Implementation Guideline No. 12 – Existing uses that do not conform to MDS - states "MDS I is applied to new proposed development, even though there may be existing non-agricultural uses that do not conform to MDS I requirements. Where there are four, or more, existing non-farm uses closer to the subject livestock facility and in immediate proximity to the current application, MDS I will not be applied. The current application must not be located closer to the livestock that the four, or more, existing non-farm uses". In addition, the MDS I formula was not calculated for any farm operations beyond two kilometers from the Subject Lands and not subject to Guideline No. 12.

As a result, the MDS I requirements for development were calculated for two active livestock operations, three hobby farms, and two retired farm operations.

As shown in Figure 7, only a very small area in the southeast corner of the Subject Lands would be constrained by the MDS I setback.

6.1.5 Disruption to Agricultural Operations

The introduction of new, non-agricultural development in rural areas has the potential to negatively affect agricultural operations. The causes of disruption are often related to increases in traffic and instances of trespass and vandalism.

Traffic

An increase in non-farm traffic in agricultural areas can increase the potential for conflicts between the agricultural and non-agricultural community. An increase in non-agricultural vehicular traffic is often associated with the introduction of new development to an area. The Study Area already contains a significant amount of non-farm traffic due to the proximity of the urban boundary and the many rural residential dwellings in the area. The proposed redesignation of the Subject Lands to General Rural does not introduce a new land use to the area and will not cause traffic patterns to change. Therefore conflicts between agricultural and non-agricultural vehicles will not occur.

Trespass and Vandalism

Trespass and vandalism are concerns for farm operations. Damage to property and fencing, disturbance of livestock by people and/or pets, litter and bio-security concerns are all potential negative effects farmers have to deal with when adjacent an urban areas and non-farm land uses. The higher potential for disruption reduces the desirability of the Subject Lands for agricultural purposes and reduces the agricultural priority of the parcel. The Subject Lands are already close in proximity to the City of Ottawa's urban boundary and several non-farm residential developments. The potential for trespass and vandalism already exists.

Legend

- Subject Lands
- Non-farm Residence
- Retired Farm Operation
- Recreational
- E — Equestrian Operation
- Study Area
- Active Farm Operation
- Commercial
- Institutional
- D — Dairy Operation
- Urban Boundary
- Hobby Farm
- Aggregate Operation
- B — Beef Operation
- CC — Cash Crop

Minimum Distance Separation - Type B Land Use

- MDS I Setback Requirement From Structure
- MDS I Setback Requirement for Manure Storage

FIGURE 7
Minimum Distance Separation Study Area

Prepared for: RICHCRAFT Group of Companies

Prepared by: COLVILLE CONSULTING INC.

DATE: May 2017

C16095_07

However, the proposed redesignation of the Subject Lands to General Rural does not add new land uses to the area. It will not cause there to be an increase in instances of trespass and vandalism as no new land uses are proposed.

6.2 Indirect Impacts

There may be indirect impacts in the form of loss of potential investment in agricultural lands and facilities. A farmer may be more reluctant to invest significantly in lands or facilities that are located in the General Rural area. The permitted land uses in the General Rural area are less restrictive than in the Agricultural Resource Area. Limited, new, non-farm development which could potentially conflict with agricultural operations may influence a farmer's investment decisions. The General Rural area designation does not provide the long-term protections for agriculture as does the Agricultural Resource Area designation.

7. CONCLUSIONS

The Subject Lands are comprised of a 76.00 ha (187.80 acre) parcel located within the former Township of Cumberland, City of Ottawa. These lands are located within the City of Ottawa's Agricultural Resource Area. Richcraft is proposing to redesignate the Subject Lands to General Rural.

The City of Ottawa's 2016 LEAR concluded that the Subject Lands meet the requirements for inclusion within the Agricultural Resource Area designation. Our investigation confirmed that the Subject Lands have a LEAR score of 147 which exceeds the 125 threshold value for inclusion within the Agricultural Resource Area designation.

Despite the fact that the Subject Lands meet the requirements for inclusion within the Agricultural Resource Area designation, they are comprised predominantly of CLI Class 3 lands. As per the definition of prime agricultural lands in the PPS, Class 3 lands have the lowest priority for protection. The existing urban boundary and several rural residential developments are located in close proximity to the Subject Lands. Agriculture within the Study Area appears to be in decline. The land use factors reduce the agricultural priority of the Subject Lands relative to other areas both within the Study Area and other areas investigated by Colville Consulting in the City of Ottawa, such as in the Richmond Plain and Carp River Valley.

Potential impacts on agriculture related to the redesignation of the lands to General Rural are minimal. The redesignation has the potential to allow new, non-agricultural development to the area through an official plan amendment. It is recommended that an agricultural impact assessment completed for any new development application to ensure that the proposal is in compliance with the PPS and that any impacts are mitigated to the extent possible. Any new proposed development in the General Rural areas would also need to meet the MDS I requirements.

Sincerely,

Sean Colville, B.Sc., P.Ag.
Colville Consulting Inc.

Date: May 30, 2017

8. BACKGROUND INFORMATION

Agricultural Land Use Systems mapping. LRRI, Research Branch, Agriculture Canada (1979).

Canada Land Inventory. 1971. Agricultural Capability for Common Field Crops. 1:50,000 scale.

City of Ottawa Official Plan Schedule A. City of Ottawa 2017. Available online: https://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/schedule_a_en_5.pdf. Last accessed: March 22, 2017.

Corel Centre Lands Agricultural Resource Assessment, CH2M Gore and Storrie Limited, 2000;

Environment Canada. 2016. National Climate Data and Information Archive. Online: www.climate.weatheroffice.ec.gc.ca. (Last accessed March 22, 2017).

Land Evaluation and Area Review for Agriculture (LEAR), Regional Municipality of Ottawa-Carleton Planning and Development Approvals Department, Policy and Infrastructure Division, LEAR Volume 1, December, 2016

Ontario Ministry of Agriculture, Food and Rural Affairs. 2017. Minimum Distance Separation I.

Ontario Ministry of Agriculture and Food. 2003. Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario.

Ontario Ministry of Agriculture and Food. January 1991. Freeze Risk During Spring and Autumn in Ontario. Order No. 91-006.

Ontario Ministry of Agriculture and Food. October 1993. Crop Heat Units for Corn and Other Warm Season Crops in Ontario. Order No. 93-119.

Ontario Ministry of Agriculture, Food, and Rural Affairs Agriculture Information Atlas. Available Online: http://www.gisapplication.lrc.gov.on.ca/AIA/Index.html?viewer=AIA.AIA&locale=en-US. Last accessed March 22, 2017.

