Environmental Impact Statement - Richmond Village Development Corporation: Laffin and Green Lands

June 24, 2020

Submitted To:

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TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

List of Acronyms and Abbreviations

ANSI – Areas of Natural or Scientific Interest
cm – centimetres
DBH – Diameter at Breast Height
DFO – Department of Fisheries and Oceans (Fisheries and Oceans Canada)
ECCC – Environment and Climate Change Canada
e.g. – *exempli gratia*

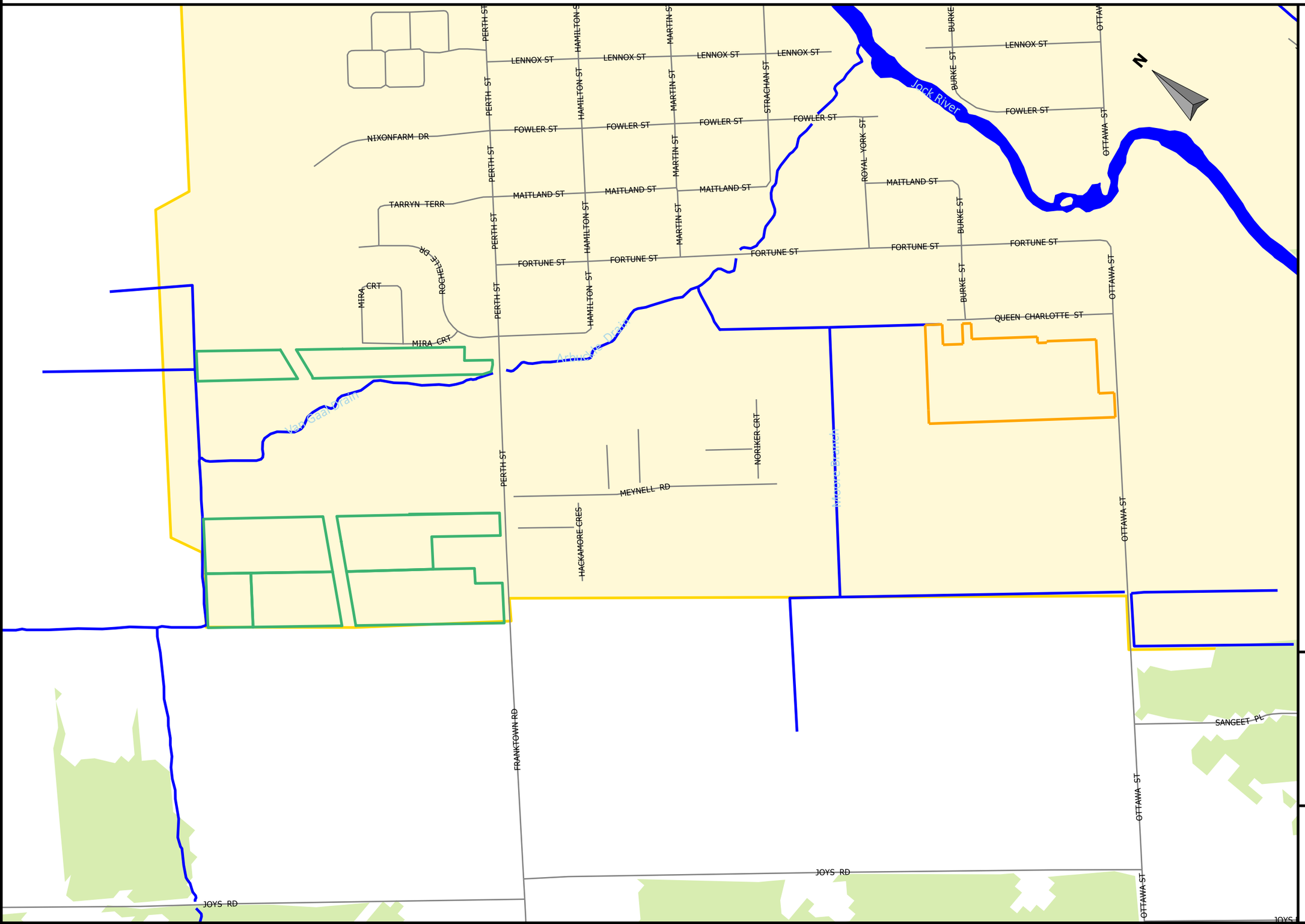
EIS – Environmental Impact Statement
ELC – Ecological Land Classification
ESA – *Endangered Species Act*
FWCA – *Fish and Wildlife Conservation Act*
i.e. – *id est*
ha - hectare
KAL – Kilgour & Associates Ltd.
km – kilometre
LIO – Land Information Ontario
m – metre
MBCA – *Migratory Birds Convention Act*
MECP – Ministry of Environment, Conservation and Parks
MNRF – Ministry of Natural Resources and Forestry
NESS – Natural Environmental System Strategy
NHIC – Natural Heritage Information Centre
OBBA – Ontario Breeding Bird Atlas
OMAFRA – Ontario Ministry of Agriculture, Food, and Rural Affairs
OP – Official Plan
ORAA – Ontario Reptile and Amphibian Atlas
PPS – Provincial Policy Statement
PSW – Provincially Significant Wetland
RNA – Rural Natural Area
ROW – Right-of-Way
RVCA – Rideau Valley Conservation Authority
RVDC - Richmond Village Development Corporation
SAR – Species at risk
SARA – *Species at Risk Act*
SARO – Species at Risk in Ontario
St. – Street
TCR – Tree Conservation Report
UNA – Urban Natural Areas
WDL – Western Development Lands

1.0 INTRODUCTION

This report is an Environmental Impact Statement (EIS) prepared by Kilgour & Associates Ltd. (KAL; Appendix A) on behalf of Richmond Village Development Corporation (RVDC) in support of their proposed residential developments in the Village of Richmond in Ottawa, Ontario. The proposed residential developments will be an extension of their Fox Run community and will be constructed within three areas adjacent to the east, west and south sides of the existing development. Two of the development areas, collectively referred to as the "Green Lands" sites, occur north of Perth St., and consist of 6409 Perth St. and 6363 Perth St. to the west Phase 2, and 6295 Perth St. to the east of Phase 2. The third development area, referred to as the "Laffin Lands" site, is located 340 metres (m) southeast of Phase 1 of Fox Run at 6305 Ottawa St. (Figure 1). The Green Lands sites collectively cover 17.8 hectares (ha); the Laffin Lands site is 7.2 ha. All areas proposed for development here are zoned DR – Development Reserve (City of Ottawa, 2020).

In the City of Ottawa (hereafter referred to as "the City"), an EIS is required when development or site alteration is proposed in or adjacent to natural heritage features (City of Ottawa, 2015a). The purposes of an EIS are to 1) identify natural heritage features on or adjacent to the site, 2) identify potential impacts of the proposed development to those features, and 3) identify mitigation measures to minimize or eliminate those impacts. The City requested an EIS for the proposed development at a pre-consultation meeting (City Reference #: PC2020-0062) on Friday, March 13, 2020 (Appendix B). The EIS must indicate the requirement for a 30 m setback for the watercourses present adjacent to the Green Lands parcels. The EIS must also include a Tree Conservation Report (TCR).

Figure 1. Site Context



Legend

Properties

- Green Lands
- Laffin Lands

OP Schedule L: Natural Heritage System Overlay

Village of Richmond

Existing Channels

0 200 m

Print Date: June 18, 2020

Project File: CAIV1015

Projection: MTM Zone 9 (NAD 83)

Produced by: AF

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2.0 ENVIRONMENTAL POLICY CONTEXT

Natural heritage policies and legislation relevant to this EIS are outlined below.

2.1 The Provincial Policy Statement, 2020

The Provincial Policy Statement (PPS; 2020) was issued under Section 3 of the Planning Act (1990). The current PPS came into effect on May 1, 2020. Natural features are afforded protections under Section 2.1 of the PPS. Protections may include maintenance, restoration, and improved function of diversity, connectivity, ecological function, and biodiversity of natural heritage systems. These protections restrict development and site alteration in significant natural areas (e.g. woodlands, wetlands, wildlife habitat) unless it can be demonstrated that there will be no negative effects on the features and ecological functions of those natural areas. Technical guidance for implementing the natural heritage policies of the PPS is found within the second edition of the *Manual for Natural Heritage Policies of the Provincial Policy Statement* (Ministry of Natural Resources and Forestry (MNRF), 2010). This manual recommends the approach and technical criteria for protecting natural heritage features and areas in Ontario.

2.2 City of Ottawa Official Plan

The City of Ottawa Official Plan (OP) provides direction for future growth in the City of Ottawa and is a policy framework to guide physical development to 2031. The OP was first approved in 2003 and is updated every five years. The most recent update was approved by City council in 2013.

2.3 *Species at Risk Act*, 2002

The federal *Species at Risk Act* (SARA, 2002) is administered by Environment and Climate Change Canada (ECCC) and provides direction to protect and ensure the survival of wildlife species in Canada. The purpose of SARA is to prevent populations of wildlife from becoming Extirpated, Endangered, or Threatened, provide recovery Endangered or Threatened species, and to manage other species to prevent them from becoming Endangered or Threatened.

All species listed on Schedule 1 of SARA are afforded protection on federal lands. Aquatic species and species of migratory birds protected by the *Migratory Birds Convention Act* (1994) and listed as Endangered, Threatened, or Extirpated under Schedule 1 of SARA are protected wherever they occur in Canada, regardless of land ownership.

2.4 *Endangered Species Act*, 2007

The provincial *Endangered Species Act* (ESA, 2007) is administered by the Ministry of Environment, Conservation, and Parks (MECP) and provides protection for species at risk (SAR) and their habitat. The Act prohibits killing, harming, harassing, possessing, transporting, buying, or selling Extirpated, Endangered, and Threatened species. Species listed as Endangered, Threatened, or Extirpated and their habitats (e.g. areas essential for breeding, rearing, feeding, hibernation, and migration) are automatically afforded legal protection under the ESA.

2.5 *Fisheries Act*, 1985

The federal *Fisheries Act* (1985) is administered by Fisheries and Oceans Canada (DFO) and provides protections to fish, fish habitat, and fisheries. Specifically, the *Fisheries Act* provides:

- Protection for all fish and fish habitat
- Prohibition against the "harmful alteration, disruption or destruction of fish habitat"
- Prohibition against causing "the death of fish by means other than fishing"

Projects that with a scope that does not fall within DFO defined standards and codes of practice require submission of a request for review to DFO.

2.6 *Migratory Birds Convention Act*, 1994

The *Migratory Birds Convention Act* (MBCA) is legislation administered by ECCC that provides protection for migratory birds listed in the Act. The disturbance, destruction, take and killing of migratory birds, their eggs, and their nests are prohibited in the Act. The “incidental take” and work that would result in the destruction of active nests or the wounding or killing of bird species protected under the MBCA and/or associated regulations (e.g. SARA) is prohibited.

2.7 *Fish and Wildlife Conservation Act*, 1997

The provincial *Fish and Wildlife Conservation Act* (FWCA; 1997) governs the hunting and trapping of a variety of wildlife including mammals, birds, reptiles, amphibians, and fish in Ontario, thereby facilitating the protection of wildlife and their habitat. The FWCA outlines the prohibition of hunting or trapping specially protected species and the requirement for provincially issued licenses for the hunting or trapping of “fur-bearing” or “game” animals.

2.8 *Conservation Authorities Act*, 1990

Conservation Authorities were created to address erosion, flooding, and drought concerns regionally by managing at the watershed level. Conservation Authorities were given the ability to regulate under Section 28 of the *Conservation Authorities Act*. The Act provides mechanisms to regulate works and site alterations that have a potential to affect erosion, flooding, land conservation, and alterations to waterbodies within their jurisdiction. It is the obligation of all Conservation Authorities to implement Ontario Regulations 42/06 and 146/06 to 182/06 *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

3.0 METHODS

3.1 Desktop and Background Data Review

3.1.1 Agency Consultation

The Green and Laffin Lands are located within the jurisdictions of MECP Kemptville district and the Rideau Valley Conservation Authority (RVCA). A request for confirmation of potential SAR and their habitat related to the Green and Laffin Lands and the adjacent land parcels was submitted to the MECP on May 20, 2020 (Appendix B). A response has not yet been received.

No request for information was submitted to RVCA for this specific project as the adjacent water feature to the area (the Van Gaal Municipal Drain) is currently subject to a significant realignment project. The realignment was specifically designed and planned as part of the community development plan for the broader area and was reviewed and approved by RVCA and DFO (Appendix C). DFO was not consulted for the same reason.

3.1.2 Records Review

The description of the existing natural environment is partially based on a desktop review of previously completed studies and information available on publicly accessible databases, including:

- Mattamy Richmond Lands: Natural Environment and Impact Assessment Study (KAL, Parish Geomorphic & Mattamy Homes, 2010)
- Urban Natural Areas Environmental Evaluation Study (Muncaster Environmental Planning Inc., 2005; 2006)

On-line databases queried for SAR, provincially rare species, and natural heritage features included the following:

- DFO SAR Mapping (DFO, 2020)
- Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) Drainage Classification Mapping (OMAFRA, 2020)
- Ontario MNRF
    - Natural Heritage Information Centre (NHIC: MNRF, 2020a)
    - Land Information Ontario (LIO) Provincially Tracked Species Grid Detail (MNRF, 2020b)
    - Species at Risk in Ontario (SARO) List (MNRF, 2020c)
- SARA, Schedule 1 (Government of Canada, 2020)
- Ontario Breeding Bird Atlas (OBBA; Cadman et al., 2007; Ontario Nature 2020a))

- Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature, 2020b)
- Atlas of the Mammals of Ontario (AMO; Dobbyn, 1994)
- RVCA Mapping Geoportal (RVCA, 2020)
- City of Ottawa
    - Official Plan Schedules (City of Ottawa ,2013)
    - geoOttawa Mapping database (City of Ottawa, 2020)

3.2 Field Surveys

The following field surveys were undertaken to support this report.

3.2.1 Vegetation

KAL Biologists Nicholas Schulz and Katherine Black completed a tree inventory and confirmed the ecological land classification (ELC) of the Green and Laffin Lands parcels on June 12, 2020. The ELC for the area had initially been completed in 2010 (KAL, Parish Geomorphic & Mattamy Homes, 2010) with each community identified and mapped in the field using the standard Ecological Land Classification (ELC) methods for Ontario (Lee et al., 1998). This method results in a standardized description of each vegetation community, giving information on vegetation type and soils. During the site visit on June 12, 2020, vegetation lists for the area were updated noting, changes in tree dominance (e.g. loss of ash trees due to Emerald Ash Borer [*Agrilus planipennis*] and conversion of agricultural areas to residential development sites).

3.2.2 Wildlife

Birds

Two breeding bird surveys (point counts) were completed in 2019 to support the Phase 2 development of Fox Run (i.e. on RVCD lands north of Perth St.) These surveys were completed on lands directly adjacent to the current Green Lands parcels and, given the open nature of the landscape there, provided a review of birds occurring in those areas as well. Two additional rounds of point count surveys were conducted in the spring of 2020 to document bird species present at the Laffin Lands parcel to the south.

All surveys followed point count guidelines by the Ontario Breeding Bird Atlas. Breeding bird surveys are to be completed from survey stations that, combined, provide suitable viewing of all habitats on-site on calm weather days with a light wind (less than 3 on the Beaufort scale) and no precipitation. Surveys must take place between sunrise and five hours after sunrise between May 24 and July 15. The Ontario Breeding Bird Atlas calls for two surveys per year during the breeding bird timing window. All five surveys began at ~06:00.

The initial bird survey in 2019 was conducted, by KAL Biologist, Katherine Black on June 3. Weather conditions on that day, while initially calm, became quite windy and rainy and so the survey was halted. Ms. Black returned to redo the survey on June 4, 2019. The weather that day was clear and calm. The second survey

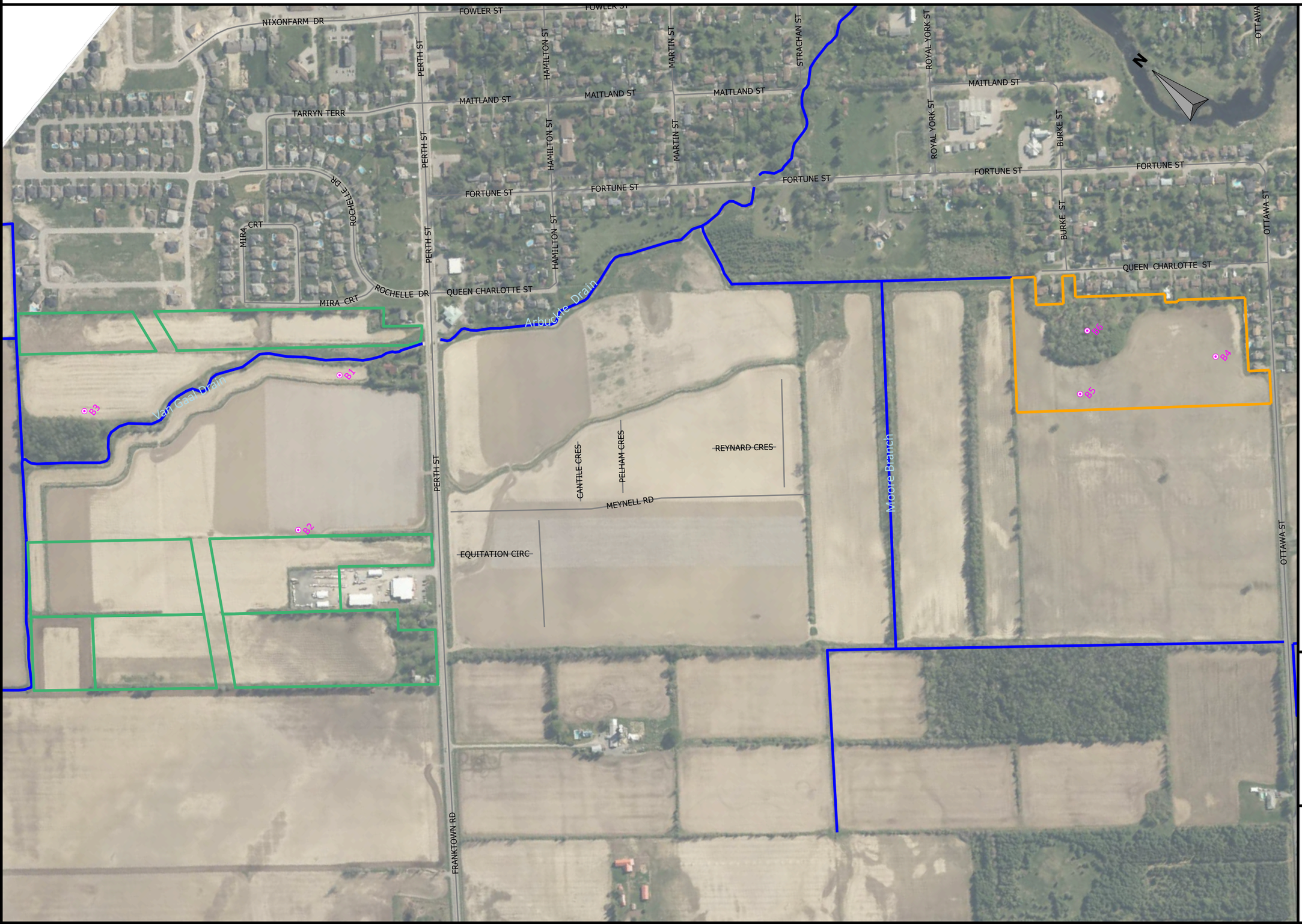
was completed on July 12, 2019, by KAL Biologist, Clare Kilgour. Weather conditions again were clear and calm. Surveys in 2019 were conducted from three stations (B1-B3; Figure 2).

The bird surveys in 2020 for the Laffin Lands were conducted on May 28 and June 12, by KAL Biologists Nicholas Schulz and Katherine Black. Weather conditions on both days were clear and calm. Surveys at the Laffin Lands parcel were conducted from three stations (B4 – B6; Figure 2).

Turtles

Five rounds of turtle surveys were performed along the Van Gaal Drain adjacent to the eastern Green Lands parcel in April and May of 2019. The surveys also covered ~400 m of the Arbuckle Drain south of Perth St. (the Van Gaal Drain changes to the Arbuckle Drain at Perth St.). Surveys methods followed the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF, 2015). Although these surveys were primarily intended to target Blanding's Turtles, all turtle species generally occurring in the vicinity would be detectable under this protocol. Surveys were completed between 8 am and 5 pm on calm, sunny days with temperatures above 10°C or on cloudy days with temperatures above 15°C, and no precipitation. We did not establish specific survey stations but instead viewed the entire riparian area of the feature while walking in the upstream direction, just outside of the stream corridor. The limited vegetation present along the feature at the time allowed the banks to be effectively scanned using binoculars, generally from distances ~50 m to prevent turtles from being startled before being observed. Surveys were performed on April 20 and May 6, 7, 8, and 21, 2019.

Figure 2. Breeding bird point count stations



Legend

Properties

- Green Lands
- Laffin Lands
- Breeding Bird Survey Station
- Existing Channels

0 — 200 m

Print Date: June 24, 2020

Project File: CAIV1015

Projection: MTM Zone 9 (NAD 83)

Produced by: AF

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4.0 PROPERTY INFORMATION

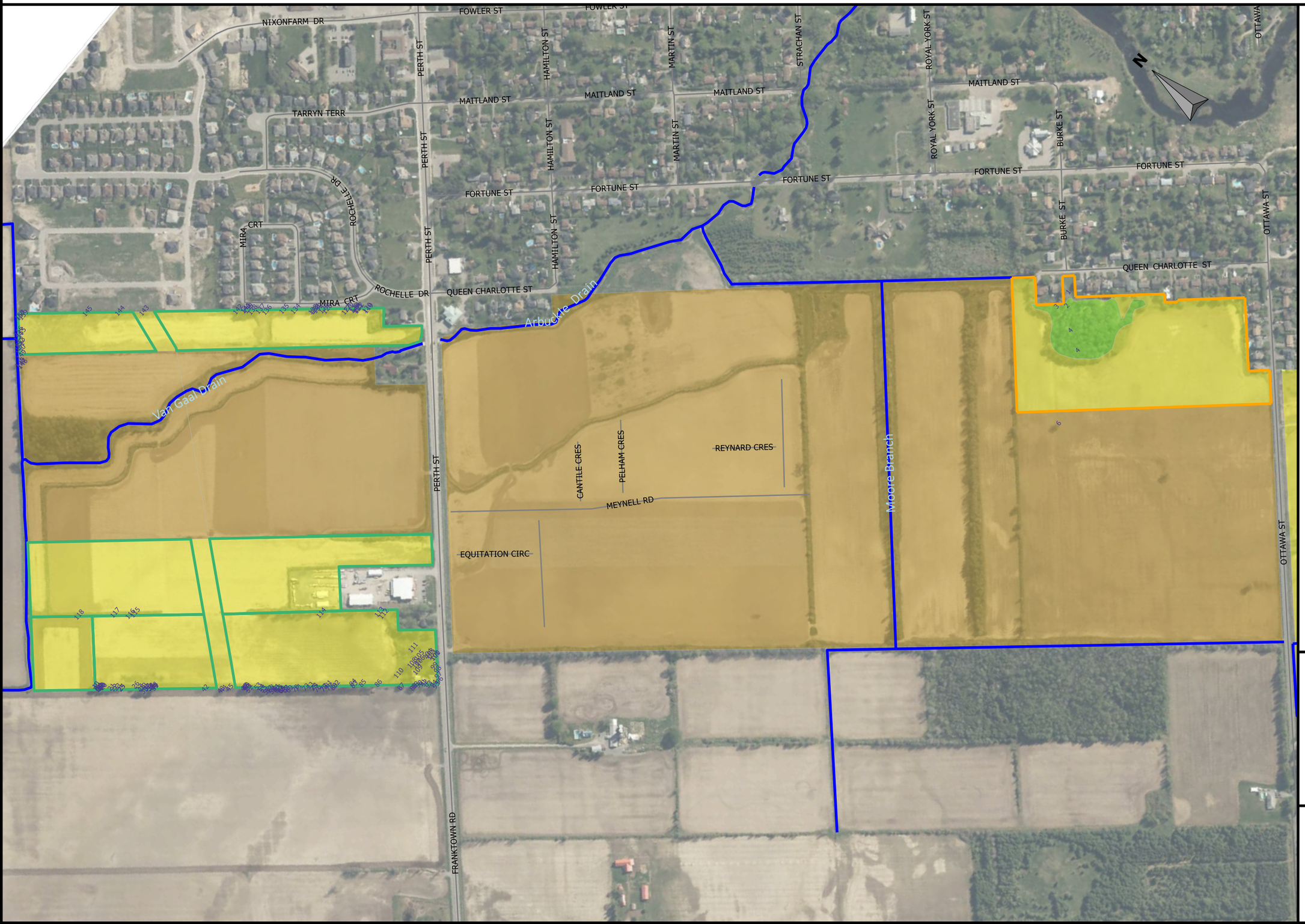
4.1 Description of the Site and the Natural Environment

Land cover information is based in part on descriptions within the *Natural Environment & Impact Assessment Study* (KAL, Parish Geomorphic & Mattamy Homes, 2010) for the Western Development Lands (WDL; a development reserve ~3.2 km long and ~600 m wide located along the length of the western side of the Village of Richmond north of the Jock River), and as confirmed during the site visits on May 28th and June 12th, 2020.

The Laffin and Green Lands parcels are former agricultural fields, having been used for corn and soybean crops. Trees occur along the peripheries of some portions of the fields and a small (0.9 ha) woodland occurs within the northeast corner of the Laffin Lands parcel (Section 4.4; Figure 3). Land areas between the two Green Lands parcels and the between the Green Lands and Laffin Lands parcels are all currently under active development as new residential communities.

No provincially significant wetlands (PSWs), significant valley lands, significant woodlands, natural environmental system strategy (NESS) areas, urban natural areas (UNAs), rural natural areas (RNAs), or areas of natural or scientific interest (ANSI) are located within >300 m of the proposed development areas. The naturalized Jock River riparian corridor, situated 420 m south of the Laffin Lands parcel, leads into the Marlborough Forest and Richmond Fen natural area complex 2.1 kilometres (km) to the southeast. This extensive forest/fen complex is all included as part of the City's natural heritage system as indicated within OP Schedule L (Figure 1). The northward extension of the feature is situated within 340 m of the western-most edge of the Green Lands parcel (Figure 1).

Figure 3. Existing Conditions



Legend

Properties
- Green Lands
- Laffin Lands

ELC
- FOD7- Forest
- OAG- Agricultural Field
- Development Area

\# Tree Number

Existing Channels

0 — 200 m

Print Date: June 24, 2020

Project File: CAIV1015

Projection: MTM Zone 9 (NAD 83)

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4.2 Landforms, Soils and Geology

The surficial geology of the site shows predominantly fine, offshore sediments of the Champlain Sea: clay, silty clay and silt. Soil mapping shows the entire property to be slightly alkaline to neutral, poorly drained clay loam (North Gower Clay Loam) and loam (Osgoode Loam) (KAL, Parish Geomorphic & Mattamy Homes, 2010). The site has generally level topography with most of the area subject to decades of continuous agricultural usage (KAL, Parish Geomorphic & Mattamy Homes, 2010).

4.3 Surface Water, Groundwater and Fish Habitat

One watercourse occurs adjacent to the Laffin lands, and two occur adjacent to the Green lands (Figure 3). An extension of the Moore Branch is located within the Queen Charlotte St. ROW adjacent to the east side of the Laffin Lands. The feature begins at the northeastern tip of the Laffin Lands parcel, receiving roadway runoff from Queen Charlotte St. (Figure 3) and flows into the channel of the Moore Branch. The banks and substrate of the Moore Branch channels all have materials of clay and silt. Vegetation in the Moore Branch consisted of grasses and herbs with more shrubs and trees in the riparian zone further upstream in the reach. Bank-side vegetation provided nearly 100% canopy cover of the channel in summer. Minor woody debris was observed at several locations (KAL, Parish Geomorphic & Mattamy Homes, 2010).

Electrofishing surveys of the main channel of the Moore Branch indicated that the channel provided habitat for 15 species of fish (KAL, Parish Geomorphic & Mattamy Homes, 2010) in the early spring of [insert year] including: Central Mudminnow (*Umbra limi*), White Sucker (*Catostomus commersoni*), Northern Redbelly-dace (*Phoxinus eos*), Brassy Minnow (*Hybognathus hankinsoni*), Silvery Minnow (*Hybognathus nuchalis*), Golden Shiner (*Notemigonus crysoleucas*), Common Shiner (*Luxilus cornutus*), Blacknose Shiner (*Notropis heterolepis*), Bluntnose Minnow (*Pimephales notatus*), Fathead Minnow (*Pimephales promelas*), Blacknose Dace (*Rhinichthys atratulus*), Longnose Dace (*Rhinichthys cataractae*), Creek Chub (*Semotilus atromaculatus*), Pearl Dace (*Margariscus margarita*), and Brook Stickleback (*Culaea inconstans*). The entire feature, however, dries by early summer. The extension of the Moore Branch closest to the Laffin Lands parcel was only briefly wet during the spring freshet, was heavily vegetated with grasses and raspberry (*Rubus spp*.), and did not have any fish present (KAL, Parish Geomorphic & Mattamy Homes, 2010).

The main channel of the Van Gaal Drain is located near the western edge of the east portion of the Green Lands parcels. Two tributaries of the Van Gaal Municipal Drain, one flowing from the east and one from the west, meet and form the main channel of the drain between the two halves of the Green Lands (Figure 2). The eastern tributary is classed as part of the municipal drain, however, the western tributary contributes most of the flows to the main channel, with the eastern channel typically intermittent in the summer. The main channel is sinuous and flows diagonally across (from west to east) through the Fox Run Phase 2 area. South of Perth St. the drainage feature is named the Arbuckle Drain, but the Van Gaal Drain and Arbuckle Drain are contiguous.

Upper tributaries of the Van Gaal Drain are approximately 2-4 m wide, while the main channel is 3.5-7.0 m wide. In-channel substrates are dominated by sand and clay. Riffles are present in the main channel at the top and bottom ends of the reach as a result of rip rap having fallen in from the bank. Riparian vegetation through the reaches is made up primarily of grasses and other perennials. A small 1 ha forest lot had been present at the confluence of the two tributary channels, but this entire feature was removed in early 2019 as part of the ongoing land development in the area. No trees are currently present along any of the channels

other than along the main channel immediately upstream of Perth St. The channel is classified as a cool water system (KAL, 2020).

The Van Gaal Drain and Arbuckle Drain combined have a similar fish community to the Moore Branch but with a few additional species including: Northern Pike (*Esox lucius*), Spottail Shiner (*Notropis hudsonius*), Longnose Dace (*Rhinichthys cataractae*), Rock Bass (*Ambloplites rupestris*), Pumpkinseed (*Lepomis gibbosus*), Johnny Darter (*Etheostoma nigrum*), and Mottled Sculpin (*Cottus bairdi*). Northern Pike are present, but in low numbers and only represented by young-of-year. Common Shiner has been the most abundant species. Most of the other fish captured are bait fishes. No species at risk have been documented in the Van Gaal Drain or the Arbuckle Drain. All species documented to date are typical for the Ottawa area (KAL, 2020).

The main channel of the Van Gaal Drain and the eastern tributary will be realigned eastward in the summer of 2020. The new channel flow will be adjacent to the full length of the western edge of the eastern Green Lands parcel. The realignment work has been fully approved by both DFO and the RVCA (Appendix C).

4.4 Vegetation Cover

4.4.1 General Vegetation

Most of the project site consists of agricultural fields. All open areas of both the Green Lands and Laffin Lands parcels were planted in 2020 with soybean crops (Figure 3). Other vegetation cover is limited to clusters of trees around the periphery of the crop fields and a small woodland feature on the Laffin Lands parcel.

The small woodlot on the Laffin Lands parcel is a 0.9 ha Fresh Moist Lowland Deciduous Forest Ecosite (FOD7). Several houses on Queen Charlotte St. to the east back onto this woodlot. This forest type is commonly associated with disturbed sites (Lee at al., 1998). Previous studies in the area (e.g. KAL, Parish Geomorphic & Mattamy Homes, 2010) had further classified this ecosite as FOD7-2, which specifies a canopy dominated by ash species. Emerald Ash Borer infestation, however, has led to the dominant canopy species now being Manitoba Maple (*Acer negundo*), followed by dead Green Ash (*Fraxinus pennsylvanica*). The Manitoba Maples in the woodlot are all relatively healthy mature trees. Ash trees in the woodlot have signs of insect predation. In addition to Manitoba Maple and Green Ash, this woodlot contains young American Elms (*Ulmus americana*, with small numbers of White Cedars (*Thuja occidentalis*), and Trembling Aspens (*Populus tremuloides*). The woodlot also included five large Bur Oaks (*Quercus macrocarpa*) (discussed further in Section 4.4.2).

The shrub layer and understory of the woodlot is dominated by Manitoba Maple and Green Ash saplings and Common Buckthorn (*Rhamnus cathartica*). Dominant shrub species include Prickly Gooseberry (*Ribes cynosbati*) and Canada Blackberry (*Rubus canadensis*). Ground cover is dominated by Goldenrod (*Solidago* spp.), Burdock (*Arctium*) spp., Stinging Nettle (*Urtica dioica*), and Greater Celandine (*Chelidonium majus*). The southeastern portion of the woodlot is relatively lower-lying and contains bryophytes and fern species indicative of wetter conditions (e.g. Sensitive Fern (*Onoclea sensibilis*)).

There are several signs of historical and ongoing disturbance throughout the woodlot, such as old furniture, sheet metal, rolls of wire, garbage, felled trees, and piles of chopped wood. There are informal footpaths throughout the woodlot. The woodlot also contains some garden escapes such as Stonecrop (*Sedum*).

The FOD7 woodlot is not considered a significant woodland per the City of Ottawa (2018) and MNRF (2010). Following the City's significant woodland evaluation criteria and size thresholds for rural woodlands (City of Ottawa, 2018), the broader forested area:

- Does not meet *Criterion 1: Size:*
    - The site falls within the Ottawa West Rural Planning Area where forest cover is estimated to be 36.7%. To meet the size criterion, woodlands in this rural planning area should be ≥50 ha to be considered significant. The woodlot is ~0.9 ha and therefore does not meet the size criterion.
- Does meet *Criterion 2: Ecological Functions:*
    - The woodlot contains no interior forest habitat, is not ≥10 ha in size with evidence of other natural heritage features such as ecological linkages or woodland diversity, and does not protect or provide any surface water features.
- Does not meet *Criterion 3: Uncommon Characteristics*:
    - There is no evidence suggesting that the subject forest contains ≥0.8 ha each of unique species composition; provincially significant vegetation communities; or rare, common, or restricted plant species. There is also no evidence demonstrating that the subject forest contains ≥5 ha of older woodlands.
- Does not meet *Economic and Social Values:*
    - There is no evidence suggesting that the subject forest provides:
        - High productivity of economically valuable products while maintaining native natural attributes;
        - High value in special services, such as air quality improvement or recreation and a sustainable level; or
        - Important identified appreciation, education, cultural, or historical value.

To be considered "significant", only a single element of the above assessment must be met. For this feature, none of the criteria are met.

