Environmental Impact Study for Phase 4 of Minto's Mahogany Community Ottawa, Ontario

2025-03-18

Final Report

Submitted To:

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List of Acronyms and Abbreviations

ANSI – Area of Natural or Scientific Interest
BBS – Breeding Bird Survey
CRZ – critical root zone
DBH – Diameter at breast height
DFO – Department of Fisheries and Oceans (Fisheries and Oceans Canada)
ECCC – Environment and Climate Change Canada
EIS – Environmental Impact Study
ELC – Ecological Land Classification
ESC – erosion and sediment control
ESA – *Endangered Species Act*
FWCA – *Fish and Wildlife Conservation Act*
HDF – Headwater Feature
HDFA – Headwater Feature Assessment
KAL – Kilgour & Associates Ltd.
MBCA – *Migratory Birds Convention Act*
MECP – Ministry of Environment, Conservation, and Parks
MNRF – Ministry of Natural Resources and Forestry
(at times, Ministry of Natural Resources – MNR)
NHIC – Natural Heritage Information Centre
OSAP – Ontario Stream Assessment Protocol
PPS – Provincial Policy Statement
SAR – species at risk
SARA – *Species at Risk Act*
SWH – Significant Wildlife Habitat
SWM – stormwater management
TCR – Tree Conservation Report

1.0 INTRODUCTION

This report is an Environmental Impact Study (EIS) prepared by Kilgour & Associates Ltd. (KAL; Appendix A) on behalf of Minto Homes Ltd. ("Minto") in support of a site plan application for Phase 4 of the Mahogany Community located on East Century Road in Manotick, Ottawa, Ontario (the "Site"; Figure 1). This report is an update to previous environmental reports that addressed the broader Mahogany development and previous phases of development (Kilgour & Associates, 2018, 2022). As such, this report retains the content included within those previous reports but identifies changes in land cover and natural heritage elements associated specifically with the development currently proposed for Phase 4.

The need for an EIS was originally triggered as the proposed development was deemed to have the potential to impact species at risk (SAR) and SAR habitat, surface water features, and other natural heritage features on and adjacent to the Site. The purposes of this EIS are specifically to address the proposed site plan for Phase 4 and to update the mitigation strategy provided in the previous EIS reports as required.

In the City of Ottawa, an EIS is required when development or site alteration is proposed in or adjacent to natural heritage features, as outlined in Section 4.8 of the Official Plan (City of Ottawa, 2021). The purposes of an EIS are to:

- Identify natural heritage features on or adjacent to the Site;
- Assess potential impacts of the proposed development to existing features; and
- Recommend mitigation measures to minimize or eliminate identified impacts.

This EIS includes the results from updated field studies and supporting work and provides recommendations and mitigation measures to minimize impacts of the proposed development on the natural heritage features located on and adjacent to the Site.