Ontario Ministry of Municipal Affairs and Housing. 2014. Provincial Policy Statement. MMAH: Toronto, Ontario.

The City of Ottawa Official Plan, as adopted May 2003. Available Online: (http://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official)

The Soils of the Regional Municipality of Ottawa-Carleton, Soil Survey No. 58 of the Ontario Institute of Pedology (1987);

GLOSSARY

Agricultural uses: - means the growing of crops, including nursery and horticultural crops; raising of livestock and other animals for food, or fur, including poultry and fish; aquaculture; agro-forestry; maple syrup production; and associated on-farm buildings and structures.

Agriculture-related uses: - means those farm-related commercial and farm-related industrial uses that are small scale and directly related to the farm operation and are required in close proximity to the farm operation.

Beef Farm: - a farm operation whose predominant livestock is beef cattle, including cow-calf operations.

Cash Crop: - means a crop being produced for income purposes and not to supplement a livestock operation by contributing to feed requirements.

Catena: - the group of soils that occur together on the same parent material to form a land pattern.

Cultivated: - means lands that have recently been under active agricultural production owever, the crop type could not be determined during the land use survey or through aerial photographic interpretation.

Dairy Farm: - a farm whose primary livestock is dairy cattle, including dairy heifers.

Development: - means the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act; but does not include activities that create or maintain *infrastructure* authorized under an environmental assessment process; or works subject to the Drainage Act.

Forage/Pasture: - means a crop that consists of either pasturelands, including rough grazing, or hay crops including silage and haylage.

Gleyed: – means soils that are poorly drained and exhibit greyish colours in the profile indicating that they have developed in a reduced environment (i.e., oxygen depleted) due to high water tables throughout the year.

Hobby Farm: - a farm that is not actively producing, however the farm infrastructure is being maintained for the enjoyment of the farm aesthetics.

Idle/Scrubland/Forested: - means lands that:

- have not been used for agricultural production for at least five years (estimated);
- are no longer farmed and woody species (young trees and shrubs) have begun regenerating; and
- are forested including new plantations and areas along creeks that contain mature and immature trees.

Minimum Distance Separation I Formulae: - used to determine the minimum distance separation for new development from existing livestock facilities.

Non-farm Residential: - means residential buildings and lots not associated with a farm operation but can include farm retirement lots/severances and/or other residences that are not the primary farm residence.

Prime Agricultural Areas: - means an area where *prime agricultural land* predominates. Prime agricultural areas may also be identified through an alternative agricultural land evaluation system approved by the Province.

Prime Agricultural Land: - means land that includes *specialty crop lands* and/or Canada Land Inventory Class 1, 2 and 3 soils, in this order of priority for protection.

Provincial Policy Statement: - the Provincial Policy Statement (PPS) was issued under Section 3 of the Planning Act and came into effect in May of 1996 and subsequently updated in 2005 and 2014. The PPS provides policy direction on matters of provincial interest related to land use planning and development.

Remnant: - means a location where:

- one or more farm buildings once stood and have fallen and/or been removed, or
- a farm building still remain, however it is in poor condition and not suitable for agricultural uses.

Secondary Uses: - means uses secondary to the principle use of the property, including home occupations, home industries, and uses that produce value-added agricultural products from the farm operation on the property.

Specialty Crop Lands: - means areas where specialty crops are predominantly grown, usually resulting from:

- soils that have suitability to produce specialty crops, or lands that are subject to special climatic conditions, or a combination of both; and/or
- a combination of farmers skilled in the production of specialty crops, and of capital investment in related facilities and services to produce, store or process specialty crops.

Specialty crops: include crops such as tender fruits (peaches, cherries, plums), grapes, other fruit crops, vegetable crops, greenhouse crops and crops from agriculturally developed organic soil.

Appendix A
Soil Data Sheets

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
1	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				SiC	
	B	G		25	45				C	
	B	tgj		45	60				C	
	C			60	100				C-SiCL	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

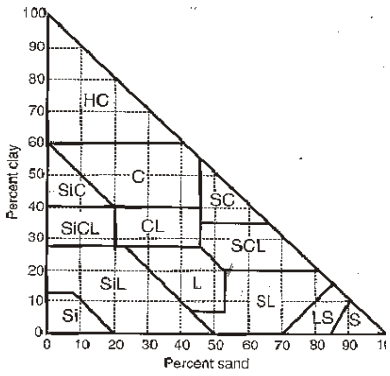
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Grey Clay - St. Rosalie (STA)



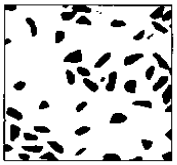
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
2	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	Ma	C	U	3	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		IM	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				C	
	B	t		25	55				C	
	C			55	100				C	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

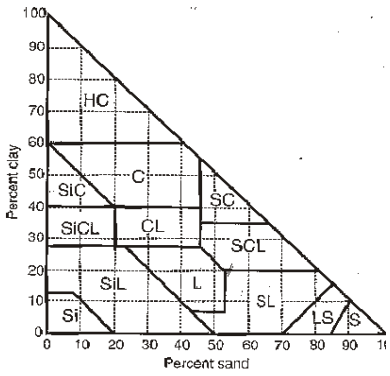
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Perhaps a BV included within the C
No reaction
Grey
Looks like clay skins in Bt



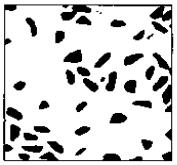
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
3	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1.5	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		IM	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	P		0	30				C	
	B	G		30	43				C	
	B	TGJ		43	65				C	
	C	GJ		65	100				SiCL	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

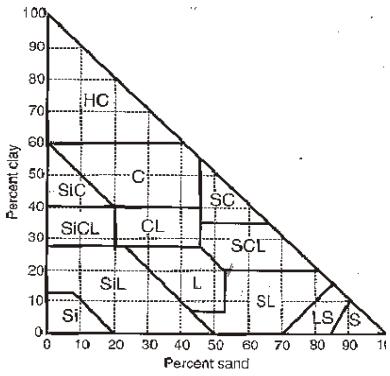
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Cold, partly sunny. It's snowing!



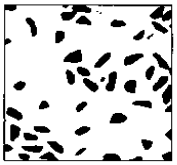
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
4	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1.5	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				C	
	B	g		20	30				C	
	B	tgj		30	70				C	
	C			70	100				C	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

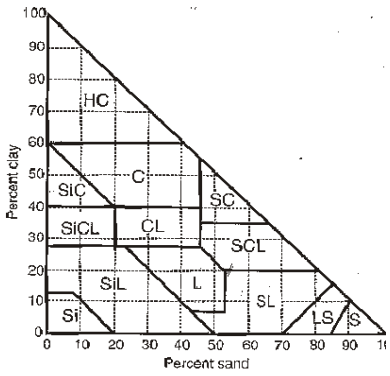
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Reddish tinge in C but still predomminatly grey could call thin stuff imperfect, greaish hues give appearance of Gley.