4.4.2 Site Trees

Descriptions of trees in a TCR within contiguously treed areas for the purposes of supporting land development need only identify the mix of tree species present and their size ranges if the cluster is otherwise "unremarkable", as opposed to detailing every tree. However, detailed locations must still be provided for trees of "notable" size, species type or character (Mark Richardson, City of Ottawa Planning Forester, personal communication, March 13, 2020). The tree community within the FOD7 woodlot (as described in Section 4.4.1) is detailed accordingly within the TCR (Appendix D); the five large Bur Oaks, however, are individually mapped and measured (Table 2; Figure 3).

The tree community in the remainder of the development site (i.e. trees with DBH >10 cm) consisted of 12 species of trees scattered along the perimeters of agricultural fields (Table 1; Figure 3). Detailed tree information is provided in the TCR (Appendix D).

Table 1. Trees on site

Tree #	Species
Laffin Lands Parcel ("Notable" trees within the FOD7 Woodlot)	
1	Bur Oak (*Quercus macrocarpa*)
2	Bur Oak (*Quercus macrocarpa*)
3	Bur Oak (*Quercus macrocarpa*)
4	Bur Oak (*Quercus macrocarpa*)
5	Bur Oak (*Quercus macrocarpa*)
Laffin Lands Parcel (Trees not within the FOD7 Woodlot)	
6	Bur Oak (*Quercus macrocarpa*)
Green Lands Parcel (West)	
7	Trembling Aspen (*Populus tremuloides*)
8	Trembling Aspen (*Populus tremuloides*)
9	Trembling Aspen (*Populus tremuloides*)
10	Trembling Aspen (*Populus tremuloides*)
11	Trembling Aspen (*Populus tremuloides*)
12	Trembling Aspen (*Populus tremuloides*)
13	American Elm (*Ulmus americana*)
14	Trembling Aspen (*Populus tremuloides*)
15	Trembling Aspen (*Populus tremuloides*)
16	Trembling Aspen (*Populus tremuloides*)
17	Trembling Aspen (*Populus tremuloides*)
18	Trembling Aspen (*Populus tremuloides*)
19	Trembling Aspen (*Populus tremuloides*)
20	Trembling Aspen (*Populus tremuloides*)
21	Bur Oak (*Quercus macrocarpa*)
22	Trembling Aspen (*Populus tremuloides*)
23	Ash (Fraxinus sp.)
24	Bur oak (*Quercus macrocarpa*)
25	2 dead snags
26	Trembling Aspen (*Populus tremuloides*)
27	Bur Oak (*Quercus macrocarpa*)
28	Bur Oak (*Quercus macrocarpa*)
29	Trembling Aspen (*Populus tremuloides*)
30	Bur Oak (*Quercus macrocarpa*)
31	2 dead ash (*Fraxinus* sp.)
32	Trembling Aspen (*Populus tremuloides*)
33	2 Trembling Aspen (*Populus tremuloides*)
34	Trembling Aspen (*Populus tremuloides*)
35	2 Manitoba Maple (*Acer negundo*)
36	Trembling Aspen (*Populus tremuloides*)
37	Trembling Aspen (*Populus tremuloides*)
38	Trembling Aspen (*Populus tremuloides*)
39	Bur Oak (*Quercus macrocarpa*)
40	Trembling Aspen (*Populus tremuloides*)
41	Trembling Aspen (*Populus tremuloides*)
42	American Elm (*Ulmus americana*)
43	American Elm (*Ulmus americana*)
44	Ash (*Fraxinus* sp.)
45	2 Common Apple (*Malus* sp.)
46	Bur Oak (*Quercus macrocarpa*)
47	Ash (Fraxinus sp.)
48	Bur Oak (*Quercus macrocarpa*)
49	Bur Oak (*Quercus macrocarpa*)
50	Bur Oak (*Quercus macrocarpa*)
51	Green Ash (*Fraxinus pennsylvanica*)
52	Green Ash (*Fraxinus pennsylvanica*)
53	Manitoba Maple (*Acer negundo*)
54	Ash (*Fraxinus* sp.)
55	Manitoba Maple (*Acer negundo*)
56	American Elm (*Ulmus americana*)
57	Bur Oak (*Quercus macrocarpa*)
58	Bur Oak (*Quercus macrocarpa*)
59	Green Ash (*Fraxinus pennsylvanica*)
60	American Elm (*Ulmus americana*)
61	Bur Oak (*Quercus macrocarpa*)
62	Bur Oak (*Quercus macrocarpa*), 3 Green Ash (*Fraxinus pennsylvanica*)
63	2 Bur Oaks (*Quercus macrocarpa*)
64	Green Ash (*Fraxinus pennsylvanica*)
65	Bur Oak (*Quercus macrocarpa*)
66	Bur Oak (*Quercus macrocarpa*)
67	2 Green Ash (*Fraxinus pennsylvanica*)
68	Bur Oak (*Quercus macrocarpa*)
69	Bur Oak (*Quercus macrocarpa*)
70	Green Ash (*Fraxinus pennsylvanica*)
71	Bur Oak (*Quercus macrocarpa*)
72	Green Ash (*Fraxinus pennsylvanica*)
73	Green Ash (*Fraxinus pennsylvanica*)
74	Manitoba Maple (*Acer negundo*)
75	Green Ash (*Fraxinus pennsylvanica*)
76	Green Ash (*Fraxinus pennsylvanica*)
77	Green Ash (*Fraxinus pennsylvanica*)
78	Green Ash (*Fraxinus pennsylvanica*)
79	Green Ash (*Fraxinus pennsylvanica*)
80	Green Ash (*Fraxinus pennsylvanica*)
81	American Elm (*Ulmus americana*)
82	Manitoba Maple (*Acer negundo*)
83	9 Green Ash (*Fraxinus pennsylvanica*)
84	2 Manitoba Maple (*Acer negundo*)
85	Manitoba Maple (*Acer negundo*)
86	Cluster of Manitoba Maple (*Acer negundo*)
87	4 Trembling Aspen (*Populus tremuloides*)
88	Silver Maple (*Acer saccharinum*)
89	Manitoba Maple (*Acer negundo*)
90	Silver Maple (*Acer saccharinum*) and 2 Bur Oaks (*Quercus macrocarpa*)
91	Bur Oak (*Quercus macrocarpa*)
92	American Elm (*Ulmus americana*)
93	Bur Oak (*Quercus macrocarpa*)
94	Bur Oak (*Quercus macrocarpa*)
95	Silver Maple (*Acer saccharinum*) and American Elm (*Ulmus americana*)
96	Siberian Elm (*Ulmus pumila*)

Tree #	Species
97	American Elm (*Ulmus americana*)
98	Siberian Elm (*Ulmus pumila*)
99	Colorado Bluespruce (*Picea pungens*)
100	Manitoba Maple (*Acer negundo*)
101	Silver Maple (*Acer saccharinum*)
102	Silver Maple (*Acer saccharinum*)
103	Silver Maple (*Acer saccharinum*)
104	Common Apple (*Malus* sp.)
105	Manitoba Maple (*Acer negundo*)
106	Manitoba Maple (*Acer negundo*)
107	Manitoba Maple (*Acer negundo*)
108	2 Silver Maple (*Acer saccharinum*)
109	2 American Elm (*Ulmus americana*)
110	Manitoba Maple (*Acer negundo*)
111	Cluster of Manitoba Maple (*Acer negundo*)
112	Manitoba Maple (*Acer negundo*)
113	Manitoba Maple (*Acer negundo*)
114	Cluster of Manitoba Maple (*Acer negundo*)
115	Manitoba Maple (*Acer negundo*)
116	Manitoba Maple (*Acer negundo*)
117	American Elm (*Ulmus americana*)
118	Viburnum sp. (*Viburnum* sp.)
Green Lands Parcel (East)	
119	Manitoba Maple (*Acer negundo*)
120	Manitoba Maple (*Acer negundo*)
121	Manitoba Maple (*Acer negundo*)
122	American Elm (*Ulmus americana*)
123	American Elm (*Ulmus americana*)
124	Manitoba Maple (*Acer negundo*)
125	Manitoba Maple (*Acer negundo*)
126	Manitoba Maple (*Acer negundo*)
127	Green Ash (*Fraxinus pennsylvanica*)
128	Manitoba Maple (*Acer negundo*)
129	Manitoba Maple (*Acer negundo*)
130	Manitoba Maple (*Acer negundo*)
131	Hawthorn ((Crataegus sp.))
132	American Elm (*Ulmus americana*)
133	Green Ash (*Fraxinus pennsylvanica*)
134	Silver Maple (*Acer saccharinum*)
135	Viburnum sp. (*Viburnum* sp.)
136	Ash (*Fraxinus* sp.)
137	Silver Maple (*Acer saccharinum*)
138	2 Silver Maple (*Acer saccharinum*)
139	Green Ash (*Fraxinus pennsylvanica*)
140	Green Ash (*Fraxinus pennsylvanica*)
141	Silver Maple (*Acer saccharinum*)
142	Sugar Maple (*Acer saccharum*)
143	Bur Oak (*Quercus macrocarpa*)
144	Bur Oak (*Quercus macrocarpa*)
145	3 American Elms (*Ulmus americana*)
146	Manitoba Maple (*Acer negundo*)
147	Manitoba Maple (*Acer negundo*)
148	Green Ash (*Fraxinus pennsylvanica*)
149	5 Green Ash (*Fraxinus pennsylvanica*)
150	Viburnum sp. (*Viburnum* sp.)
151	American Elm (*Ulmus americana*)
152	Green Ash (*Fraxinus pennsylvanica*)
153	American Elm (*Ulmus americana*)
154	Manitoba Maple (*Acer negundo*)
155	American Elm (*Ulmus americana*)
156	Manitoba Maple (*Acer negundo*)
157	Manitoba Maple (*Acer negundo*)
158	American Elm (*Ulmus americana*)

Tree #	Species
159	Manitoba Maple (*Acer negundo*)

The trees on site are relatively disconnected from broader forested areas. The ecological function of the site trees is likely limited to the provision of shade and some limited habitat for small, urban tolerant wildlife. Larger Bur Oak trees on the site, especially the individuals within the FOD7 woodlot on the Laffin lands, are notable and should warrant consideration for preservation. These trees, however, are situated directly in line with the Burke St. ROW (Figure 2), which provides the only option for a roadway connection between the Laffin Lands parcel and the adjacent community, or the roadway entrance to the western Green Lands parcel. All trees on site will be removed as part of site development.

4.5 Wildlife

4.5.1 Birds

A total of 16 bird species were observed near the Green Lands parcels during the three rounds of surveys conducted in 2019 (Table 2). American Crow (*Corvus brachyrhynchos*) was the most abundant species on site followed by Red-winged Blackbirds (*Agelaius phoeniceus*) and Canada Geese (*Passerculus sandwichensis*). A total of 16 bird species were observed at the Laffin Lands parcel during the two rounds of surveys conducted in 2020 (Table 2). A single Eastern Wood-Pewee was heard calling from the FOD7 woodlot.

Table 2. Breeding birds observed during field surveys in 2019 (Green Lands) and 2020 (Laffin Lands)

Common Name	Species	Green Lands			Laffin Lands	
		June 3, 2019	June 4, 2019	July 12, 2019	May 28, 2020	June 12, 2020
American Crow	*Corvus brachyrhynchos*	x	x	x	x	x
American Goldfinch	*Spinus tristis*			x	x	x
American Robin	*Turdus migratorius*		x			
Black-capped Chickadee	*Poecile atricapillus*				x	
Canada Goose	*Branta canadensis*	x	x			
Clay-coloured Sparrow	*Spizella pallida*				x	
Common Grackle	*Quiscalus quiscula*			x	x*	x
Common Yellowthroat	*Geothlypis trichas*				x	
Eastern Wood-pewee	*Contopus virens*					x
European Starling	*Sturnus vulgaris*	x	x	x		
Great Crested Flycatcher	*Myiarchus crinitus*				x	
House Wren	*Troglodytes aedon*					x
Killdeer	*Charadrius vociferus*		x		x	x
Mallard	*Anas platyrhynchos*	x	x		x*	
Mourning Dove	*Zenaida macroura*		x			x
Northern Cardinal	*Cardinalis cardinalis*			x	x	x
Northern Rough Winged Swallow	*Stelgidopteryx serripennis*	x				
Red-Winged Blackbird	*Agelaius phoeniceus*		x	x		
Ring-billed Gull	*Larus delawarensis*				x	
Savannah Sparrow	*Passerculus sandwichensis*			x		
Song Sparrow	*Melospiza melodia*	x	x	x	x	x
Tree Swallow	*Tachycineta bicolor*		x			
White-throated Sparrow	*Zonotrichia albicollis*				x	
Wood Pecker (heard, species unconfirmed)	Picidae			x		

* Flyover only

4.6 Species at Risk

Of the 71 SAR currently known to occur within the region of the City of Ottawa (Appendix E), 20 species were deemed to have some potential to occur within the general vicinity of the proposed development (i.e. in or near the Village of Richmond). ELC delineations (habitat categorization), observed existing conditions, and other site information were used to determine which of these 20 species have some potential to occur on (or have habitat on) the project site and/or to interact with proposed site development (Table 3).

Based on our SAR assessment (Table 3), four SAR have some potential to interact with proposed development directly as individuals (i.e. possibly present at some point during or subsequent to construction) and/or their habitat may be impacted: Eastern Wood-pewee, Little Brown Bat, Tri-Coloured Bat, and Blanding's Turtle.

Of the four species, only Eastern Wood-pewee was considered to have specific habitat on or adjacent to the proposed development area, with the FOD7 woodlot on the Laffin Lands parcel providing potential nesting habitat (albeit of low quality). This habitat area will be removed under the proposed development. As a species of special concern, however, the ESA does not confer specific habitat protection to the species. Under the ESA, habitat protection for species of special concern is to be provided through individual species management plans.

The two listed bat species - Little Brown Bat and Tri-Coloured Bat - may each opportunistically use larger snags on the site and or in the broader vicinity during the breeding season in June or transiently at any point in the active season between April and mid-August. Snags on site will be removed regardless of proposed development in consideration of human safety.

Observational records for Blanding's Turtle exist along the Arbuckle Drain and within the urban areas of the Village of Richmond east of the site (on Fortune St.). The single observation within the Arbuckle Drain is an iNaturalist record (https://www.inaturalist.org/observations/26720457) of a carcass found on the banks of the drain in June 2019. The other records were of turtles spotted walking along streets of the community. The Van Gaal Drain is a hard-bottomed channel with swift flows during the spring freshet and minimal water levels through the remainder of the season. No vegetation currently remains along the channel adjacent to the Green Lands parcels as preparatory work for the channel realignment was begun in 2019 (Kilgour, 2020). The Moore Branch does not retain sufficient wetted width beyond the spring freshet to support turtles (KAL, Parish Geomorphic & Mattamy Homes, 2010). Neither features provide suitable wet space to form a basis for consideration of protected Category 2 habitat areas (general summer habitat), or Category 3 habitat areas (travel ways; MNRF, 2014). As such, the proposed development is not considered to constitute a negative impact to the habitat of this species.

Table 3 Species at risk potential for the Site

Species Name	Provincial (ESA) Status	Federal (SARA) Status	Habitat Requirement	Presence/Habitat on Site	Project Concerns Associated with Habitat on Site
Birds					
Bald Eagle (*Haliaeetus leucocephalus*)	Special Concern	No Status	Nests in mature forests near open water. In large trees such as Pine and Poplar.	No portion of the site provides suitable habitat though transient presence was considered possible if the species occurred in the broader vicinity. No individuals were observed.	Negligible potential for presence. Not a concern for this project.
Bank Swallow (*Riparia riparia*)	Threatened	Threatened	Nest in banks or earthen walls cut by meandering streams and rivers, but artificial banks may also be used. Foraging occurs over fields, streams, wetlands, farmlands, and still water.	Open agricultural fields across the Site (CUM1-1) may provide suitable foraging habitat. No available nesting habitat on Site. The banks of the Van Gaal Drain could provide some limited habitat potential but no individuals were observed in the area.	Negligible potential for presence. Not a concern for this project.
Barn Swallow (*Hirundo rustica*)	Threatened	Threatened	Terrestrial open and anthropogenic structures for nesting; near open areas for feeding.	Open agricultural fields over the site may provide suitable foraging habitat, though suitable nesting structures are limited in the area. No individuals were observed.	Negligible potential for presence. Not a concern for this project.
Bobolink (*Dolichonyx oryzivorus*)	Threatened	Threatened	Periodically mown, dry meadow for nesting. Habitat (meadow) should be >10 ha, and preferably >30 ha before Bobolink are attracted to the Site. Not near tall trees.	Open fields over the site could provide suitable habitat if left fallow. The fields, however, have been planted with corn or soybean crops for the past decade or more rendering them unsuitable. No individuals were observed.	Negligible potential for presence. Not a concern for this project.
Canada Warbler *(Wilsonia Canadensis)*	Special Concern	Threatened	Prefers wet forests with dense shrub layers. Nests located on or near the ground on mossy logs or roots, along stream banks or on hummocks.	Habitat suitability along the Van Gaal drain was very limited in 2019. All trees along that feature have now been removed in preparation for the planned realignment, removing all habitat potential. No individuals were observed.	Negligible potential for presence. Not a concern for this project.
Chimney Swift (*Chaetura pelagica*)	Threatened	Threatened	Nests in open chimneys and, very rarely, in tree hollows (trees > 60 cm DBH). Tend to forage close to water as this is where the	Snags are present in the FOD7 forest though they do not provide preferred habitat. No individuals were observed.	Negligible potential for presence. Not a concern for this project.

Species Name	Provincial (ESA) Status	Federal (SARA) Status	Habitat Requirement	Presence/Habitat on Site	Project Concerns Associated with Habitat on Site
			flying insects they eat congregate.		
Common Nighthawk (*Chordeiles minor*)	Special Concern	Threatened	Nests in a wide variety of open sites, including beaches, fields, and gravel rooftops.	The species can nest in open areas such as those present on the site though actively tended agricultural fields provide limited habitat suitability. No individuals were observed	Negligible potential for presence. Not a concern for this project.
Eastern Meadowlark (*Sturnella magna*)	Threatened	Threatened	Periodically mown, dry meadow for nesting. Habitat (meadow) should be >10 ha, and preferably >30 ha before Eastern Meadowlark are attracted to the Site. Not near tall trees.	Open fields over the site could provide suitable habitat if left fallow. The fields, however, have been planted with corn or soybean crops for the past decade or more rendering them unsuitable. There are no observations of the species on the site.	Negligible potential for presence. Not a concern for this project.
Eastern Wood-Pewee (*Contopus virens)*	Special Concern	Special Concern	Woodland species, often found near clearings and edges.	The FOD7 provides suitable habitat but is only large enough for single nesting pair, reducing its overall utility as habitat. A single bird was noted in the feature during the second survey in 2020.	Some potential for presence. Limited concern for this project. The habitat of this species is not protected under the ESA. No tree clearing, however, should take during the active bird nesting season (April 1 to August 15) to prevent harm to individuals.
Evening Grosbeak *(Coccothraustes vespertinus)*	Special Concern	Special Concern	Nests in trees or large shrubs; prefers mature mixed-wood forests dominated by fir species, White Spruce, and/or Trembling Aspen but will also use deciduous forests, parklands, and orchards.	The FOD7 provides low suitability habitat. There are no observations of the species on the site.	Negligible potential for presence. Not a concern for this project.
Grasshopper Sparrow (*Ammodramus savannarum*)	Special Concern	Special Concern	Prefers open grasslands with well-drained, sandy soil but will also nest in hayfields, pastures, alvars, prairies, and occasionally grain crops (e.g. barley).	No portion of the site provides suitable habitat though transient presence was considered possible if the species occurred in the broader vicinity. No individuals were observed.	Negligible potential for presence. Not a concern for this project.
Least Bittern (*Ixobrychus exilis*)	Threatened	Threatened	Found in large (> 5-10 ha) marshes with tall emergent vegetation (usually cattails), relatively stable water levels (usually 10-50 cm), and about 50% open water interspersed in small pockets throughout vegetated areas.	No portion of the site provides suitable habitat though transient presence was considered possible if the species occurred in the broader vicinity. No individuals were observed.	Negligible potential for presence. Not a concern for this project.

Species Name	Provincial (ESA) Status	Federal (SARA) Status	Habitat Requirement	Presence/Habitat on Site	Project Concerns Associated with Habitat on Site
Olive-sided Flycatcher *(Contopus cooperi)*	Special Concern	Threatened	Found along edges of coniferous and mixed forests often adjacent to rivers or wetlands.	The FOD7 provides low suitability habitat. There are no observations of the species on the site.	Negligible potential for presence. Not a concern for this project.
Wood Thrush (*Hylocichla mustelina*)	Special Concern	Threatened	Deciduous or mixed woodlands.	The FOD7 woodlot provides low suitability habitat. There are no observations of the species on the site.	Negligible potential for presence. Not a concern for this project.
Mammals					
Little Brown Bat (*Myotis lucifugus*)	Endangered	Endangered	Widespread, roosting in trees and buildings. Hibernate in caves or abandoned mines.	The site includes large dying/dead ash trees with cavities, and/or peeling bark that may be suitable for roosting habitat. As these trees decay, however, they will be removed for human safety considerations regardless of proposed development. Most trees on the site and in the broader area provide some potential for short term roosting but do not represent unique habitat features.	Some potential for presence. Some concern for this project. No tree clearing, however, should take place during the active season (April 1 to August 15) to prevent possible harm to individuals.
Tri-Coloured Bat (*Perimyotis subflavus*)	Endangered	Endangered	Widespread, roosting in trees and buildings. Hibernate in caves or abandoned mines.	The site includes large dying/dead ash trees with cavities, and/or peeling bark that may be suitable for roosting habitat. As these trees decay, however, they will be removed for human safety considerations regardless of proposed development. Most trees on the site and in the broader area provide some potential for short term roosting but do not represent unique habitat features.	Some potential for presence. Some concern for this project. No tree clearing, however, should take place during the active season (April 1 to August 15) to prevent possible harm to individuals.
Reptiles					
Blanding's Turtle (*Emydoidea blandingii*)	Threatened	Threatened	Shallow water usually in large wetlands or shallow lakes. Can be found far from water bodies if searching for mates or nesting sites, which usually contain gravel, cobble, and/or sand.	Observational records exist near along the Arbuckle Drain, within the urban areas of the Village of Richmond east of the site (on Fortune St.) and west of the site (on Ottawa St.) The Van Gaal drain provides some limited suitability as a travel corridor (and the Moore Branch less so) but these features do not provide	No turtles were observed on Site during any surveys. Limited potential for presence. Fencing behind residential units backing on to either the Van Gaal Drain or the Moore Branch is recommended to be designed and installed as a permanent turtle exclusion to ensure transient turtles potentially using these features as travel corridors do not stray from those routes while transiting the community. Roadway

Species Name	Provincial (ESA) Status	Federal (SARA) Status	Habitat Requirement	Presence/Habitat on Site	Project Concerns Associated with Habitat on Site
				suitable wet space to define Category 2 habitat areas.	crossing of these features should be similarly designed to direct turtles under roadways instead of crossing over them.
Snapping Turtle (*Chelydra serpentina)*	Special Concern	Special Concern	Prefers shallow water usually in large wetlands or shallow lakes. Can be found far from water bodies if searching for mates or nesting sites, which usually contain gravel, cobble, and/or sand.	The Van Gaal drain provides some habitat suitability but is outside of the project area.	No turtles were observed on Site during any surveys. Negligible potential for presence. Not a concern for this project.
Vascular Plants					
Butternut (*Juglans cinerea*)	Endangered	Endangered	Variable but typically on well-drained soils.	The entire area provides generally suitable habitat but no individuals were observed on or within 50 m of the site.	Negligible potential for presence. Not a concern for this project.
Arthropods					
Monarch (*Danaus plexippus*)	Special Concern	Special Concern	Larvae (caterpillars) feed on Milkweed plants (*Asclepias* spp.) in meadows and open areas where Milkweed grows. Adult butterflies are found in farmlands, meadows, open wetlands, prairies, roadsides, city gardens, and parks where wildflowers provide nectar.	Transient presence is possible on the site, but no suitable habitat is present.	Negligible potential of presence for purposes of breeding or feeding. Not a concern for this project.

5.0 DESCRIPTION OF THE PROPOSED PROJECT

The project addressed by this EIS is a proposed extension of the Fox Run residential community on to the Green Lands and Laffin Lands parcels (Figure 3).

For the Green Lands parcels, the residential development concept plan includes a mix of single-family homes (96 units) and townhomes (198 units). The western parcel includes the development of a 1.1 ha park. It also includes a 25 m wide strip of the corridor along the existing western tributary to the Van Gaal Drain. This ~0.6 ha area will be landscaped with riparian vegetation. The western edge of the eastern parcel similarly includes a 16 m wide strip of the new, realigned Van Gaal Drain corridor, covering 1.1 ha. The residential units here will share servicing with the existing Fox Run development. Site preparation is anticipated to begin by mid-summer of 2020, with home construction to begin in the fall of the same year. House closing will begin by spring of 2021 with final house sales to be completed by 2023.

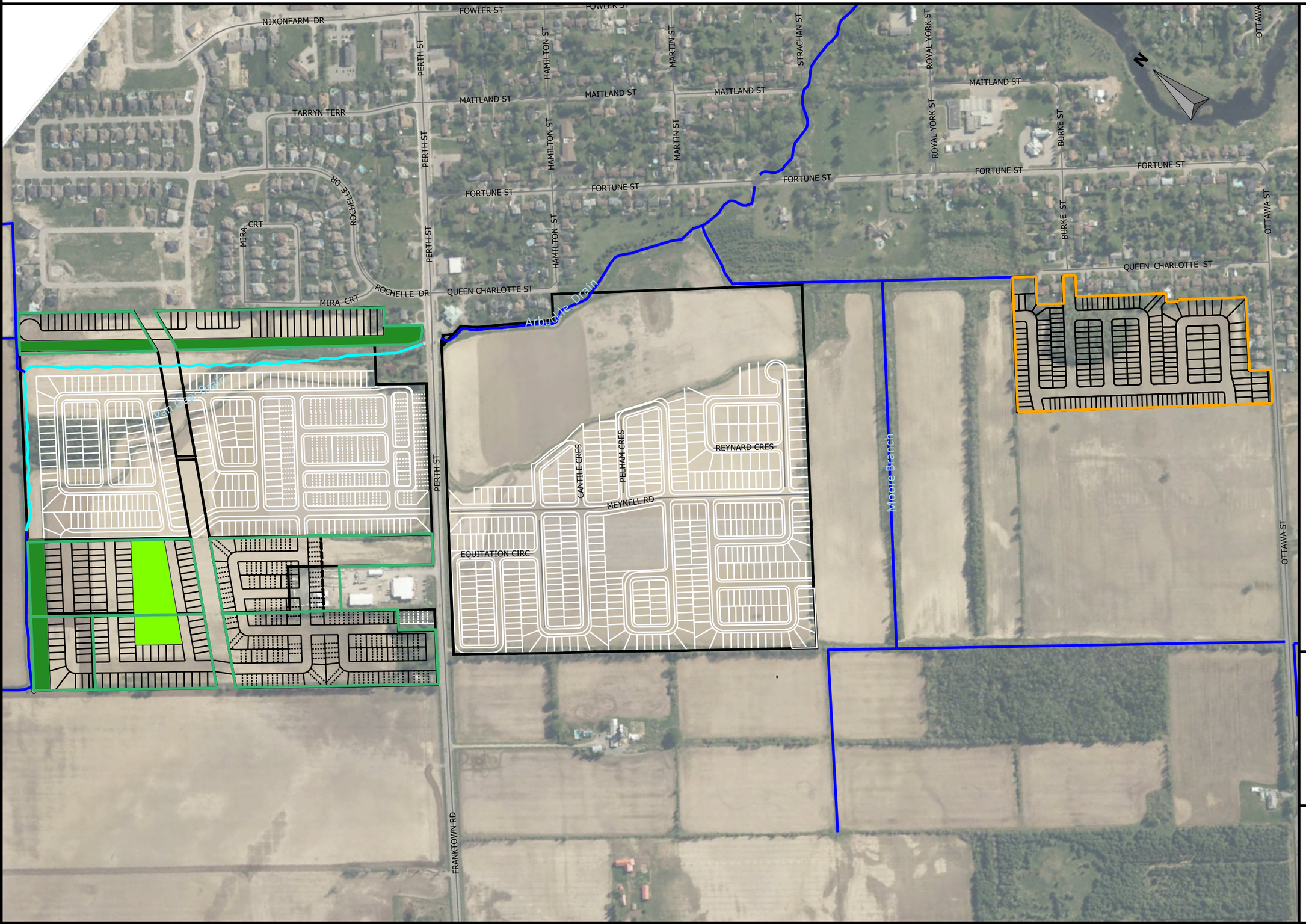
For the Laffin Lands parcel, the residential development concept plan includes a mix of single-family homes (42 units) and townhomes (169 units). The parcel does not include space for parks or stormwater management. The residential units here will be developed with and share servicing with residential community areas being developed on the adjacent lands to the north and west by Mattamy Homes. As such, specific dates for commencement and completion of construction for this parcel will be set based on the approval and commencement of the adjacent Mattamy development.

5.1 Constraints

The biggest natural heritage development constraint related to the overall community layout is the requirement of appropriate setbacks from the realigned Van Gaal Drain and its western tributary and from the Moore Branch. Setbacks prescribed for these features within the Jock River Subwatershed Study (Stantec, 2007) are consistent with the standard setback requirements as listed within the City's OP: the maximum of the 100-year floodplain, meander belt allowance, 30 m from normal high watermark; and geotechnical hazard (KAL, Parish Geomorphic & Mattamy Homes, 2010).

No regulatory floodplain has been established for the Moore Branch, the Van Gaal Drain or its tributaries (City of Ottawa, 2020). The meander belt allowances are 42 m (i.e. total width) for the Van Gaal channels and 15 m for the portion of the Moore Branch adjacent to the Laffin Lands parcel; no other geotechnical hazards were identified for the features (KAL, Parish Geomorphic & Mattamy Homes, 2010). As such, the setback requirement is 30 m from the normal high watermark. The proposed community design respects this setback along both the channels of the Van Gaal Drain (existing and realigned) and the Moore Branch (Figure 4).

Figure 4. Proposed development



Legend

Properties

- Green Lands
- Laffin Lands

- Existing Channel
- Van Gaal Realignment

- Block Plan
- Other Development
- Park
- Van Gaal Corridor

0 — 200 m

Print Date: June 24, 2020

Project File: CAIV1015

Projection: MTM Zone 9 (NAD 83)

Produced by: AF

KILGOUR & Associates

6.0 IMPACT ASSESSMENT

6.1 Surface Water and Fish Habitat

No surface water features are located directly within the proposed development areas, though the Moore Branch, the Van Gaal Drain (once it is realigned) and the western tributary to the Van Gaal Drain are located adjacent to the development (Figure 2). The proposed development is set back from all three features by 30 m or more (in accordance with the required setbacks), and the corridors along these channels will be revegetated. All three features currently have active agriculture within 15 m or less of the channels. The proposed development increases the width of the natural riparian buffer along the channels. No negative impacts are anticipated to these features.

6.2 Vegetation / Trees

All trees and other vegetation will be removed from the proposed development. This includes the removal of the 0.9 ha woodlot on the Laffin Lands parcel, and ~201 live trees from the remainder of the proposed development areas (Figure 3). The remaining vegetation on the site consists only of soybean crops. The agricultural fields will be removed.

The woodlot currently provides a concentrated area of tree cover, but only over 3.6% of the total site area. All remaining trees are packed into tight rows along the periphery of the remaining 96.4% of the site, which otherwise lacks tree cover entirely. Tree planting on the site at a target density of 1.5 trees per lot, will provide ~550 trees or ~174% increase in the number of trees currently present outside of the woodlot. The trees to be planted as part of the proposed development will be distributed evenly throughout the development area. Potions of the Green Lands parcel included within the realigned Van Gaal corridor area not included within this review as they will be subject to a separate landscape plan (Appendix F).

6.3 Significant Natural Heritage Features

No PSWs, significant woodlands, significant valleylands, NESS areas, UNAs, or RNAs occur on the site or within 120 m of the site. Therefore, no impacts to such significant natural features area anticipated from the proposed development.

6.4 Species at Risk

Based on our SAR assessment (Table 3) four SAR have some potential to interact with proposed development directly as individuals (i.e. possibly present at some point during or subsequent to construction) and/or their habitat may be impacted: Eastern Wood-pewee, Little Brown Bat, Tri-Coloured Bat, and Blanding's Turtle.

A management plan for Eastern Wood-pewee has not yet been produced by either the MNRF or the MECP directing specific habitat mitigation requirements. Restricting the removal of trees on the site to outside of the active nesting season will prevent negative impacts (harm) directly to individual birds.

The proposed development is not considered to constitute a negative impact to the habitat of either Little Brown Bat or Tri-Coloured Bat. Restricting the removal of trees on the site to outside of the active bat season will prevent potential negative impacts (harm) directly to individual bats.

The proposed development does not impact the habitat of Blanding's Turtles, but it is possible that Blanding's Turtles could occur near new residential areas if travelling along the Moore Branch or the Van Gaal Drain. The application of appropriate structural design elements along the channels will prevent turtles travelling through the Village of Richmond from straying from the naturalized corridors, thereby limiting the potential for harm to individuals by traffic.

7.0 MITIGATION

7.1 Setbacks and Buffers

The setback requirement for the Moore Branch, the Van Gaal Drain and its tributaries is 30 m from the normal high watermark. The proposed community design respects this setback along both the channels of the Van Gaal Drain (existing and realigned) and the Moore Branch. No other natural heritage features within the Green or Laffin lands require specific buffers.

7.2 Surface Water Features

Construction works near water during the development of the residential community will, at minimum, require standard erosion and sediment control mitigation measures to protect receiving waters from sediment-laden runoff, including:

- a multi-faceted approach to provide erosion and sediment control;
- retention of existing vegetation and stabilize exposed soils with vegetation where possible;
- limiting the duration of soil exposure and phase construction;
- limiting the size of disturbed areas by minimizing nonessential clearing and grading;
- minimizing slope length and gradient of disturbed areas;
- refuelling of machinery should occur >30 m from any watercourse;
- maintaining overland sheet flow and avoid concentrated flows; and
- storing/stockpiling all soil away (e.g. greater than 30 m) from watercourses, drainage features and top of steep slopes.

7.3 Vegetation / Trees

To minimize impacts to trees adjacent to the site, the following general protection measures are recommended as necessary during construction:

- Tree removal on Site should be limited to that which is necessary to accommodate construction.

- To minimize impact to remaining trees during Site development:

    - Erect a fence beyond the critical root zone (CRZ; i.e. 10x the DBH) of trees. The fence should be highly visible (orange construction fence) and paired with erosion control fencing. Pruning of branches is recommended in areas of potential conflict with construction equipment;

- Do not place any material or equipment within the CRZ of trees;
- Do not attach any signs, notices, or posters to any trees;
- Do not raise or lower the existing grade within the CRZ of trees without approval;
- Tunnel or bore when digging within the CRZ of a tree;
- Do not damage the root system, trunk, or branches of any remaining trees; and
- Ensure that exhaust fumes from all equipment are not directed towards any tree's canopy.