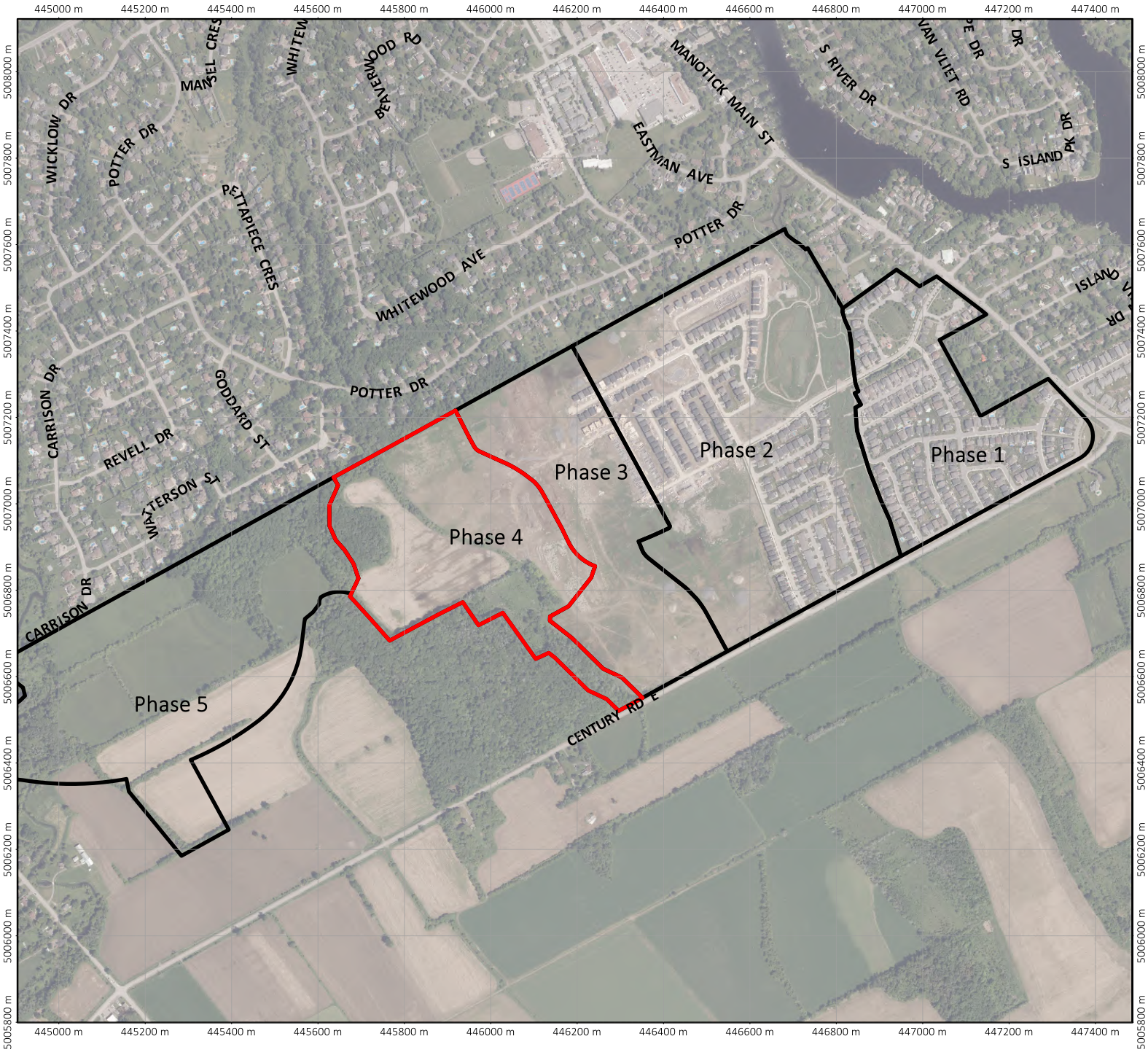

Figure 1 Site Context

Legend

Phase 4 Boundary

N

0 200 m

Project: MINTO1623
Map File: Minto 1623-2407b.map
Universal Transverse Mercator - Zone 18 (N)
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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 Planning Statement, 2024

The Provincial *Policy* Statement ("PPS") was originally issued under Section 3 of the *Planning Act* (Government of Ontario, 1990). The PPS in effect when the Phase 4 project began came into effect on May 1, 2020 (Ministry of Municipal Affairs and Housing, 2020). Under that version of the PPS, natural features were afforded protections under Section 2.1. The protections included address the 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) except where 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 *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005* (NHRM; Ministry of Natural Resources (MNR), 2010). This manual recommends the approach and technical criteria for protecting natural heritage features and areas in Ontario.

While the 2020 PPS was the version in effect at the start of this updated EIS, the Province approved the updated version as the Provincial *Planning* Statement 2024 (herein also the "PPS") on August 20, 2024; it came into effect on October 20, 2024 (MMAH, 2024). The 2024 PPS is intended to simplify and integrate existing policies to achieve housing objectives while providing tools for municipalities to deliver on housing objectives. While the 2024 PPS will formally be the planning document in effect going forward, other than renumbering the relevant policies, there were no meaningful changes related to Natural Heritage considerations between the two versions. Thus, for the analysis and recommendations of this EIS, the "PPS" documents from 2020 and 2024 are effectively equivalent.

2.2 City of Ottawa Official Plan

The City of Ottawa Official Plan (2021) provides direction for future growth in the City and is a policy framework to guide physical development to 2031 in accordance with the PPS. The Official Plan was first approved in 2003 and is typically updated every five years. The Site is designated "Greenspace" and "Neighbourhood" in Schedule B3 of the Official Plan. The Official Plan includes a Natural Heritage Features map (Schedule C12), providing additional information on wetlands, watercourses, and wooded areas within the City boundaries (2021).

2.3 *Species at Risk Act*, 2002

The federal *Species at Risk Act* (SARA; Government of Canada, 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 the 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* (MBCA; (Government of Canada, 1994) and listed as Endangered, Threatened, or Extirpated under Schedule 1 of SARA are protected wherever they occur in Canada, regardless of land ownership. SARA protections do not typically apply for other species groups on non-federal properties. However, the Federal Minister of ECCC can impose SARA protections on private projects where habitat is deemed "…necessary for the survival or recovery of the species… " in the area of concern.

2.4 *Endangered Species Act*, 2007

The provincial *Endangered Species Act* (ESA; Government of Ontario, 2007) is administered by the Ministry of Environment, Conservation, and Parks (MECP) and provides protection for species at risk (SAR) and their habitat. The ESA states that it is illegal to harm the habitat of species listed as Extirpated, Endangered, and Threatened. It is also illegal to kill, harm, harass, possess, transport, buy, or sell Extirpated, Endangered, and Threatened species, whether it is living or dead. 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* (Government of Canada, 1985) is administered by Fisheries and Oceans Canada (DFO) and provides protections to fish, fish habitat, and fisheries. Specifically, the *Fisheries Act* in its current version provides: 1) Protection for all fish and fish habitat; 2) Prohibition against the "harmful alteration, disruption or destruction of fish habitat"; and 3) Prohibition against causing "the death of fish by means other than fishing".