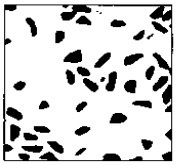
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
5	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	U	1.5	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				SiCL	
	B	g		20	45				C	
	Bt	g		45	60				C	
	C			60					C	

Mode of Deposition
- MT Morainal Till
- LA Lacustrine
- GF Glacial Fluvial
- GL Glacio Lacustrine
- AL Aluvial

Slope Class
- Aa 0-0.5%
- Bb 0.5-2.0%
- Cc 2-5%
- Dd 5-9%
- Ee 9-15%
- Ff 15-30%
- Gg 30-45%

Drainage Class
- RA Rapidly
- WE Well
- MW Mod. Well
- IM Imperfectly
- PO Poorly
- VP Very Poorly

Stoniness/Rockiness
- X Non
- 1 Slightly
- 2 Moderately
- 3 Very
- 4 Excessively
- 5 Exceedingly

Consistency
- L- Loose
- FR - Friable
- F - Firm
- VF - Very Firm

Depth to (cm):

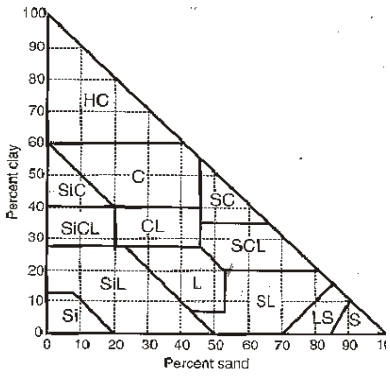
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Fine blocky structure in C
Strong



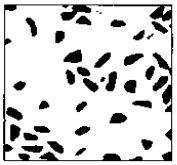
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
6	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

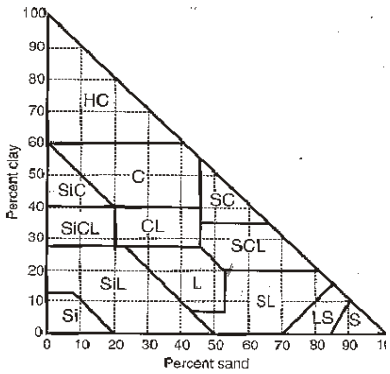
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES:



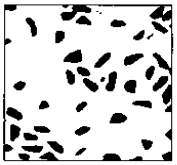
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
7	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1.5	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		MW	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				L-CL	
	B	m		25	55				CL	
	C			55	100				CL	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

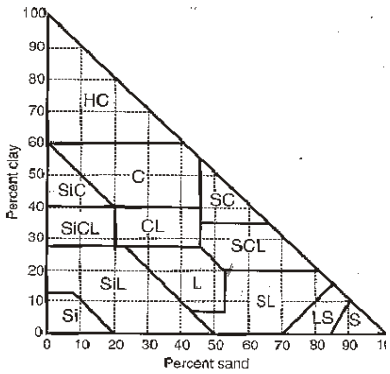
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Profile influenced by limestone ridge adjacent to site.



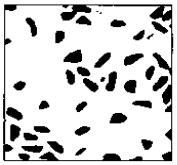
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
8	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	MT	e	C	12	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		WE	1	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	15				L	
	C	k		15	30				L-SL	
	R			30	-					

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

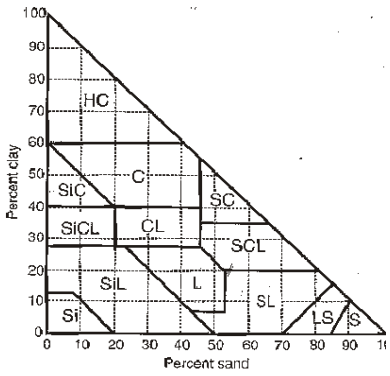
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Bedrock Ridge (or Esker) stopped by what appears to be bedrock.



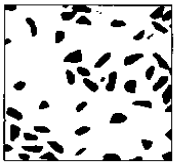
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
9	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	MT				
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

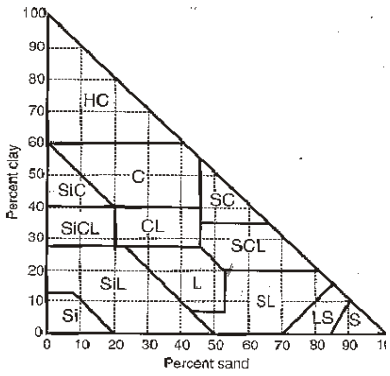
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Surface modified Bedrock at less than 50cm



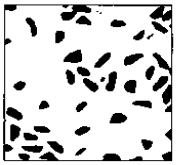
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
10	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
	MT	IM	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				SiCL	
	B	tgj		25	50				C	
	C			50	85				C	
II	C	gj		85	95				gSL	
	R			95	-					

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

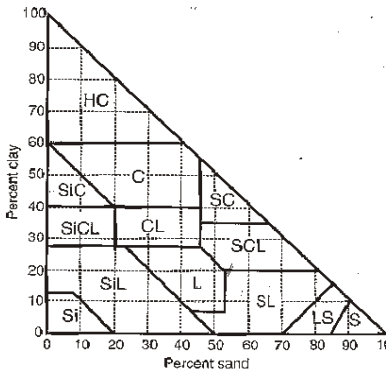
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Marine/Morainal Till/Bedrock



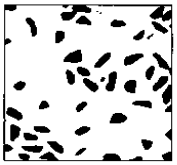
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
11	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L-	Loose
FR -	Friable
F -	Firm
VF -	Very Firm

Depth to (cm):

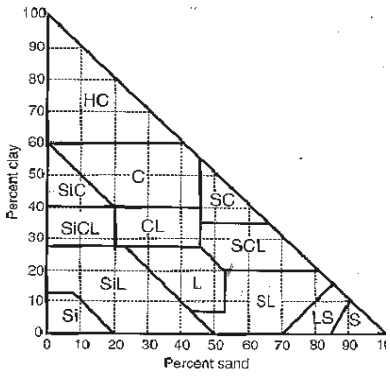
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Same as #10 but poorly drained and slightly deeper bedrock, likely just below 100cm. No Morainal Till within upper 100 cm



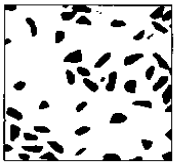
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
12	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1.5	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
	MT	IM	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				CL	
	B	tgj		20	30				CL	
II	C	kgj		30	55				gSL	
	R			55						