Specific trees to be planted on the site will be identified in the landscape plan for the development. Trees species identified in this plan, however, must be non-invasive and should be both native to the Ottawa area and tolerant of the site's urban setting. Recommended tree species to consider in the landscaping plan include Red Maple (*Acer rubrum*), White Spruce (*Picea glauca*), Pin Cherry (*Prunus pensylvanica*), White Birch (*Betula papyrifera*), Black Cherry (*Prunus nigra*), White Cedar (*Thuja occidentalis*) and Serviceberry (*Amelanchier* spp.). Bur Oak may be considered where spacing allows for future showcase trees. Common Juniper (*Juniperus communis*), Maple-leaf Viburnum (*Viburnum acerifolium*), Nannyberry (*Viburnum lentago*) and Northern Bush-honeysuckle (*Diervilla lonicera*) may be considered as appropriate shrub species.

Trees are to be planted at a minimum of one tree per lot, with additional tree plantings to be included where feasible (e.g. in larger single lots, at the ends of rows of townhomes and/or in other public areas such as the proposed park on the Green lands) with a target of planting the equivalent of 1.5 trees per lot through the community. Trees planting along the realigned Van Gaal corridor has been planned separately as part the realignment works there (Appendix F) and do not count towards the required tree count for this project.

This report does not constitute permission to remove any trees from the Site. Removal of trees can only be undertaken following appropriate consultation with City planning staff.

No mitigation measures are required to protect other site vegetation (i.e. other than trees).

7.4 Species at Risk

7.4.1 Eastern Wood-pewee

To protect Eastern Wood-pewee the removal of trees from theFOD7 woodlot on the Laffin Lands parcel is not to occur during the active nesting season for non-stick nesting birds (April 15 to August 15; City of Ottawa, 2015b). The removal of other site trees (i.e. outside of the FOD7 forest on the Laffin Lands) may be completed during the active nesting season only if the absence of nesting birds in trees to be cut has been confirmed by a qualified biologist within five days prior to cutting. Please note, however, that that there are additional timing restrictions on cutting due to bats (Section 7.4.2).

7.4.2 Bats

Occurrences of roosts (maternal or otherwise) could occur within any given year the FOD7 woodlot on the Laffin Lands parcel. Suitable trees within that feature (i.e. snags), however, provide a human health risk and must be regularly removed regardless. The removal of trees from the FOD7 woodlot on the Laffin Lands parcel is not to occur during the maternal roosting season (June to mid-August). The removal of other site trees may be completed during the active bat season (April 1 to August 15) only if the absence ofbats in trees to be cut has been confirmed by a qualified biologist within five days prior to cutting. Pleasenote that that there are additional timing restrictions on cutting due to Eastern Wood-pewee (Section7.4.2).

7.4.3 Blanding's Turtles

No turtles were observed on or near the project area during any KAL surveys, but limited potential for transient individuals exists. To prevent potential impacts to Blanding's Turtles, the proponent must implement the following measures during the construction phase:

- All areas subject to active works during the turtle nesting season (May 15-July 15; MNFR 2015) require the installation of temporary exclusion fencing around the perimeter prior to May 15. Properly installed and maintained standard silt fence can function as exclusion fence (Appendix G);

- Prior to vegetation clearing, pre-construction sweeps of vegetated areas should be undertaken to ensure turtles are not present; and

- If possible, vegetation clearing should be undertaken outside of the active season of Blanding's turtle (generally taken to be April 1st to October 30th).

The fencing behind residential units backing on to either the Van Gaal Drain or the Moore Branch is recommended to be designed and installed as permanent turtle exclusion fencing (Appendix G) to ensure transient turtles potentially using these features as travel corridors do not stray from those routes while transiting the community. Roadway crossing of these features must be designed to direct turtles under roadways (e.g. oversized culverts with an appropriate openness ratio and with vertical headwalls).

7.5 General Wildlife Mitigation

Common wildlife species were observed on site, all of which are represented throughout the developed adjacent landscape. The following mitigation measures shall be implemented during construction of the project to generally protect wildlife:

- Areas shall not be cleared during sensitive times of the year for wildlife (breeding season; early spring to early summer), unless mitigation measures are implemented and/or the habitat has been inspected by a qualified Biologist.
- Do not harm, feed, or unnecessarily harass wildlife.
- Manage waste to prevent attracting wildlife to the site. Effective mitigation measures include litter prevention and keeping all trash secured in wildlife-proof containers and promptly removing it from the Site, especially during warm weather.

- Drive slowly and avoid hitting wildlife.
- Manage stockpiles and equipment on Site to prevent wildlife from being attracted to artificial habitat. Cover and contain any piles of soil, fill, brush, rocks and other loose materials and cap ends of pipes where necessary to keep wildlife out. Ensure that trailers, bins, boxes, and vacant buildings are secured at the end of each workday to prevent access by wildlife.
- Check the entire work site for wildlife prior to beginning work each day.
- Inspect protective fencing and/or other installed wildlife exclusion measures daily and after each rain event to ensure their integrity and continued function.
- Monitor construction activities to ensure compliance with the project-specific protocol (where applicable) or any other requirements.
- If SAR are encountered on the worksite, immediately stop all work and comply with the project-specific SAR protocol (where applicable; e.g. contact project Biologist to determine next steps).
- Buildings on Site should be inspected to ensure the absence of snakes, bats, and any other wildlife immediately prior to demolition. Bats may day-roost in buildings while snakes may be present in building foundations/walls in search of food, shelter, and/or overwintering habitat. Any wildlife present in buildings should be removed and safely relocated by a qualified person.
- The *Migratory Birds Convention Act* (Government of Canada, 1994) protects the nests and young of migratory breeding birds in Canada. As such, clearing of trees or vegetation should take place between April 1st and August 15, unless a qualified Biologist has determined that no nesting is occurring within 5 days prior to the clearing (City of Ottawa, 2015).
- Follow the best practices for the construction and maintenance of bird-safe buildings, such as applying visual markers on windows to prevent birds from colliding with glass and reducing the intensity and direction of night lighting (turn off lights at night if possible). See https://flap.org/workplaces-safe-for-birds/ for more resources and tips on designing and maintaining bird-friendly buildings.

8.0 SUMMARY AND RECOMMENDATIONS

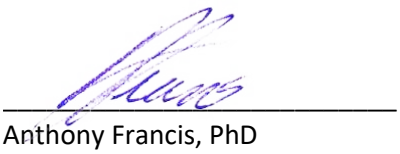
It is our professional opinion that no significant negative impacts are anticipated to SAR or their habitats, or to significant natural heritage features present in the broader project vicinity under the proposed project if all mitigation recommendations provided within this report are followed.

9.0 CLOSURE

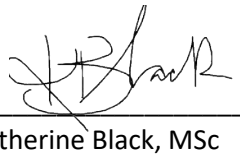
This report was prepared for exclusive use by RVDC and may be distributed only by or in accordance with the instructions of RVDC. Questions relating to the data and interpretation can be addressed to the undersigned.

Respectfully submitted,

KILGOUR & ASSOCIATES LTD.



Anthony Francis, PhD
Project Director



Katherine Black, MSc
Biologist and Project Manager

Ed Malindzak, MSc
Senior Biologist

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Appendix A – Report Authors

Katherine Black, MSc

Ms. Black is a Biologist with a background in vegetation ecology; she has performed vegetation surveys in a variety of natural and disturbed environments, including wetland, tundra, and forest environments. She has also worked on projects in aquatic ecology, ecohydrology, and biostatistics. Ms. Black has worked in a variety of research settings, including technical laboratories, greenhouses, construction sites, and remote fly-in field sites. Since joining Kilgour & Associates Ltd., she has provided technical field and logistical support for Environmental Impact Statements, Tree Conservation Reports, Headwater Drainage Features Assessments, Integrated Environmental Reviews, Constraints Analyses, Existing Conditions Reports, species at risk monitoring, and sorting and identification of aquatic macroinvertebrates. Ms. Black is certified in the Ontario Wetland Evaluation System protocol, Ontario Reptile and Amphibian Survey methods, and Butternut Health Assessment (BHA #731).

Anthony Francis, PhD

Dr. Francis is a Senior Ecologist with 20 years' consulting experience to both government agencies and private industry. He has worked on a diversity of projects relating to species at risk, invasive species, terrestrial and aquatic habitat, environmental effects monitoring and mitigation, and fate/effects of contaminants. Within each of these subject areas, Dr. Francis has completed projects addressing specific site concerns and broader policy initiatives.

In the Ottawa area Dr. Francis helps clients work their way through the land development process by producing key supporting studies such as Environmental Impact Statements, Integrated Environmental Reviews, and by obtaining various permits and approvals from local regulatory agencies including the conservation authorities and Ministries of Environment and Natural Resources. Dr. Francis is our local in-house geomatics specialist, capable of carrying out detailed and complex analyses of geospatial data of plant and animal distribution. He often utilizes his skills to carry out constraint studies prior to a client purchasing or planning a development for a property.

Appendix B – Agency Correspondence

PC2020-0062 – Perth and Ottawa Street Richmond: DRAFT

Friday March 13 2020

Attendance:

May Pham, Caivan

Matthew Hayley, Environmental Planner

Neeti Paudel, Transportation Engineer

Sarah McCormick, Planner

Damien Whittaker, Senior Engineer

Eric Lalande, RVCA

Reid Shepherd, Parks Planner

Cheryl McWilliams, Planner

Matthew Ippersiel, Urban Design (absent)

The proposal relates to residential subdivision development of lands known as the Green lands and the Laffin lands would see an additional approximately 600 plus units. There are a number of separate parcels at 6295, 6363, 6409 Perth Street and 6305 Ottawa Street.

General

Please note that this pre-consultation is only valid for one year. In addition, given the current sanitary servicing constraints in Richmond, capacity may not be available for the development of these sites until the completion of the final stage of the upgrades, which is the full replacement of the pump station not yet scheduled, so possibly 20 years away.

Given the timing and preliminary nature we are available to speak further on these matters and any revised plans.

Planning

- The road widths and cross-section, block depths and proposed setbacks must be demonstrated as supporting trees (one on each lot not just on average) as part of draft approval
- 16.5 m row widths will not be accepted
- The depths of the blocks must be adequate along the west lot line (Village boundary) to preserve any hedge row.
- There are some older trees on the house lot that should be preserved.
- Demonstrate consistency with the CDP and secondary plan for connections. Look at the north side potential of a MUP connecting across the drains to the east side of the van Gaal Drain to connect eventually to Cedarstone. Alternatively consider the hydro corridor. Royal York is the vehicular connection Mattamy is proposing to the village on

the south side. Burke Street connection as shown is also an option, but we would also want to see pedestrian links through to Meynell.
- Demonstrate compliance with the unit counts and density mixes per the CDP and secondary plan
- The sidewalk will need to be extended along Perth Street to the window street west of the Home Hardware.
- Servicing will need to be confirmed as available prior to supporting any draft approval.
- Consider approaching Hydro again with respect to their lands.
- The current version of the draft update to the Master Drainage Plan for the Western Development lands shows a 3rd storm pond within the hydro corridor and seems to be an in-line pond of the van Gaal. This is not acceptable.
- That same MDP is also showing much of the Laffin lands as a storm pond, which is consistent with the current approved version of the MDP but not the concept plan provided.
- An Archaeological Assessment will be needed
- The LandOwners Agreement and trustee sign-off will be required, for any works to commence.
- There is some sensitivity of the residents in Cedarstone Subdivision (north of Perth) to increases in traffic.
- There is a triangle parcel that is not owned and would limit frontage of the southern most lots on Mira.
- There is a small watercourse abutting the Laffin lands that will require some setback

<u>Engineering</u>

This is a follow-up to the pre-application consultation held on Friday March 13, 2020, at City Hall for regarding a proposal PC2020-0062 for development of the balance of the Western development Lands; 6363, 6409 and 6296 Perth Street in the City of Ottawa district of Rideau-Goulbourn (Ward 21) covered by Councillor Scott Moffatt. The purpose of the meeting was to identify and conduct a general overview of the key issues regarding the proposed development to ensure the application, when submitted, will be as complete as possible prior to circulation of the application and review.

Please find below City of Ottawa engineering/infrastructure information regarding an engineering design submission relevant to the proposed development. The information provided will assist the applicant for their plan of subdivision application.

Guidelines;

Please note that as this application is quite premature, the guidelines to be reviewed against will need to be the (future) amended versions, and there may even be guidelines in place then, that are not currently contemplated.

Water/Sanitary/Storm Servicing:

Water pipes:

Municipal water pipes will need to be extended to service the proposed development. The Western Development Lands developments will need to expand the well supply when appropriate and need to collectively expand the water storage at 28 l/s demand.

Sanitary Sewers:

No capacity exists in the sanitary sewer system presently and the application will not be accepted for draft approval for, probably, ten years, or more. Design parameters shall be the higher of the rates in the Sewer Design Guidelines, as amended and monitored flows. The developer shall apply I/I reduction techniques beyond that provided for the Fox Run Phase II development, that presently consists of blueskin wrap to the existing groundwater level and the use of pressure-rated pipe.

Storm Sewers:

The developer will need to extend conveyance systems in the Village of Richmond to include the development and, entirely at their cost, provide such extension.

Storm Water Management:

The consultant should determine a stormwater management regime for the application and, generally, maintain post-development flows to pre-development levels by way of providing storage to offset increased impervious areas. The existing runoff coefficient shall be taken as that from approved development; non-approved development should be ignored by the consultant in the determination of existing runoff coefficient and will not be taken into consideration by City engineering review staff.

Any existing stormwater runoff from adjacent site(s) that crosses the property must be accommodated by the proposed stormwater management design.

Stormwater quality control is required for the site. The Rideau Valley Conservation Authority (RVCA) can be contacted to determine the level of stormwater quality control required for the site.

All stormwater management determinations shall have supporting rationale.

Stormwater management solutions should be in concurrence with the content of the Western Development Lands Master Drainage Plan (MDP) that shows stormwater management ponds on both areas of proposed development; it is not clear how some of the development will proceed as the MDP plan currently shows the Laffin Lands to be entirely a SWM pond and SWM pond 1 was not designed to take more flow nor is there space for it to be expanded.

Please note that the SWM pond and upstream pipe/s and connected manholes shall be held in securities until the pond unit accepts the pond (at a date anticipated to be later than the rest of the subdivision)

A hydrogeoloogical report will be required for each, and all, stormwater management ponds

Please note that LID will be required and that the forthcoming LID policy may impact the design.

Roads:

Please refer to the City of Ottawa Private Approach By-Law 2003-447 for the entrance design.

Please note that Council has adopted a safer roads initiative called the Road Safety Action Plan that requires local residential roads be both, signed and designed to a 30 km/h limit. This means that curvilinear design is required to deny vehicles from achieving speeds accessible on long straight roads.

Please note that 16.5 m ROW will not be permitted for the development.

Please note that 18 m ROW will not be permitted where either sensitive marine clay is found (whether named or not) or a sidewalk is proposed
Please note that a 25 m, or wider, ROW will be required for any road sections with two sidewalks.

Sensitive Marine Clay:

It is understood that sensitive marine clay (or by any other name) exists in the vicinity. Enhanced investigation will be required including, but not limited to: Atterberg limits testing, sensitivity analysis (if sensitivity analysis is not included an exhaustive discussion of why will be required), consolidation testing (cyclic and non-cyclic) and plasticity chart

Discussion of vibration induced loss of strength (by any name) is required

Discussion of retrogressive landslides is required.

Peer-reviewed and published papers may be necessary for the consultant's reviews; any papers/articles/journals/textbooks used shall be sufficiently provided to the City and the reference shall show unmistakable and undeniable concurrence with the consultant's usage.

Relatively impervious clay shall not be accepted as a reason for not applying LID.

High Performance design Standard:

In due time the City will have High Performance Design Standards in place that the proposal will need to adhere to that may include, but not be limited to; enhanced insulation, electrical generation, electrical grid security, reduced energy demand, reduced environmental "footprint".

Permits and Approvals:

Please note that approval through the Ministry of the Environment, Conservation and Parks (MECP), amongst other federal and provincial departments/agencies, including the Rideau Valley Conservation Authority (RVCA), will be required to facilitate the development: responsibility rests with the developer and their consultant for determining which approvals are needed and for obtaining all external agency approvals. The address shall be in good standing with all approval agencies, for example the RVCA, prior to approval. Copies of confirmation of correspondence will be required by the City of Ottawa from all approval agencies that a form of assent is given. Please note that a stormwater program for multiple lots is understood to be the expanded transfer-of-review type of Environmental Compliance

Approval (ECA) application with the MECP; please speak with your engineering consultant to understand the impact of time and cost this has on the application. An MECP ECA is not submitted until after planning approval. No construction shall commence until after a commence work notification is given from an engineering representative from Development Review.

Ministry of the Environment, Conservation and Parks	Rideau Valley Conservation Authority
Contact Information:	Contact Information:
Christina Des Rochers	Eric Lalande
Water Inspector	eric.lalande@rvca.ca
613-521-3450 ext. 231	
Chstina.Desrochers@ontario.ca	

Plan requirements;

Grading and Drainage Plans*

Erosion and Sediment Control Plan/s*

*All identified required plans are to be submitted on standard A1 size sheets as per City of Ottawa Servicing and Grading Plan Requirements and note the survey monument used to establish datum on the plans with sufficient information to enable a layperson to locate the monument.

Report Submission Requirements[1]:

-Site Servicing Report

A plan is required that clearly shows the proposed water service layout.

-Storm Water Management Report

-Erosion and Sediment Control Measures

-Geotechnical Investigation Study

Please note that the area may contain sensitive marine clays. Please note that Atterberg limits, consolidation testing, grade raise restriction, and chemical analysis and discussion will be required in the report if sensitive marine clay is found. The geotechnical consultant will need to provide full copies of any published and peer reviewed papers relied on to determine results and conclusions

Earthquake analysis is now required to be provided in the report.

-Slope Stability Study (if topography deems necessary)

-Phase 1 Environmental Site Assessment (ESA)

The Phase 1 Environmental Site Assessment (ESA) as per O.Reg. 153/04. Phase 1 ESA documents performed to CSA standards are not acceptable.

Please find relevant City of Ottawa Links to Preparing Studies and Plans below:

Guide to preparing drawings for City of Ottawa engineering submissions

https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-and-grading-plan-requirements

Guide to preparing City of Ottawa Studies and Plans:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

Servicing Study Guidelines for Development Applications:

https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-and-grading-plan-requirements

To request City of Ottawa plan(s) or report information please contact the ISD Information Centre:

Information Centre

(613) 580-2424 ext. 44455

Please feel free to contact me if you have any questions.

Damien

Parks Planning

- Area Parks Plan (APP) is currently in place and was approved in 2019.
- The amenities and park sizes in the APP should be considered minimum requirements for any new proposals.
- If unit density is above that which is listed in the APP, park size requirements and/or Cash-in-Lieu will be larger than those required in the APP. These sizes would need to be determined once a more detailed proposal is put forward containing actual unit numbers.
- Parkland funding agreement required to be in place prior to registering any new phases of development in Western Lands.
- Parks recommends that the lotting pattern around the proposed northern parkette be adjusted to shift the park south so that it is adjacent to the hydro corridor that contains a proposed Multi-Use Pathway (MUP). The adjustment will improve connectivity from the MUP to the park, which was the intention behind the proposed location originally shown in the APP.

Reid Shepherd

Environmental Planning

- A Tree Conservation Report and an Environmental Impact Statement will be required
- A preliminary Integrated Environmental Impact Statement will be required at submission, and form part of the Planning Rationale.
- A 30 m setback is require for the watercourses to the north
- A minimum 6 m access will be needed to the watercourse buffer lands – likely best off the north end of the collector road.

Matthew Hayley

Transportation:

- Follow Traffic Impact Assessment Guidelines
    - Traffic Impact Assessment will be required. Proceed to scoping.
    - Start this process asap.
    - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- ROW protection on Perth Street between Eagleson and Village Boundary is 30m even.
- Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings. These drawings should include such items as, but is not limited to:
    - Road Signage and Pavement Marking for the subdivision;
    - Intersection control measure at new internal intersections; and
    - Location of depressed curbs and TWSIs;
    - More details can be provided upon request
- Include traffic calming measures on roads within the limits of their subdivision to limit vehicular speed and improve pedestrian safety. Traffic calming measures shall reference best management practices from the Canadian Guide to Neighbourhood Traffic Calming, published by the Transportation Association of Canada, and/or Ontario Traffic Manual, and/or the City of Ottawa's Draft Traffic Calming Design Guidelines. These measures may include either vertical or horizontal features (such measures shall not interfere with stormwater management and overland flow routing), including but not limited to:
    - intersection or mid block narrowings, chicanes, medians;
    - speed humps, speed tables, raised intersections, raised pedestrian crossings;
    - road surface alterations (for example, use of pavers or other alternate materials, provided these are consistent with the City's Official Plan polices related to Design Priority Areas);
    - pavement markings/signage; and
    - temporary/seasonal installations such as flexi posts or removable bollards.
- Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required:
    - Local Road to Local Road: 3 metre x 3 metres
    - Local Road to Collector Road: 5 metre x 5 metres

    - Collector Road to Collector Road: 5 metre x 5 metres
    - Collector Road to Arterial Road: 5 metre x 5 metres
- Noise Impact Studies required (Road):
    - Feasibility before draft approval
    - Detailed before registration

-Residential streets (local and collector) are to be designed for 30 kph speed limits (posted). (Direction from Councillors and Director of Traffic Services).

Neeti Paudel, P.Eng.

Rideau Valley Conservation Authority

- Some flood plain showing on the lands. Confirm that the realignment of the Van Gaal Drain resolves that
- Looking for 80% TSS removal for water quality
- Require a 30 metre setbacks from the drain to the north side of the Green lands.

Eric Lalande

Green Lands Urban Design Comments

- Ensure lot sizes, ROWs, and setbacks are sufficiently sized to achieve the design guidelines found in Section 7.4 of the Village of Richmond CDP. Currently, there may be enough space to achieve such guidelines as having enough space to plant a tree in the front yard, having a varied building setbacks, or parking a vehicle without it overhanging onto the sidewalk or street.
- Explore opportunities to integrate large-lot, village-style detached dwellings into the development along targeted and highly visible streets. See section 7.4.8 of the Village of Richmond CDP for additional details.
- Include a greater mix of the proposed building typologies. It appears the highest densities units have been clustered south of the hydro corridor.
- Open a vehicular connection to Perth Road as a gateway into the community, as shown in the Richmond CDP Demonstration Plan.
- If a window street is created adjacent to Perth Road, re-orient as many of the properties towards Perth as possible.
- Create pedestrian pathway connections in the north-most block to break up the long block and provide a link to a potential future pedestrian pathway north of the site. The pathways should be aligned with proposed north-south streets to create view corridors.
- It would be preferable to have the park open to the public realm on at least three sides, surrounded by single-loaded streets. Configure surrounding roads to have the park terminate views and offset the street grid.

Laffin Lands Urban Design Comments

- Relocate the proposed park to a more central location in the development that is well connected.
- Include mid-block pedestrian pathways to align with adjacent proposed pathways.

Matt Ippersiel

May 20, 2020 **Our File: CAIV 1015**

Carolyn Hann
Management Biologist
Permissions and Compliance Section
Ontario Ministry of Environment, Conservation and Parks
10-1 Campus Drive
Kemptville, ON
K0G 1J0

Reference: Preliminary species at risk screening for a proposed residential development of the Laffin and Green lands in Richmond, Ottawa, Ontario

Ms. Hann,

1.0 INTRODUCTION

This letter provided by Kilgour & Associates Ltd. (KAL) includes information gathered to conduct a preliminary species at risk (SAR) screening for a proposed residential development located along Perth Street and Ottawa Street in the Village of Richmond in Ottawa (i.e., "the site"). This letter uses the resources and guidelines outlined in the draft document, *Client's Guide to Preliminary Screening for Species at Risk* (Ministry of the Environment, Conservation and Parks (MECP), 2019). Following these guidelines, we have obtained available SAR information for the site from all applicable information sources.

Following the preliminary SAR screening presented in this letter, we are seeking advice and guidance related to potential SAR or habitat suitable for SAR that may interact with the proposed development, along with measures that our client should consider to avoid adverse effects on SAR and their habitat. This letter does not include an assessment of the likelihood of SAR to interact with the proposed development, potential impacts to SAR, or associated mitigation measures. These analyses and recommendations, along with any advice and guidance provided by MECP pertaining to this preliminary SAR screening letter, will be included in the Environmental Impact Statement that KAL will provide to our client.

1.1 Site Overview

The site is made up of six parcels (Figure 1):

- 6295 Perth Street, 6363 Perth Steet, 6409 Perth Street, and two adjacent parcels with unknown civc addresses ("Green" lands); and
- 6305 Ottawa Street ("Laffin" lands).

The zoning of all six parcels is *DR1 – Development Reserve Zone* and they are currently used as agricultural fields. The Laffin lands contain a small (~1.3 ha) wooded area. The Van Gaal Drain flows adjacent to 6295 Perth Street on the Green lands. The main branch of the Jock River is located ~450 m south of the Laffin lands.

Current land use to the west of the more westerly Green lands parcel and to the north of both Green lands parcels is agricultural. Lands to the west and north of Laffin lands and between the two Green lands parcels are former agricultural fields that are currently undergoing regrading and preloading in preparation for site development. Lands to the east of both the Green and Laffin lands are village residential.

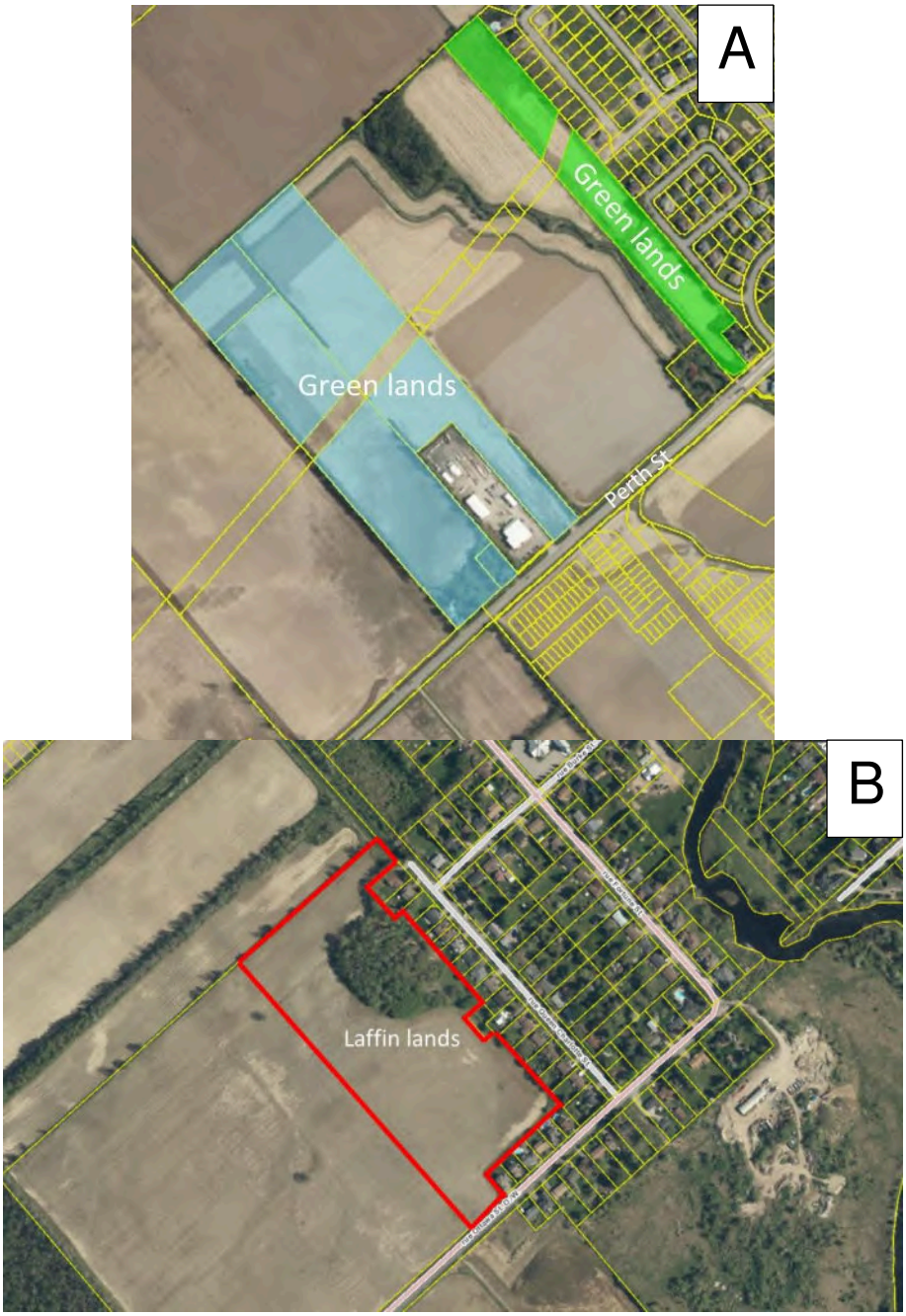

Figure 1 Map showing the locations of the Green lands (Panel A; blue and green parcels) and the Laffin lands (Panel B; outlined in red)

1.2 Project Overview

Both the Green and Laffin lands will be developed as residential communities. Details on the number and type of dwellings, construction phases, etc. are currently not available.

2.0 SPECIES AT RISK RESOURCES REVIEW AND RESULTS

To perform a preliminary SAR screening for the site, we reviewed the following online resources to determine SAR occurrences on and/or nearby the site.

- Make a Map: Natural Heritage Areas (Ministry of Natural Resources and Forestry (MNRF), 2020);
- Land Information Ontario (LIO; Government of Ontario, 2020);
- Atlas of the Breeding Birds of Ontario (Bird Studies Canada et al., 2009);
- eBird (Cornell Lab of Ornithology, 2020);
- iNaturalist (California Academy of Sciences and National Geographic Society, 2020); and
- The Ontario Reptile & Amphibian Atlas (Ontario Nature, 2019).

Twenty-two SAR were identified with potential to occur in or adjacent to the site based on our SAR resources review (Table 1). Note that occurrence data in Table 1 from Make a Map: Natural Heritage Areas, LIO, eBird, and iNaturalist are occurrences within ~5 km of the site. SAR occurrence data from the Atlas of the Breeding Birds of Ontario and the Ontario Reptile & Amphibian Atlas are based on the 10 x 10 km Atlas square that the site falls in (18VR30).

Table 1 Results of our preliminary species at risk screening and the information source associated with occurrence data

Species Name	Information Source
Bald Eagle (*Haliaeetus leucocephalus*)	eBird
Bank Swallow (*Riparia riparia*)	Atlas of the Breeding Birds of Ontario, eBird
Barn Swallow (*Hirundo rustica*)	Make a Map: Natural Heritage Information Centre, Atlas of the Breeding Birds of Ontario, eBird, LIO
Black Tern (*Chlidonias niger*)	eBird
Blanding's Turtle (*Emydoidea blandingii*)	iNaturalist, Ontario Reptile & Amphibian Atlas, LIO
Bobolink (*Dolichonyx oryzivorus*)	Make a Map: Natural Heritage Information Centre, Atlas of the Breeding Birds of Ontario, eBird, LIO
Bogbean Buckmoth (*Hemileuca* sp.)	LIO
Canada Warbler (*Cardellina canadensis*)	eBird
Chimney Swift (*Chaetura pelagica*)	eBird

Species Name	Information Source
Common Nighthawk (*Chordeiles minor*)	Atlas of the Breeding Birds of Ontario, eBird
Eastern Meadowlark (*Sturnella magna*)	Make a Map: Natural Heritage Information Centre, Atlas of the Breeding Birds of Ontario, eBird, LIO
Eastern Wood-pewee (*Contopus virens*)	Make a Map: Natural Heritage Information Centre, Atlas of the Breeding Birds of Ontario, eBird
Evening Grosbeak (*Coccothraustes vespertinus*)	Atlas of the Breeding Birds of Ontario, eBird
Horned Grebe *(Podiceps auritus*)	eBird
Least Bittern (*Ixobrychus exilis*)	eBird
Olive-sided Flycatcher (*Contopus cooperi*)	eBird
Peregrine Falcon (*Falco peregrinus*)	eBird
Rusty Blackbird (*Euphagus carolinus*)	eBird
Snapping Turtle (*Chelydra serpentina*)	Make a Map: Natural Heritage Information Centre, iNaturalist, Ontario Reptile & Amphibian Atlas, LIO
Western Chorus Frog (*Pseudacris triseriata*)	Ontario Reptile & Amphibian Atlas
Wood Thrush (*Hylocichla mustelina*)	Make a Map: Natural Heritage Information Centre, Atlas of the Breeding Birds of Ontario, eBird
Yellow Rail (*Coturnicops noveboracensis*)	Make a Map: Natural Heritage Information Centre, LIO

The local conservation authority (Rideau Valley Conservation Authority) does not have a SAR geodatabase and no additional SAR information was found in their relevant watershed/subwatershed reports. No relevant SAR information for the site was found from local naturalist groups or similar community-based organizations, local indigenous communities, local land trusts, or environmental non-government organizations.

We note that observation records on eBird and iNaturalist are crowd-sourced and rely heavily on data submitted by volunteer citizen scientists that are not necessarily vetted by experts. As such, observation records from eBird and iNaturalist are considered non-confirmed by KAL, but are included in this preliminary SAR screening per recommendations in MECP's SAR screening guidelines (2019).

3.0 CLOSURE

Thank you for considering this preliminary SAR screening for the proposed development of the Laffin and Green lands in Richmond, Ottawa, Ontario. We look forward to any comments you may have. Questions relating to the contents of this letter can be addressed to the undersigned.

Respectfully submitted,

KILGOUR & ASSOCIATES LTD.

Katherine Black, MSc
Project Biologist
E-mail: kblack@kilgourassociates.com
Office: (613) 260-5555
Cell: (647) 202-8725
16-2285 St. Laurent Blvd, Ottawa, ON, K1G 4Z6

Anthony Francis, PhD
Project Lead
E-mail: afrancis@kilgourassociates.com
Office: (613) 260-5555
Cell: (613) 277-4027
16-2285 St. Laurent Blvd, Ottawa, ON, K1G 4Z6

cc: Ed Malindzak (KAL)

4.0 REFERENCES

Bird Studies Canada, OFO, Environment Canada, Ontario Nature, Ministry of Natural Resources. 2009. Atlas of the Breeding Birds of Ontario. Available online at: https://www.birdsontario.org/atlas/index.jsp?lang=en

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Appendix C – Van Gaal Realignment Permits

RVCA Letter of Permission —

Ont. Reg. 174/06, S. 28 *Conservation Authorities Act* 1990, As Amended.

January 23, 2020
File: RV5-2919
Contact: hal.stimson@rvca.ca (613) 692-3571 Ext 1127

Rideau Valley Conservation Authority

3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504
F 613-692-0831 | www.rvca.ca

Mr. David Ryan
City of Ottawa
2155 Roger Stevens Dr.
North Gower, ON
K0A 2T0

Permit to alter a waterway under Section 28 of the *Conservation Authorities Act* for alterations to a municipal drain at Lot 22, Concession 3, Goulbourn Township, now in the Citv of Ottawa.