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

2.6 *Migratory Birds Convention Act*, 1994

Nesting migratory birds are protected under the MBCA (Government of Canada, 1994). No work is permitted 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). The "incidental take" of migratory birds and the disturbance, destruction, or taking of the nest of a migratory bird is prohibited. "Incidental take" is the killing or harming of migratory birds due to actions that are not primarily focused on taking migratory birds (e.g., economic development) and no permits exist for the incidental take of migratory birds or their nest/eggs as a result of activities that are not focused on taking migratory birds. These prohibitions apply throughout the year. The Government of Canada has compiled nesting calendars that apply across Canada that can be used to greatly reduce the risk of harming/destroying active nests by ensuring works that may impact nests are performed outside of the nesting period.

2.7 *Fish and Wildlife Conservation Act*, 1997

The provincial *Fish and Wildlife Conservation Act* (FWCA; Government of Ontario, 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 "furbearing" or "game" animals. Examples of specifically protected animals include, for example, Southern Flying Squirrel (*Glaucomys volans*), Northern Harrier (*Circus cyaneus*), American Kestrel (*Falco sparverius*), Blue Jay (*Cyanocitta cristata*), Midland Painted Turtle (*Chrysemys picta marginata*), Northern Watersnake (*Nerodia sipedon*), and Gray Treefrog (*Hyla versicolor*). In particular, raptors that are not protected under the MBCA (including Peregrine Falcon) are protected under the FWCA.

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 (CA Act; Government of Ontario, 1990a). The Act obliges Conservation Authorities to implement Ontario Regulation (O.Reg.) 41/24, Prohibited Activities, Exemptions and Permits (formerly O.Reg. 174/06, Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) under Section 28.1 of the Conservation Authorities Act for relevant works. This project falls under the jurisdiction of the Rideau Valley Conservation Authority (RVCA).

Bill 23, which was passed on November 28th, 2022, and received Royal Assent the same day, introduced a series of legislative and proposed regulatory changes affecting conservation authorities. It is now in effect. Among the changes under Bill 23, the definition of "watercourse" was updated from an identifiable depression to a defined channel having a bed, and banks or sides.

3.0 PROPERTY IDENTIFICATION

The broader Mahogany property was situated at 5651 First Line Road (North Gower; Lot 4 and 5, Concession A; PINs: 039020900, 039021066, 039021070, 039021073) in the south end of Ottawa, Ontario (45.213015°N, 75.689918°E). It comprised a 133 ha parcel owned by Minto for the development of the Mahogany community (Figure 1). Phases 1 - 3 are now nearly complete. Phase 4, the subject of this EIS, remains zoned as Development Reserve (DR1). The Phase 4 study area comprises approximately 24 ha of the westernmost portion of the Mahogany lands (Figure 1). It is characterized by a central, cleared area (formerly an agricultural field but recently cleared to accommodate development), surrounded by deciduous and mixed-wood forests to the north, west, and south, with a meadow and deciduous treed swamp also situated to the south. A drainage feature (a tributary to the Wilson Cowan Drain) bisects the Phase 4 lands.

The Phase 4 area is situated immediately east of the Manotick Drumlin Forest, which is designated as a natural heritage feature under Schedule C of the City of Ottawa Official Plan (City of Ottawa, 2021). The Drumlin Forest is owned by the City.

The Phase 4 area is bordered by:

- Residential development to the north;
- Residential developments (including previous phases of the Mahogany community), Manotick Main Street, and the Rideau River to the east;

- East Century Road, forested areas, and agricultural lands to the south; and
- Forested areas and agricultural lands to the west.

4.0 METHODOLOGY

4.1 Desktop and Background Data Review

4.1.1 Agency Oversight and Consultation

The Site is located within the jurisdictions of the City of Ottawa and Rideau Valley Conservation Authority (RVCA). The need for an EIS was triggered as the proposed Mahogany development was deemed to have the potential to impact species at risk (SAR) and SAR habitat, and natural heritage features on and adjacent to the Site. Specifically, triggers for this EIS include 1) the presence of potential habitat for SAR, including Butternut (*Juglans cinerea*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*) and Blanding's Turtle (*Emydoidea blandingii*); 2) the presence of significant woodlands and candidate Area of Natural and Scientific Interest (ANSI) in the vicinity of the Site; and 3) the potential for fish and fish habitat within the unnamed drains crossing the Mahogany lands.

4.1.2 Site Overview

Aerial imagery from Google Earth and the City of Ottawa's geoOttawa system was used to develop preliminary mapping of existing site features and landcover and to inform how the Site may be divided into vegetation communities.

Existing data on soils in the vicinity of the Site were obtained from the Ontario Ministry of Agriculture, Food and Rural Affairs' AgMaps (OMAFRA, 2023) and the Ontario Geotechnical Boreholes Data collected in 2001 (Ontario Ministry of Mines, 2012).