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

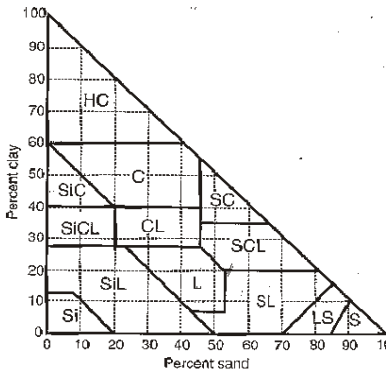
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Surface modified Bedrock at less than 50cm (Same as #9)



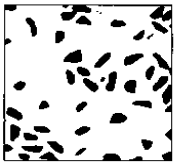
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
13	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				C	
	B	g		25	45				C	
	B	tgj		45	80				C	
	C	g		80	100				C	

Mode of Deposition		Slope Class		Drainage Class		Stoniness/Rockiness		Consistency
MT	Morainal Till	Aa	0-0.5%	RA	Rapidly	X	Non	L- Loose
LA	Lacustrine	Bb	0.5-2.0%	WE	Well	1	Slightly	FR - Friable
GF	Glacial Fluvial	Cc	2-5%	MW	Mod. Well	2	Moderately	F - Firm
GL	Glacio Lacustrine	Dd	5-9%	IM	Imperfectly	3	Very	VF - Very Firm
AL	Aluvial	Ee	9-15%	PO	Poorly	4	Excessively	
		Ff	15-30%	VP	Very Poorly	5	Exceedingly	
		Gg	30-45%					

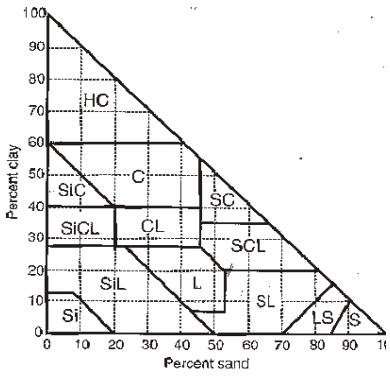
Depth to (cm):	
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Look like Gley colours.



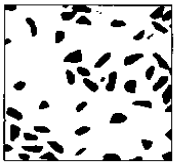
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
14	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
	MT	PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				CL	
	B	g		20	50				CL	
	C	gj		50	70				CL	
II	C	kgj		70	85				gSL-L	
	R			85						

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

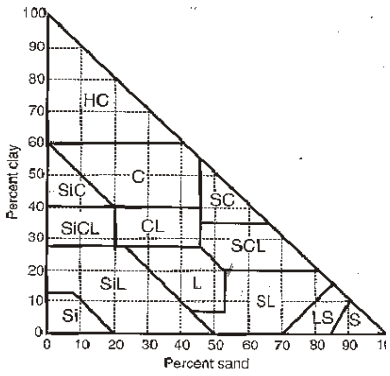
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Close to C slopes
Bedrock encountered at about 85cm



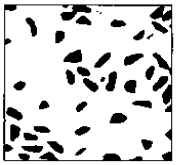
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
15	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	MT	b	M	1.5	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				L-CL	
	B	t		20	35				CL	
	C	kg		35	50				gL-SL	
	R			50						

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L-	Loose
FR -	Friable
F -	Firm
VF -	Very Firm

Depth to (cm):

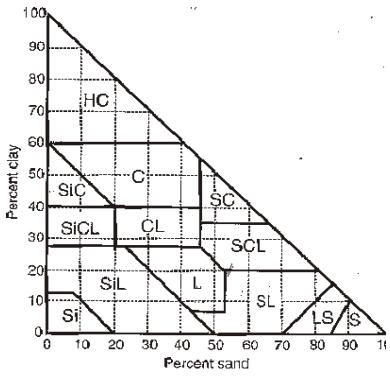
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Ckg lots of promnant mottles.



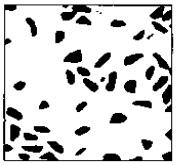
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
16	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	MT	e	M	12	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		WE	2	1	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	15				L	
	B	m		15	40				Gl	
	C	k		40	-				gSL	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

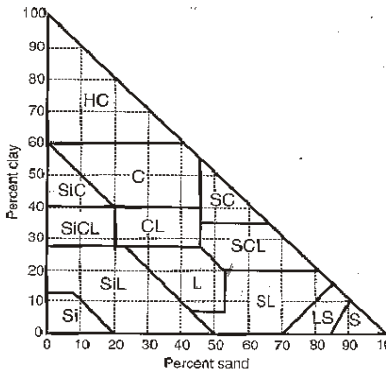
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Stopped by stones at abour 60cm
Grenville
Calcareous reation throughout profile strong inf C
Probably an eroded profile



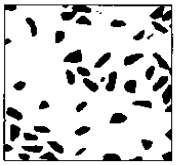
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
17	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				SiC	
	B	g		25	35				C	
	B	tgj		35	55				C	
	C			55	100				C	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

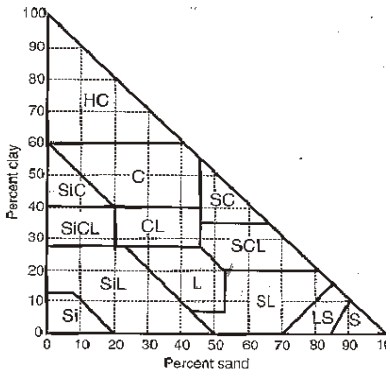
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Bearbrooke



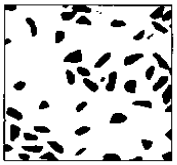
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
18	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				C	
	B	g		20	35				C	
	B	tgj		35	55				C	
	C			55	100				C	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L-	Loose
FR -	Friable
F -	Firm
VF -	Very Firm

Depth to (cm):

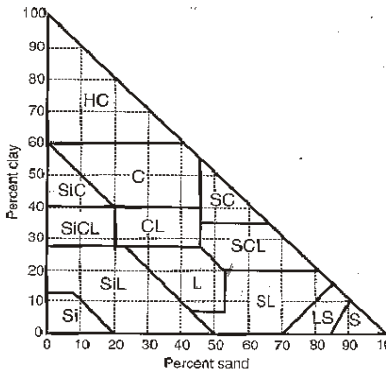
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES:



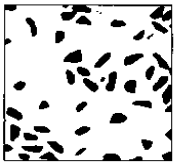
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
19	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M				
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