Dear Mr. David Ryan,

The Rideau Valley Conservation Authority has reviewed your application on behalf of the City of Ottawa and understands the proposal to be for:

> **The realignment of the Van Gaal Municipal Drain in accordance with the amended engineers report as prepared by Robinson Consulting dated January 2019 and approved by Ottawa City Council in June 2019. The watercourse is a tributary of the Jock River and is being relocated to accommodate area development. The new design is features natural channel design principles and upon completion is intended to reconfigure the existing flood plain. Final grades will need to be confirmed and submitted prior to RVCA accepting a change to the regulatory flood plain limits.**

This proposal was reviewed under Ontario Regulation 174/06, the "*Development, Interference with Wetlands, and Alteration to Watercourse and Shorelines*" regulation and the RVCA Development Policies (approved by the RVCA, Board of Directors), specifically Section 3.0 Alteration to Waterways. The proposal is not expected to impact the control of flooding, pollution, erosion or conservation of land providing conditions are followed.

PERMISSION AND CONDITIONS

By this letter the Rideau Valley Authority hereby grants you approval to undertake this project as outlined in your permit application but subject to the following conditions:

1. Approval is subject to the understanding of the project as described above and outlined in the application and submitted plans including:
    - Report titled "Amendments to the Engineer's Report for the Van Gaal Municipal Drain", Project No. B13056 prepared by Robinson Consultants Inc. Consulting Engineers dated January 2019.

- Drawing by NAK Design Strategies entitled Planting Plan III, Revision 9 dated May 30, 2019.
- Drawing by Coldwater Consulting Ltd. entitled Sections, Village of Richmond Channel Re-Alignment, Revision 6, dated May 27, 2019.
- Drawing by Coldwater Consulting Ltd. entitled Village of Richmond Channel Re-Alignment, Revision 6, dated May 27, 2019.

2. **A De-watering Plan and Sediment and Erosion Control Plan must be submitted by the contractor to this office for review prior to construction activities commencing.**

3. Any excess excavated material, as a result of the work or on-going maintenance, must be disposed of off-site in accordance with the Engineers Report or in a suitable location outside any regulatory floodplain and fill regulated area. RVCA must be consulted to ensure fill is not placed elsewhere within a flood plain.

4. It is recommended that you retain the services of a professional engineer to conduct on-site inspections to ensure adequacy of the work, verify stability of the final grade and slopes and confirm all imported fill is of suitable type and has been adequately placed and compacted.

5. **A final as built grading plan shall be submitted upon completion of the approved works prepared by an Ontario Land Surveyor or Professional Engineer licensed to practice in Ontario indicating that grades achieved on the site conform to those indicated on the approved plan and that the proposed flood plain storage volumes are achieved.**

6. Upon completion of the work a post effectiveness monitoring program is to be undertaken with monitoring and reporting after years 1,3 and 5 to ensure the compensation works are functioning as intended. The post effectiveness monitoring plan should contain a contingency plan for any necessary corrective actions.

7. Work in-water shall not be conducted at times when flows are elevated due to local rain events, storms or seasonal floods. Existing stream flows must be maintained downstream of the de-watered work area without interruption, during all stages of the work. There must be no increase in water levels upstream of the de-watered work area.

8. Only clean non-contaminated fill material will be used, and all work is to occur on your property, or if on other property, only with full authorization of the owner(s).

9. Sediment barriers should be used on site in an appropriate method according to the Ontario Provincial Standard Specifications (OPSS) for silt barriers as a minimum. If the sediment and erosion control methods include silt fence it should be placed along the shoreline to prevent overland flow on disturbed areas from entering the watercourse. Soil type, slope of land, drainage area, weather, predicted sediment load and deposition should be considered when selecting the type of sediment/erosion control.

10. Demolition or construction debris is not to be deposited in the waters of any creek; inert concrete/asphalt debris will be considered a deleterious substance. An emergency spill kit should be kept on site in case of fluid leaks or spills from machinery.

11. Sediment and erosion control measures shall be in place before any excavation or construction works commence. All sediment/erosion control measures are to be monitored

regularly by experienced personnel and maintained as necessary to ensure good working order. If the erosion and sedimentation control measures are deemed not to be performing adequately, the contractor shall undertake immediate additional measures as appropriate to the situation to the satisfaction of the Conservation Authority.

12. All materials and equipment used for the purpose of site preparation and project completion must be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt, debris etc.) from entering the water.

13. The waters of the creek are NOT to be considered as machine staging areas. Activities such as equipment refuelling, and maintenance must be conducted away from the water to prevent entry of petroleum products, debris, or other deleterious substances into the water. All in-stream work on the new channel should be completed in the dry.

14. Operate machinery from outside the water, or on the water in a manner that minimizes disturbance to the banks or bed of the watercourse. Equipment shall not be cleaned in the watercourse or where wash-water can enter any watercourse. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.

15. All disturbed soil areas must be appropriately stabilized to prevent erosion.

16. It is recommended that you ensure your contractor(s) are provided with a copy of this letter to ensure compliance with the conditions listed herein.

17. Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. This plan is to include measures to: a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse and downstream receiving watercourses; b) notify the RVCA and all applicable authorities in the area c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.

18. **There will be no in-water works between March 15 and June 30, of any given year to protect local aquatic species populations during their spawning and nursery time periods.**

19. Any aquatic species (fish, turtles) trapped within an enclosed work area are to be safely relocated outside of the enclosed area to the main watercourse downstream of the work zone.

20. The RVCA is to receive 48 hours' notice of the proposed commencement of the works to ensure compliance with all conditions. The applicant agrees that Authority staff may visit the subject property before, during and after project completion to ensure compliance with the conditions as set out in this letter of permission.

21. A new application must be submitted should any work as specified in this letter be ongoing or planned for or after January 23, 2022.

All other approvals as might be required from the Municipality, and/or other Provincial or Federal Agencies must be obtained prior to initiation of work. This includes but is not limited to the Drainage Act, the Endangered Species Act, the Ontario Water Resources Act, Environmental Protection Act, Public Lands Act, or the Fisheries Act.

By this letter the Rideau Valley Conservation Authority assumes no responsibility or liability for any flood, erosion, or slope failure damage which may occur either to your property or the structures on it or if any activity undertaken by you adversely affects the property or interests of adjacent landowners. This letter does not relieve you of the necessity or responsibility for obtaining any other federal, provincial or municipal permits. This permit is not transferable to subsequent property owners.

Should you have any questions regarding this letter, please contact Hal Stimson.

Terry K. Davidson

Terry K. Davidson P.Eng
Conservation Authority S. 28 Signing delegate
O. Reg. 174/06

c.c. A. Robinson, P. Eng., Robinson Consultants
K. Murphy, P. Eng., DSEL
A. Finnson, Caivan

- Pursuant to the provisions of S. 28(12) of the Conservation Authorities Act (R.S.O.1990, as amended.) any or all of the conditions set out above may be appealed to the Executive Committee of the Conservation Authority in the event that they are not satisfactory or cannot be complied with.
- Failure to comply with the conditions of approval or the scope of the project may result in the cancelling of the permission and/or initiation of legal action under S. 28(16) of the Act.
- Commencement of the work **and/or** a signed and dated copy of this letter indicates acknowledgement and acceptance of the conditions of the RVCA's approval letter concerning the application and the undertaking and scope of the project.

Name: _____ (print)

Signed: _____ Date: _____

Fisheries and Oceans Canada | Pêches et Océans Canada

Central and Arctic Region
520 Exmouth Street
Sarnia, Ontario
N7T 8B1

Région du centre et de l'arctique
520 rue Exmouth
Sarnia, Ontario
N7T 8B1

Your file *Votre référence*

April 1, 2020

Our file *Notre référence*

19-HCAA-00218

Project Manager
Richmond Village Development Corporation
2934 Baseline Road, Suite 302
Ottawa, ON
K2H 1B2

Attention: May Pham

Subject: Van Gaal Drain channel realignment – *Fisheries Act* Authorization

Dear Ms. Pham:

Pursuant to Paragraphs 34.4(2)(b) and 35(3)(b) for the authorization for work/undertaking/activity resulting in harmful alteration, disruption or destruction of fish habitat under the *Fisheries Act*, Fisheries and Oceans Canada (DFO) authorizes the carrying on of your proposed work, undertaking or activity that results in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*.

The proposed project involves the realignment of approximately 900 m of the Van Gaal Drain that will result in the destruction of approximately 6,940 m^2 of fish habitat. The authorization under paragraphs 34.4(b) and 35(2)(b) of the *Fisheries Act* is attached.

Failure to comply with any of the terms or conditions of the attached authorization may lead to prosecution under the *Fisheries Act*.

A copy of this authorization should be kept on site while the work is in progress and upon request be provided to relevant federal or provincial officials. The authorization holder is responsible for ensuring work crews are familiar with, and able to adhere to, the conditions.

If you or anyone conducting work on your behalf have any questions please contact Jane Tymoshuk at our Burlington office at 365-292-0537 or by email at jane.tymoshuk@dfo-mpo.gc.ca.

Yours sincerely,

David Nanang, PhD
Regional Director General
Central & Arctic Region
Fisheries and Oceans Canada

CC: Jane Tymoshuk – Fisheries and Oceans Canada
Anthony Francis – Kilgour and Associates

ATTACHMENT: *Fisheries Act* Authorization

Paragraphs 34.4(2)(b) and 35(2)(b) *Fisheries Act* Authorization

Authorization issued to
Richmond Village Development Corporation *(hereafter referred to as the "Proponent")*
2934 Baseline Road, Suite 302
Ottawa, ON
K2H 1B2

Attention to:
May Pham, Project Manager

Location of Proposed Project
6335 Perth Street
Ottawa, ON
K0A 2Z0

Nearest community (city, town, village): Richmond
Municipality, district, township, county: City of Ottawa
Province: Ontario
Name of watercourse, waterbody: Van Gaal Drain
Longitude and latitude, UTM Coordinates: 18N 433300m E, 5004500m N

Description of Proposed Project

The proposed project of which the work, undertaking or activity authorized is a part involves:

To accommodate a new residential community, Richmond Village Development Corporation (RVDC) proposes to realign a portion of the Van Gaal Drain to increase the number of housing units on their property. The new channel will be relocated along the north and east boundaries of the property in a naturalized riparian corridor and reconnected to the existing channel (Arbuckle Drain) downstream at Perth Street in Richmond, Ontario.

Description of Authorized work(s), undertaking(s) or activity(ies) likely to result in the harmful alteration, disruption or destruction of fish habitat:

The work(s), undertaking(s), or activity(ies) associated with the proposed project described above, that are likely to result in the harmful alteration, disruption or destruction of fish habitat, are:

- Construction of a realigned channel for approximately 900 m of the Van Gaal Drain.

The authorized work(s), undertaking(s), or activity(ies) are likely to result in the following impacts to fish and fish habitat:

- Destruction of approximately 6,940 m^2 of habitat in the existing Van Gaal Drain as a result of permanent infilling of the existing channel.

Conditions of Authorization

The above described work, undertaking or activity must be carried on in accordance with the following conditions.

1. **Conditions that relate to the period during which the work, undertaking or activity can be carried on:**

   The work, undertaking or activity that is/are authorized to be carried on during the following period:

   From date of issuance to November 30, 2020

   If the Proponent cannot complete the work, undertaking or activity during this period, Fisheries and Oceans Canada (DFO) must be notified in advance of the expiration of the above time period. An application for amendment, suspension or cancellation of the authorization should be submitted to DFO.

   The periods during which other conditions of this authorization must be complied with are provided in their respective sections below.

2. Conditions that relate to measures and standards to avoid and mitigate impacts to fish and fish habitat:

2.1 Sediment and erosion control: Sediment and erosion control measures must be in place and shall be upgraded and maintained, such that release of sediment is avoided at the location of the authorized work, undertaking, or activity.

- 2.1.1 All erosion and sediment controls shall be in place and functioning around the area of planned daily work and offsetting activity prior to work commencing.
- 2.1.2 Erosion and sediment control measures shall be inspected daily and repaired or upgraded as required and temporary measures removed once the sites are stabilized.
- 2.1.3 All in-water works shall be conducted in an isolated area using coffer dams, turbidity curtains, or similar techniques when increased turbidity is anticipated.
- 2.1.4 Construction activities shall be scheduled to avoid rainy periods that may increase erosion and sedimentation.
- 2.1.5 Sediment-laden water from dewatering activities shall be managed to effectively mitigate the entry of sediment into any waterbody.
- 2.1.6 All pumped water shall be released with energy control systems in place to prevent scour.
- 2.1.7 All fill material, including construction rubble, rock, and soil, to be used in construction shall be clean and free of fine materials and debris prior to placement.
- 2.1.8 Clearing of riparian vegetation shall be kept to a minimum and where removal is necessary, proper clearing techniques shall be used.
- 2.1.9 Stockpiled material shall be stored in a manner that prevents its entry into nearby waterbodies.
- 2.1.10 All areas disturbed by any activity associated with the project shall be stabilized through revegetation with native species, suitable for the site, upon completion of the work.

2.2 List of measures and standards to avoid and mitigate impacts to fish and fish habitat:

- 2.2.1 Timing for in-water work(s), undertaking(s), or activity(ies) shall comply with the restricted activity period specified by the Ministry of Natural Resources and Forestry for the

protection of the local fish community during their critical life stages. No in-water works to be conducted from **March 15 to June 30** in any year.

2.2.2 Fish shall be removed from work areas (isolated and dewatered construction areas) by a qualified fisheries professional using standard, non-lethal methodology and multi-pass elimination and shall be relocated immediately into the drain downstream of the work area.

2.2.3 All water intakes used to dewater area(s) that may contain fish shall be screened according to DFO's *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995).

2.2.4 All machinery shall arrive on site in a clean condition and be maintained free of fluid leaks, noxious weeds, and invasive species.

2.2.5 Machinery shall be washed, refuelled, and serviced in such a way as to prevent any deleterious substances from entering the water.

2.2.6 A Spill Management Plan shall be implemented in the event of accidental spill.

2.3 Contingency measures: Described below, and as set out in the Van Gaal Drain Application, shall be put in place if monitoring required in condition 3 below indicates that the measures and standards to avoid and mitigate serious harm to fish are not successful.

2.3.1 Should a breach into the isolated work area occur, fish shall be salvaged using methodology outlined in section 2.2.2. The breach shall be identified and repaired prior to the recommencement of in-water work, with additional mitigation measures being implemented to ensure a breach does not re-occur.

2.3.2 Should monitoring of erosion and sediment control measures show that they are not functioning as intended, all work shall be halted and the issue corrected, or secondary control measure installed, prior to work recommencing.

2.3.3 Should re-suspended sediment be observed migrating outside of the work site, or monitoring of the turbidity identifies that levels are in exceedance of CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life Total Particulate Matter and not settling within the expected timeframe, work shall cease and additional mitigation measures shall be installed to isolate the work area.

2.4 Dates by which these measures and standards shall be implemented: Measures and standards to avoid and mitigate impacts to fish and fish habitat shall be implemented prior to the commencement of construction activities and be maintained until project completion.

3. Conditions that relate to monitoring and reporting of measures and standards to avoid and mitigate impacts to fish and fish habitat:

3.1 Monitoring of avoidance and mitigation measures: The Proponent shall monitor the implementation of avoidance and mitigation measures referred to in section 2 of this authorization and report to DFO on a monthly basis until construction is complete and indicate whether the measures and standards to avoid and mitigate impacts to fish and fish habitat were conducted according to the conditions of this authorization. This shall be done, by:

3.1.1 Demonstration of effective implementation and functioning: Providing dated photographs and inspection reports to demonstrate effective implementation and functioning of mitigation measures and standards described above to limit the impacts to fish and fish habitat to what is covered by this authorization.

3.1.2 Contingency measures: Providing details of any contingency measures that were followed, to prevent impacts greater than those covered by this authorization in the event that mitigation measures did not function as described.

3.2 Other monitoring and reporting conditions: Not Applicable

4. **Conditions that relate to offsetting**

4.1 Letter of credit: DFO may draw upon funds available to DFO as the beneficiary of the letter of credit provided to DFO ($1,427,393.55) as part of the application for this authorization, to cover the costs of implementing and maintaining the offsetting measures required to be implemented under this authorization, including the associated monitoring measures included in section 5 of this authorization, in instances where the Proponent fails to implement these required measures.

4.2 Scale and description of offsetting measures: Offsetting shall be undertaken on the Fox Run Community development property north of Perth Street, Richmond, Ontario. The offsetting measures shall be carried out in accordance with the measures set out in the Proponent's offsetting plan dated February 23, 2017 (Coldwater, 2017). Measures shall include:

- 4.2.1 As per the Design Brief (Coldwater, 2017) for the proposed project, a new alignment for the west branch of the drain shall be constructed with channel improvements.
- 4.2.2 Similar improvement in the east branch shall occur but with the direction of flow reversed to convey flows from the west branch across the northwest edge of the site so the confluence of the east and west branches shall occur at the north corner of the property.
- 4.2.3 A new channel shall be constructed for the main drain in a southeast direction along the east side of the property and shall reconnect to the original channel immediately upstream of the existing culvert crossing under Perth St in the southeast corner of the site.
- 4.2.4 All segments of the new alignment shall follow natural-channel design principles, within a broader, bankfull channel with a sinuous low-flow channel (with a base width of approximately 1.0 m and side slopes of 2H:1V).
- 4.2.5 Six (6) boulder (300 mm to 600 mm diameter) cross-vanes shall be constructed within the new alignment (two (2) within the west branch and four (4) within the main drain).
- 4.2.6 Four (4) to five (5) boulders (600 mm to 900 mm diameter) shall be embedded in the stream bed as clusters upstream of each cross-vane.
- 4.2.7 Pools shall be excavated (0.5 m deep and 2.0 m long) downstream of the cross-vanes and lined with 300 mm of 'Type A' river gravel.
- 4.2.8 The bend at the confluence of the west and east branches shall be lined with R50 riprap.
  - 4.2.8.1 Live stakes shall be planted in the riprap along the upper slope of the main channel.
  - 4.2.8.2 Along the upper slope, lower slope, and channel bottom, the R50 riprap shall be top-dressed with 'Type A' river gravel.
  - 4.2.8.3 A stilling basin shall be formed at the junction of the west and east branches.
- 4.2.9 Two (2) sedimentation basins (1.0 m depth) shall be excavated in the realignment at the upstream end of the west branch and at the downstream end of the main drain. Basins shall be lined with 300 mm of 'Type A' river gravel.
- 4.2.10 All channel realignment segments shall be situated within a re-naturalized riparian corridor planted with native shrubs and trees as well as seed mixes to increase shading of the channel.

4.3 Offsetting criteria to assess the implementation and effectiveness of the offsetting measures: All fish habitat offsetting measures shall be completed and functioning according to the criteria below and as set out in the Proponents Offsetting Plan:

- 4.3.1 All offset structures and features shall be shown to be constructed as designed and stable, and shall be assessed by visual inspection.
- 4.3.2 The channel realignment shall be constructed by November 30, 2020 and shall be available to fishes immediately after construction. As-built report shall be provided no later than

December 31, 2020. The offsetting channel shall be assessed for fish presence and abundance, including evidence of at least three (3) native fish species (including White Sucker, Common Shiner and Mottled Sculpin) occupying the new channel and habitat features.

4.4 Contingency measures: If the results of monitoring, as required in section 5, indicate that the offsetting measures are not completed by the date specified and/or are not functioning according to the above criteria in 4.3, the Proponent shall give written notice to DFO and shall implement the contingency measures and associated monitoring measures, as contained within the approved offsetting plan (referenced in section 4.2), and, as set out in section 5 of this authorization, to ensure the implementation of the offsetting measures is completed and/or functioning as required by this authorization.

4.4.1 Scale and description of contingency measures: Should the initial offsetting plan not meet the requirements for offsetting associated with the authorization, the Proponent shall conduct the necessary works, undertakings or activities, to ensure the structural stability and ongoing functionality of any contingency offsetting habitat to the satisfaction of DFO.

4.4.2 Monitoring measures to ensure offsetting contingency is completed and/or functioning as required: The Proponent shall conduct monitoring as per the Offsetting Plan with additional requirements as determined by DFO, to document the success of any contingency offsetting habitat to the satisfaction of DFO, to meet the offsetting requirement associated with the Authorization.

4.5 The Proponent shall not carry on any work, undertaking or activity that will adversely impact the offsetting measures.

4.6 Other conditions related to offsetting: Not applicable.

5. **Conditions that relate to monitoring and reporting of implementation of offsetting measures (described in section 4):**

5.1 Schedule(s) and criteria: The Proponent shall conduct monitoring of the implementation of offsetting measures according to the timeline and criteria in the offsetting plan found in the :

5.1.1 List of timeline(s) and monitoring and reporting criteria:

5.1.1.1 Monitoring shall commence the year following the completion of construction to allow the habitat time to naturalize and become functional.

5.1.1.2 Form and stability of habitat features shall be assessed through visual inspections in spring of 2021 and 2023.

5.1.1.3 Fish habitat offsetting measures and any potential habitat limitations or enhancement opportunities shall be assessed through visual observation in spring of 2021 and 2023.

5.1.1.4 Fish presence shall be monitored at the offsetting features at a minimum of mid-spring in 2021 and 2023.

5.1.1.4.1 Fish sampling efforts (fish presence and abundance assessments) shall focus on the habitat usage by various fish species at various sample points (to be determined by the project biologist) along the length of the realignment.

5.1.1.5 A digital photographic record of pre-construction, during construction, and post-construction conditions shall be compiled using the same vantage points and direction to show that the approved works have been completed in accordance with the offsetting plan including offsetting and enhancement measures, site stabilization and restoration works.

5.2 List of reports to be provided to DFO: The Proponent shall report to DFO on whether the offsetting measures were conducted according to the conditions of this authorization by providing the following:

5.2.1 As-built report shall be due on or before December 31, 2020.
5.2.2 The results of the monitoring and reporting of the implementation of offsetting measures (described above in section 5.1.1) shall be submitted in an annual report to DFO before July 31st of each monitoring year (2021 and 2023).

5.3 Other monitoring and reporting conditions for offsetting: Not applicable.

Authorization Limitations and Application Conditions

The Proponent is solely responsible for plans and specifications relating to this authorization and for all design, safety and workmanship aspects of all the works associated with this authorization.

The holder of this authorization is hereby authorized under the authority of Paragraphs 34.4(2)(b) and 35(2)(b) of the *Fisheries Act*. R.S.C., 1985, c.F-14, to carry on the work(s), undertaking(s) and/or activity(ies) that are likely to result in impacts to fish and fish habitat as described herein.

This authorization does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

This authorization does not permit the deposit of a deleterious substance in water frequented by fish. Subsection 36(3) of the *Fisheries Act* prohibits the deposit of any deleterious substances into waters frequented by fish unless authorized by regulations made by Governor in Council.

At the date of issuance of this authorization, no individuals of aquatic species listed under the *Species at Risk Act* (SARA) were identified in the vicinity of the authorized works, undertakings or activities.

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the unauthorized death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to (http://www.dfo-mpo.gc.ca/pnw-ppe/CONTACT-eng.html).

The failure to comply with any condition of this authorization constitutes an offence under Paragraph 40(3)(a) of the *Fisheries Act* and may result in charges being laid under said Act.

A copy of this authorization should be kept on site while the work is in progress and upon request be provided to relevant federal or provincial officials. The authorization holder is responsible for ensuring work crews are familiar with, and able to adhere to, the conditions.

This authorization cannot be transferred or assigned to another party. If the work(s), undertaking(s) or activity(ies) authorized to be conducted pursuant to this authorization are expected to be sold or transferred, or other circumstances arise that are expected to result in a new Proponent taking over the work(s), undertaking(s) or activity(ies), the Proponent named in this authorization shall advise DFO in advance.

Date of Issuance: ___April 1, 2020_____

Approved by: _____

David Nanang, PhD
Regional Director General
Central and Arctic Region
Fisheries and Oceans Canada

Appendix D– Tree Conservation Report

The Tree Conservation Report

1. Inventory of the trees currently on site, including species composition, size, age, and condition and health of the trees.

Descriptions of trees in a TCR within contiguously treed areas for the purposes of supporting land development need only identify the mix of tree species present and their size ranges if the cluster is otherwise "unremarkable", as opposed to detailing every tree. However, detailed locations must still be provided for trees of "notable" size, species type or character (Mark Richardson, City of Ottawa Planning Forester, personal communication, March 13, 2020).

The 0.9 ha FOD7 woodlot (TCR Figure 1) has Manitoba Maple as the dominant species. Manitoba Maples in the woodlot are all relatively healthy mature trees with an average diameter at breast height (DBH) of ~22 cm, with sizes ranging from < 10 cm to 58 cm. Green Ashes, the second most abundant species, have a DBH range of <10 cm to 61 cm, with an average DBH of ~24.5 cm. All canopy-sized Green Ash trees in the woodlot have signs of insect predation, peeling bark, and no live buds or crowns. Some Green Ash trees have live epicormic branching on lower branches which is indicative of physiological stress. Subdominant species include American Elms (DBH range: <10 cm to 11.5 cm), a few White Cedars (DBH range: 20 to 30 cm), and a couple Trembling Aspens (DBH = 12 cm). Six five Bur Oaks (average DBH = 50 cm), were present in the wood and were considered to be "notable". These Bur Oaks were specifically mapped and measured (TRC Table 1; TCR Figure 1); other trees within the FOD7 woodlot were not individually enumerated.

The tree community (i.e. trees with DBH >10 cm) in the remainder of the development area consisted of 12 species of trees scattered along the perimeters of agricultural fields (TCR Table 1; TCR Figure 1).

TCR Table 1. Trees on site

Tree #	Species	Diameter (cm)	Notes
Laffin Lands Parcel ("Notable" trees within the FOD7 Woodlot)			
1	Bur Oak (*Quercus macrocarpa*)	53	No apparent health or structural issues
2	Bur Oak (*Quercus macrocarpa*)	32.1	No apparent health or structural issues
3	Bur Oak (*Quercus macrocarpa*)	61.5	No apparent health or structural issues
4	Bur Oak (*Quercus macrocarpa*)	45.5	No apparent health or structural issues
5	Bur Oak (*Quercus macrocarpa*)	55.6	Poor health, peeling bark
Laffin Lands Parcel (Trees not within the FOD7 Woodlot)			
6	Bur Oak (*Quercus macrocarpa*)	61.5	Stand alone on NW corner of site
Green Lands Parcel (West)			
7	Trembling Aspen (*Populus tremuloides*)	25	No apparent health or structural issues
8	Trembling Aspen (*Populus tremuloides*)	13.5	No apparent health or structural issues
9	Trembling Aspen (*Populus tremuloides*)	38	No apparent health or structural issues
10	Trembling Aspen (*Populus tremuloides*)	33.5	No apparent health or structural issues
11	Trembling Aspen (*Populus tremuloides*)	33.5	No apparent health or structural issues
12	Trembling Aspen (*Populus tremuloides*)	39	No apparent health or structural issues
13	American Elm (*Ulmus americana*)	41.5	No apparent health or structural issues
14	Trembling Aspen (*Populus tremuloides*)	32.5	Dead
15	Trembling Aspen (*Populus tremuloides*)	32.5	Grapevine on tree, 3 dead Trembling aspen surround this tree
16	Trembling Aspen (*Populus tremuloides*)	20	No apparent health or structural issues
17	Trembling Aspen (*Populus tremuloides*)	32.5	Covered in Wild Grape
18	Trembling Aspen (*Populus tremuloides*)	19	No apparent health or structural issues
19	Trembling Aspen (*Populus tremuloides*)	37	Dead, no foliage no bug holes
20	Trembling Aspen (*Populus tremuloides*)	48	No apparent health or structural issues

Tree #	Species	Diameter (cm)	Notes
21	Bur Oak (*Quercus macrocarpa*)	52.5	No apparent health or structural issues
22	Trembling Aspen (*Populus tremuloides*)	12	Trunk is snapped
23	Ash (Fraxinus sp.)	40	Nearly dead, some branching
24	Bur oak (*Quercus macrocarpa*)	27.5	No apparent health or structural issues
25	2 dead snags	25.5 and 20	No apparent health or structural issues
26	Trembling Aspen (*Populus tremuloides*)	37.5	No apparent health or structural issues
27	Bur Oak (*Quercus macrocarpa*)	25	Wild Grape
28	Bur Oak (*Quercus macrocarpa*)	20.5	Wild Grape
29	Trembling Aspen (*Populus tremuloides*)	42.5 and 47.5	First one is missing its crown
30	Bur Oak (*Quercus macrocarpa*)	72	No apparent health or structural issues
31	2 dead ash (*Fraxinus* sp.)	12 and 12	No bark, no buds
32	Trembling Aspen (*Populus tremuloides*)	32	No apparent health or structural issues
33	2 Trembling Aspen (*Populus tremuloides*)	35 and 35	Both missing their crowns
34	Trembling Aspen (*Populus tremuloides*)	40	No apparent health or structural issues
35	2 Manitoba Maple (*Acer negundo*)	35.5	2 stems (largest stem measurement indicated)
36	Trembling Aspen (*Populus tremuloides*)	38.5	Missing crown, peeling bark
37	Trembling Aspen (*Populus tremuloides*)	37.5	Missing main crown and missing some leaves
38	Trembling Aspen (*Populus tremuloides*)	33	Missing crown, has some branching
39	Bur Oak (*Quercus macrocarpa*)	13	No apparent health or structural issues
40	Trembling Aspen (*Populus tremuloides*)	33	Lot's of bark loss, covered in wild grape
41	Trembling Aspen (*Populus tremuloides*)	53.5	A lot of wild grape
42	American Elm (*Ulmus americana*)	48	Dead tree, 2 stemmed (largest stem measurement indicated)
43	American Elm (*Ulmus americana*)	31	Dead tree with cavities, no bark
44	Ash (*Fraxinus* sp.)	54	Multi-stemmed dead canopy
45	2 Common Apple (*Malus* sp.)	16 and 16	Covered in Wild grape
46	Bur Oak (*Quercus macrocarpa*)	23.5	No apparent health or structural issues
47	Ash (Fraxinus sp.)	38	2 stemmed, dead
48	Bur Oak (*Quercus macrocarpa*)	25	No apparent health or structural issues
49	Bur Oak (*Quercus macrocarpa*)	57.5	No apparent health or structural issues
50	Bur Oak (*Quercus macrocarpa*)	25	wild grape
51	Green Ash (*Fraxinus pennsylvanica*)	22	Almost dead, some epicormic branching
52	Green Ash (*Fraxinus pennsylvanica*)	38.5	Canopy almost dead, wild grape, some epicormic branching
53	Manitoba Maple (*Acer negundo*)	19	2 stems (largest stem measurement indicated)
54	Ash (*Fraxinus* sp.)	81	Dead branches, some foliage
55	Manitoba Maple (*Acer negundo*)	11	Dead snag (30cm), dead bark
56	American Elm (*Ulmus americana*)	61	Minimal branch dieback
57	Bur Oak (*Quercus macrocarpa*)	34	No apparent health or structural issues
58	Bur Oak (*Quercus macrocarpa*)	27	Wild Grape
59	Green Ash (*Fraxinus pennsylvanica*)	46	Canopy dead, branching at base
60	American Elm (*Ulmus americana*)	16.5	No apparent health or structural issues
61	Bur Oak (*Quercus macrocarpa*)	32	2 stems, dead leaf cluster
62	Bur Oak (*Quercus macrocarpa*), 3 Green Ash (*Fraxinus pennsylvanica*)	13	All Green Ash are about 30cm
63	2 Bur Oaks (*Quercus macrocarpa*)	21 and 21	No apparent health or structural issues
64	Green Ash (*Fraxinus pennsylvanica*)	31	Dead canopy, epicormic branching
65	Bur Oak (*Quercus macrocarpa*)	13	No apparent health or structural issues
66	Bur Oak (*Quercus macrocarpa*)	32	No apparent health or structural issues
67	2 Green Ash (*Fraxinus pennsylvanica*)	32.5 and 32.5	No apparent health or structural issues
68	Bur Oak (*Quercus macrocarpa*)	41.5	Wild Grape, Low branch dieback
69	Bur Oak (*Quercus macrocarpa*)	32.5	No apparent health or structural issues
70	Green Ash (*Fraxinus pennsylvanica*)	63	Dead Canopy
71	Bur Oak (*Quercus macrocarpa*)	41.5	No apparent health or structural issues
72	Green Ash (*Fraxinus pennsylvanica*)	46	Dead canopy, epicormic branching
73	Green Ash (*Fraxinus pennsylvanica*)	50	Wild grape, some canopy alive, branch dieback
74	Manitoba Maple (*Acer negundo*)	30	Copius rapevine
75	Green Ash (*Fraxinus pennsylvanica*)	20	Grapevine, canopy dieback
76	Green Ash (*Fraxinus pennsylvanica*)	29	some branch dieback

Tree #	Species	Diameter (cm)	Notes
77	Green Ash (*Fraxinus pennsylvanica*)	60.5	Crown completely dead, significant bark loss, epicormic branching
78	Green Ash (*Fraxinus pennsylvanica*)	41	Dead canopy, wild grape
79	Green Ash (*Fraxinus pennsylvanica*)	60	Crown almost completely dead
80	Green Ash (*Fraxinus pennsylvanica*)	34	Dead tree
81	American Elm (*Ulmus americana*)	20	
82	Manitoba Maple (*Acer negundo*)	28	4 stems, one has fallen over
83	9 Green Ash (*Fraxinus pennsylvanica*)	22-27	9 Green Ashes in the row, All have dead crowns and epicormic branching
84	2 Manitoba Maple (*Acer negundo*)	30 and 30	No apparent health or structural issues
85	Manitoba Maple (*Acer negundo*)	21	No apparent health or structural issues
86	Cluster of Manitoba Maple (*Acer negundo*)	Average 10cm	All are healthy
87	4 Trembling Aspen (*Populus tremuloides*)	20.5, 38, 12.5, 18.5	All healthy, last one has is covered in grapevine
88	Silver Maple (*Acer saccharinum*)	13.5	5 main stems (largest stem measurement indicated)
89	Manitoba Maple (*Acer negundo*)	50	2 stems (largest stem measurement indicated)
90	Silver Maple (*Acer saccharinum*) and 2 Bur Oaks (*Quercus macrocarpa*)	SM=57, BO= 17 and <10	Silver Maple has 2 main stems (Biggest one used for measurement
91	Bur Oak (*Quercus macrocarpa*)	53.5	No apparent health or structural issues
92	American Elm (*Ulmus americana*)	13.5	No apparent health or structural issues
93	Bur Oak (*Quercus macrocarpa*)	14	No apparent health or structural issues
94	Bur Oak (*Quercus macrocarpa*)	75.5	No apparent health or structural issues
95	Silver Maple (*Acer saccharinum*) and American Elm (*Ulmus americana*)	SM=55, AE=30.5	Silver Maple has 3 stems (largest stem measurement indicated)
96	Siberian Elm (*Ulmus pumila*)	28.5	No apparent health or structural issues
97	American Elm (*Ulmus americana*)	21	2 main stems (largest stem measurement indicated), dead crown, epicormic branching
98	Siberian Elm (*Ulmus pumila*)	84	No apparent health or structural issues
99	Colorado Bluespruce (*Picea pungens*)	24.5	No apparent health or structural issues
100	Manitoba Maple (*Acer negundo*)	38	No apparent health or structural issues
101	Silver Maple (*Acer saccharinum*)	73	No apparent health or structural issues
102	Silver Maple (*Acer saccharinum*)	78	No apparent health or structural issues
103	Silver Maple (*Acer saccharinum*)	46.6	No apparent health or structural issues
104	Common Apple (*Malus* sp.)	29	3 stems (largest stem measurement indicated)
105	Manitoba Maple (*Acer negundo*)	85	No apparent health or structural issues
106	Manitoba Maple (*Acer negundo*)	55	No apparent health or structural issues
107	Manitoba Maple (*Acer negundo*)	51	No apparent health or structural issues
108	2 Silver Maple (*Acer saccharinum*)	54 and 64	No apparent health or structural issues
109	2 American Elm (*Ulmus americana*)	14 and 21.5	First one has 2 stems (biggest one used for measurement), and the second has one
110	Manitoba Maple (*Acer negundo*)	22	2 stems (largest stem measurement indicated)
111	Cluster of Manitoba Maple (*Acer negundo*)	All stems 10cm or greater	25 Manitoba maple in the cluster, average is 12cm
112	Manitoba Maple (*Acer negundo*)	23	3 stems (biggest one used for measurement)
113	Manitoba Maple (*Acer negundo*)	15.5	No apparent health or structural issues
114	Cluster of Manitoba Maple (*Acer negundo*)	Average 21cm, largest ash is 60cm and the rest are 35 cm, elm 30 cm, snag 40cm	All healthy
115	Manitoba Maple (*Acer negundo*)	17	No apparent health or structural issues
116	Manitoba Maple (*Acer negundo*)	15	2 stems (biggest one used for measurement)
117	American Elm (*Ulmus americana*)	18.5	No apparent health or structural issues
118	Viburnum sp. (*Viburnum* sp.)	Largest 14, avg= 12	Multiple stems
Green Lands Parcel (East)			
119	Manitoba Maple (*Acer negundo*)	13.5	3 stems (largest stem measurement indicated)
120	Manitoba Maple (*Acer negundo*)	15.5	2 stems (largest stem measurement indicated)
121	Manitoba Maple (*Acer negundo*)	54	No apparent health or structural issues