4.1.3 Preliminary SAR Review

The review of existing information included a preliminary SAR screening for species listed under the federal SARA and provincial ESA. The screening functions to identify SAR having some potential to be in the broader vicinity of the Site. The screening was completed following the *Draft Client's Guide to Preliminary Screening for Species at Risk* (MECP, 2019;Appendix B). An initial screening was undertaken in 2017 and was updated in April 2024. The Preliminary Screening considered data sources including:

- Species at Risk in Ontario (SARO; Ministry of Environment, Conservation, and Parks (MECP, 2024b);
- Species at Risk Public Registry (Government of Canada, 2024);
- Natural Heritage Information Centre (NHIC; Ministry of Natural Resources, and Forestry (MNRF, 2024c);
- Land Information Ontario (MNRF, 2024b);
- Aquatic Species at Risk Map (Fisheries and Oceans Canada (DFO), 2024);

- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2019);
- Ontario Breeding Birds Atlas (Birds Canada, Canadian Wildlife Service (Environment and Climate Change Canada), et al., 2009);
- Ontario Butterfly Atlas (Toronto Entomologists' Association, 2024);
- eBird (The Cornell Lab of Ornithology, 2024);
- iNaturalist (California Academy of Sciences and National Geographic Society, 2024);
- Bumble Bee Watch (Wildlife Preservation Canada et al., 2024);
- Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) in Ontario (Humphrey & Fotherby, 2019);
- Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario (Humphrey, 2017); and
- Fish ON-Line (MNRF, 2024a).

4.2 Field Surveys

Field surveys for this Phase 4 EIS update were conducted in spring and summer 2024 and included an ELC confirmation exercise, a Butternut Health Assessment, a Black Ash investigation and assessment, and a surface water/hydrology investigation (Table 1). Previous field studies addressing the whole Mahogany area (e.g., Breeding Bird Surveys (BBS), amphibian surveys, headwater drainage features assessment (HDFA), and vegetation studies including a general tree survey to support a Tree Conservation Report (TCR), a SAR vegetation survey, and a full Ecological Land Classification (ELC)) were undertaken in 2017 (Kilgour & Associates, 2018). Results of the relevant field studies are included in this report, with updates as required to reflect changing landcover and site context due to ongoing development and with a particular focus on the Phase 4 area. The field surveys are detailed in the sections below.

Table 1 Summary of 2024 Field Studies

Date	Purpose	Conditions	Personnel
May 28, 2024	• ELC confirmation • Tree survey • Butternut Health Assessment • Black Ash investigation	• 19°C • 75-100% cloud cover • Moderate breeze • Light rain	• Rob Hallett • Kesia Miyashita
May 29, 2024	• ELC confirmation • Tree survey • Butternut Health Assessment	• 17°C • 75-100% cloud cover • Light breeze • No precipitation	• Kesia Miyashita • Kurtis Westbury
May 30, 2024	• ELC confirmation • Tree survey • Butternut Health Assessment	• 20°C • 0-25% cloud cover • Light breeze • No precipitation	• Kesia Miyashita • Derek Irwin
July 15, 2024	• Black Ash assessment • Surface water/hydrology investigation	• 30°C • 75-100% cloud cover • Light breeze • No precipitation	• Kesia Miyashita • Maren Nielsen

4.2.1 Surface Water, Groundwater, and Fish Habitat

A Headwater Drainage Feature Assessment (HDFA) was undertaken for the whole Mahogany area in 2017. The HDFA followed the Ontario Stream Assessment Protocol (OSAP) methodologies for descriptions of flow conditions, riparian vegetation and site features that are important components of habitat (headwater sampling protocol OSAP S4.M10) and included an electrofishing survey to describe fish and fish habitat (OSAP S4.M10) (Stanfield, 2017). OSAP investigations of Headwater Drainage Features (HDFs) were conducted by KAL biologists on April 5, 2017, electrofishing surveys were conducted on May 9 and 10, 2017, and a final survey was performed on July 6, 2017.

Subsequently, specific information on surface water features and drainage patterns within the Phase 4 area was required in 2024 to support Phase 4 development planning, with a particular emphasis on Site grading plans. To that end, additional investigations were completed on July 15, 2024. The drainage feature on the Phase 4 lands (the tributary to the Wilson Cowan Drain) was investigated to determine hydrological connectivity through the Site. The deciduous swamp on the south edge of the Site was further investigated to determine the presence of any drainage features within the unit and assess hydrological connectivity between the Mahogany Phase 4 area and adjacent lands.

4.2.2 Vegetation

4.2.2.1 Ecological Land Classification

Vegetation communities on the Site were based on standard ELC methods for Ontario (Lee et al., 1998). The ELC methodology provides a consistent approach to identify, describe, and map vegetation communities or physiographic features on the landscape based on dominant plant species and soil composition. This method results in a standardized description of each vegetation community to capture the natural diversity and variability of communities within a site and to provide insight into available habitat and the types of species that may be present. More specifically, the classifications from ELC provide a basis for determining whether potential habitat for a given SAR or other ecological value may be present.