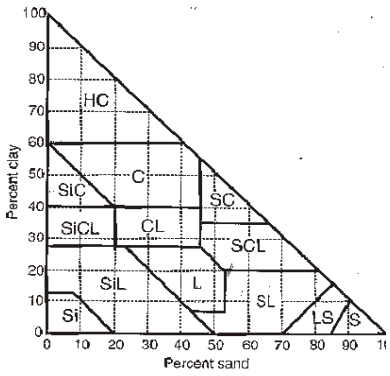
HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				C	
	B	g		25	35				C	
	B	tgj		35	50				C	
	C	gj		50	100				C	

Mode of Deposition		Slope Class		Drainage Class		Stoniness/Rockiness		Consistency
MT	Morainal Till	Aa	0-0.5%	RA	Rapidly	X	Non	L- Loose
LA	Lacustrine	Bb	0.5-2.0%	WE	Well	1	Slightly	FR - Friable
GF	Glacial Fluvial	Cc	2-5%	MW	Mod. Well	2	Moderately	F - Firm
GL	Glacio Lacustrine	Dd	5-9%	IM	Imperfectly	3	Very	VF - Very Firm
AL	Aluvial	Ee	9-15%	PO	Poorly	4	Excessively	
		Ff	15-30%	VP	Very Poorly	5	Exceedingly	
		Gg	30-45%					

Depth to (cm):		Mottles			
Bedrock		Horizon	Abun.	Size	Contrast
Constricting Layer					
Carbonates					
Gley Colours					
Water Table					

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Grey, some reddish inclusions.



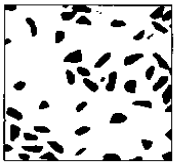
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
20	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				SiC	
	B	g		25	40				C	
	B	tg		40	55				C	
	C	g		55	100				C	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L-	Loose
FR -	Friable
F -	Firm
VF -	Very Firm

Depth to (cm):

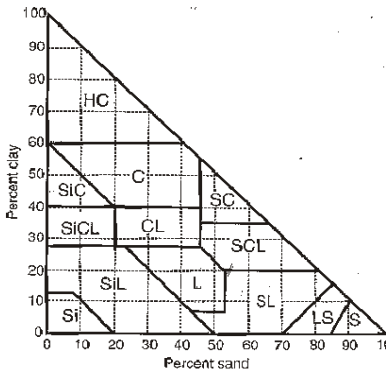
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES:



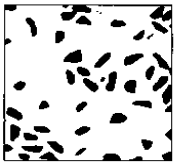
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
21	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	25				SiC	
	B	g		25	40				C	
	C	tg		40	60				C	
	C	g		60	100				C	

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

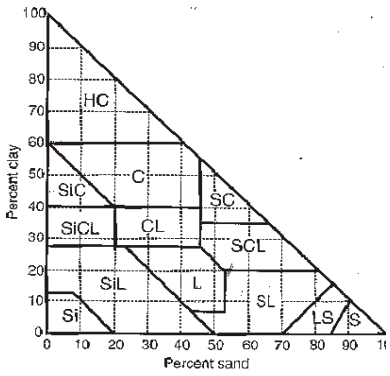
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Standing water between site #20 and #21



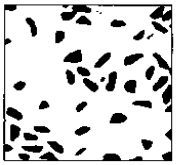
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Number:
22	12	10	12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	B	M	1	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		PO	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	30				C	
	B	g		30	45				C	
	B	tg		45	60				C	
	C	gj		60	100				C	

Mode of Deposition		Slope Class		Drainage Class		Stoniness/Rockiness		Consistency
MT	Morainal Till	Aa	0-0.5%	RA	Rapidly	X	Non	L- Loose
LA	Lacustrine	Bb	0.5-2.0%	WE	Well	1	Slightly	FR - Friable
GF	Glacial Fluvial	Cc	2-5%	MW	Mod. Well	2	Moderately	F - Firm
GL	Glacio Lacustrine	Dd	5-9%	IM	Imperfectly	3	Very	VF - Very Firm
AL	Aluvial	Ee	9-15%	PO	Poorly	4	Excessively	
		Ff	15-30%	VP	Very Poorly	5	Exceedingly	
		Gg	30-45%					

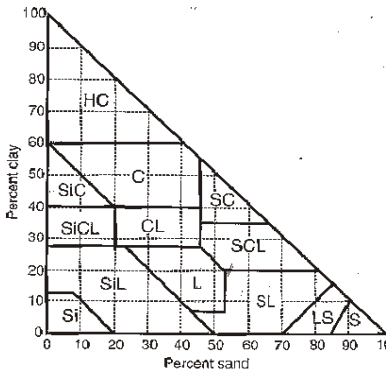
Depth to (cm):	
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES:



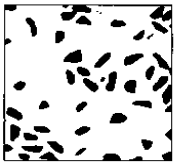
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)			Project Nu
23	12	10	12	C1

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	M	C	L	2	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		IM-MW	X	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.	
	A	p		0	25				C-CL
	B	mgj		25	45				C
	B	t		45	60				C
	C			60	100				C

Mode of Deposition		Slope Class		Drainage Class		Stoniness/Rockiness		Consistency
MT	Morainal Till	Aa	0-0.5%	RA	Rapidly	X	Non	L- Loose
LA	Lacustrine	Bb	0.5-2.0%	WE	Well	1	Slightly	FR - Friable
GF	Glacial Fluvial	Cc	2-5%	MW	Mod. Well	2	Moderately	F - Firm
GL	Glacio Lacustrine	Dd	5-9%	IM	Imperfectly	3	Very	VF - Very Fi
AL	Aluvial	Ee	9-15%	PO	Poorly	4	Excessively	
		Ff	15-30%	VP	Very Poorly	5	Exceedingly	
		Gg	30-45%					

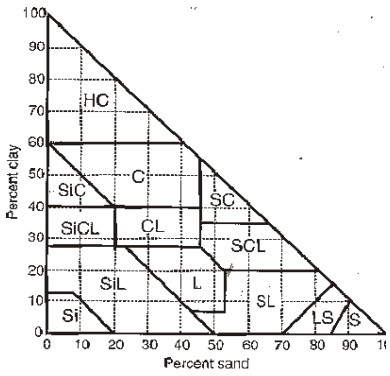
Depth to (cm):	
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES:



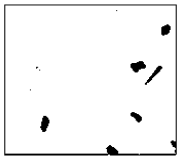
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the occupied by mottles (%) (refer to Appendix II percentage charts).