Tree #	Species	Diameter (cm)	Notes
122	American Elm (*Ulmus americana*)	28.5	No apparent health or structural issues
123	American Elm (*Ulmus americana*)	15.5	No apparent health or structural issues
124	Manitoba Maple (*Acer negundo*)	16.5	No apparent health or structural issues
125	Manitoba Maple (*Acer negundo*)	58.5	No apparent health or structural issues
126	Manitoba Maple (*Acer negundo*)	50.5	2 stems (largest stem measurement indicated)
127	Green Ash (*Fraxinus pennsylvanica*)	26	No apparent health or structural issues
128	Manitoba Maple (*Acer negundo*)	54	No apparent health or structural issues
129	Manitoba Maple (*Acer negundo*)	69	2 stems (largest stem measurement indicated)
130	Manitoba Maple (*Acer negundo*)	17	No apparent health or structural issues
131	Hawthorn ((Crataegus sp.))	20.5	No apparent health or structural issues
132	American Elm (*Ulmus americana*)	21	No apparent health or structural issues
133	Green Ash (*Fraxinus pennsylvanica*)	16	No apparent health or structural issues
134	Silver Maple (*Acer saccharinum*)	45	No apparent health or structural issues
135	Viburnum sp. (*Viburnum* sp.)	10	No apparent health or structural issues
136	Ash (*Fraxinus* sp.)	16	Dead tree, wild grape
137	Silver Maple (*Acer saccharinum*)	56	No apparent health or structural issues
138	2 Silver Maple (*Acer saccharinum*)	68 and 63	First Silver maple has 4 stems (largest stem measurement indicated)
139	Green Ash (*Fraxinus pennsylvanica*)	25	Dead canopy, peeling bark, wild grape
140	Green Ash (*Fraxinus pennsylvanica*)	10	Broken branches, wild grape
141	Silver Maple (*Acer saccharinum*)	51	6 stems
142	Sugar Maple (*Acer saccharum*)	43	No apparent health or structural issues
143	Bur Oak (*Quercus macrocarpa*)	19	No apparent health or structural issues
144	Bur Oak (*Quercus macrocarpa*)	27	No apparent health or structural issues
145	3 American Elms (*Ulmus americana*)	16 each	No apparent health or structural issues
146	Manitoba Maple (*Acer negundo*)	13	No apparent health or structural issues
147	Manitoba Maple (*Acer negundo*)	15	No apparent health or structural issues
148	Green Ash (*Fraxinus pennsylvanica*)	55	2 stems (largest stem measurement indicated), dead canopy
149	5 Green Ash (*Fraxinus pennsylvanica*)	20, 10, 13, 42.5, <10	No apparent health or structural issues
150	Viburnum sp. (*Viburnum* sp.)	11.4	No apparent health or structural issues
151	American Elm (*Ulmus americana*)	10	Dead tree, significant bark loss, dead canopy
152	Green Ash (*Fraxinus pennsylvanica*)	25	Dead canopy
153	American Elm (*Ulmus americana*)	10	Broken branches, dying canopy
154	Manitoba Maple (*Acer negundo*)	63	4 snags, dead branches
155	American Elm (*Ulmus americana*)	11	branches are healthy
156	Manitoba Maple (*Acer negundo*)	13	No apparent health or structural issues
157	Manitoba Maple (*Acer negundo*)	21	Significant branch dieback, wild grape
158	American Elm (*Ulmus americana*)	33.5	Dead tree with peeling bark, wild grape
159	Manitoba Maple (*Acer negundo*)	17.5	Significant branch dieback

Note: All trees listed here will be removed as part of the site proposed development

2. Description of the environmental value of the trees within the site and their ecological function, including their context within the surrounding landscape.

The trees on site are relatively disconnected from broader forested areas. The ecological function of the site trees is likely limited to the provision of shade and some limited habitat for small, urban tolerant wildlife. Bur Oak trees on the site are "notable" and should warrant some consideration for preservation. These trees, however, are situated directly in line with the Burke St. ROW (TCR Figure 1), which provides the only option for a roadway connection between the Laffin Lands parcel and the adjacent community, or the roadway entrance to the western Green Lands parcel. All trees site Table 1) will be removed as part of site development.

Specific natural elements considered:

a) Surface water features, including wetlands and watercourses;

- For this project, there is no significant relationship between site trees and adjacent watercourses. All trees along the Van Gaal Drain have already been removed.

b) Steep slopes, including valleys and escarpments;

- None present

c) Valued woodlots designated as Urban Natural Features or Natural Environment Areas, areas evaluated in the Urban Natural Areas Environmental Evaluation Study (UNAEES), or other areas that meet the criteria used in the UNAEES;

- None present within 120 m of the Site

d) In the rural area, identify the presence of significant woodlands, which are woodlands that contain mature stands of trees 80 years or older, have interior forest habitat more than 100 m from forest edge, and are adjacent to a surface water feature;

- None present within 120 m of the Site

e) Greenspace linkages as identified in the Greenspace Master Plan or as may occur in the larger landscape;

- None present

f) High quality, specimen trees;

- Several large Bur Oaks are present on site but are situated with the road ROW for access to the community. A such, they cannot be retained.

g) The presence of rare communities or other unique ecological features, as may be identified in available data sources including the Natural Environment System Strategy, Natural Heritage Information Centre, Ecological Land Classification, or other MNR data;

- None present 120 m of the Site

h) Species at Risk and their habitat.

- Four SAR have some potential to interact with proposed development directly as individuals (i.e. possibly present at some point during or subsequent to construction) and/or considering impacts to their habitat: Eastern Wood-pewee, Little Brown Bat, Tri-Coloured Bat, and Blanding's Turtle.
    - A management plan for Eastern Wood-pewee has not yet been produced by either the MNRF or the MECP directing specific habitat mitigation requirements. Restricting the removal of trees on the site to outside of the active nesting season will prevent negative impacts (harm) directly to individual birds.
    - The proposed development is not considered to constitute a negative impact to the habitat of either Little Brown Bat or Tri-Coloured Bat. Restricting the removal of trees on the site to outside of the active bat season will prevent potential negative impacts (harm) directly to individual bats.
    - The proposed development does not impact the habitat of Blanding's Turtles, but it is possible that Blanding's Turtles could occur near new residential areas if

travelling along the Moore Branch or the Van Gaal Drain. The application of appropriate structural design elements along the channels will prevent turtles travelling through the Village Richmond from straying from the naturalized corridors, thereby limiting the potential for harm to individuals by traffic.

3. **Identification of vegetation to be retained and why it has been chosen for retention. If there are several vegetated areas on site or a large area, it should be identified how the areas are prioritized for retention.**

   No existing vegetation will be retained.

4. **Indication of how parkland dedication, road locations, infrastructure, stormwater management facilities, creative lot layouts, and design approaches can help to conserve vegetated areas, where feasible.**

   No existing vegetation will be retained.

5. **Description of the area and nature of vegetation loss on the site and how it will affect the natural systems on site and on the surrounding landscape.**

   The site was mostly subject to active agriculture. The proposed development will increase the area of canopy cover.

6. **Impact of the development on the conserved portions of vegetation should be examined and outlined, including and not limited to the impacts of grade change, changes to drainage patterns, effects of impervious surfaces and new buildings, and changes in the water table.**

   No existing vegetation will be retained.

7. **Description of mitigation measures that will be used to promote the long-term survival of retained trees and woodlands (e.g. buffers for protection, fencing, single loaded roads along forest stands, edge preparation).**

   No existing vegetation will be retained.

8. **Protection measures during construction for trees and woodlands being retained that may be impacted by the construction. Where feasible, show that efforts will be made to protect trees on adjacent property that may be impacted by the construction.**

   The following standard measures are to be applied during construction:

   - erect a fence at the critical root zone ((CRZ) is established as being 10 cm from the trunk of a tree for every cm of trunk DBH. The CRZ is calculated as DBH x 10 cm.) of trees;
   - do not place any material or equipment within the CRZ of the tree;
   - do not attach any signs, notices or posters to any tree;
   - do not raise or lower the existing grade within the CRZ without approval;

- tunnel or bore when digging within the CRZ of a tree;
- do not damage the root system, trunk or branches of any tree;
- ensure that exhaust fumes from all equipment are NOT directed towards any tree's canopy.

9. Where there is substantial alteration of the tree cover on the site, consider the impact on fauna or rare species during and after construction and propose mitigation measures, using the City's Protocol for Wildlife Protection during Construction. Indicate how this is meeting any existing legislation on species protection.

Common wildlife species were observed on site, all of which are represented throughout the developed adjacent landscape. The following mitigation measures shall be implemented during construction of the project to generally protect wildlife:

- Areas shall not be cleared during sensitive times of the year for wildlife (breeding season; early spring to early summer), unless mitigation measures are implemented and/or the habitat has been inspected by a qualified Biologist.
- Do not harm, feed, or unnecessarily harass wildlife.
- Manage waste to prevent attracting wildlife to the site. Effective mitigation measures include litter prevention and keeping all trash secured in wildlife-proof containers and promptly removing it from the Site, especially during warm weather.
- Drive slowly and avoid hitting wildlife.
- Manage stockpiles and equipment on Site to prevent wildlife from being attracted to artificial habitat. Cover and contain any piles of soil, fill, brush, rocks and other loose materials and cap ends of pipes where necessary to keep wildlife out. Ensure that trailers, bins, boxes, and vacant buildings are secured at the end of each work day to prevent access by wildlife.
- Check the entire work site for wildlife prior to beginning work each day.
- Inspect protective fencing and/or other installed wildlife exclusion measures daily and after each rain event to ensure their integrity and continued function.
- Monitor construction activities to ensure compliance with the project-specific protocol (where applicable) or any other requirements.
- If SAR are encountered on the work site, immediately stop all work and comply with the project-specific SAR protocol (where applicable; e.g. contact project Biologist to determine next steps).
- Buildings on Site should be inspected to ensure the absence of snakes, bats, and any other wildlife immediately prior to demolition. Bats may day-roost in buildings while snakes may be present in building foundations/walls in search of food, shelter, and/or overwintering habitat. Any wildlife present in buildings should be removed and safely relocated by a qualified person.

- The *Migratory Birds Convention Act* (Government of Canada, 1994) protects the nests and young of migratory breeding birds in Canada. As such, clearing of trees or vegetation should take place between April 1st and August 30th, unless a qualified Biologist has determined that no nesting is occurring within 5 days prior to the clearing (City of Ottawa, 2015).
- Follow the best practices for the construction and maintenance of bird-safe buildings, such as applying visual markers on windows to prevent birds from colliding with glass and reducing the intensity and direction of night lighting (turn off lights at night if possible). See https://flap.org/workplaces-safe-for-birds/ for more resources and tips on designing and maintaining bird-friendly buildings.

10. Include tree planting recommendations for the site which will direct the development of the Landscape Plan, including the following recommendations:

The landscape plan will be developed as part of the detailed design. The EIS, however, addresses the following:

- The species to be used for the given site conditions;
- The required use of native tree species;
- Where tree planting is required to provide protection for watercourses and steep slopes;
- Proposed tree planting across the site.

11. Other Required Information

- The name, address and telephone number of the owner.

Richmond Village Development Corporation
Contact: Zeyad Hassan
Manager, Land Development

Richmond Village Development Corporation
2934 Baseline Road, Suite 302
Ottawa, ON
K2H 1B2

613-218-8579

- The name, address and telephone number of the applicant, if different from the owner and the owner's written consent to the application.

Same as the owner.

- The name, address and telephone number of the professional hired by the owner or applicant to complete the report.

Kilgour & Associates Ltd.
Contact: Anthony Francis

Senior Ecologist

2285C St. Laurent Blvd. Unit C16
Ottawa, ON
K1G 4Z6

613-277-4027

- The name, address and telephone number of the contractor implementing the tree and forest conservation plan, if applicable.

  Not applicable.

- The municipal address and legal description of the land, upon which the trees are proposed to be protected, injured or destroyed.

  The residential developments proposed is proposed for four parcels located along the western side of the village of Richmond in the City of Ottawa, Ontario:

  i. 6409 Perth St.
  ii. 6363 Perth St.
  iii. 6295 Perth St.
  iv. 6305 Ottawa St.

- Confirmation of existing Official Plan and zoning designations, and the status of any planning applications on the property.

  All areas subject to proposed for development here are zoned DR – Development Reserve (City of Ottawa, 2020).

- The purpose for which the Tree Conservation Report is being prepared.

  This report is a TCR prepared by Kilgour & Associates Ltd. on behalf of Richmond Village Development Corporation (RVDC) in support of their proposed residential developments in the Village of Richmond in Ottawa, Ontario.

- A schedule of the proposed works, including the start and end dates and the construction period.

  Site preparation for the three properties located on Perth St. is anticipated to begin by mid-summer of 2020, with home construction to begin in the fall of the same year. House closing will begin by spring of 2021 with final house sales to be completed by 2023.

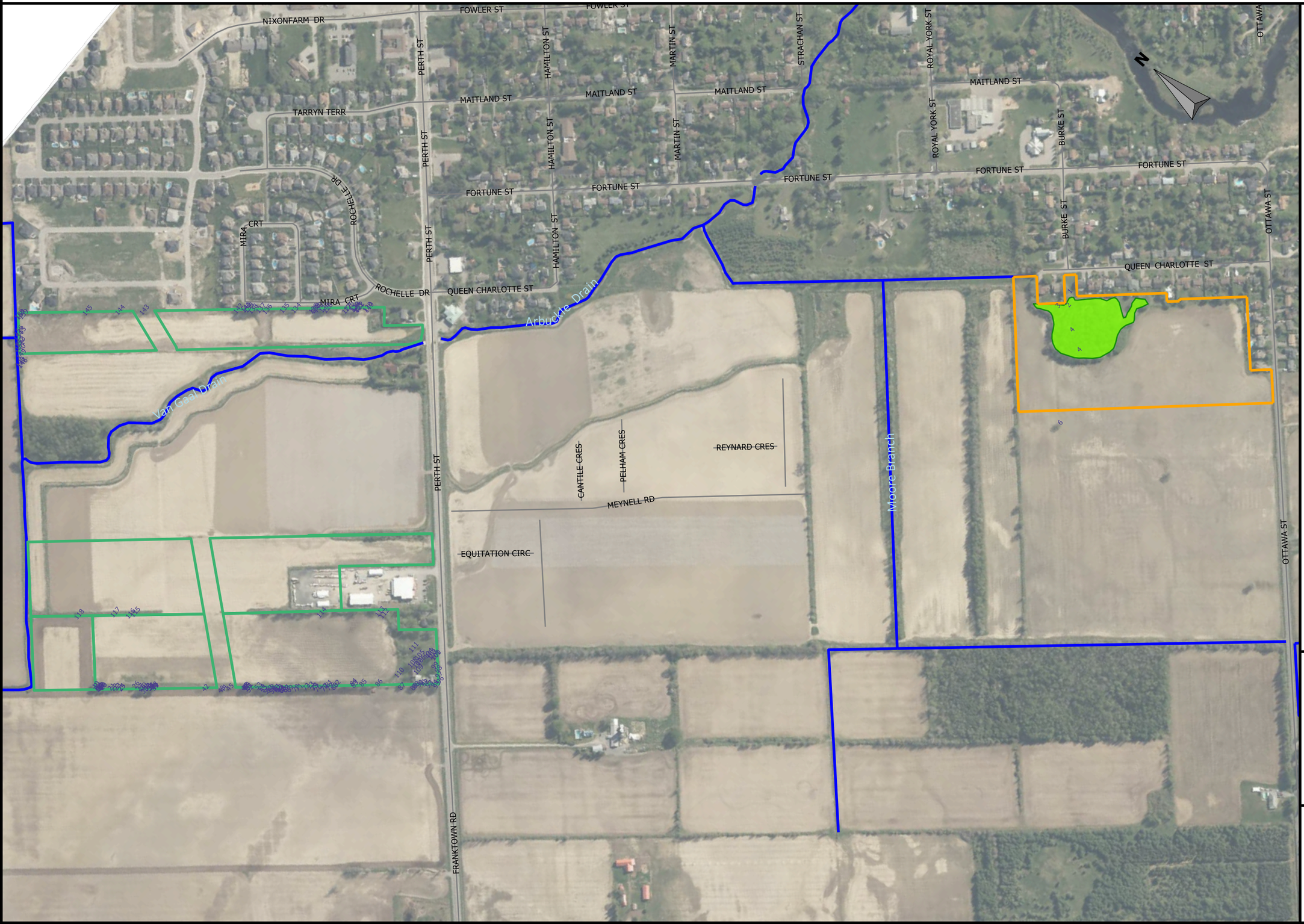
  The parcel at 6305 Ottawa St. does not include space for parks or stormwater management. The residential units here will be developed with and share servicing with residential community areas being developed on the adjacent lands to the north and west

by Mattamy Homes. As such, specific dates for commencement and completion of construction for this parcel will be set based on the approval and commencement of the adjacent Mattamy development.

- Confirmation of any other applications affecting the land, upon which the trees are to be protected, injured or destroyed.

  Per Section 4.1 and Appendix A of the attached EIS, the Van Gaal Drain adjacent to the development area has been approved for realignment. All trees near that feature have already been removed.

TCR Figure 1. Existing Conditions



Legend

Properties

- Green Lands
- Laffin Lands
- # Tree Number
- FOD7 Woodlot
- Existing Channels

0 — 200 m

Print Date:
June 24, 2020

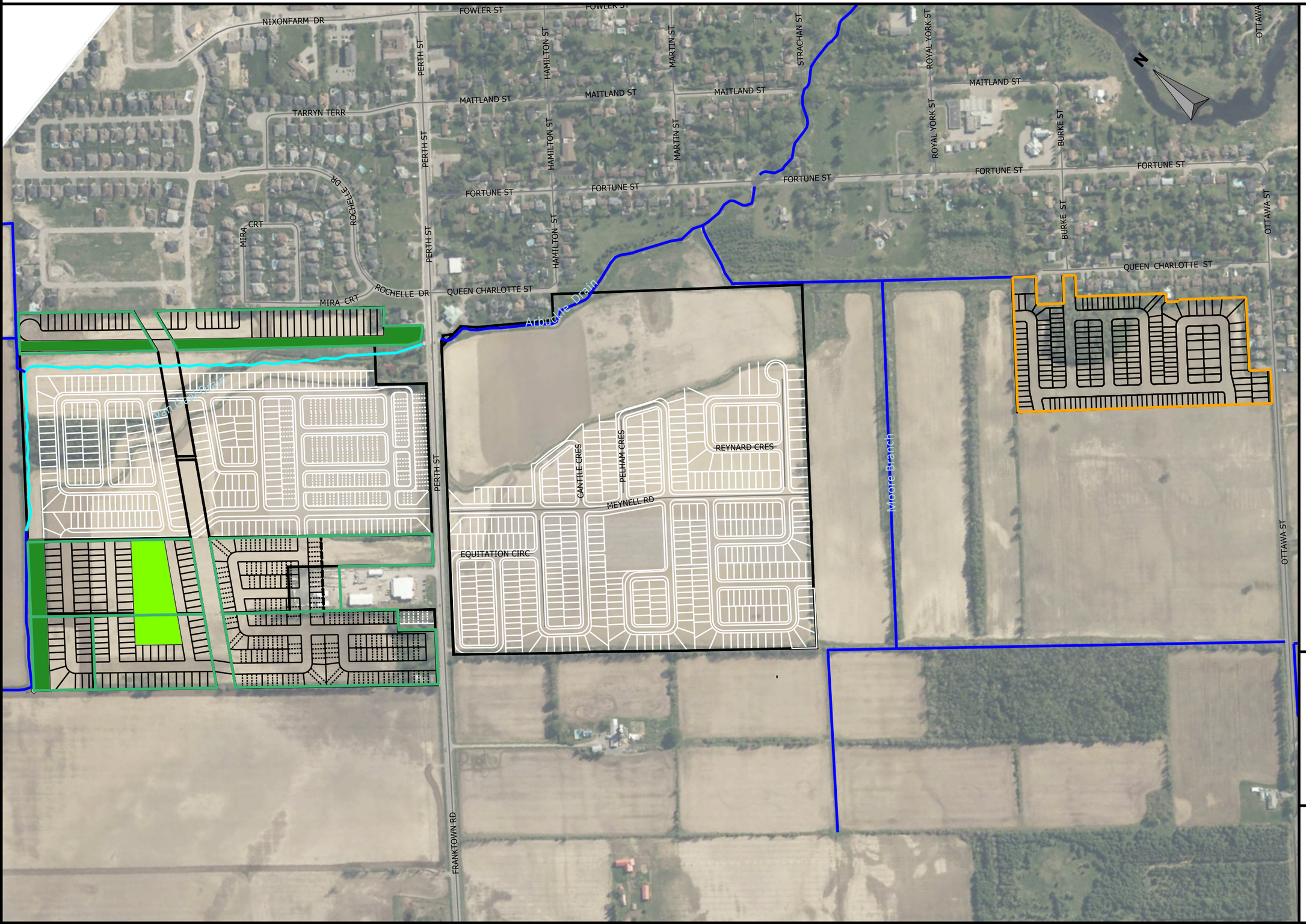
Project File:
CAIV1015

Projection:
MTM Zone 9
(NAD 83)

Produced by: AF

KILGOUR & Associates

TCR Figure 2. Proposed development



Legend

Properties

- Green Lands
- Laffin Lands

- Existing Channel
- Van Gaal Realignment

- Block Plan
- Other Development
- Park
- Van Gaal Corridor

0 — 200 m

Print Date: June 24, 2020

Project File: CAIV1015

Projection: MTM Zone 9 (NAD 83)

Produced by: AF

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Appendix E – Regional SAR Screening

Species Name (*Taxonomic Name*)	Status under Ontario *Endangered Species Act* (ESA)	Status under federal *Species at Risk Act* (SARA) - Schedule 1	Habitat Description	Potential to Occur in the Project Area (Yes / No)	If Potentially Present - Probability of Interaction with the Project (None, Low, Moderate, High)	Ottawa (Regional Occurrence)
Avian						
Bald Eagle (*Haliaeetus leucocephalus*)	**Special Concern**	**No Status**	Nest in mature forests near open water. In large trees such as Pine and Poplar.	Yes	Low. Habitat does not occur in the Project Area	Confirmed nest at Shirley's Bay since 2012.
Bank Swallow (*Riparia riparia*)	**Threatened**	**Threatened**	Colonial nester; burrows in eroding silt or sand banks, sand pit walls, and human-made settings, which are often found on banks of rivers and lakes.	Yes	Moderate	12 confirmed, 2 probable and 8 possible nests in recent OBBA4.
Barn Swallow (*Hirundo rustica*)	**Threatened**	**Threatened**	Nests on barns and other structures; forages in open areas for flying insects. Live in close association with humans and prefer to nest in structures such as open barns, under bridges, and in culverts.	Yes	Moderate	33 confirmed, 2 probable and 3 possible nests during recent OBBA.
Black Tern (*Chlidonias niger*)	**Special Concern**	**No Status**	Build floating nests in loose colonies in shallow marshes, especially cattails.	Yes	None. Habitat does not occur in the Project Area	Four confirmed nests in recent OBBA.
Bobolink (*Dolichonyx oryzivorus*)	**Threatened**	**Threatened**	Live in tall grass prairie and other open meadows. With major clearing of prairies, Bobolink are moving to hayfields. Build nests on the ground in dense grasses.	Yes	Low. Habitat areas have been subject to corn and soybean agricultural since ~ 2009, limiting habitat potential.	Widespread; confirmed or probable nests found in 39 out of 40 local atlas squares during recent OBBA.

Canada Warbler (*Cardellina canadensis*)	**Special Concern**	**Threatened**	Prefers wet forests with dense shrub layers. Nests located on or near the ground on mossy logs or roots, along stream banks or on hummocks.	Yes	Low. Habitat does not occur in the Project Area	One confirmed nest, two probable and six possible reported in recent OBBA. No critical habitat identified.
Cerulean Warbler (*Setophaga cerulea*)	**Threatened**	**Endangered**	Prefers mature deciduous forests with an open under storey.	No		Unlikely but within range (found on Gatineau side)
Chimney Swift (*Chaetura pelagica*)	**Threatened**	**Threatened**	Nests in traditional-style open brick chimneys (and rarely in hollow trees). Tend to stay close to water	Yes	Low, habitat does not occur in the Project Area	Confirmed nests in 3 squares, 2 probable and 11 possible reported in recent OBBA. No critical habitat identified.
Common Nighthawk (*Chordeiles minor*)	**Special Concern**	**Threatened**	Nests in wide variety of open sites, including beaches, fields and gravel rooftops with little to no ground vegetation. They also nest in cultivated fields, orchards, urban parks, mine tailings and along gravel roads/railways but tend to occupy more natural sites.	Yes	Low. Habitat areas have been subject active agriculture and other disturbance.	Six probable and five possible nests reported in recent OBBA. No critical habitat identified
Eastern Meadowlark (*Sturnella magna*)	**Threatened**	**Threatened**	Typically nest in tall grasslands (pastures/hayfields) but also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Often use trees, shrubs, or fence posts to elevate song perches.	Yes	Low. Habitat areas have been subject to corn and soybean agricultural since ~ 2009, limiting habitat potential.	22 confirmed, 11 probable and 3 possible nests during recent OBBA.
Eastern Whip-poor-will (*Antrostomus vociferus*)	**Threatened**	**Threatened**	Nests on the ground in open deciduous or mixed woodlands with little underbrush.	No		Seven squares with probable nests and 10 with possible nests reported in recent OBBA. Critical habitat tentatively identified in 4 squares in western Ottawa.
Eastern Wood-pewee (*Contopus virens*)	**Special Concern**	**Special Concern**	Woodland species, often found in the mid-canopy layer near clearings and edges of deciduous and mixed forests.	Yes	Moderate. Habitat limited to Laffin Lands parcel.	4 possible, 15 probable and 19 confirmed nests in recent OBBA.
Golden Eagle (*Aquila chrysaetos*)	**Endangered**	**No Status**	Nest in remote, undisturbed areas, usually building their nests on ledges on a steep cliff/riverbank or large trees if needed. Most hunting is done near open areas such as large bogs or tundra.	No		Migrant only; no reported nests.

Golden-winged Warbler (*Vermivora chrysoptera*)	**Special Concern**	**Threatened**	Ground nesting in areas of young shrubs surrounded by mature forest. Often areas that have recently been disturbed such as field edges, hydro or utility right-of-ways, or logged areas.	No		One confirmed nest, one probable nest reported during recent OBBA. Critical habitat identified in Québec (adjacent to northwestern Ottawa).
Grasshopper Sparrow (*Ammodramus savannarum*)	**Special Concern**	**Special Concern**	Lives in open grassland areas with well-drained sandy soil. Will also nest in hayfields and pastures, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated and its nests are well hidden in the field, woven from grasses in a small cup-like shape.	No		4 confirmed, 5 probable and 2 possible nests in recent OBBA.
Evening Grosbeak (*Coccothraustes vespertinus*)	**Special Concern**	**Special Concern**	Nest in trees or large shrubs; prefer mature coniferous forests but will also use deciduous forests, parklands and orchards.	Yes	Low. Forest habitat is very limited and only within the Laffin Lands parcel.	Five confirmed nests, six probable and eight possible during recent OBBA (mostly in west).
Henslow's Sparrow (*Ammodramus henslowii*)	**Endangered**	**Endangered**	Tends to avoid fields that have been grazed or are crowded with trees and shrubbs. Prefers extensive, dense, tall grasslands where it can more easily conceal its small ground nest.	No		No nests reported during recent OBBA.
Horned Grebe (*Podiceps auritus)*	**Special Concern**	**No Status**	Nest in small ponds, marshes and shallow bays that contain areas of open water and emergent vegetation.	No		Migrant only; no reported nests.
Least Bittern (*Ixobrychus exilis*)	**Threatened**	**Threatened**	Found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels.	No	Low, habitat does not occur in the Project Area	Confirmed nesting in 1 square, 3 probable and 4 possible reported during recent OBBA.
Loggerhead Shrike (*Lanius ludovicianus*)	**Endangered**	**Endangered**	The Loggerhead prefers pasture or other grasslands with scattered low trees and shrubs. Lives in fields or alvars (areas of exposed bedrock) with short grass, which makes it easier to spot prey.	No		One possible nest reported in recent OBBA. Critical habitat identified in Montague Township.
Olive-sided Flycatcher (*Contopus cooperi*)	**Special Concern**	**Threatened**	Found along natural forest edges and openings. Will use forests that have been logged or burned, if there are ample tall snags and trees to use for foraging perches.	Yes	Low. Forest habitat is very limited and only within the Laffin Lands parcel.	One probable and one possible nest reported in recent OBBA. No critical habitat identified.

Peregrine Falcon (*Falco peregrinus*)	**Special Concern (as of January 2013)**	**Special Concern**	Nest on tall, steep cliff ledges close to large bodies of water. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas.	Yes	None, habitat does not occur in the Project Area	One confirmed nest (101 Lyon) in recent OBBA. Second nest (875 Heron) established in 2011.
Red Knot (*Calidris canutus rufa*)	**Endangered**	**Endangered**	Prefer open beaches, mudflats, and coastal lagoons, where they feast on molluscs, crustaceans, and other invertebrates.	No		Migrant only; Ottawa River shores, area lagoons, etc.
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	**Special Concern**	**Threatened**	Lives in open woodland and woodland edges, and is often found in parks, golf courses, and cemeteries. These area typically have many dead trees, which the birds use for nesting and perching.	No		One confirmed nest, one probable and two possible during recent OBBA.
Rusty Blackbird (*Euphagus carolinus*)	**Special Concern**	**Special Concern**	Prefers wet wooded or shrubby areas (nests at edges of boreal wetlands and coniferous forests). These areas include bogs, marshes and beaver ponds.	Yes	None. Habitat does not occur in the Project Area	No nests reported during recent OBBA. Primarily occurs during migration.
Short-eared Owl (*Asio flammeus*)	**Special Concern**	**Special Concern**	Lives in open areas such as grasslands, marshes and tundra where it nests on the ground and hunts for small mammals.	No		One confirmed nest, two probable and two possible nests reported during recent OBBA.
Wood Thrush (*Hylocichla mustelina*)	**Special Concern**	**Threatened**	Lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing and perches. Usually build nests in sugar maple or American beech.	Yes	Low. Forest habitat is very limited and only within the Laffin Lands parcel.	5 possible, 15 probable and 16 confirmed nests in recent OBBA.
Fish						
American Eel (*Anguilla rostrata*)	**Endangered**	**No Status**	Primarily nocturnal, hiding in soft substrate or submerged vegetation during the day.	No		Ottawa, Mississippi, Carp (including Poole Creek), South Nation and Rideau Rivers (including Rideau Canal)
Bridle Shiner (*Notropis bifrenatus*)	**Special Concern**	**Special Concern**	Prefers clear water with abundant vegetation over silty or sandy substrate.	No		Rideau River
Channel Darter (*Percina copelandi*)	**Special Concern**	**Threatened**	Prefers clean streams and lakes with moderate current over sandy or rocky substrate.	No		Ottawa River
Lake Sturgeon (*Acipenser fulvescens*)	**Endangered**	**No Status**	Only found in large lakes and rivers. Forages in cool water, 4-9 m deep over soft substrate; spawns in shallower, fast-flowing areas over rocks or gravel.	No		Ottawa River

Northern Brook Lamprey (*Ichthyomyzon fossor*)	Special Concern	Special Concern	Non-parasitic species; prefers shallow areas with warm water. Larvae live in burrows in soft substrate for up to 7 years.	No		Ottawa River
Northern Sunfish (*Lepomis peltastes*)	Special Concern	No Status	Lives in shallow vegetated areas of quiet, slow flowing rivers and streams, as well as warm lakes and ponds, with sandy banks or rocky bottoms.	No		Ottawa River
River Redhorse (*Moxostoma carinatum*)	Special Concern	Special Concern	Prefers fast-flowing, clear rivers over rocky substrate.	No		Ottawa and Mississippi Rivers; unconfirmed reports from Rideau River
Silver Lamprey (*Ichthyomyzon unicuspis*)	Special Concern	Special Concern	Require clear water for they can find fish hosts, relatively clean stream beds of sand and organic debris for larvae to live in, and unrestricted migration routes for spawning. Larvae live 4-7 years in burrows (prefer soft substrates); filter-feed on plankton.	No		Ottawa River and mouths of tributaries from Rideau Canal east (downstream)
Molluscs						
Hickorynut (*Obovaria olivaria*)	Endangered	Endangered	Live on sandy beds in large, wide, deep rivers. Usually more than two or three metres deep. Larval host believed to be Lake Sturgeon.	No		Ottawa River
Mammals						
Algonquin Wolf (*Canis sp.*)	Threatened	Special Concern	Not restricted to any specific habitat type but typically occurs in deciduous and mixed forest landscapes.	No	Low, no known recent occurrences	Occasional reports
Eastern Cougar (*Puma concolor*)	Endangered	No Status	Live in large, undisturbed forests or other natural areas where there is little human activity	No		Occasional reports
Eastern Small-footed Myotis (*Myotis leibii*)	Endangered	No Status	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. Overwinters in caves and abandoned mines.	Yes	Negligible habitat potential on site.	Historical record in downtown Ottawa
Gray Fox (*Urocyon cinereoargenteus*)	Threatened	Threatened	Live in deciduous forests and marshes. Their dens are usually found in dense shrubs close to a water source but they will also use rocky areas, hollow trees, and underground burrows dug by other animals.	No		Recent reports to south and west of Ottawa (2016 COSEWIC status report).