A full ELC was undertaken in the summer of 2017. Subsequently, an updated ELC confirmation exercise took place on May 28-30, 2024. During that exercise, Phase 4 lands were revisited to determine whether the present state of those areas is consistent with the previously-assigned ELC units.

4.2.2.2 Tree Studies

An initial tree inventory was completed for the broader Mahogany lands on February 22, 2017. The tree inventory entailed the identification of tree species, their diameter and breast height (DBH), and notes on apparent health. Extensive tree removal took place to accommodate earlier phases of the Mahogany development (i.e. including preparatory grubbing and regrading within Phase 4 areas planned for residential development). To identify current conditions, an updated tree survey was performed for the Phase 4 area concurrently with the ELC confirmation exercise on May 28-30, 2024. The tree survey followed TCR guidelines set forth by the City of Ottawa Forestry Staff (City of Ottawa, 2020). The tree survey concentrated on areas with potential to be impacted by Phase 4 development (i.e., trees along the edges of the existing forest communities whose critical root zones may extend into development areas). Trees within the interior of forest stands were not assessed.

Trees were generally characterized based on groupings within ELC units. Dominant species within each ELC unit were documented and the average size (average diameter at breast height (DBH)) of trees of each species were recorded. Notable trees (e.g., species uncommon to the Site or considerably larger than the average) were documented and characterized individually.

As part of the tree survey, Butternut (*Juglans cinerea*) and Black Ash (*Fraxinus nigra*) trees (both Endangered under the ESA) were identified and assessed as required. While tree surveys can generally be completed at any time of year, Butternut Health Assessments (BHAs) must be completed between May 15 and August 31, and Black Ash Assessments must be completed between June 1 and October 1 (MECP, 2021b, 2024a). The assessment evaluates Butternut and Black Ash health for the purpose of compliance with the ESA. Butternut assessments had previously been completed for the Site; however, trees must be reassessed after two years. Butternut Health Assessments and Black Ash Assessments, as required, were completed concurrently with the tree survey between May 28-30, 2024.

4.2.3 Breeding Bird Surveys

Breeding Bird Surveys for the entire Mahogany area took place in 2017. Morning breeding bird surveys were performed via point count surveys following the Ontario Breeding Bird Atlas Guide for Participants (Birds Canada, Canadian Wildlife Service (Environment and Climate Change Canada), et al., 2009). Breeding bird surveys are to be completed from survey stations that, combined, provide suitable viewing of all habitats on a site on calm weather days with light wind (<3 on the Beaufort scale) and no precipitation. Per (Birds Canada et al., 2021), two rounds of surveys must take place between sunrise and five hours after sunrise between May 24 and July 10. An additional (third) bird survey is required under MNRF protocols for at-risk bird species that nest in field habitats(Ministry of Natural Resources (MNR), 2011). At the time of the surveys in 2017, portions of the Mahogany lands comprised agricultural fields; as such, there was potential to provide habitat for at-risk grassland bird species (e.g., Bobolink and Eastern Meadowlark), and three rounds of breeding bird surveys were conducted. KAL staff undertook breeding bird surveys on June 14, 27 and July 6, 2017. Ten stations were established across the Site (Figure 2 Survey Stations, 2017). Birds were identified by vocalization and/or direct visual observation at each station. All incidental observations were recorded while moving between survey points as well as during other field visits.

The presence of regionally rare bird species was based on an analysis of data from the Atlas of Breeding Birds of Ontario (Birds Canada, Canadian Wildlife Service (Environment and Climate Change Canada), et al., 2009) based on Hill's Site Regions, now Ecoregions. The Ontario Wetland Evaluation System: Southern Manual (MNRF, 2022) also assisted with classifying regionally significant breeding birds in the area (Region 6). The presence of provincially and federally significant species was based on species listed under the ESA and SARA, respectively, and any other non-SAR species that are tracked by the Natural Heritage Information Centre (these species are considered provincially significant (MNRF, 2024c).

4.2.4 Nightjars

Nightjar surveys for the entire Mahogany area took place in 2017. Night-time bird surveys to confirm the presence/absence of at-risk nightjars, specifically Eastern Whip-poor-will (*Antrostomus vociferus*), and their potential breeding territories, were conducted following the survey plan developed by the Ontario Ministry of Natural Resources and Forestry (MNRF, 2014). This protocol calls for three separate night-time surveys between May 18 and June 30 that are timed based on moon conditions. Eastern Whip-poor-will usually

forage in the semi-darkness of early morning and dusk, but on nights when the moon is more than half full, they are likely to forage all night long under the brighter conditions. Their broods are timed such that the young hatch approximately 10 days before the full moon when the parents have more time (and moonlight) to catch food for them (Kaufman, 2019; The Cornell Lab of Ornithology, 2023). As such, this species is more detectable during a full moon period.