Few <2% Common 2 - 20%



Size - the diameter of the mottle if round dimension if length is not more than 2 or 3 ti the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm

SOIL DATA SHEET

Site No.	Date (DD/MM/YY)	Project Number:
24	12 10 12	C12040

Surveyor	Observation Type	Project Name
SC	A	RichCraft - Rohling

MODE OF DEPOSITION	NO. 1	SLOPE CLASS	SLOPE POSITION	SLOPE %	LENGTH
	MT	C	M	4	
	NO.2	DRAINAGE CLASS	STONINESS	ROCKINESS	
		WE	1	X	
	NO.3				

HORIZONS				DEPTH (cm)		COLOURS		%	FIELD TEXTURE	CONSISTENCY
D	Ma	Suffix	Mod.	Upper	Lower	Matrix Colours	Mottle Colours	C.F.		
	A	p		0	20				SL	
	B	m		20	35				L	
	C	k		35	55				gSL-L	
	R			55						

Mode of Deposition

MT	Morainal Till
LA	Lacustrine
GF	Glacial Fluvial
GL	Glacio Lacustrine
AL	Aluvial

Slope Class

Aa	0-0.5%
Bb	0.5-2.0%
Cc	2-5%
Dd	5-9%
Ee	9-15%
Ff	15-30%
Gg	30-45%

Drainage Class

RA	Rapidly
WE	Well
MW	Mod. Well
IM	Imperfectly
PO	Poorly
VP	Very Poorly

Stoniness/Rockiness

X	Non
1	Slightly
2	Moderately
3	Very
4	Excessively
5	Exceedingly

Consistency

L- Loose
FR - Friable
F - Firm
VF - Very Firm

Depth to (cm):

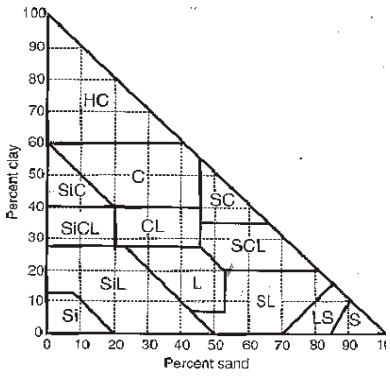
Bedrock	
Constricting Layer	
Carbonates	
Gley Colours	
Water Table	

Mottles

Horizon	Abun.	Size	Contrast

Abundance	Size	Contrast
F - Few	F - Fine	Faint
C - Common	M - Medium	Distinct
M - Many	L - Large	Prominent

NOTES: Grenville - shallow phase
Some Farmington



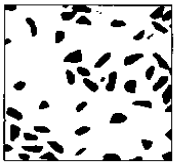
Contrast - the difference between the mottle colour and the matrix colour, using the Munsell Soil Color Charts.

	Difference from matrix in		
	Hue* pages	Value* units	Chroma* units
Faint	0	≤2	≤1
	1	0	0
Distinct	0	3 - 4	2 - 4
	1	≤2	≤1
Prominent	0	≥4	≥4
	1	≥2	≥1
	2+	≥0	≥0

*Hue, Value, and Chroma differences are determined using the Munsell Soil Color Charts (see page 25) e.g. common, fine, distinct brown (10YR 5/3) mottles. Values in the table are taken from 1982 CanSIS manual for describing soils in the field.

Abundance - the proportion of the exposed surface occupied by mottles (%) (refer to Appendix II for additional area percentage charts).

Few <2% Common 2 - 20% Many >20%



Size - the diameter of the mottle if round, or, the greatest dimension if length is not more than 2 or 3 times the width, or, the width if the mottle is long and narrow.

Fine <5mm Medium 5 - 15mm Coarse >15mm

APPENDIX B

Canada Land Inventory
Agricultural Soil Capability

Canada Land Inventory Soil Capability Classification for Agriculture

The Canada Land Inventory (CLI) classification system was developed to classifying soil capability for agricultural use for use across Canada. CLI is an interpretative system which assesses the effects of climate and soil characteristics on the limitations of land for growing common field crops. It classifies soils into one of seven capability classes based on the severity of their inherent limitations to field crop production. Soils descend in quality from Class 1, which is highest, to Class 7 soils which have no agricultural capability for the common field crops. Class 1 soils have no significant limitations. Class 2 through 7 soils have one or more significant limitations, and each of these are denoted by a capability subclass.

In Ontario the document, "Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario" (OMAFRA, 2008) provides a Provincial interpretation of the CLI classification system. These guidelines are based on the "Canada Land Inventory, Soil Capability Classification for Agriculture" (ARDA Report No. 2, 1965) and have been modified for use in Ontario. In Ontario, CLI Classes 1 to 4 lands are generally considered to be arable lands and Classes 1 to 3 soils and specialty crop lands are considered to be prime agricultural lands.

The following definitions were taken from Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application of the Canada Land Inventory in Ontario (2008).

Definitions of the Capability Classes

Class 1 *- Soils in this class have no significant limitations in use for crops.* Soils in Class 1 are level to nearly level, deep, well to imperfectly drained and have good nutrient and water holding capacity. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for the full range of common field crops

Class 2 *- Soils in this class have moderate limitations that reduce the choice of crops, or require moderate conservation practices.* These soils are deep and may not hold moisture and nutrients as well as Class 1 soils. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a wide range of common field crops.

Class 3 *- Soils in this class have moderately severe limitations that reduce the choice of crops or require special conservation practices.* The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. Under good management these soils are fair to moderately high in productivity for a wide range of common field crops.

Class 4 *- Soils in this class have severe limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both.* The severe limitations seriously affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. These soils are low to medium in productivity for a narrow to wide range of common field crops, but may have higher productivity for a specially adapted crop.

Class 5 *- Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible.* The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants and may be improved through the use of farm machinery. Feasible improvement practices may include clearing of bush, cultivation, seeding, fertilizing or water control.

Class 6 *- Soils in this class are unsuited for cultivation, but are capable of use for unimproved permanent pasture.* These soils may provide some sustained grazing for farm animals, but the limitations are so severe that improvement through the use of farm machinery is impractical. The terrain may be unsuitable for the use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.

Class 7 *- Soils in this class have no capability for arable culture or permanent pasture.* This class includes marsh, rockland and soil on very steep slopes.

Definitions of the Capability Subclasses

Capability Subclasses indicate the kinds of limitations present for agricultural use. Thirteen Subclasses were described in CLI Report No. 2. Eleven of these Subclasses have been adapted to Ontario soils.

Subclass Definitions:

Subclass C - Adverse climate: This subclass denotes a significant adverse climate for crop production as compared to the "median" climate which is defined as one with sufficiently high growing-season temperatures to bring common field crops to maturity, and with sufficient precipitation to permit crops to be grown each year on the same land without a serious risk of partial or total crop failures. In Ontario this subclass is applied to land averaging less than 2300 Crop Heat Units.