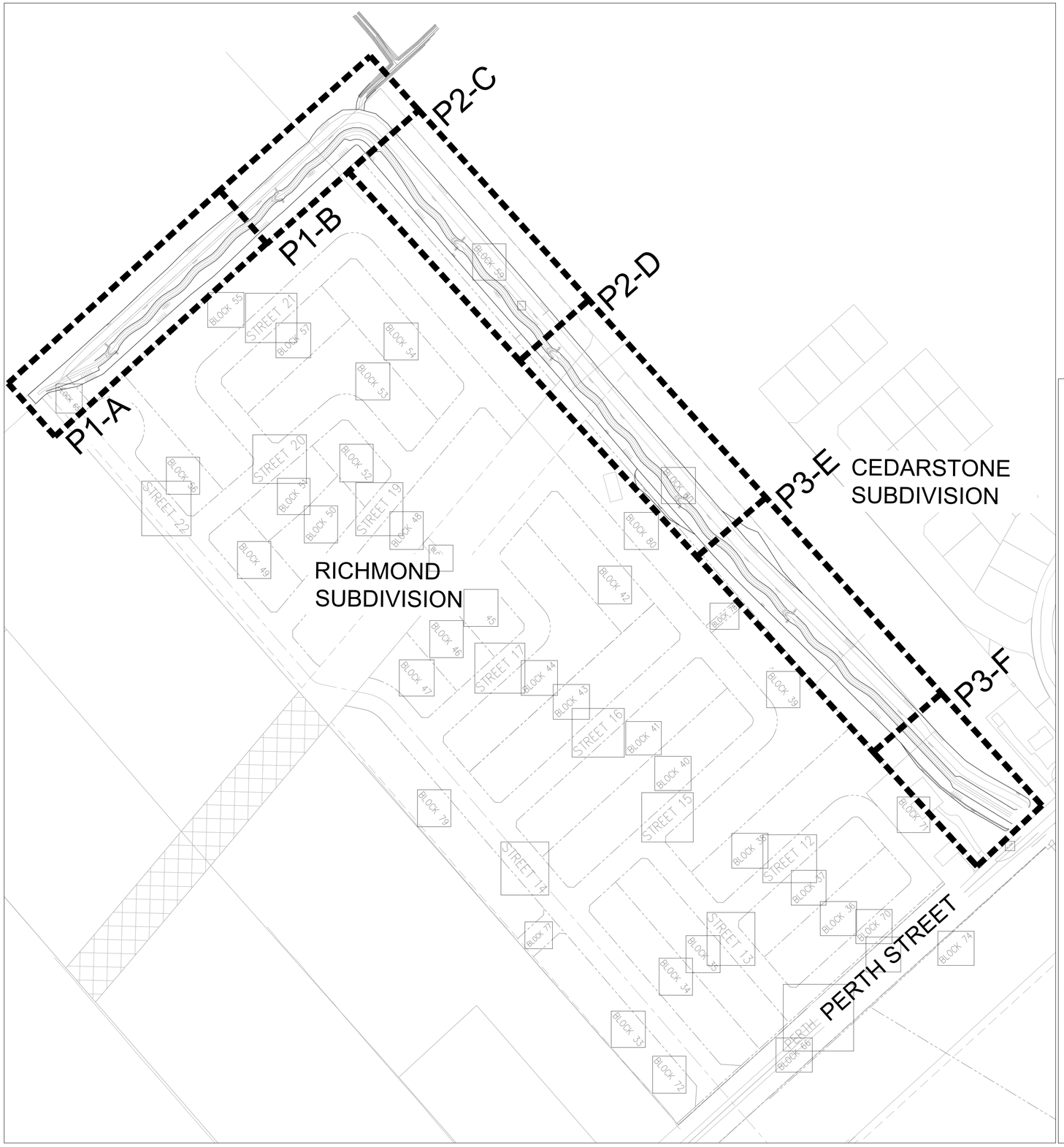
Little Brown Myotis (*Myotis lucifugus*)	**Endangered**	**Endangered**	During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. They can squeeze through very tiny spaces (as small as six millimetres across) allowing them access to many different roosting areas.	Yes	Low, preferred habitat does not occur in the Project Area	Various sites in central and western parts of City; no critical habitat (hibernacula) identified in Ottawa to date.
Northern Myotis / Northern Long-eared Bat (*Myotis septentrionalis*)	**Endangered**	**Endangered**	Associated with boreal forests, choosing to roost under loose bark and in the cavities of trees.	Yes	Negligible habitat potential on site.	Historical record in downtown Ottawa, more recent sites to east (Orléans, Clarence- Rockland); no critical habitat (hibernacula) identified in Ottawa to date.
Tri-coloured Bat / Eastern Pipistrelle (*Perimyotis subflavus*)	**Endangered**	**Endangered**	Roosts mainly in trees during summer; overwinters in caves and mines along with other species, but often uses deeper parts of the hibernaculum.	Yes	Low. Forest habitat is very limited and only within the Laffin Lands parcel.	Unknown; historical records from sites in urban Ottawa, Lanark County. No critical habitat (hibernacula) identified in Ottawa to date.
Amphbians						
Western Chorus Frog (*Pseudacris triseriata*)	**No Status**	**Threatened**	Inhabits forest openings around woodland ponds but can also be found in or near damp meadows, marshes, bottomland swamps and temporary ponds in open country, or even urban areas.	Yes	Negligible habitat potential on site.	Scattered throughout, with numerous sites in western half of City. Critical habitat identified in several atlas squares in western Ottawa.
Reptiles						
Blanding's Turtle (*Emydoidea blandingii*)	**Threatened**	**Threatened**	Quiet lakes, streams and wetlands with abundant emergent vegetation; also frequently occurs in adjacent upland forests.	Yes	Low. Preferred habitat does not occur in the Project Area	Scattered throughout, with numerous sites in western half of City. Critical habitat present in Ottawa.
Eastern Musk Turtle / Stinkpot (*Sternotherus odoratus*)	**Special Concern**	**Special Concern**	Found in ponds, lakes, marshes, and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that thye burrow into for winter hibernation.	No		Scattered
Eastern Ribbonsnake (*Thamnophis sauritus*)	**Special Concern**	**Special Concern**	Found in marshy edges of wetlands and watercourses. Livebearer (does not lay eggs).	No		Few reported; mostly from northwestern Ottawa

Milksnake (*Lampropeltis triangulum*)	**No Status**	**Special Concern**	Found in variety of open, scrubby or edge habitats, including pastures.	No longer listed	Not applicable as this species is not protected on private lands	Scattered throughout the northern half of the City
Northern Map Turtle (*Graptemys geographica*)	**Special Concern**	**Special Concern**	Lives in rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, they hibernate on the bottom of deep, slow-moving sections of river.	No		Ottawa River, Rideau River (Burritt's Rapids area), South Nation River
Snapping Turtle (*Chelydra serpentina*)	**Special Concern**	**Special Concern**	Spend most of their lives in the water. Prefer shallow waters so they can hide under the soft mud and leaf litter with only their noses exposed to the surface to breathe.	Yes	Low. Preferred habitat does not occur in the Project Area.	Widespread and abundant
Spiny Softshell (*Apalone spinifera*)	**Endangered**	**Threatened**	Found primarily in rivers and lakes but also in creeks, ditches and ponds near rivers. Habitat requirements are open sand or gravel nesting areas, shallow muddy or sandy areas to bury in, deep pools for hibernation, areas for basking, and suitable habitat for crayfish and other food species.	No		Few historical records along Ottawa River, outside of Ottawa. No critical habitat identified in Ottawa.
Spotted Turtle (*Clemmys guttata*)	**Endangered**	**Endangered**	Semi-aquatic and prefers ponds, marshes, bogs, and even ditches with slow-moving, unpolluted water and an abundant suply of aquatic vegetation.	No		Few reported (locations confidential). Critical habitat present in Ottawa
Wood Turtle (Glyptemys insculpta)	**Endangered**	**Threatened**	The wood turtle prefers clear rivers, streams, or creeks with a slight current and sandy or gravelly bottom. Wooded areas are essential habitat for the Wood Turtle, but they are found in other habitats, such as wet meadows, swamps, and fields.	No		Few historical records in NHIC, NESS7 (may have been extirpated locally). No regulated habitat identified in Ottawa. Critical habitat may be present to northwest.
Plants						
American Chestnut (*Castanea dentata*)	**Endangered**	**Endangered**	Typical habitat is upland deciduous forests on sandy acidic soils, occuring with red oak, black cherry, sugar maple and beech.	No		One population reported along Dolman Ridge Road (federal property); may have been extirpated.
American Ginseng (*Panax quinquefolius*)	**Endangered**	**Endangered**	Grows in rich, moist, but well-drained, and relatively mature, deciduous woods dominated by Sugar Maple, White Ash, and American Basswood.	No		Various (locations confidential) Critical habitat broadly identified in Ottawa area.

Butternut (*Juglans cinerea*)	**Endangered**	**Endangered**	Commonly found in riparian habitats, but is also found on rich, moist, well-drained loams, and well-drained gravels, especially those of limestone origin.	Yes	Moderate	Widespread
Eastern Prairie Fringed-orchid (Platanthera leucophaea)	**Endangered**	**Endangered**	Populations are found in three main habitat types: fens (peat-forming wetlands fed by groundwater), tallgrass prairie, and moist old fields	No		Richmond Fen (2 locations)
Lichens						
Flooded Jellyskin (*Leptogium rivulare*)	**No Status**	**Threatened**	It grows in seasonally flooded habitats, typically on the bark of deciduoud trees and rocks along the margins of seasonal ponds and on rocks along shorelines and stream/riverbeds.	No		Stony Swamp, Marlborough Forest
Pale-bellied Frost Lichen (*Physconia subpallida*)	**Endangered**	**Endangered**	Typically grows on the bark of hardwood trees such as White ash, Black walnut, and American elm. Could also be found growing on fence posts and boulders.	No		Historical records in downtown area (extirpated locally). No critical or regulated habitat identified in Ottawa.
Insects						
Bogbean Buckmoth (Hemileuca sp. 1)	**Endangered**	**Endangered**	Restricted to open, chalky, low shrub fens containing large amounts of bogbean, an emergent wetland flowering plant.	Yes	None. Habitat does not occur in the Project Area	Richmond Fen (2 locations)
Gypsy Cuckoo Bumble Bee (*Bombus bohemicus*)	**Endangered**	**Endangered**	Live in diverse habitats including open meadows, mixed farmlands, urban areas, boreal forest and montane meadows. Host nests occur in abandoned underground rodent burrows and rotten logs.	No		Historic occurrences only; no known recent occurrences.
Monarch butterfly (*Danaus plexippus*)	**Special Concern**	**Special Concern**	Milkweeds are the sole food plant for Monarch caterpillars. These plants predominantly grow in open and periodically disturbed habitats such as roadsides, fields, wetlands, prairies, and open forests.	Yes	Moderate to high as a transient, but no habitat exists on site.	Widespread
Mottled Duskywing (*Erynnis martialis*)	**Endangered**	**No Status**	Requires host plants such as the New Jersey Tea and the Prairie Redroot. These plants grow in dry, well-drained soils or alvar habitat within oak woodland, pine woodland, roadsides, riverbanks, shady hillsides and tall grass prairies.	No		Constance Bay area, Burnt Lands Alvar

Nine-spotted Lady Beetle (*Coccinella novemnotata*)	**Endangered**	**No Status**	Occur within agricultural areas, suburban gardens, parks, coniferous forests, deciduous forests, prairie grasslands, meadows, riparian areas and isolated natural areas.	No		Unknown – historically present, but COSSARO reports no Ontario records since mid-1990s
Rapids Clubtail (*Gomphus quadricolor*)	**Endangered**	**Endangered**	Inhabit a wide variety of riverine habitats ranging in size from the St. Lawrence River to small creeks Larvae are typically found in microhabitats with slow to moderate flow and fine sand or silt substrates where they burrow into the stream bed. Adults disperse from the river after emerging and feed in the forest canopy and other riparian vegetation.	No		None known. No regulated habitat identified in Ottawa.
Rusty-patched Bumble Bee (*Bombus affinis*)	**Endangered**	**Endangered**	Can be found in open habitat such as mixed farmland, urban settings, savannah, open woods, and sand dunes.	No		Historic records only from scattered sites in Ottawa and Gatineau.
Transverse Lady Beetle (*Coccinella transversoguttata*)	**Endangered**	**Special Concern**	Able to live in a wide range of habitats, including agricultural areas, suburban gardens, parks, coniferous forests, deciduous forests, prairie grasslands, meadows and riparian areas.	No		Unknown – historically present, but COSSARO reports no southern Ontario records since 1985.
West Virginia White butterfly (*Pieris virginiensis*)	**Special Concern**	**No Status**	Lives in moist, deciduous woodlots. Requires a supply of toothwort, a small, spring-blooming plant that is a member of the mustard family, since if it the only food source for larvae.	No		Unknown; no records in NESS or NHIC
Yellow-banded Bumble Bee (*Bombus terricola*)	**Special Concern**	**Special Concern**	Forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions.	No		Sporadic sightings submitted throughout (COSEWIC)

Appendix F – Van Gaal Landscape Plan



VAN GAAL DRAIN RE-ALIGNMENT & CHANNEL ENHANCEMENTS

Richmond Village Development Corporation

List of Drawings:

P0	-	COVER SHEET
RP	-	REMOVALS PLAN
P1	-	PLANTING PLAN I
P2	-	PLANTING PLAN II
P3	-	PLANTING PLAN III
D1	-	DETAILS
D2	-	DETAILS

GENERAL NOTES:

1. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF ALL SERVICES AND UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
3. ELEVATIONS ARE GEODETIC.
4. ALL DRAWING DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER, THE ENGINEER MUST APPROVE ALL SUBSTITUTIONS.
5. AN ENVIRONMENTAL MONITOR MUST BE PRESENT AT ALL TIMES DURING THE IN-STREAM WORKS. THE MONITOR HAS THE AUTHORITY TO ALTER OR HALT WORKS SHOULD HE/SHE FEEL THE WORKS MAY BE DETRIMENTAL TO THE ENVIRONMENT AND/OR AQUATIC LIFE. INSTREAM WORKS ARE DEFINED AS ANY WORK OCCURING BELOW THE HIGH WATER MARK.
6. THE CONTRACTOR'S FIELD OFFICES, STAGING AREAS, STOCKPILE STORAGE, AND TEMPORARY BUILDINGS SHALL BE PLACED AS DIRECTED BY THE ENGINEER OR HIS/ HER REPRESENTATIVE.
7. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL MARK THE AREAS THAT NEED NOT BE DISTURBED UNDER THIS CONTRACT. ISOLATED AREAS WITHIN THE GENERAL WORK AREA, WHICH ARE TO BE SAVED AND PROTECTED, SHALL ALSO BE MARKED OR FENCED. MONUMENTS AND MARKERS SHALL BE PROTECTED BEFORE CONSTRUCTION OPERATIONS COMMENCE. THE CONTRACTOR'S PERSONNEL SHALL BE KNOWLEDGEABLE OF THE PURPOSE FOR MARKING AND/OR PROTECTING PARTICULAR OBJECTS.

ENVIRONMENTAL CONTROL

8. CONSTRUCTION MUST BE COORDINATED TO MINIMIZE THE DURATION OF IN-STREAM WORK. ALL WORK IN-STREAM MUST BE UNDERTAKEN WITHIN THE FISHERIES WINDOW (JULY 1 TO MARCH 15 TENTATIVE) RIVER LEVELS PENDING. CONSTRUCTION TIMING SHALL BE CONFIRMED WITH ENVIRONMENTAL MONITOR.
9. THE CONTRACTOR SHALL EFFECTIVELY PREVENT EROSION AND CONTROL SEDIMENTATION THROUGH APPROVED METHODS.
10. CLEARED TOPSOIL AND EXCAVATED MATERIAL NOT RE-USED IN THE CONSTRUCTION WILL BE STOCKPILED IN AN APPROVED LOCATION AND PLACED IN A MANNER THAT WILL PREVENT THEIR ENTRY INTO ANY WATERCOURSE. ANY MATERIAL NOT SUITABLE AS FILL ALONG WITH ANY CONSTRUCTION DEBRIS MUST BE DISPOSED OF OFF SITE.
11. ALL EARTHWORK SHALL BE PLANNED AND CONDUCTED TO MINIMIZE THE EXTENT AND DURATION OF EXPOSURE OF UNPROTECTED SOILS. CLEARING SHALL PROGRESS IN REASONABLY SIZED INCREMENTS AS NEEDED TO UNDERTAKE THE WORKS.
12. ALL DISTURBED AREAS ARE TO BE RESTORED AND RE-VEGETATED WITHIN 14 DAYS AFTER ACHIEVING FINAL GRADE. TEMPORARY SLOPE AND SURFACE PROTECTION MUST BE PROVIDED TO THE SATISFACTION OF THE ENGINEER FOR DELAYS GREATER THAN 14 DAYS.
13. REVEGETATED SLOPES SLOPES STEEPER THAN 3H:1V MUST BE PROTECTED WITH AN EROSION CONTROL BLANKET. USE ECC-2B BY EASTCOAST EROSION CONTROL SUPPLIED BY GEOSYTHETIC SYSTEMS OTTAWA (OR APPROVED EQUIVALENT). EROSION CONTROL BLANKET TO BE INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS.

CARE OF WATER

14. THE CONTRACTOR SHALL NOT COMMENCE ANY PART OF THE WORK UNTIL APPROPRIATE CARE OF WATER MEASURES HAVE BEEN DESIGNED, REVIEWED BY THE ENGINEER, AND IMPLEMENTED.
15. CONSTRUCTION OPERATIONS SHALL BE SURVEYED, MANAGED AND CONTROLLED AT ALL TIMES TO LIMIT THE IMPACTS ON WATER QUALITY (INCLUDING TURBIDITY) FOR DOWNSTREAM USE. MONITORING OF WATER AREAS AFFECTED BY CONSTRUCTION SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
16. ALL WORK MUST BE UNDERTAKEN IN ISOLATION OF FLOWING AND STANDING WATER. THE CONTRACTOR MUST PROVIDE APPROPRIATE DIVERSIONS AND DEWATERING MEASURES. WATERS FROM DIVERSIONS AND DEWATERING ACTIVITIES NOT MEETING DISCHARGE QUALITY, AS EVALUATED BY THE ENVIRONMENTAL MONITOR, MUST BE DIRECTED TO TEMPORARY SEDIMENTATION PONDS. THE CONTRACTOR SHALL REMOVE ALL DIVERSION AND DEWATERING MEASURES AND OTHER TEMPORARY WORKS WHEN THEY ARE NO LONGER REQUIRED. MATERIALS FROM SUCH DEMOLITION SHALL BE HAULED TO DESIGNATED DISPOSAL AREAS.
17. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DELAY, DAMAGE OR LOSS OCCURRING DURING THE PERIOD OF CONSTRUCTION OF THE WORK DUE TO INADEQUATE CARE OF WATER.

RIP RAP, ROCK AND CHANNEL LINING MATERIAL

18. RIP RAP TO BE COMPOSED OF CLEAN, DURABLE ANGULAR QUARRY ROCK OF A QUALITY THAT WILL NOT DISINTEGRATE ON EXPOSURE TO WATER OR THE ATMOSPHERE.
19. RIP RAP SHALL BE UNDERLAIN BY NON-WOVEN GEOTEXTILE AND PLACED AS NECESSARY TO PROVIDE MASS STABILITY AND A REGULAR SURFACE WITH A MINIMUM OF VOIDS. A SUFFICIENT NUMBER OF THE LARGER ROCKS SHALL BE PLACED AT THE TOE OF THE SLOPES TO FORM A FIRM FOUNDATION APPROXIMATELY 50% THICKER THAN THE REQUIRED NOMINAL RIPRAP THICKNESS.
20. RIFFLE ROCK MATERIAL TO CONSIST OF CLEAN, IMPORTED ROUND STONES, BE FREE OF TOPSOIL AND OTHER UNSUITABLE MATERIALS. BACKFILL VOIDS IN ROCK RIFFLES WILL CHANNEL LINING MATERIAL.
21. RIFFLE ROCK MATERIAL GRADATION AND NOMINAL THICKNESS IS TABULATED BELOW.

% PASSING BY MASS	SIZE
100	150 mm
50-85	102 mm
25-40	63 mm
0-10	26 mm
MIN. THICKNESS	200 mm

22. SIEVE ANALYSIS FOR RIPRAP AND RIFFLE ROCK MATERIAL TO BE SUBMITTED PRIOR TO MATERIAL DELIVERY TO SITE.
23. GEOTEXTILE: NON-WOVEN GEOTEXTILE TO BE AMOCO 4550 OR APPROVED EQUAL.
24. CHANNEL LINING MATERIAL (EXCEPT RIFFLES) TO BE CLEAN, WELL-GRADED 100 mm MINUS PIT RUN GRAVEL INSTALLED A MINIMUM 250 mm THICKNESS OVER NATIVE MATERIAL.

LARGE WOODY DEBRIS

25. STRUCTURAL LOGS, TREES AND ROOTWADS MUST BE SOUND AND OF CONIFEROUS SPECIES WITH A MINIMUM 250 MM DIAMETER AT THE BUTT. ROOTWADS MUST HAVE A MINIMUM DIAMETER OF 1.0M.

SEED NOTES:

SITE PREPARATION

1. ENSURE PROPER ORGANIC MATTER AND FERTILITY AMENDMENTS ARE ADDED TO SOIL TO SATISFY RESULTS OF SOIL TESTING.
2. AVOID ADDING FERTILIZERS EXCEPT ON UPLAND AND WOODED SITES.
3. ENSURE SOIL Ph is 6.0 (+/- 0.5) FOR OPTIMUM SEED ESTABLISHMENT.
4. THE AREA MUST BE FREE OF WEEDS PRIOR TO SEEDING. THE CONTRACTOR MUST COMPLY WITH THE CITY OF OTTAWA'S PESTICIDE BY-LAW.
5. SEEDED AREAS SHALL HAVE A MINIMUM 50mm TOPSOIL.

ESTABLISHMENT/SEEDING

6. ALL SEED MUST MEET THE REQUIREMENTS FOR THE SEEDS ACT FOR CANADA NO. 1 SEED. SEED SHALL BE CERTIFIED NO. 1 GRADE. A GERMINATION TEST MAY BE REQUESTED AND MUST COMPLY WITH FEDERAL AND PROVINCIAL SEED LAWS.
7. INSTALL STANDARD MIXTURE BY HYDROSEEDING. USE BIODEGRADABLE EROSION CONTROL MAT AS DIRECTED BY CONTRACT ADMINISTRATOR TO RETAIN SEED ON STEEP SLOPES (OVER 3:1) UNTIL ESTABLISHED.
8. 'WET MEADOW SEED MIX' SHALL BE INSTALLED BELOW 100YEAR W.L. AND THE 'DRY-MESIC MEADOW MIX' SEED MIX SHALL BE INSTALLED ABOVE THE 100YEAR W.L.
9. PLANT SEED AT A DEPTH EQUAL TO THE WIDEST THICKNESS OF THE SEED. GENERALLY THIS IS 6 MM (1/4") OR LESS.
10. FIRM THE SOIL. GENTLY TAMP OR ROLL THE SEEDBED. DO NOT COMPACT THE SOIL. EXCESSIVE FORCE WILL DESTROY THE SOIL STRUCTURE AND INHIBIT GERMINATION.
11. OPTIMUM SEEDING WINDOW IS OCTOBER 15 TO LATE NOVEMBER.
12. LOOSEN SOIL TO 1" DEPTH FOR GOOD SEED TO SOIL CONTACT.
13. ENSURE ADEQUATE MOISTURE IS AVAILABLE FOR INITIAL SEEDING APPLICATION AND FOR MINIMUM SIX WEEKS AFTER.

MAINTENANCE:

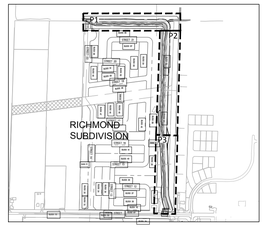
14. MAINTENANCE REQUIRES FIRST CUT WHEN WEEDS REACH 12" HEIGHT. DO NOT CUT LOWER THAN 6" HEIGHT. THIS WILL PREVENT WEED SEEDING. LOWER CUTS WILL ENCOURAGE WEED GROWTH.
15. IN SECOND YEAR PERFORM SPRING CUT RATHER THAN LATE FALL TO PROVIDE OVERWINTERING HABITAT FOR WILDLIFE.
16. NATIVE SEED MIXES TAKE A LONGER TIME TO ESTABLISH THAN TYPICAL TURFGRASS SEED MIXES. PATIENCE AND ADEQUATE MOISTURE AT INITIAL SEEDING WILL PROVIDE THE BEST RESULTS WITH PERIODIC WATERING IN TIMES OF HEAT STRESS UNTIL SEEDS ARE FULLY ESTABLISHED.

PLANTING NOTES:

1. CONTRACTOR SHALL SUPPLY ALL PLANTS AND MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE WORK SHOWN ON THIS DRAWING. ANY DISCREPANCIES BETWEEN QUANTITIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR FOR DIRECTION.
2. STAKING (LAYOUT) OF PLANT MATERIALS TO BE APPROVED BY THE CONTRACT ADMINISTRATOR PRIOR TO INSTALLATION.
3. CONTRACT ADMINISTRATOR RESERVES THE RIGHT TO REFUSE ACCEPTANCE OF ANY PLANT DISPLAYING POOR GROWTH HABITS INJURY OR DISEASE. ANY PLANT MATERIAL THAT IS REJECTED BY THE CONTRACT ADMINISTRATOR WILL BE PROMPTLY REMOVED FROM THE SITE BY THE CONTRACTOR AND REPLACED WITH MATERIAL OF ACCEPTABLE QUALITY AT NO ADDITIONAL COST TO THE PROJECT.
4. ALL DECIDUOUS AND CONIFEROUS TREES AND SHRUBS SHALL BE PLANTED AND STAKED IN ACCORDANCE WITH THE PLANTING DETAILS ON THIS DRAWING.
5. ALL PLANT MATERIAL SHALL BE NURSERY GROWN STOCK UNLESS OTHERWISE NOTED
6. ALL PLANT MATERIALS TO CONFORM TO THE CANADIAN NURSERY LANDSCAPE ASSOCIATION (CNLA) FOR VARIETY, SIZE AND CONDITION. ANY PLANTS THAT DO NOT CONFORM TO THESE STANDARDS WILL BE PROMPTLY REMOVED FROM THE SITE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
7. ANY SUBSTITUTIONS OF PLANT MATERIALS OR QUANTITIES REQUIRES THE WRITTEN APPROVAL OF THE CONTRACT ADMINISTRATOR. BAREROOT MATERIAL SHOULD BE SUBSTITUTED WITH POTTED OR WIRE BASKET MATERIAL IF PLANTING IS NOT COMPLETED IN THE SPRING.
8. PLANTS ARE NOT TO BE INSTALLED OR TRANSPLANTED DURING EXTREME HEAT, DROUGHT OR OTHER UNDESIRABLE CONDITIONS. CONTRACTOR SHALL NOT PROCEED IN UNCERTAINTY. CONTACT CONTRACT ADMINISTRATOR FOR DIRECTION.
9. TOPSOIL TO BE FREE FROM WEEDS, SUBSOIL, ROOTS, STONES, LUMPS OF CLAY AND TOXIC MATERIAL.
10. SHREDDED BARK MULCH TO BE UNIFORMLY APPLIED UNDER ALL TREES AND IN PLANTING BEDS TO 60 mm IN THICKNESS. SAMPLE TO BE SUBMITTED TO THE CONTRACT ADMINISTRATOR FOR APPROVAL PRIOR TO PLACEMENT.
11. INSTALL APPROVED WRAPAROUND TYPE TREE GUARDS ON ALL DECIDUOUS TREES OVER 2000 mm IN HEIGHT. ENSURE THAT THE BOTTOM 50 mm OF THE TREE GUARD EXTENDS BELOW SOIL TO PREVENT ENTRY BY RODENTS.
12. ANY DEAD OR DAMAGED BRANCHES OF TREES OR SHRUBS TO BE PRUNED ACCORDING TO STANDARDS AND TIMING APPROPRIATE TO EACH SPECIES.
13. CONTRACTOR TO VERIFY ALL DIMENSIONS AND QUANTITIES AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR.
14. CONTRACTOR TO IDENTIFY WITH OWNER AND CONTRACT ADMINISTRATOR ANY MAINTENANCE REQUIREMENTS NECESSARY FOR WARRANTY PURPOSES.
15. CONTRACT ADMINISTRATOR RESERVES THE RIGHT TO EXTEND CONTRACTOR'S WARRANTY RESPONSIBILITIES FOR AN ADDITIONAL YEAR IF, AT THE END OF INITIAL WARRANTY PERIOD, LEAF DEVELOPMENT AND GROWTH IS NOT SUFFICIENT TO ENSURE FUTURE SURVIVAL AS DETERMINED BY THE CONTRACT ADMINISTRATOR.
16. ALL PLANT MATERIAL SHALL BE GUARANTEED FOR TWO YEARS FROM THE DATE OF PERFORMANCE ACCEPTANCE AS DETERMINED BY THE CITY OF OTTAWA.
17. CONTRACTOR TO MAKE GOOD ALL EXISTING AREAS DAMAGED BY HIS WORK TO THE SATISFACTION OF THE CITY OF OTTAWA.
18. PERIODIC REVIEWS OF PLANTING SHALL BE CARRIED OUT BY THE LANDSCAPE ARCHITECT.
19. THE CONTRACTOR SHALL RELOCATE ANY TREE OR SHRUB ON THE PROPERTY AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
20. CONTRACTOR SHALL REMOVE ALL TIES, TREE STAKES AND ASSOCIATED GUY WIRES AND ATTACHMENT DEVICES AFTER THE SPECIFIED WARRANTY PERIOD.
21. ALL TREE LOCATIONS SHALL CONFORM TO THE SETBACK REQUIREMENTS ESTABLISHED BY THE CONTRACT ADMINISTRATOR.
22. ALL SHRUBS SHALL BE PLANTED IN 'BEDS' NOT IN INDIVIDUAL PLANTING PITS. EACH SHRUB BED SHALL BE APPROVED DURING THE LAYOUT / STAKING PROCESS AND SHALL RECEIVE TOPSOIL AND MULCH THROUGHOUT THE ENTIRE BED AREA.
23. ALL PLANT MATERIALS WILL BE PLANTED IN AN APPROVED TOPSOIL. NO ADDITIONAL SOILS OR ADDITIVES WILL BE PERMITTED UNLESS SPECIFIED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
24. THE FOLLOWING TREE PROTECTION MEASURES WILL BE PROVIDED TO ENSURE THE PRESERVATION OF THE TREES IDENTIFIED IN THE DETAILED TREE PLANTING AND CONSERVATION PLAN TO THE SATISFACTION OF FORESTRY SERVICES:
    - 24.1.1. THE OWNER SHALL INSTALL PRESERVATION TREE FENCING AS OUTLINED IN LANDSCAPE PLANS.
    - 24.1.2. EQUIPMENT SHALL NOT BE ALLOWED TO OPERATE, PARK, BE REPAIRED OR REFUELLED, NOR SHALL CONSTRUCTION MATERIALS BE STORED OR ANY EARTH MATERIALS BE STOCKPILED WITHIN THE BARRICADES OR WITHIN THE CRITICAL ROT ZONE OF A TREE. WASTE OR VOLATILE MATERIALS, SUCH AS MINERAL SPIRITS, OIL OR PAINT THINNER SHALL NOT BE DISPOSED OF ON SITE. ENSURE THAT EXHAUST FUMES FROM ALL EQUIPMENT ARE NOT DIRECTED TOWARDS ANY TREE'S CANOPY
    - 24.1.3. FINE RAKING AND GRADING MAY OCCUR WITHIN THE DRIPLINE OF EXISTING VEGETATION AS PER THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
    - 24.1.4. WHEN EXCAVATION MUST TAKE PLACE WITHIN THE DRIPLINE OF A TREE, A TRENCH SHALL BE DUG CAREFULLY BY HAND OR WITH A ROOT-CUTTING (STUMP GRINDER) OR STONE CUTTING (CUT-OFF) MACHINE ALONG THE FURTHEST REACH OF THE CUT.
    - 24.1.5. IF ANY TREE ROOTS ARE EXPOSED DURING CONSTRUCTION, THEY SHALL BE IMMEDIATELY REBURIED WITH SOIL OR COVERED WITH FILTER CLOTH OR WOOD CHIPS AND KEPT MOIST UNTIL THEY CAN BE BURIED PERMANENTLY. FLOODING OR DEPOSITION OF SEDIMENT SHALL BE PREVENTED WHERE TREES ARE LOCATED.
    - 24.1.6. IN ORDER TO ELIMINATE SAFETY HAZARDS, THE OWNER SHALL PRUNE AND/OR REMOVE ANY FUTURE CITY-OWNED TREES PRIOR TO CITY TAKEOVER. ALL SUCH WORK MUST BE APPROVED AND SUPERVISED BY FORESTRY STAFF.
    - 24.1.7. DO NOT ATTACH ANY SIGNS, NOTICES OR POSTERS TO ANY TREE.
    - 24.1.8. INVASIVE VEGETATION SHALL BE TAGGED BY A CITY FORESTER AND REMOVED FROM SITE.
    - 24.1.9. TAKE CARE TO NOT DISTURB SURROUNDING RETAINED PLANT MATERIAL.
    - 24.1.10. EXCAVATE ROOTS TO 300MM DEPTH
25. FOR BARE ROOT STOCK
    - 25.0.1. SPREAD THE ROOTS OUT WELL AND NEVER ROLL THEM UP IN THE SOIL.
    - 25.0.2. PLACE THE SEEDLING AS UPRIGHT AS POSSIBLE. EVEN ON SLOPES.
    - 25.0.3. THE TREES SHOULD BE NO MORE THAN 10 DEGREES FROM VERTICAL.
    - 25.0.4. SELECT THE BEST MICROSITE. DON'T PLANT SEEDLINGS NEAR WATER HOLES, STUMPS, OR ROCKS.
    - 25.0.5. PLANT THE SEEDLINGS AT THE PROPER DEPTH. FOR BARE ROOT SEEDLINGS, THE ROOT COLLARS SHOULD BE AT GROUND LEVEL. WHILE FOR CONTAINER STOCK, THE TOP OF THE SOIL PLUG SHOULD BE 1 TO 2 CM BELOW GROUND LEVEL.
    - 25.0.6. NEVER LEAVE ROOTS EXPOSED TO THE AIR, AND NEVER BURY THE BRANCHES.
    - 25.0.7. DO NOT TRIM OR PRUNE SEEDLING ROOTS. SEEDLINGS NEED EVERY SINGLE TINY ROOT TO ABSORB MOISTURE AND NUTRIENTS FROM THE GROUND. THE MORE ROOT SURFACE, THE BETTER THE GROWTH.
    - 25.0.8. PACK THE SOIL WELL, BUT DONT OVER PACK IT OR SLAM THE HOLE SHUT. PRESS GENTLY BUT FIRMLY TO PREVENT SHOCKING THE ROOTS. AIR POCKETS CAN KILL ROOTS.
    - 25.0.9. SPACE THE SEEDLINGS AS INDICATED
    - 25.0.10. PLANT MIN. 1.0M FROM NATURAL REGENERATING AREAS ON SITE.