As per the protocol, surveys were completed within a week of the full moon while the moon was visible above the horizon (greater than 50% illuminated) and started at least 30 minutes after sunset and ended while the moon was still visible. Surveys were conducted under field conditions with no precipitation, little or no wind, clear skies, temperature of 10°C or above, and good visibility (low cloud cover). The timing of Eastern Whip-poor-will surveys is also optimal for observing Common Nighthawk (*Chordeiles minor*), as that species is generally best heard calling in the late evening. MNRF (2014) recommends a minimum of three surveys to be completed during the breeding season, with two ideally occurring in late May or the first week of June during a week preceding or just after a full moon, and a third survey in the next available full moon period (middle/end of June). Nightjar surveys took place on the evenings of May 18 and June 7 and 13, 2017.

Survey points are to be established at approximately 500 m intervals (the aim is to have one survey point for every 30 ha of typical habitat). Three survey stations were used for nightjar surveys (Figure 2 Survey Stations, 2017), and these stations covered habitats that were considered most likely to support nightjars (i.e., they were close to edge habitats along wooded areas that would provide feeding opportunity near potential nesting areas). As per MNRF (2014), each point count station had a fixed radius of 300 m so that the absolute number of birds could be counted within a reasonable hearing range (note that calling Eastern Whip-poor-will can be heard up to 1 km away under ideal conditions). Surveyors were careful not to walk directly through suitable nightjar habitat in between survey stations to avoid stepping on any potential Eastern Whip-poor-will eggs, which are cryptically coloured and laid on the forest floor.

4.2.5 Anurans

Anuran (frog and toad) surveys for the entre Mahogany area took place in 2017, following the Marsh Monitoring Program (Birds Canada, Environment Canada, et al., 2009). This protocol calls for multiple survey stations at a site to capture spatial and habitat variability. Accordingly, anuran surveys were performed at five stations across the broader Mahogany lands (Figure 2 Survey Stations, 2017). The Marsh Monitoring Program advises that each station be visited a minimum of three times at night, no less than five days apart, during the spring and early summer. Following this protocol, the timing of the three anuran surveys is based on nighttime air temperature:

- Early breeders (Western Chorus Frog, Wood Frog, and Spring Peeper): above 5°C
- Mid-season breeders (Northern Leopard Frog, Pickerel Frog, Mink Frog, American Toad, and Gray Treefrog): above 10°C; and
- Late breeders (Green Frog and Bullfrog): above 17°C.