Subclass D - Undesirable soil structure and/or low permeability*:* This subclass is used for soils which are difficult to till, or which absorb or release water very slowly, or in which the depth of rooting zone is restricted by conditions other than a high water table or consolidated bedrock. In Ontario this subclass is based on the existence of critical clay contents in the upper soil profile.

Subclass E - Erosion*:* Loss of topsoil and subsoil by erosion has reduced productivity and may in some cases cause difficulties in farming the land e.g. land with gullies.

Subclass F - Low natural fertility*:* This subclass is made up of soils having low fertility that is either correctable with careful management in the use of fertilizers and soil amendments or is difficult to correct in a feasible way. The limitation may be due to a lack of available plant nutrients, high acidity, low exchange capacity, or presence of toxic compounds.

Subclass I - Inundation by streams or lakes: Flooding by streams and lakes causes crop damage or restricts agricultural use.

Subclass M – Moisture deficiency: Soils in this subclass have lower moisture holding capacities and are more prone to droughtiness.

Subclass P - Stoniness: This subclass indicates soils sufficiently stony to hinder tillage, planting, and harvesting operations.

Subclass R - Shallowness to Consolidated Bedrock

This subclass is applied to soils where the depth of the rooting zone is restricted by consolidated bedrock. Consolidated bedrock, if it occurs within 100 cm of the surface, reduces available water holding capacity and rooting depth. Where physical soil data were available, the water retention model of McBride and Mackintosh was used to assist in developing the subclass criteria.

Subclass S - Adverse soil characteristics: This subclass denotes a combination of limitations of equal severity. In Ontario it has often been used to denote a combination of F and M when these are present with a third limitation such as T, E or P.

Subclass T - Topography

The steepness of the surface slope and the pattern or frequency of slopes in different directions are considered topographic limitations if they: 1) increase the cost of farming the land over that of level or less sloping land; 2) decrease the uniformity of growth and maturity of crops; and 3) increase the potential of water and tillage erosion.

Subclass W - Excess water:

The presence of excess soil moisture, other than that brought about by inundation, is a limitation to field crop agriculture. Excess water may result from inadequate soil drainage, a high water table, seepage or runoff from surrounding areas.

Appendix C
Land Use Survey Notes

Appendix C Land Use Survey Notes – AG & Rohling		
Site No.	**Type of Operation**	**Description of Operation**
1	Commercial	The property is proposed to be developed by Richcraft and they have a satellite office on site. The office was vacant at the time of the Land Use Survey.
2	Commercial	The property is used for municipal storage of materials and equipment.
3	Livestock Operation	The property is a large sized dairy operation. The infrastructure includes 3 concrete capped silos, a concrete silo with an auger for feed, two steel feed bins, and a milk parlour.
4	Remnant Farm	There is no residential building associated with the run down barn on site. The barn is in very poor condition and is likely a remnant farm.
5	Commercial	The property is a commercial aggregate operation (Prebbel) including, grounds maintenance, design and landscape residential properties, and snow and ice management.
6	Hobby Farm	The property is a small hobby farm, likely for goats.
7	Remnant Farm	There is no residential building associated with the run down barn on site. The barn is in very poor condition and is likely a remnant farm.
8	Remnant Farm	All the barns on the property are in poor condition and the residential building has been abandoned.
9	Hobby Farm	"Proulx Farm" – the owners are FAO members. The farm has a range of events and activities including: a sugar bush, berry picking, and sleigh rides.
10	Hobby Farm	The property is a small hobby farm with padlocks and a small barn with about six stalls to house horses.
11	Commercial	The property is the sugar bush associated with the "Proulx Farm" (#13)
12	Retired Farm Operation	The property is likely a former horse farm. A small barn with a small number of stables was observed, though the property is currently a bed and breakfast (Cox Family).
13	Livestock Operation	The property is a livestock operation. Dairy cows were observed but does not appear to be a dairy farm (does not have the required infrastructure). The cows may be dry cows from the Moners Farm (#18)
14	Farm Operation (Former Livestock)	The property is a former livestock operation; a large bank barn and medium to small concrete capped silo were observed. No livestock were observed, and the property is currently used for cash crop (corn) production.

15	Livestock Operation	The property is a Holstein dairy operation (Moners Farm). A new style dairy barn, with two concrete capped silos, a few outbuildings, three coveralls, and farm implements were observed.
16	Livestock Operation (Subject Lands)	The property is currently an equestrian operation, and the owner is an OFA member. Infrastructure includes outdoor riding padlocks, a few outbuildings and an indoor riding stable. The maximum capacity of the farm is approximately 45 horses and manure is stored outside uncovered on a concrete slab.
17	Farm Operation (Former Livestock)	The property has a an old bank barn, concrete capped silo in fair condition, an implement shed, manure is stored outside though no evidence of current livestock operation. The current use of the surrounding fields is likely for cash crop production.
18	Farm Operation	The property is a small farm operation; a small bank barn, concrete silo, field shelters, and a few Holsteins were observed on site. There does not appear to be the infrastructure necessary for an active dairy operation.
19	Hobby Farm	The property may be a hobby farm; there is high fencing and a barn capable of housing a few horses.
20	Hobby Farm	The property is a small hobby farm, three (3) horses were observed in the padlock. The property is also a dog grooming company "Country Clips Dog Grooming".
21	Recreational	The property is associated with the Camelot Golf and Country Club, the building on site is as a maintenance shed.
22	Farm Operation	The property is a beef operation. There is an old barn, small beef feedlot, implement shed and a barn for round bales located on the property.
23	Retired Farm Operation	The buildings located on the property are in very poor condition, barely standing.
24	Retired Farm Operation	A steel barn of unknown condition, likely part of the remnant farm (#22) was observed at a distance.
25	Commercial	The property is an outdoor storage facility for boats.
26	Commercial	The property is the location of a nursery and landscaping operation. Soil piles and saplings were observed on site.
27	Institutional	The property is the location of the "Capital City Church".