REMOVAL NOTES:

1. CONTRACTOR TO REPAIR ALL DAMAGE TO ADJACENT PROPERTY TO THE SATISFACTION OF THE ADJACENT PROPERTY OWNER AND THE CITY OF OTTAWA.
2. CONTRACTOR'S BID TO INCLUDE THE COST OF DISPOSAL OFF-SITE FOR ANY ITEMS NOTED TO BE REMOVED.
3. ALL UTILITY STRUCTURES SHALL BE MAINTAINED UNLESS INDICATED ON THE DRAWINGS.
4. THE CONTRACTOR TO NOTIFY THE PROJECT MANAGER OF ANY DISCREPANCIES OR UTILITY STRUCTURES / VEGETATION NOT SHOWN ON THE DRAWINGS.



LEGEND

- LIMIT OF WORKS
- CHANNEL FLOODLINE
- PROPERTY LINE
- TREE PRESERVATION TREE
- MATCH LINE
- EXISTING VEGETATION TO BE REMOVED
- EXISTING VEGETATION TO BE RETAINED

No.	Description	Date
8	Revised as per Comments	Jun.8/17
7	Revised as per Comments	Mar.30/17
6	Issued for Fourth Submission	Dec.16/16
5	Revised as per Comments	Mar.19/15
4	Issued for Third Submission	Feb.11/15
3	Issued for Second Submission	Mar.04/13
2	Re-Issued for First Submission	Dec.06/12
1	Issued for First Submission	Nov.23/12

Revision

City Approval Stamp

N

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Project

VAN GAAL DRAIN
CHANNEL RE-ALIGNMENT
Richmond Village Development Corporation

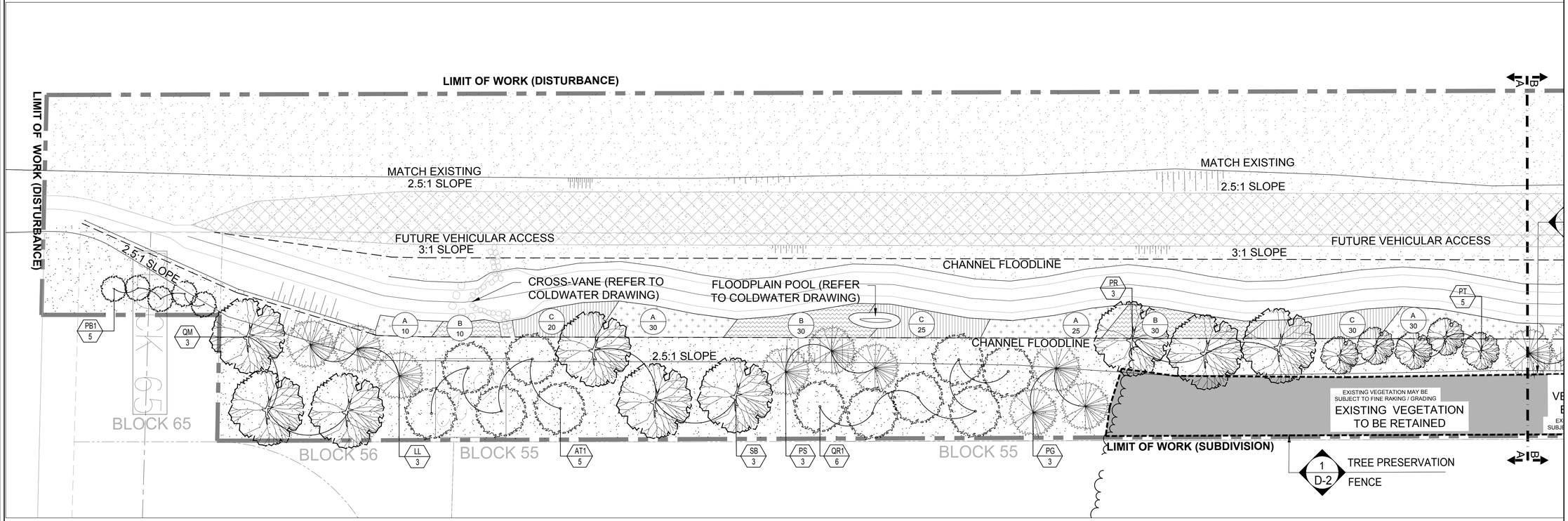
Title

REMOVALS PLAN

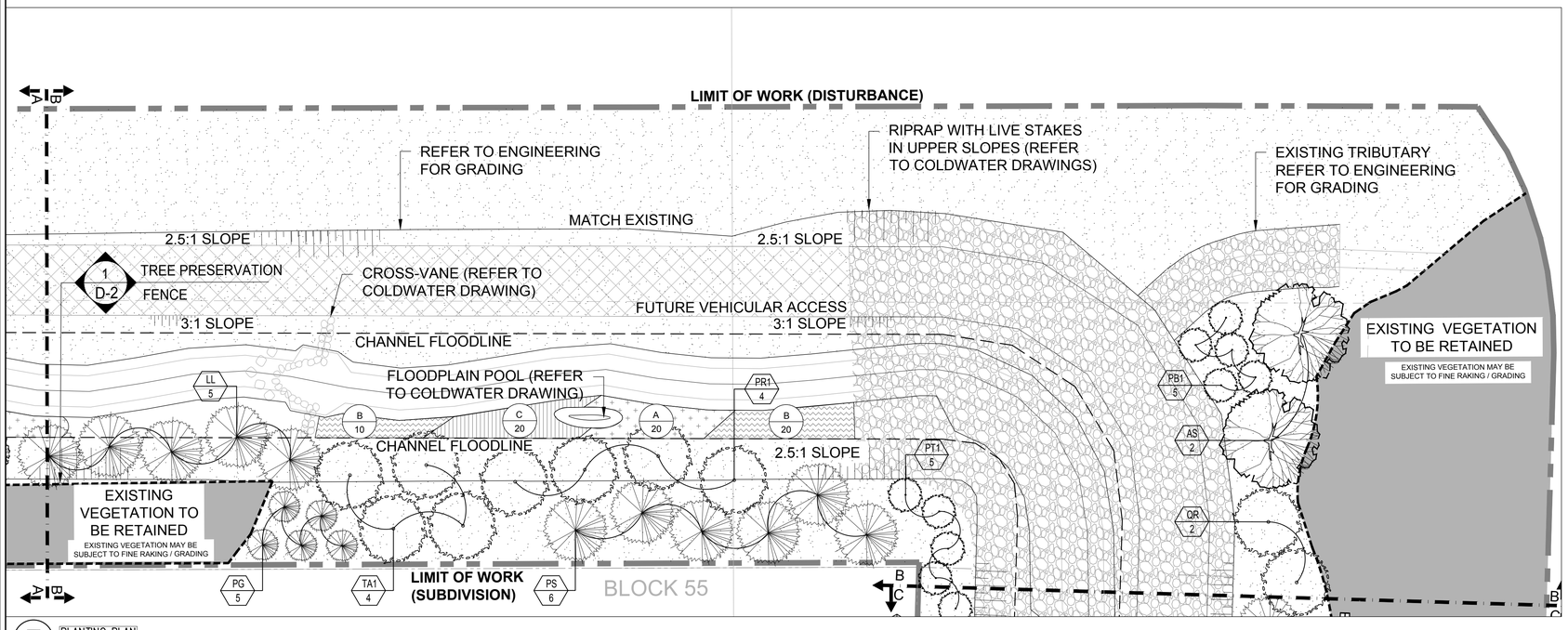
Date	JANUARY 2015
Scale	NTS
Drawn	AB
Checked	LM
Job No.	1-12128

Sheet

RP-0



A PLANTING PLAN



B PLANTING PLAN

PLANT LIST - FOR PLANTING PLAN 1, 2, AND 3

DECIDUOUS TREES

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
AR	14	ACER RUBRUM	RED MAPLE	175cm	B.R.
AR1	15	ACER RUBRUM	RED MAPLE	150cm	B.R.
AS	16	ACER SACCHARINUM	SILVER MAPLE	175cm	B.R.
AS1	13	ACER SACCHARINUM	SILVER MAPLE	150cm	B.R.
AT	9	ACER SACCHARUM	SUGAR MAPLE	175cm	B.R.
AT1	27	ACER SACCHARUM	SUGAR MAPLE	150cm	B.R.
OV	6	OSTRYA VIRGINIANA	IRON WOOD	175cm	B.R.
OV1	24	OSTRYA VIRGINIANA	IRON WOOD	150cm	B.R.
PB	10	POPULUS BALSAMIFERA	BALSAM POPLAR	175cm	B.R.
PB1	17	POPULUS BALSAMIFERA	BALSAM POPLAR	150cm	B.R.
PR	23	PRUNUS SEROTINA	BLACK CHERRY	175cm	B.R.
PR1	17	PRUNUS SEROTINA	BLACK CHERRY	150cm	B.R.
PT	22	POPULUS TREMULOIDES	TREMBLING ASPEN	175cm	B.R.
PT1	31	POPULUS TREMULOIDES	TREMBLING ASPEN	150cm	B.R.
QM	12	QUERCUS MACROCARPA	BURR OAK	175cm	B.R.
QM1	10	QUERCUS MACROCARPA	BURR OAK	150cm	B.R.
QR	15	QUERCUS RUBRA	RED OAK	175cm	B.R.
QR1	16	QUERCUS RUBRA	RED OAK	150cm	B.R.
SB	16	SALIX NIGRA	BLACK WILLOW	175cm	B.R.
SB1	18	SALIX NIGRA	BLACK WILLOW	150cm	B.R.
TA	9	TILIA AMERICANA	BASS WOOD	175cm	B.R.
TA1	15	TILIA AMERICANA	BASS WOOD	150cm	B.R.

CONIFEROUS TREES

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
LL	42	LARIX LARICINA	EASTERN TAMARACK	60cm	F.P.
PG	54	PICEA GLAUCA	WHITE SPRUCE	60cm	F.P.
PS	57	PINUS STROBUS	WHITE PINE	60cm	F.P.
TO	20	THUJA OCCIDENTALIS	WHITE CEDAR	60cm	F.P.

DECIDUOUS SHRUB MIX 'A' - 1.069sq.m. @ 1.5m SPACING (555 PLANTS TOTAL)

%	QTY	BOTANICAL NAME	COMMON NAME	ROOT
25%	135	ILEX VERTICILLATA	WINTERBERRY	SEEDLING / BARE-ROOT
25%	140	SALIX AMYGDALOIDES	PEACH-LEAVED WILLOW	SEEDLING / BARE-ROOT
25%	140	SALIX BEBBIANA	BEBB'S WILLOW	SEEDLING / BARE-ROOT
25%	140	SALIX DISCOLOR	PUSSY WILLOW	SEEDLING / BARE-ROOT

DECIDUOUS SHRUB MIX 'B' - 1,065sq.m. @ 1.5m SPACING (555 PLANTS TOTAL)

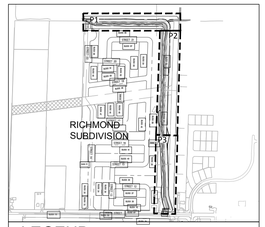
%	QTY	BOTANICAL NAME	COMMON NAME	ROOT
25%	140	RHUS TYPHINA	STAGHORN SUMAC	SEEDLING / BARE-ROOT
25%	140	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	SEEDLING / BARE-ROOT
25%	140	AMELANCHIER CANADENSIS	SERVICEBERRY	SEEDLING / BARE-ROOT
25%	135	VIBURNUM LENTAGO	NANNYBERRY	SEEDLING / BARE-ROOT

DECIDUOUS SHRUB MIX 'C' - 1,083sq.m. @ 1.5m SPACING (560 PLANTS TOTAL)

%	QTY	BOTANICAL NAME	COMMON NAME	ROOT
20%	140	RUBUS CANADENSIS	BLACKBERRY	SEEDLING / BARE-ROOT
20%	140	VIBURNUM TRILOBUM	HIGHBUSH CRANBERRY	SEEDLING / BARE-ROOT
20%	140	CORUS OBLIQUE	SILKY DOGWOOD	SEEDLING / BARE-ROOT
20%	140	CORNUS SERICEA	RED OSIER DOGWOOD	SEEDLING / BARE-ROOT
20%	140	PRUNUS VIRGINIANA	CHOKECHERRY	SEEDLING / BARE-ROOT

SEED MIX

WET MEADOW SEED MIX - 32,600m²		DRY-MESIC MEADOW SEED MIX - 2100m²	
25%	CANADA BLUE JOINT GRASS	25%	CANADA BLUE GRASS
25%	ROUGH-STALKED MEADOW GRASS	25%	CREEPING RED FESCUE
20%	HIGHLAND COLONIAL BENTGRASS	25%	PERENNIAL RYEGRASS
15%	CREEPING RED FESCUE	10%	RED CLOVER
5%	TALL WHITE ASTER	10%	BLACK-EYED SUSAN
10%	NEW ENGLAND ASTER	5%	NEW ENGLAND ASTER



LEGEND

- LIMIT OF WORKS
- CHANNEL FLOODLINE
- PROPERTY LINE
- TREE PRESERVATION TREE
- MATCH LINE
- DECIDUOUS TREE
- DECIDUOUS TREE
- CONIFEROUS TREE
- WET MEADOW SEED MIX
- DRY-MESIC MEADOW SEED MIX
- SHRUB MIX 'A'
- SHRUB MIX 'B'
- SHRUB MIX 'C'
- EXISTING VEGETATION TO BE RETAINED
- GRAVEL (REFER TO COLDWATER DRAWINGS)
- FUTURE VEHICULAR ACCESS (REFER TO COLDWATER DRAWINGS)

PLANTING KEY

- XX / 00 — TREE SPECIES / QUANTITY
- XX / 00 — SHRUB GROUP / QUANTITY
- XX / X — DETAIL / SHEET

No.	Description	Date
8	Revised as per Comments	Jun.8/17
7	Revised as per Comments	Mar.30/17
6	Issued for Fourth Submission	Dec.16/16
5	Revised as per Comments	Mar.19/15
4	Issued for Third Submission	Feb.11/15
3	Issued for Second Submission	Mar.04/13
2	Re-Issued for First Submission	Dec.06/12
1	Issued for First Submission	Nov.23/12

Revision

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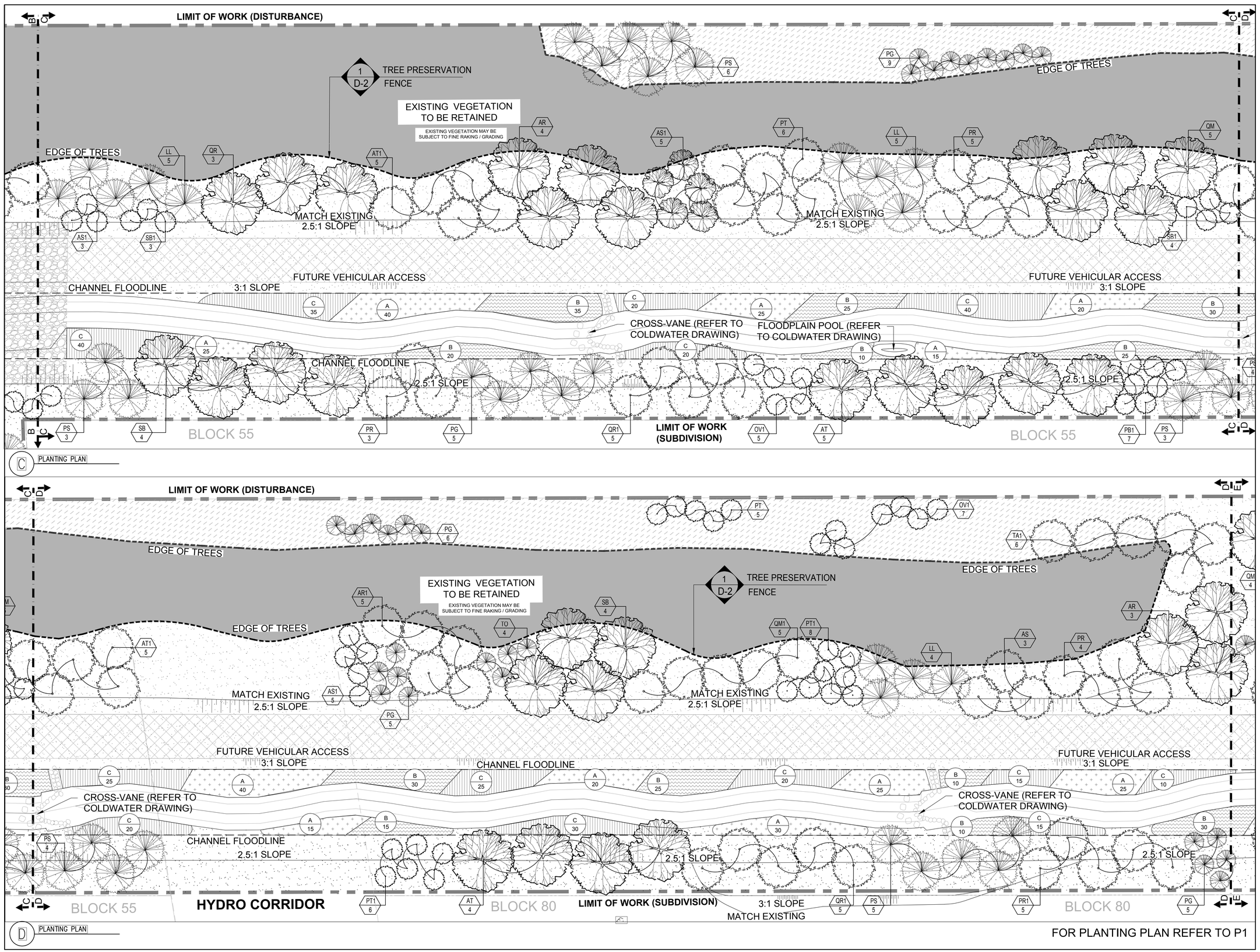
Project

VAN GAAL DRAIN
CHANNEL RE-ALIGNMENT
Richmond Village Development Corporation

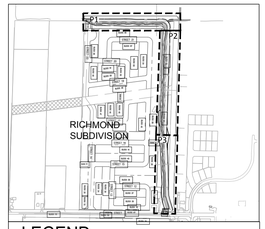
Title

PLANTING PLAN I

Date	JANUARY 2015	Sheet	P1
Scale	NTS		
Drawn	AB		
Checked	LM		
Job No.	1-12128		



Contractor shall check all dimensions on the work and report any discrepancy to the Landscape Architect before proceeding. All drawings and specifications are the property of the Landscape Architect and must be returned at the completion of the work. This drawing is not to be used for construction until signed by the Landscape Architect.



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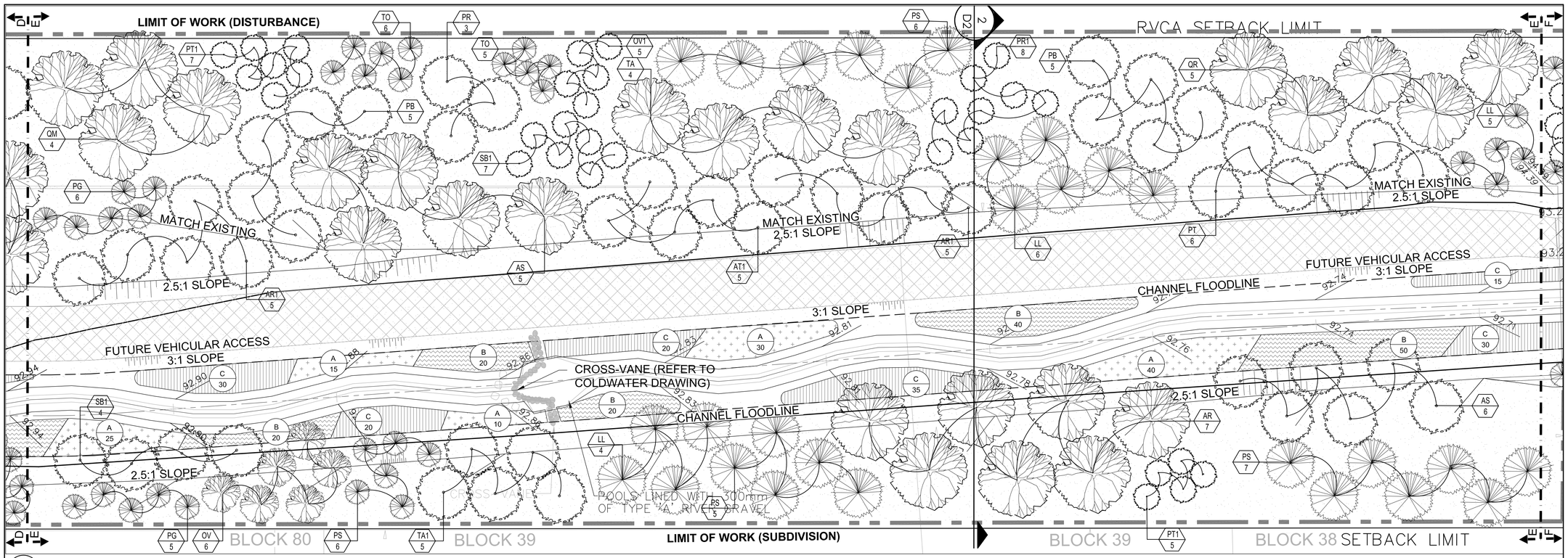
VAN GAAL DRAIN
CHANNEL RE-ALIGNMENT
Richmond Village Development Corporation

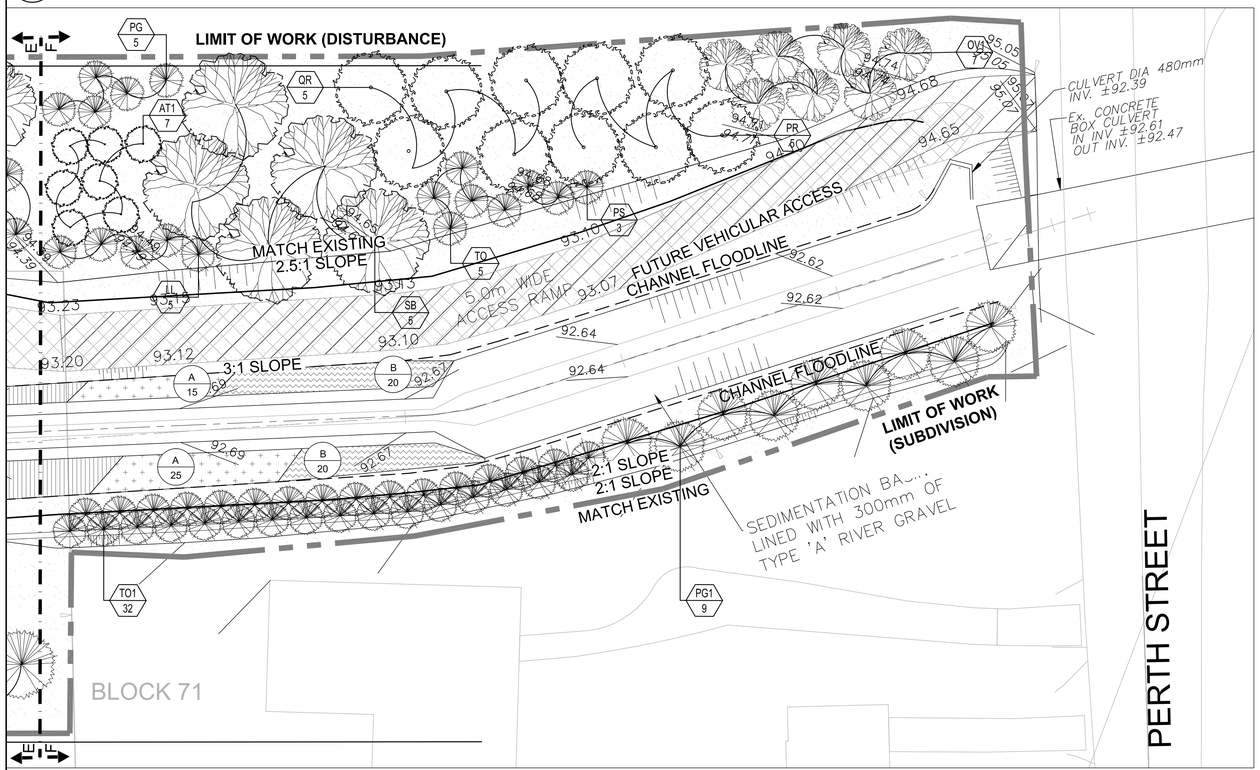
Title

PLANTING PLAN II

Date	JANUARY 2015	Sheet	P2
Scale	NTS		
Drawn	AB		
Checked	LM		
Job No.	1-12128		



E PLANTING PLAN



F PLANTING PLAN

PLANT LIST - FOR PLANTING PLAN 1, 2, AND 3

DECIDUOUS TREES

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
AR	14	ACER RUBRUM	RED MAPLE	175cm	B,R.
AR1	15	ACER RUBRUM	RED MAPLE	150cm	B,R.
AS	16	ACER SACCHARINUM	SILVER MAPLE	175cm	B,R.
AS1	13	ACER SACCHARINUM	SILVER MAPLE	150cm	B,R.
AT	9	ACER SACCHARUM	SUGAR MAPLE	175cm	B,R.
AT1	27	ACER SACCHARUM	SUGAR MAPLE	150cm	B,R.
OV	6	OSTRYA VIRGINIANA	IRON WOOD	175cm	B,R.
OV1	24	OSTRYA VIRGINIANA	IRON WOOD	150cm	B,R.
PB	10	POPULUS BALSAMIFERA	BALSAM POPLAR	175cm	B,R.
PB1	17	POPULUS BALSAMIFERA	BALSAM POPLAR	150cm	B,R.
PR	23	PRUNUS SEROTINA	BLACK CHERRY	175cm	B,R.
PR1	17	PRUNUS SEROTINA	BLACK CHERRY	150cm	B,R.
PT	22	POPULUS TREMULOIDES	TREMBLING ASPEN	175cm	B,R.
PT1	31	POPULUS TREMULOIDES	TREMBLING ASPEN	150cm	B,R.
QM	12	QUERCUS MACROCARPA	BURR OAK	175cm	B,R.
QM1	5	QUERCUS MACROCARPA	BURR OAK	150cm	B,R.
QR	15	QUERCUS RUBRA	RED OAK	175cm	B,R.
QR1	16	QUERCUS RUBRA	RED OAK	150cm	B,R.
SB	16	SALIX NIGRA	BLACK WILLOW	175cm	B,R.
SB1	18	SALIX NIGRA	BLACK WILLOW	150cm	B,R.
TA	4	TILIA AMERICANA	BASS WOOD	175cm	B,R.
TA1	15	TILIA AMERICANA	BASS WOOD	150cm	B,R.

CONIFEROUS TREES

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS
LL	42	LARIX LARICINA	EASTERN TAMARACK	60cm	F.P.
PG	54	PICEA GLAUCA	WHITE SPRUCE	60cm	F.P.
PS	57	PINUS STROBUS	WHITE PINE	60cm	F.P.
TO	20	THUJA OCCIDENTALIS	WHITE CEDAR	60cm	F.P.
PG1	9	PICEA GLAUCA	WHITE SPRUCE	200cm	F.P.
TO1	32	THUJA OCCIDENTALIS	WHITE CEDAR	200cm	F.P.

DECIDUOUS SHRUB MIX 'A' - 1,069sq.m. @ 1.5m SPACING (555 PLANTS TOTAL)

%	QTY	BOTANICAL NAME	COMMON NAME	ROOT
25%	135	ILEX VERTICILLATA	WINTERBERRY	SEEDLING / BARE-ROOT
25%	140	SALIX AMYGDALOIDES	PEACH-LEAVED WILLOW	SEEDLING / BARE-ROOT
25%	140	SALIX BEBBIANA	BEBB'S WILLOW	SEEDLING / BARE-ROOT
25%	140	SALIX DISCOLOR	PUSSY WILLOW	SEEDLING / BARE-ROOT

DECIDUOUS SHRUB MIX 'B' - 1,065sq.m. @ 1.5m SPACING (555 PLANTS TOTAL)

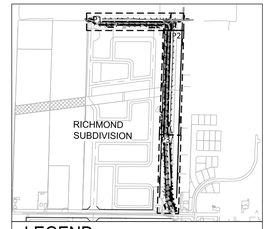
%	QTY	BOTANICAL NAME	COMMON NAME	ROOT
25%	140	RHUS TYPHINA	STAGHORN SUMAC	SEEDLING / BARE-ROOT
25%	140	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	SEEDLING / BARE-ROOT
25%	140	AMELANCHIER CANADENSIS	SERVICEBERRY	SEEDLING / BARE-ROOT
25%	135	VIBURNUM LENTAGO	NANNYBERRY	SEEDLING / BARE-ROOT

DECIDUOUS SHRUB MIX 'C' - 1,083sq.m. @ 1.5m SPACING (560 PLANTS TOTAL)

%	QTY	BOTANICAL NAME	COMMON NAME	ROOT
20%	140	RUBUS CANADENSIS	BLACKBERRY	SEEDLING / BARE-ROOT
20%	140	VIBURNUM TRILOBUM	HIGHBUSH CRANBERRY	SEEDLING / BARE-ROOT
20%	140	CORUS OBLIQUE	SILKY DOGWOOD	SEEDLING / BARE-ROOT
20%	140	CORNUS SERICEA	RED OSIER DOGWOOD	SEEDLING / BARE-ROOT
20%	140	PRUNUS VIRGINIANA	CHOKECHERRY	SEEDLING / BARE-ROOT

SEED MIX

WET MEADOW SEED MIX - 32,600m²		DRY-MESIC MEADOW SEED MIX - 2100m²	
25%	CANADA BLUE JOINT GRASS	25%	CANADA BLUE GRASS
25%	ROUGH-STALKED MEADOW GRASS	25%	CREEPING RED FESCUE
20%	HIGHLAND COLONIAL BENTGRASS	25%	PERENNIAL RYEGRASS
15%	CREEPING RED FESCUE	10%	RED CLOVER
5%	TALL WHITE ASTER	10%	BLACK-EYED SUSAN
10%	NEW ENGLAND ASTER	5%	NEW ENGLAND ASTER



LEGEND

- LIMIT OF WORKS
- CHANNEL FLOODLINE
- PROPERTY LINE
- TREE PRESERVATION TREE
- MATCH LINE
- DECIDUOUS TREE
- DECIDUOUS TREE
- CONIFEROUS TREE
- WET MEADOW SEED MIX
- DRY-MESIC MEADOW SEED MIX
- SHRUB MIX 'A'
- SHRUB MIX 'B'
- SHRUB MIX 'C'
- EXISTING VEGETATION TO BE RETAINED
- GRAVEL (REFER TO COLDWATER DRAWINGS)
- FUTURE VEHICULAR ACCESS (REFER TO COLDWATER DRAWINGS)

PLANTING KEY

- XX / 00 — TREE SPECIES QUANTITY
- XX / 00 — SHRUB GROUP QUANTITY
- XX / X — DETAIL SHEET

No.	Revision	Date
9	Revised planting density	May.30/19
8	Revised as per Comments	Jun.8/17
7	Revised as per Comments	Mar.30/17
6	Issued for Fourth Submission	Dec.16/16
5	Revised as per Comments	Mar.19/15
4	Issued for Third Submission	Feb.11/15
3	Issued for Second Submission	Mar.04/13
2	Re-Issued for First Submission	Dec.06/12
1	Issued for First Submission	Nov.23/12

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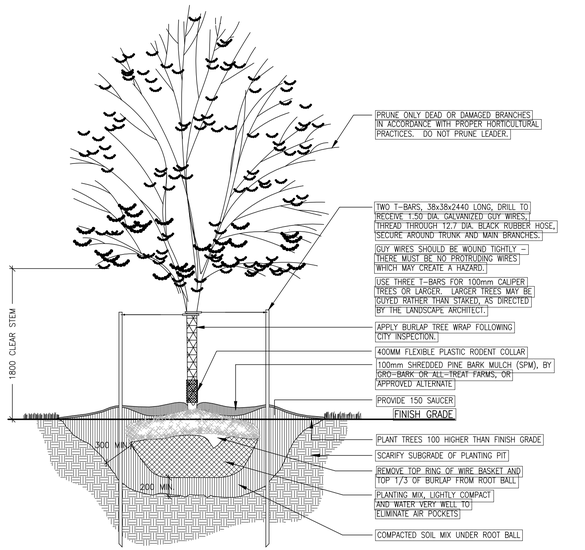
Project

VAN GAAL DRAIN
CHANNEL RE-ALIGNMENT
Richmond Village Development Corporation

Title

PLANTING PLAN III

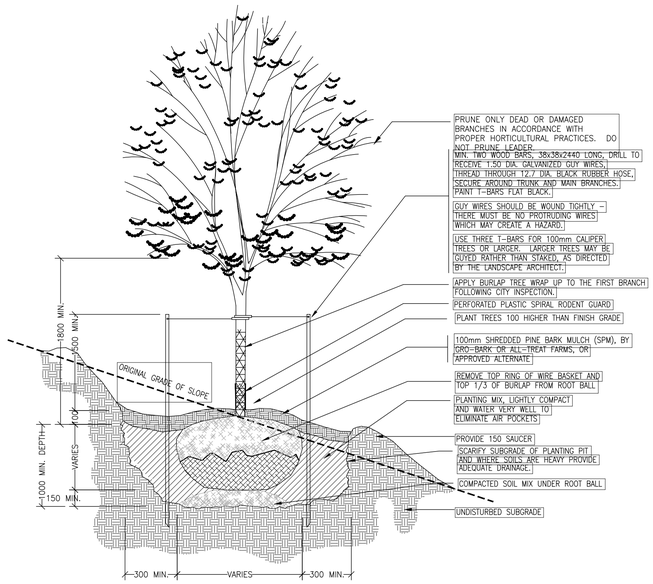
		Sheet
Date	JANUARY 2015	P3
Scale	NTS	
Drawn	AB	
Checked	LM	
Job No.	1-12128	



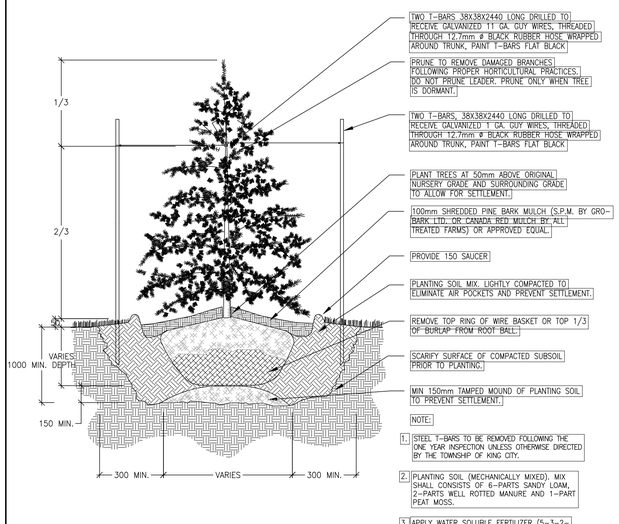
NOTE:

1. STEEL T-BARS TO BE REMOVED FOLLOWING THE ONE YEAR INSPECTION UNLESS OTHERWISE DIRECTED BY THE TOWNSHIP OF KING CITY.
2. PLANTING MIX SHALL BE MECHANICALLY MIXED AND CONSIST OF 6 PARTS SANDY LOAM, 2 PARTS WELL-ROTTED MANURE, TO 1 PART PEAT MOSS.
3. REMOVE TREE WRAP PRIOR TO INSPECTION BY TOWNSHIP OF KING CITY REPRESENTATIVE.
4. CALIPER TO BE MEASURED 305 ABOVE FINISH GRADE.