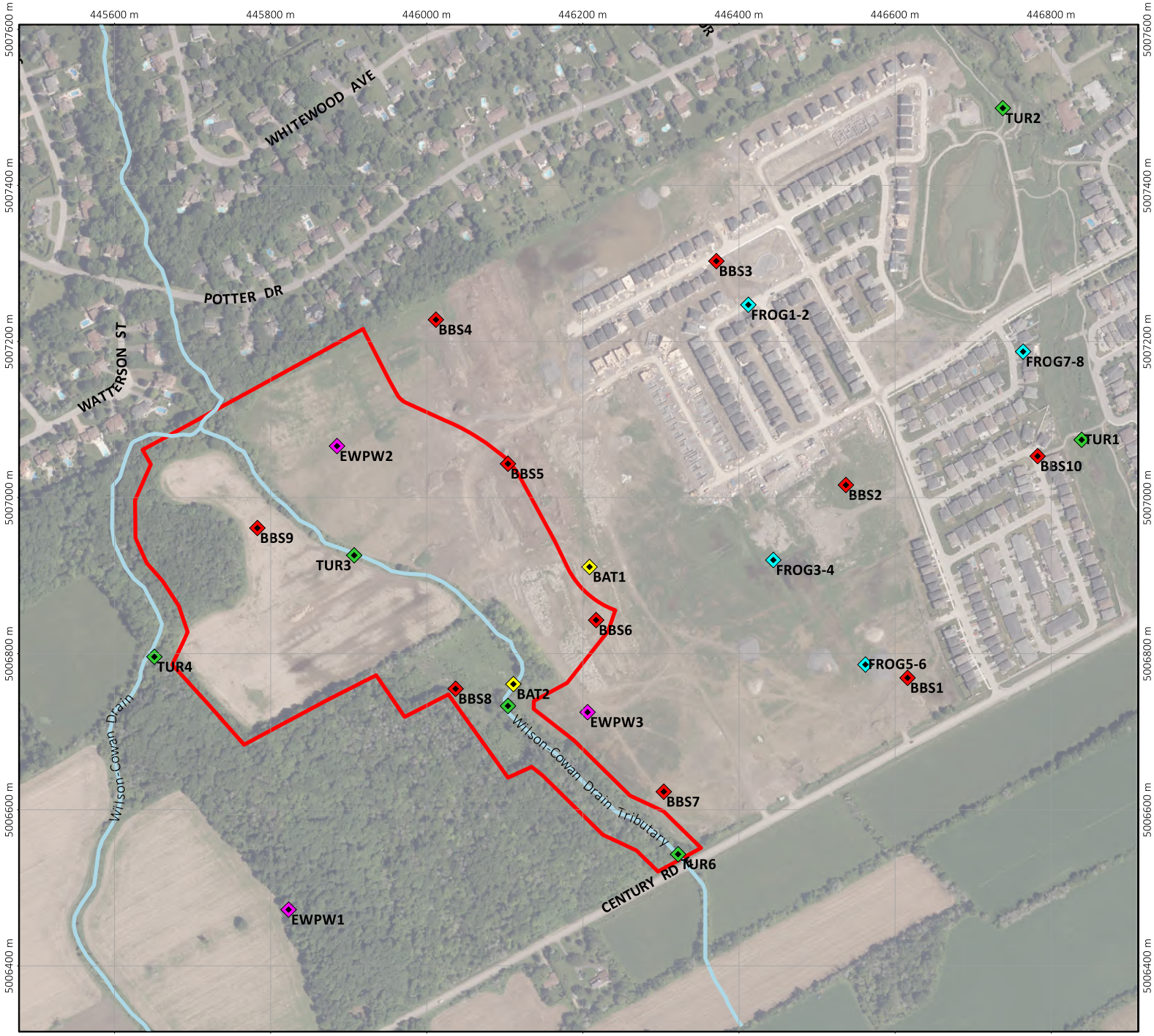

Figure Survey Stations, 2017

Legend

Phase 4 Boundary

Survey Stations

- Amphibian
- Bat
- Breeding Bird
- Eastern Whip-poor-will
- Turtle

N

0 200 m

Project: MINTO1623
Map File: Minto 1623-2407b.map
Universal Transverse Mercator - Zone 18 (N)
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Anuran surveys took place on April 21, May 17, and June 28, 2017, beginning one half-hour after sunset and ending before 12:00 am on evenings with appropriate temperatures and light wind (<3 on the Beaufort Scale). Additional observations of amphibians were made throughout the spring and summer during other field visits, as well as during the 2024 field studies.

4.2.6 Turtles

Visual encounter surveys were completed for the entire Mahogany area in 2017, following MNRF's Survey Protocol for Blanding's Turtle in Ontario (MNRF, 2015b). During turtle surveys, surveyors stopped and scanned areas of interest with binoculars from a distance of approximately 50 m to prevent any turtles from being startled before being observed. Areas of potential overwintering and nesting were also investigated to assess suitability (Figure 2 Survey Stations, 2017). The protocol calls for five rounds of visual encounter surveys starting immediately after ice-off (approximately mid-April) until June 15, with surveys spanning a minimum of three weeks. Although this protocol is intended primarily for Blanding's Turtle (*Emydoidea blandingii*), most turtle species generally occurring in the area would be detectable under this protocol.

This protocol requires that potential habitat for turtles be visited under the following conditions:

- After ice off, and no later than June 15;
- If air temperature is between 5 and 15°C, surveys are to take place during sunny periods, between 10:00 am and 5:00 pm, when basking sites are receiving full sunlight;
- If air temperature is between 15 and 25°C, surveys are to take place during sunny periods between 8:00 am and 12:00 pm, when basking sites are receiving full sunlight or during overcast periods from 9:00 am until 4:00 pm if air temperature is higher than water temperature; and
- Five surveys must be spread over a period of at least three weeks, at sites with no previous documentation of the species.

KAL conducted formal turtle surveys on May 9, 18, 23 and June 13 and 15, 2017. In addition to formal surveys, all incidental turtle observation were documented throughout the field season. Incidental observations were also documented during the 2024 field studies.

4.2.7 Acoustic Bat Monitoring

Bat monitoring was completed following acoustic survey guidelines from Bats and Bat Habitats: Guidelines for Wind Power Projects (Ministry of Natural Resources (MNR), 2011). Acoustic surveys took place by placing song meter SM3Bat ultrasonic acoustic recorders onsite in areas of potentially suitable habitat. The recorders are programmed to activate from sunset until sunrise for every day that they are installed on the Site. While activated, the unit scans the surrounding area for ultrasonic signals that are used by bats for echolocation in the 10 to 120 kHz range. When the acoustic monitor encounters a signal within this range, it will record the signal until it ends or once 15 seconds has elapsed. This results in hundreds to thousands of recorded sound files of ultrasonic signals in the vicinity of the unit.

The files are then analyzed using bat detection software (Kaleidoscope 4.3.2) that identifies bats to the species level using their echolocation sound patterns. Kaleidoscope provides automatic identification of bat species, which are then manually verified by KAL biologists.

Two rounds of acoustic monitoring using an SM3 bat unit were performed on the Site in 2017. Round one began on June 15 and ended on June 21, 2017. Round two began on June 23 and ended on June 28, 2017. In both cases, the monitor was installed in a woodlot area east of the Wilson Cowan Drain tributary that has subsequently been cleared (Figure 2 Survey Stations, 2017).

5.0 RESULTS

5.1 Landforms, Soils and Geology

The regional soils context for the Mahogany lands consists of Paleozoic Dolostone and sandstone belonging to the Beekmantown Group (Ontario Ministry of Mines, 2024). On a more local scale, the Mahogany lands are situated within the North Gower soil association, which is characterized by neutral to alkaline silty clay loam or clay loam marine material, overlying silty clay or clay marine materials at a depth greater than 1 m (Schut & Wilson, 1987). The area also comprises the Dalhousie soil association, which is characterized by gray, neutral silty clay or clay marine materials and the Grenville series, which is comprised of alkaline stony sandy loam, fine sandy loam, loam, or silt loam glacial till material (Schut & Wilson, 1987).