Appendix D
LEAR Calculations

2016 LEAR Score LIN 609679

Land Evaluation Scoring				Area Review Score							LEAR Score
CLI Rating	**Points**	**% on property**	**Score**	**Fragmentation (F)**		**Land Use (L)**		**Non-Conflicting (NC)Land Uses**		**AR Score**	
1	10	0	0	Parcel Size	Points	% Parcel in Agricultural Use	Points	% Non-Conflicting Uses within 500m	Points	58	**=LE Score + AR Score**
2	8	0	0	>36.4	**10**	85-100%	**10**	100%	10		
3	6.5	89	80.99	20.2-36.4	9	70-<85%	9	**85-99%**	**8**		
4	5.5	3	2.31	10.1-20.2	6	55-<70%	8	50-<85%	4		
5	5	7	4.9	4.5-10.1	4	40-<55%	7	0-<50%	0		
6	4	1	0.56	<4.5	1	25-<40%	4	**8**	Weight x1		
7	0	0	0	Weight	x2	10-<25%	2				
LE Score			**89**	Score	**20**	0-<10%	1				
						Weight	x3				
						Score	**30**	***TOTAL LEAR SCORE***			**147**

Appendix E
Minimum Distance Separation (MDS I)
Summary Reports

Minimum Distance Separation I

C16095

Prepared By: Brett Espensen, Environmental Technician, Colville Consulting Inc

Description: Rohling MDS Calculation

Application Date: Wednesday, March 22, 2017

Municipal File Number:

Proposed Application: Other Type B land use
Type B Land Use

Applicant Contact Information
Not Specified

Location of Subject Lands
District of Algoma

Roll Number:

Calculation Name: ***Farm #10***

Description: Farm #10

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 10, Lot: B
Roll Number: 0614

Total Lot Size: 1.9 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Solid	Horses, Medium-framed, mature; 227 - 680 kg (including unweaned offspring)	6	6.0	139 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: No storage required (manure is stored for less than 14 days)

Design Capacity (NU): 6.0

Potential Design Capacity (NU): 6.0

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**153.33**	**X**	**0.7**	**X**	**2.2**	**=**	**165 m (542 ft)**	**TBD**

Storage Base Distance 'S'
(minimum distance from manure storage)
No storage present

Calculation Name: ***Farm #12***

Description: Farm #12

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 8, Lot: B
Roll Number: 0614

Total Lot Size: 40.71 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Solid	Horses, Medium-framed, mature; 227 - 680 kg (including unweaned offspring) [Livestock barn is currently unoccupied]	10	10.0	232 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: V3. Solid, outside, no cover, >= 30% DM

Design Capacity (NU): 10.0

Potential Design Capacity (NU): 20.0

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**199.99**	**X**	**0.7**	**X**	**2.2**	**=**	**216 m (707 ft)**	**TBD**

Storage Base Distance 'S' (minimum distance from manure storage)	(actual distance from manure storage)
216 m (707 ft)	**TBD**

Calculation Name: ***Farm #13***

Description: Farm #13

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 7, Lot: B
Roll Number: 0614

Total Lot Size: 41 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Solid	Dairy, Milking-age Cows (dry or milking) Medium Frame (455 - 545 kg) (eg. Guernseys), Bedded Pack	26	30.6	362 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: V4. Solid, outside, no cover, 18-30% DM, with covered liquid runoff storage

Design Capacity (NU): 30.6

Potential Design Capacity (NU): 91.8

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**308.39**	**X**	**0.7**	**X**	**2.2**	**=**	**332 m (1091 ft)**	**TBD**

Storage Base Distance 'S' (minimum distance from manure storage)	(actual distance from manure storage)
332 m (1091 ft)	**TBD**

Calculation Name: ***Farm #15***
Description: Farm #15

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 7, Lot: C
Roll Number: 0614
Total Lot Size: 36.6 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Liquid	Dairy, Heifers Large Frame (182 - 545 kg) (eg. Holsteins), Pack Scrape 1 Side	74	37.0	687 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: M2. Liquid, outside, roof, but with open sides
Design Capacity (NU): 37.0
Potential Design Capacity (NU): 111.0

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**327.49**	**X**	**0.8**	**X**	**2.2**	**=**	**403 m (1324 ft)**	**TBD**

Storage Base Distance 'S' (minimum distance from manure storage)	(actual distance from manure storage)
463 m (1519 ft)	**TBD**

Calculation Name: ***Farm #17***
Description: Farm #17

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 8, Lot: C
Roll Number: 0614
Total Lot Size: 17.25 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Solid	Beef, Cows, including calves to weaning (all breeds), Confinement	40	40.0	372 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: V3. Solid, outside, no cover, >= 30% DM
Design Capacity (NU): 40.0
Potential Design Capacity (NU): 80.0

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**297.87**	**X**	**0.7**	**X**	**2.2**	**=**	**321 m (1053 ft)**	**TBD**

Storage Base Distance 'S' (minimum distance from manure storage): **321 m (1053 ft)** (actual distance from manure storage): **TBD**

Calculation Name: ***Farm #20***
Description: Farm #20

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 7, Lot: D
Roll Number: 0614
Total Lot Size: 3.75 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Solid	Horses, Medium-framed, mature; 227 - 680 kg (including unweaned offspring)	3	3.0	70 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: No storage required (manure is stored for less than 14 days)
Design Capacity (NU): 3.0
Potential Design Capacity (NU): 3.0

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**150**	**X**	**0.7**	**X**	**2.2**	**=**	**162 m (531 ft)**	**TBD**

Storage Base Distance 'S' (minimum distance from manure storage): **No storage present**

Calculation Name: ***Farm #9***
Description: Farm#9

Farm Contact Information
Not Specified

Location of existing livestock facility or anaerobic digester
City of Ottawa
CUMBERLAND, Concession: 6, Lot: A
Roll Number: 0614
Total Lot Size: 38.17 ha

The barn area is an estimate only and is intended to provide users with an indication of whether the number of livestock entered is reasonable.

Manure Type	Type of Livestock/Manure	Existing Maximum Number	Existing Maximum Number (NU)	Estimated Livestock Barn Area
Solid	Horses, Medium-framed, mature; 227 - 680 kg (including unweaned offspring)	11	11.0	255 m²

The livestock/manure information has not been confirmed with the property owner and/or farm operator.

Existing Manure Storage: V1. Solid, inside, bedded pack

Design Capacity (NU): 11.0

Potential Design Capacity (NU): 22.0

Factor A (Odour Potential)		Factor B (Size)		Factor D (Manure Type)		Factor E (Encroaching Land Use)		Building Base Distance F' (minimum distance from livestock barn)	(actual distance from livestock barn)
0.7	**X**	**204**	**X**	**0.7**	**X**	**2.2**	**=**	**220 m (721 ft)**	**TBD**

Storage Base Distance 'S' (minimum distance from manure storage)	(actual distance from manure storage)
220 m (721 ft)	**TBD**

Preparer Information

Brett Espensen
Environmental Technician
Colville Consulting Inc
404 Queenston Street
St Catharines, ON, Canada L2P 2Y2
Phone #1: 905-935-2161
Fax: 905-935-0397
Email: brett@colvilleconsultinginc.com

Signature of Preparer:  Date: April 12, 2017

Brett Espensen, Environmental Technician