1 DECIDUOUS TREE PLANTING
N.T.S.



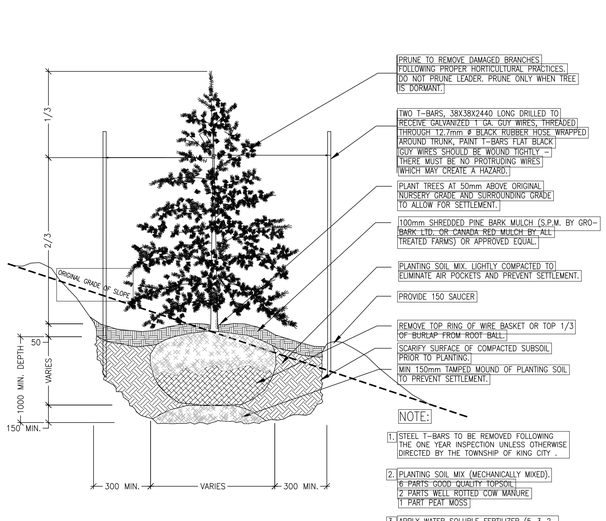
2 DECIDUOUSTREE PLANTING ON SLOPE
N.T.S.



NOTE:

1. STEEL T-BARS TO BE REMOVED FOLLOWING THE ONE YEAR INSPECTION UNLESS OTHERWISE DIRECTED BY THE TOWNSHIP OF KING CITY.
2. PLANTING SOIL (MECHANICALLY MIXED), MIX SHALL CONSISTS OF 6-PARTS SANDY LOAM, 2-PARTS WELL ROTTED MANURE AND 1-PART PEAT MOSS.
3. APPLY WATER SOLUBLE FERTILIZER (5-3-2-RATIO) AT A MIX. RATE OF 9kg/225L.

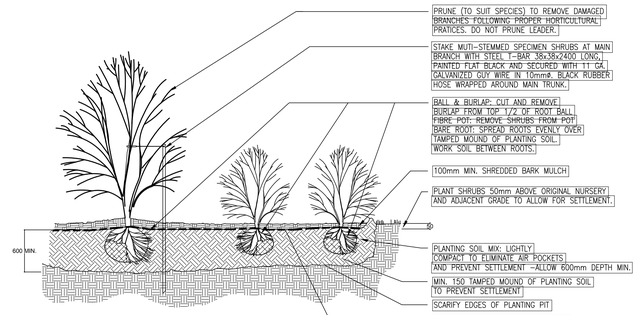
3 CONIFEROUS TREE PLANTING
N.T.S.



NOTE:

1. STEEL T-BARS TO BE REMOVED FOLLOWING THE ONE YEAR INSPECTION UNLESS OTHERWISE DIRECTED BY THE TOWNSHIP OF KING CITY .
2. PLANTING SOIL MIX (MECHANICALLY MIXED), 6 PARTS GOOD QUALITY TOPSOIL, 2 PARTS WELL ROTTED COW MANURE 1 PART PEAT MOSS
3. APPLY WATER SOLUBLE FERTILIZER (5-3-2-RATIO) AT A MIX. RATE OF 9kg/225L.

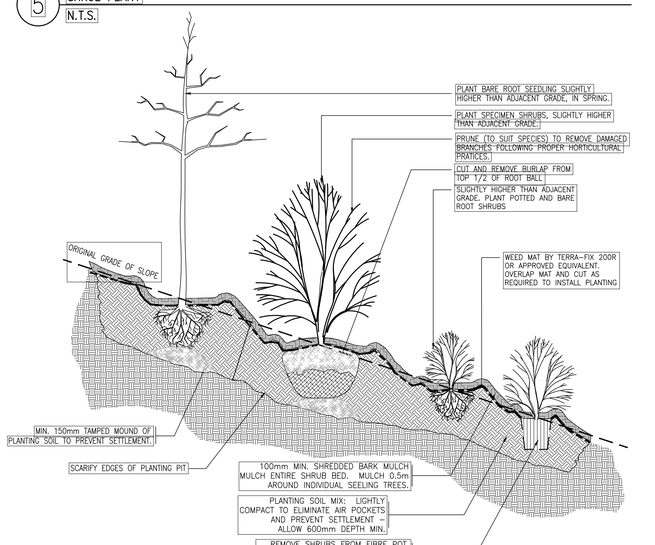
4 CONIFEROUS TREE PLANTING ON SLOPE
N.T.S.



NOTES:

1. PLANTING SOIL MIXTURE (MIX THOROUGHLY): 6-PARTS GOOD QUALITY TOPSOIL; 2-PARTS WELL ROTTED COW MANURE; 1-PART PEAT MOSS
2. SHRUBS SPECIFIED BARE ROOTS (B.R.) TO BE PLANTED SO THAT ROOTS ARE PLACED NATURALLY WITH SOIL MIX BACKFILLED CAREFULLY TO PREVENT ROOT DAMAGE.
3. APPLY WATER SOLUBLE FERTILIZER (5-3-2 RATIO) MIX RATE 9kg/255L, PER 100m OF SHRUB BED AREA. WATERPLANT MATERIAL IMMEDIATELY AFTER PLANTING.
4. PROVIDE 100 HIGH EARTH SAUCER AROUND SHRUB BED WITH 100 WIDE SMOOTH BED EDGE TO RETAIN MULCH.

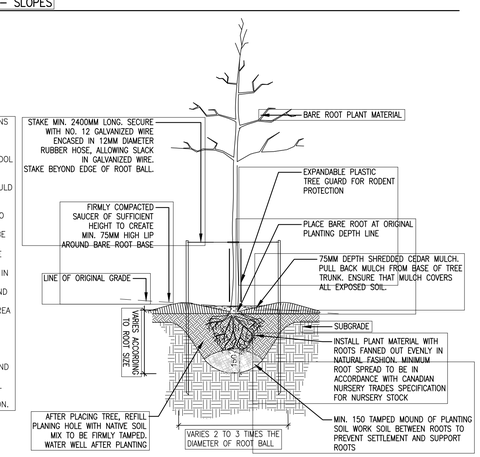
5 SHRUB PLANT
N.T.S.



6 SHRUB PLANTING - SLOPES
N.T.S.

NOTES:

1. ALL MEASUREMENTS AND DIMENSIONS ARE IN MILLIMETERS.
2. BARE ROOT SHOULD BE PLANTED DURING THE DORMANT SEASON. PREFERRABLY PLANT ON CLOUDY, COOL HUMID DAYS.
3. PROTECT ROOTS FROM WIND AND SUN EXPOSURE. BARE ROOTS SHOULD BE KEPT MOIST AND PLANTED IMMEDIATELY.
4. SOAK ROOTS COMPLETELY PRIOR TO PLANTING.
5. UNHEALTHY PLANTS SHOULD NOT BE PLANTED.
6. ORIGINAL (NATIVE) SOIL SHOULD BE GENTLY BACKFILLED AROUND THE ROOTS WHILE HOLDING THE PLANT IN PLACE.
7. ENSURE THE PLANT IS VERTICAL AND ADEQUATELY SUPPORTED.
8. ADD WATER TO THE BACKFILLED AREA UNTIL A SOUPY CONSISTENCY TO REMOVE AIR POCKETS.
9. STAKES TO BE REMOVED AT COMPLETION OF THE TWO YEAR WARRANTY PERIOD.
10. MONITOR WEEDS, SOIL MOISTURE AND GENERAL PLANT HEALTH. PROVIDE WEED MAINTENANCE, SUPPLEMENTAL IRRIGATION, AND PLANT CARE AS NEEDED OVER THE GROWING SEASON.



7 WHIP AND SEEDLING PLANTING
N.T.S.

Contractor shall check all dimensions on the work and report any discrepancy to the Landscape Architect before proceeding. All drawings and specifications are the property of the Landscape Architect and must be returned at the completion of the work. This drawing is not to be used for construction until signed by the Landscape Architect.

No.	Description	Date
8	Revised as per Comments	Jun.8/17
7	Revised as per Comments	Mar.30/17
6	Issued for Fourth Submission	Dec.16/16
5	Revised as per Comments	Mar.19/15
4	Issued for Third Submission	Feb.11/15
3	Issued for Second Submission	Mar.04/13
2	Re-Issued for First Submission	Dec.06/12
1	Issued for First Submission	Nov.23/12

Revision

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Project

VAN GAAL DRAIN
CHANNEL RE-ALIGNMENT
Richmond Village Development Corporation

Title

DETAIL SHEET

Date	JANUARY 2015
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Drawn	AB
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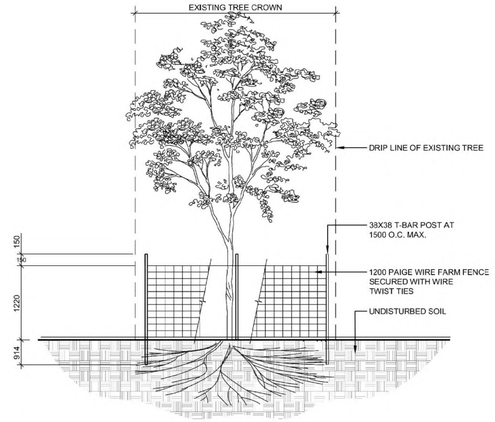
Job No.	1-12128

Sheet

D1

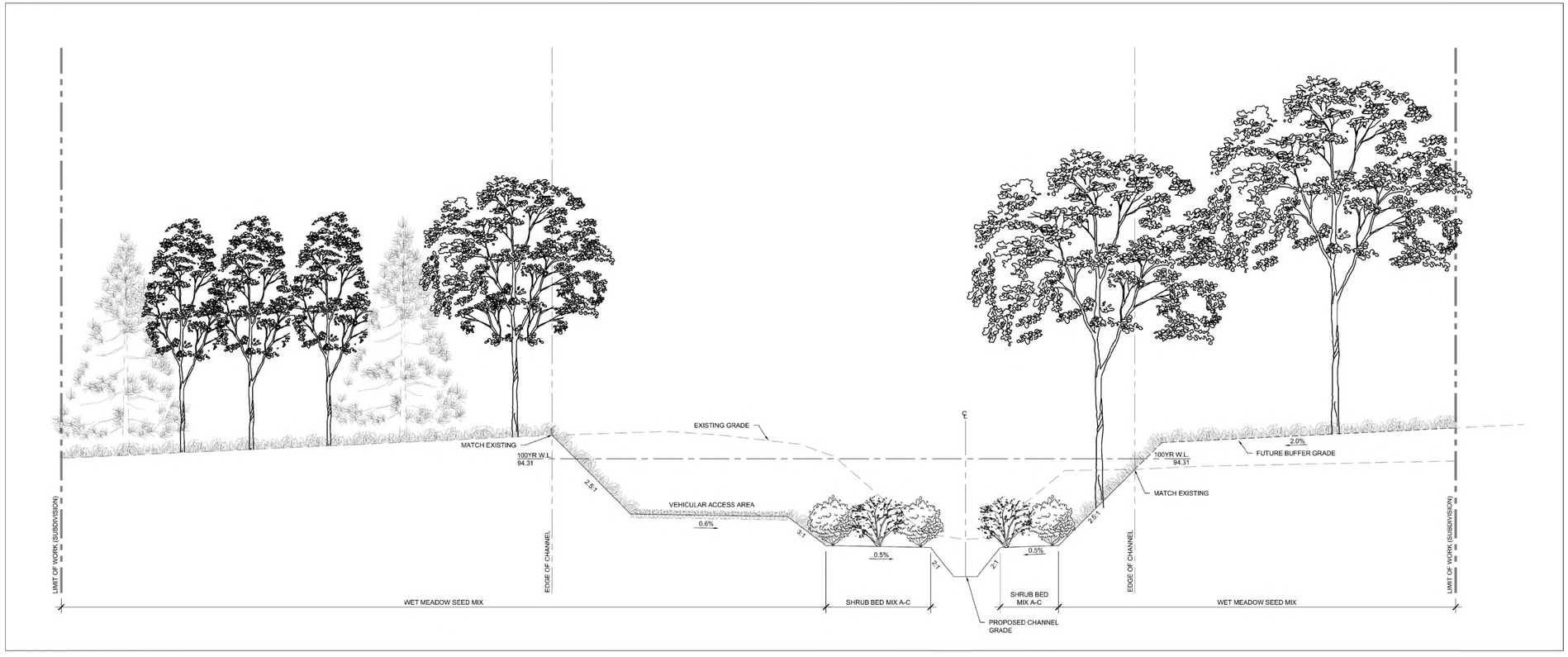


NOTES:

1. THE AREA WITHIN THE DRIPLINE OF ALL EXISTING TREES SHALL BE PROPERLY PROTECTED WITH TEMPORARY FENCING AS PER THE APPROVED LANDSCAPE PLAN.
2. THE SURVEY SHALL SHOW EXISTING ELEVATION AT BASE OF ALL TREES TO BE PRESERVED AS SHOWN BY "+".
3. THE AREA WITHIN THE PROTECTED FENCING SHALL REMAIN UNDISTURBED AND SHALL NOT BE USED FOR THE STORAGE OF BUILDING MATERIALS OR EQUIPMENT. REMOVE ALL DEBRIS.
4. PRUNE BRANCHES TO REMOVE DAMAGED OR OBJECTIONABLE BRANCHES. DO NOT PRUNE LEADERS.
5. TREE PROTECTION SHALL REMAIN UNTIL SUBSTANTIAL PERFORMANCE OF THE PROJECT.
6. IF CUTTING OF ROOTS OR CHANGING OF GRADES AROUND EXISTING TREES IS CALLED FOR, FOLLOW APPROPRIATE DETAILS AS DIRECTED BY LANDSCAPE ARCHITECT.
7. IF TREES ARE BEING AFFECTED BY CONSTRUCTION, A WATER AND FERTILIZING PROGRAM WILL BE REQUIRED TO THE SATISFACTION OF THE CITY.

1 PRESERVATION FENCE
N.T.S.

FOR POOL, RUN AND CROSS-VANE SECTION REFER TO DSEL DRAWING CH-5



2 CHANNEL CROSS SECTION (TYP.)
N.T.S.

No.	Description	Date
8	Revised as per Comments	Jun.8/17
7	Revised as per Comments	Mar.30/17
6	Issued for Fourth Submission	Dec.16/16
5	Revised as per Comments	Mar.19/15
4	Issued for Third Submission	Feb.11/15
3	Issued for Second Submission	Mar.04/13
2	Re-Issued for First Submission	Dec.06/12
1	Issued for First Submission	Nov.23/12

Revision

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Sheet D2

Appendix G – Turtle Fencing Guidelines

SPECIES AT RISK BRANCH
BEST PRACTICES TECHNICAL NOTE

REPTILE AND AMPHIBIAN EXCLUSION FENCING

Version 1.1

July 2013

Ministry of Natural Resources

Ontario

July 2013

Ontario Ministry of Natural Resources
Species at Risk Branch

Recommended Citation:
OMNR. 2013. Reptile and Amphibian Exclusion Fencing: Best Practices, Version 1.0. Species at Risk Branch Technical Note. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. 11 pp.

Cover illustration: Photograph by Matthew J. Aresco, Conservation Director, Nokuse Plantation

Before an activity can be initiated, permissions, approvals or authorizations may be required from MNR (e.g. Endangered Species Act authorization, Wildlife Scientific Collector's Authorization) or other agencies, levels of government (e.g. a conservation authority, municipality, federal or provincial government), or landowners. It is your responsibility to ensure that all necessary permissions, approvals and authorizations are acquired prior to proceeding with your activity.

This document presents information as of the point in time of publication and is meant to be updated through time as improved information becomes available.

Cette publication hautement spécialisée, Reptile and Amphibian Exclusion Fencing Best Practices n'est disponible qu'en anglais en vertu du Règlement 671/92 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez communiquer avec le ministère des Richesses naturelles au Pamela Wesley,705-755-5217.

Document History

Revision Number	Revision Date	Summary of Changes	Originated	Reviewed	Authorized
1.1	**June, 2013**	**Pre-publishing edits**	**June, 2013**	**June, 2013**	**June, 2013**

REPTILE AND AMPHIBIAN EXCLUSION FENCING - BEST PRACTICES -

The purpose of this guidance document is to provide an overview of proven design and installation techniques for reptile and amphibian exclusion fencing. Though this document points to site and species-specific design requirements, it is important to recognize that every situation is different. This guidance is not meant to replace site-specific advice obtained from local MNR staff or experienced exclusion fencing contractors. Moreover, exclusion fences are only effective when well planned, properly constructed, and maintained.

Exclusion fencing seeks to eliminate access to specific areas where activities that could harm animals are occurring (e.g. active aggregate operations, construction sites, and roads). The selection and installation of exclusion fencing can present some challenges, particularly if multiple species are being excluded. For example, some reptiles and amphibians are able to dig under fencing while others can climb over. Some may also take advantage of burrows dug by other animals. To maintain effectiveness, the bottom of the fence should be buried or secured firmly to the ground and minimum height recommendations (Table 1) are considered.

Exclusion fence design should consider the target species as well as those that might be unintentionally impacted. Fencing material should not pose a risk of entanglement or permit individuals to pass underneath or between openings. Landscape features such as topography and substrate need to be considered as they may constrain fencing design.

Including plans for fencing in advance of a project can increase efficiency and fence effectiveness. For example, long-term road projects that will include a permanent sound barrier could design the sound barrier such that it also meets the specifications of the required exclusion fence.

EFFECTIVE FENCE CHARACTERISTICS

The fence burial and height recommendations listed in Table 1 below have been compiled from scientific literature, established management practices, and practitioner best advice. These are general recommendations and at times other specifications may be more appropriate. For instance, in areas where the substrate does not permit fence burial, weighing down the fence with heavy items (e.g. sand bags) or backfilling may be acceptable. Where needed, speak with your local MNR staff or experienced exclusion fencing contractor to develop site-specific plans.

If multiple species are being excluded from the same area, and the species-specific fencing specifications differ, the uppermost minimum height and greatest depth recommendation should be used (Table 1). If you are excluding both Blanding's Turtle and Gray Ratsnake, for example, the exclusion fence should be a minimum of 2 m tall (see Gray Ratsnake section below for additional details).

Exclusion fences should be installed prior to emergence from hibernation. A survey of the enclosed/secluded area should be conducted immediately following fence installation to ensure that no individuals have been trapped on the wrong side of the fence.

Table 1. Recommended burial depth and height requirements of exclusion fencing for reptiles and amphibians. Recommended height is the height of the fence after it has been installed including the buried components and any installed overhangs or extended lips.

SPECIES	RECOMMENDED DEPTH OF FENCE BURIED (cm) *	RECOMMENDED HEIGHT OF FENCE (cm) **
Turtles – general	10 – 20	60
Eastern Musk Turtle, Wood Turtle	10 – 20	50
Massasauga, Eastern Hog-nosed Snake, Butler's Gartersnake, Queensnake	10 – 20	60
Gray Ratsnake & Eastern Foxsnake	10 – 20	200
Fowler's Toad	10 – 20	50
Snakes - general	10 – 20	100
Common Five-lined Skink	10 – 20	unknown
Salamanders	10 – 20	30

*** does not include the 10 cm horizontal lip that should extend outward an additional 10 – 20 cm (see Figure 2)**
**** the height of fencing has been provided as an approximate. Fencing materials may in fact not be available in proportions that would allow for these precise measurements. It is most effective, if the height and burial depth recommendations are met.**

DURATION OF ACTIVITIES & DEGREE OF ANTICIPATED DISTURBANCE

The type of disturbance, the proximity to disturbance, and the planned fence longevity are factors that influence which type of exclusion fence is most effective. For short-term activities (i.e. 1 to 6 months) such as minor road repairs, a light-duty geotextile fence is appropriate. Longer term or permanent fencing projects, however, require more durable materials such as – heavy-duty geotextile, wood, concrete, woven-wire, sheet metal, vinyl panels, or galvanized mesh.

GEOTEXTILE FENCES

Geotextile fences (e.g. silt fences) come in many types and qualities. They can be very effective for the temporary exclusion of reptiles and amphibians. For the purposes of this document, temporary use ranges from a few months up to 2-3 years. Winter weather is generally damaging to geotextile materials and the cost of maintenance over the long-term should be considered during the planning phase. Depending upon the quality, geotextile can be resistant to UV degradation and the bio-chemical soil environment.

Light-duty Geotextile Fencing:

Light-duty geotextile fencing is made of nylon material and is typically purchased with wooden stakes pre-attached at 2 m to 3 m intervals (Plate 1). It can also come without pre-attached stakes. Light-duty geotextiles are largely intended for projects with shorter durations of only a few months in duration and up to one season.

Geotextile fencing with nylon mesh lining should be avoided due to the risk of entanglement by snakes.

To use light-duty geotextile fencing:

- Fencing fabric is effective if attached to wooden, heavy plastic or metal stakes using heavy-duty wire staples or tie-wire (Figure 2).
- Secure the fence on posts that are placed at 2 m to 3 m apart. If using the greater recommended distance between posts, additional maintenance may be required to maintain effectiveness.
- Securely drive the stakes into the ground to a recommended depth of 30 cm. The fencing fabric should be buried to the recommended specifications in Table 1 and back-filled with soil.
- For snakes, supporting posts should be staked on the activity side (e.g. on the side facing the aggregate stock pile or the road - Figure 2).
- Light-duty geotextile fences are not effective where rocks or other hard surfaces prevent proper anchoring of fence posts and burial of the fence fabric.
- Light-duty geotextile fences are not effective where a large amount of concentrated run-off is likely or to cross streams, ditches or waterways without specific modifications.
- Contact your local MNR staff or experienced exclusion fencing contractor for advice and recommendations.
- See general best practices section below for additional details.

Generally, light-duty geotextile fences are not effective if they exceed 1 metre in height unless purposely manufactured for greater height (e.g. stakes placed at closer intervals or cross braces). If greater height is required consider using heavy duty geotextile, hardware cloth or other fencing materials.

Plate 1. Light-duty geotextile fencing with pre-attached wooden stakes used to exclude turtles from a road as seen on a regular maintenance check (photo credit: Brad Steinberg).

Heavy-duty Geotextile Fencing:

Heavy-duty geotextile fencing is typically constructed of a thick felt-like fabric. It may also be called 'double row' or 'trenched' fencing. For support, this fencing uses a woven wire fence (e.g. chain link) or some other structure (Plate 2). It is recommended that a minimum density of 270R or equivalent woven geotextile fabric is used.

Heavy-duty geotextile material can be effective for up to 2 or 3 years with proper maintenance. This type of fencing can be damaged by small mammals chewing through or torn by heavy debris (e.g. tree branches). Therefore, it may be best suited to turtles, which are less likely to take advantage of holes or tears in the fabric. If

used to exclude snakes or other animals, more maintenance may be required.

Heavy-duty geotextile fencing:

- The wire fence should be installed on the activity side to prevent animals from leveraging and climbing into the exclusion area while allowing the animal to escape if they find themselves on the wrong side (Figure 2).
- Geotextile fences across streams, ditches or waterways should have case-specific modifications.
- Contact your local MNR staff or experienced exclusion fencing contractor for advice.
- See light-duty geotextile section above and general best practices below for additional details.

Plate 2. Example of a heavy-duty geotextile fencing used to exclude snake species (photo credit: Jeremy Rouse).

HARDWARE CLOTH FENCES

Hardware cloth (also known as galvanized mesh or Birdscreen) is durable, cost effective and useful for excluding reptiles and amphibians. The fence should be made of heavy galvanized hardware cloth with a ¼ inch mesh. For fences intended to exclude small snakes, a ⅛ inch mesh may be more effective. In contrast, fencing intended to exclude turtle species can have a larger mesh size (e.g. ½ inch). Larger mesh may have a longer lifespan as it is constructed from a thicker material compared to smaller mesh sizes.

To use hardware cloth fencing:

- Secure the fence on posts placed a recommended 2.5 m apart with the stakes on the activity side (Figure 2).
- Pull the mesh taught and staple or secure with screws and a metal stripping to prevent the mesh from being ripped when pressure is applied.
- Installing a top rail or folding the mesh over a taut smooth wire reduces tearing (Plates 3 and 4).
- An outward facing lip installed on the species side ensures that snakes and amphibians are unable to climb or jump over the fence (Figure 2; Plate 4)
- Tears can be mended with 18-gauge galvanized wire.
- See general best practices section below for additional details.

Plate 3. Example of a galvanized mesh fencing used for the long-term exclusion of snakes and turtles from the adjacent highway (photo credit: Megan Bonenfant).

Plate 4. Long-term to permanent exclusion fencing using galvanized mesh with over-hanging lip to prevent animals from climbing or jumping over (photo credit: Megan Bonenfant).

WOOD LATH SNOW FENCING

In certain circumstances, wood lath snow fencing can be effective at excluding turtles. This fencing is typically constructed from soft wood slats that have been woven together with 13-gauge wire and is then attached to steel fence posts which have been driven into the ground.

Wood lath fencing is cost effective and can easily be laid down during the winter to prevent damage. The durability of the material, however, is not meant for very long-term use (e.g. more than 3 years), unless regular maintenance occurs.

To use wood lath snow fencing:

- The fencing should be attached to heavy plastic or metal stakes using heavy-duty wire staples or tie-wire.
- The stakes are recommended to be placed at 2 to 3 m intervals and securely driven into the ground 30 cm or more.
- Wood lath snow fencing across streams, ditches or waterways should have case-specific modifications.
- Wood lath snow fencing lends itself well to being combined with other types of material to ensure complete exclusion.
- See general best practices section below for additional details.

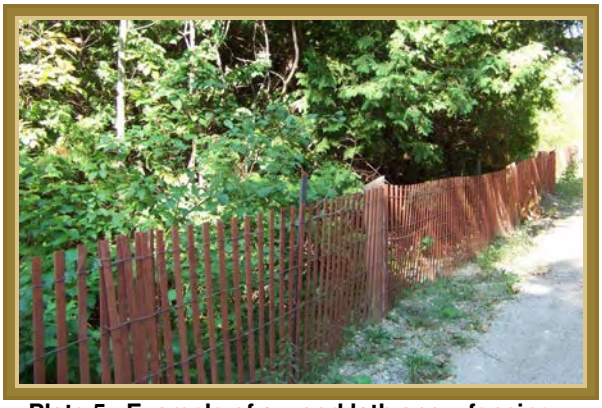

Plate 5. Example of a wood lath snow fencing used to exclude turtles (photo credit: Karine Beriault).

EXCLUSION FENCING FOR GRAY RATSNAKE AND EASTERN FOXSNAKE

Gray Ratsnake and Eastern Foxsnake are the largest snakes in Ontario - reaching nearly 2 m in length. They are also excellent climbers. For this reason, fencing intended to exclude either of these species has additional recommended design specifications.

- The fence should be at least 2 m high.
- The material on the species side (Figure 2) should be smooth to prevent the snakes from climbing into the excluded area.
- Stakes should be on the activity side of the fence (Figure 2).
- Due to the increase in fence height, it is valuable to decrease the distance between posts or install diagonal braces.
- See general best practices section below for additional details.

CONCRETE, SHEET METAL & VINYL WALLS

Concrete, metal or vinyl walls can stand alone or be combined with woven wire or chain link fences. They are durable, require minimal maintenance and are effective in excluding target species from high risk areas and guiding them to crossing structures or other desired locations (Plates 6 and 7). This fence type is comprised of a continuous vertical face of concrete, metal or vinyl sheeting with no gaps. Concrete walls can be installed as either pre-cast sections or pour directly in place.

Plate 6. Stand-alone continuous concrete wall used to exclude salamander species installed as pre-cast forms (photo credit: Steven Roorda).

Plate 7. Pre-formed vinyl sheeting fence intended to exclude salamanders for a construction site (photo credit: Herpetosure Ltd.)

The wall height depends upon the target species, but they are usually between 45 and 60 cm tall and buried 25 cm. Concrete, metal or vinyl exclusion fencing is most appropriate for salamanders, skinks, small snakes, and small turtles. For large turtle species, a chain link fence can be installed directly on top of the concrete wall for complete exclusion.

HABITAT CONNECTIVITY

Habitat connectivity is the connectedness between patches of suitable habitat or the degree to which the landscape facilitates animal movement. Exclusion fencing installed along roads or other large projects can effectively reduce or eliminate habitat connectivity for animals. In these scenarios, exclusion fencing should be considered with eco-passages in order to maintain connectivity. Fencing in isolation should be viewed as a temporary method to reduce mortality until species movement can be restored. Where eco-passages are not feasible they should be identified for consideration with any future road work or development to improve connectivity.

During the installation of fencing with an eco-passage, it is important that the fencing sits flush with the passage to ensure that

there are no gaps where animals can squeeze through.

Plate 7. A wood turtle travelling through a dry eco-passage. Ecopassages such as this help to ensure the long-term connectivity of seasonal habitat for this and other reptile and amphibian species (photo credit: Amy Mui).

GENERAL BEST PRACTICES:

- To deter digging, bury the fence 10 cm down with an additional 10 cm horizontal lip (Figure 2).
- Backfill and compact soil along the entire length on both sides of the fence (Figure 2).
- Once the fence is installed, a survey should be done to ensure that no individuals have been trapped inside (speak with MNR for survey advice).
- Exclusion fencing intended to exclude snakes should have the stakes installed on the activity side (opposite the normal requirement for sediment control fencing) to prevent snakes from using the stakes to maneuver over the fencing.
- For snakes and toads, the fence should have an overhanging lip on the species side (Figure 2).
- Fences should be inspected after spring thaw and at regular intervals throughout the active season, especially following heavy rain events. This is particularly important for geotextile fences. Any damage that affects the integrity of the fence (e.g. tears, loose edges, collapses, etc.) should be fixed promptly.
- Tall or woody vegetation on the species side of the fence should be managed if there is a risk that it may enable the animals to climb over. This is most important during spring and fall. Proceed cautiously to not harm animals protected plant species during vegetation removal.
- When installing an eco-passage, fencing or exclusion walls should be used as a guiding system to direct animals to passage openings.
- Natural screens such as trees or shrubs can help to reduce road access and can be combined with fencing to provide protection of individuals from predation.
- Install fences with a turn-around at the ends furthest from the wetland habitat and at any access areas to assist in redirecting animals away from any fence openings (Figure 1).
- Curving the ends of the fencing inward (i.e. away from the road or construction site) may help to reduce access to these locations. The ends may also be tied off to natural features on the landscape such as trees or rock cuts.

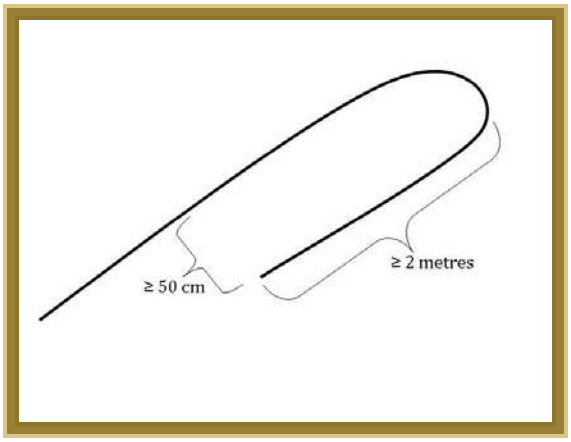

Figure 1. Diagram of the ends of the fence designed to curve inward in order to direct animals away from the area of exclusion.

WATER MOVEMENT & DRAINAGE

- In areas where surface water run-off may erode a soil-based backfill, consider using rocks or sand bags. Ensure these materials cannot be used by animals to climb over the fence.
- Where possible, minimize the number of water crossings: when necessary, it should occur where flow is minimal.
- Fence posts in waterways or areas prone to seasonal flooding should be driven rather than dug – unless following established best practices.
- Fencing should be placed above the high water mark anticipated for high water events such as spring freshet or periods of heavy or continuous rainfall.

TOPOGRAPHY:

- Fence posts should be closer together in undulating topography.
- Fences installed on slopes have a different effective height depending upon whether the animal will be approaching from the up or down slope. The fence height can be adjusted accordingly.

Improvements or questions regarding exclusion fencing can be brought to the local MNR Species at Risk Biologist or other MNR staff.

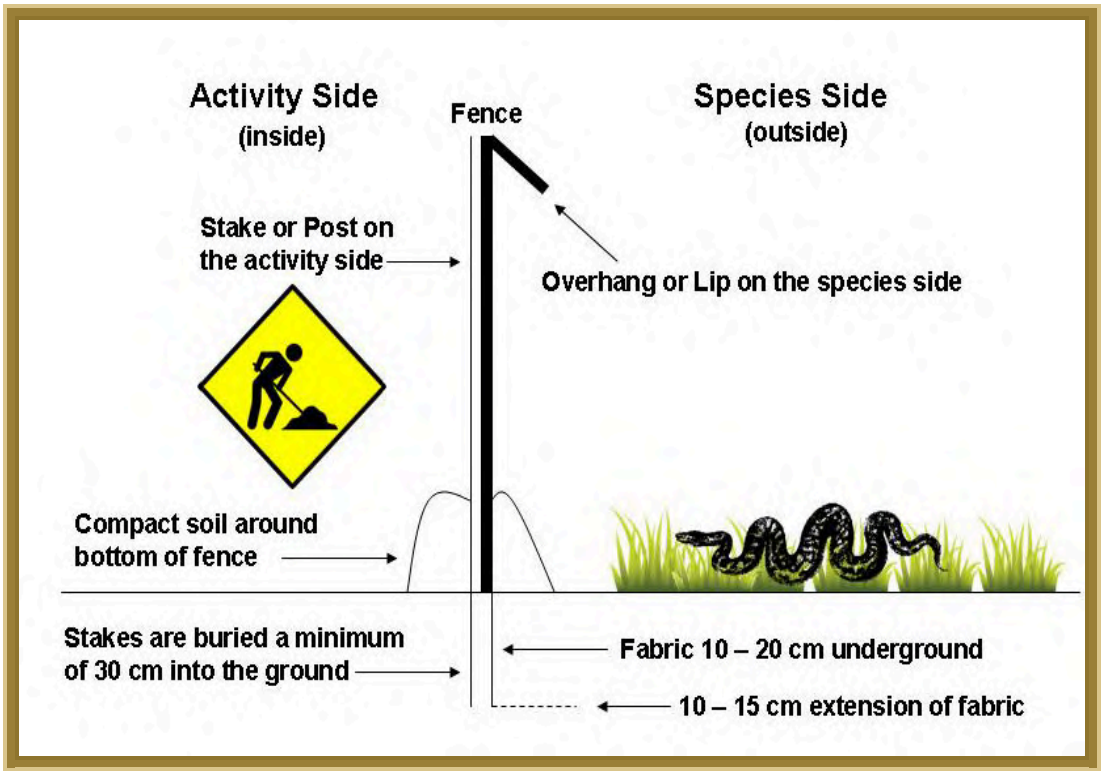

Figure 1. A side view of a basic exclusion fence including an overhang or flexible lip to deter animals from climbing or jumping over the fence. Placement of the stake on the Activity Side or on the inside of excluded area is also illustrated. This is particularly important for snake species which may use the stakes to maneuver over the fence.

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For additional information:

Visit the species at risk website at
ontario.ca/speciesatrisk
Contact your MNR district office
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