The Phase 4 development area is mostly flat and relatively low-lying. Some of these areas are likely to be inundated with water, with the potential to form ephemeral wetlands in the spring and early summer. The soil units were characterized as very stony, but this has likely been altered due to agricultural activities. There are no rocky outcrops on the Site or within or near areas proposed for development.

5.2 Surface Water, Groundwater, and Fish Habitat

The Mahogany area and adjacent lands lie within the Mud Creek and Rideau River – Long Island Catchment (RRLIC) Subwatersheds (Rideau Valley Conservation Authority, 2012.; Rideau Valley Conservation Authority, 2016). The Rideau River and Mahogany Creek are located approximately 1.3 km and 800 m to the east of the Phase 4 development site, respectively; Mud Creek is approximately 860 m to the west. The Wilson Cowan Drain flows northward on the west side of the Manotick Drumlin Forest and touches the northwestern-most edge of the Phase 4 area.

The Wilson Cowan Drain Tributary flows northward along the eastern edge of the Drumlin Forest and bisects the Phase 4 development area. Mahogany Creek borders the Mahogany lands to the east and feeds into the Rideau River. Habitat improvements were made for this feature in the fall of 2017 as part of the development of the adjacent Phase 1 area. The Mud Creek Catchment SWS provides fish habitat to 28 fish species (RVCA, 2012) and the RRLIC SWS provides fish habitat to 39 species (RVCA, 2016). The smaller drainage features on the Mahogany lands are unlikely to provide habitat for most of these species.

5.2.1 Headwater Drainage Feature Assessment

A Headwater Drainage Feature Assessment (HDFA) of the broader Mahogany lands was completed by KAL in 2017. OSAP investigations of Headwater Drainage Features (HDFs) were conducted by KAL biologists on April 5, 2017. Electrofishing surveys were conducted on May 9 and 10, 2017, and a final survey was performed on July 6, 2017.

The HDFA identified 20 HDFs or sub-reaches thereof on the Mahogany lands. Of those 20, four reaches comprised major drainage features, while 13 were classified as small agricultural drains or roadside ditches. Two of the major reaches that occur on the Phase 4 lands are described below (Figure 3). The minor features, for the most part, contained water during the spring and early summer but were mostly dry by the July survey. As such, the minor features, which all occur in areas subject to proposed development, provided a limited suite of ecological services that can be replicated through, and provided by, appropriate, well-designed, stormwater management systems (KAL, 2017). The final three reaches identified occur within the Manotick Drumlin Forest and are thus well removed from any areas subject to potential development. The HDFA descriptions for all reaches are included in Appendix C.

At the time of the field studies in 2017, fish were only observed in the Wilson Cowan Drain, though existing records for fish occurrence within the other major site drains (i.e., the two reaches of the Wilson Cowan Drain Tributary on the Phase 4 lands and Mahogany Creek) were noted.

5.2.1.1 Wilson Cowan Drain

The Wilson Cowan Drain is a municipal drain that flows north, passing through the northwest corner of the Phase 4 lands (Figure 3). In this location, the drain runs through forested areas on both sides. Instream vegetation is minimally present and both banks are covered with a mixture of grasses, shrubs, and trees. The substrate consists of silt and clay. Woody debris and submergent vegetation are present in patches throughout. Reach 1 was fast-flowing in April, May, and July, and was too deep to fish at the time of the fishing surveys. In the Mud Creek Subwatershed Study (City of Ottawa, 2015), researchers observed 16 fish in the Wilson Cowan Drain in proximity to the Mahogany Lands: four each of Blacknose Shiner (*Notropis heterolepis*), Brook Stickleback (*Culaea inconstans*), Central Mudminnow (*Umbra limii*), and Creek Chub (*Semotilus atromaculatus*). No frogs or turtles were observed in this reach during site studies in 2017, although Snapping Turtles (*Chelydra serpentina*) have previously been noted here (KAL & Savanta, 2014) .

5.2.1.2 Wilson Cowan Drain Tributary

The Wilson Cowan Drain Tributary is the only surface water feature that crosses the Phase 4 development area (Figure 3). The 875 m portion of this agricultural drainage ditch, which flows northwestwards from the southwest corner of the property to the northwest corner of the property, is split up into two reaches: upstream reach and downstream reach. The upstream reach is 450 m long and flows through forest, whereas the downstream reach is 425 m long and flows through cropland (at the time of the 2017 study; presently an open, cleared area). The upstream reach has no instream vegetation, whereas the downstream reach is inundated with instream vegetation, comprising grasses and sedges, shrubs and trees. Both banks of the upstream reach are dominated by trees. Both banks of the downstream reach are dominated by grass in the upstream portion, with shrubs and trees becoming more prevalent in the downstream portion of the reach.

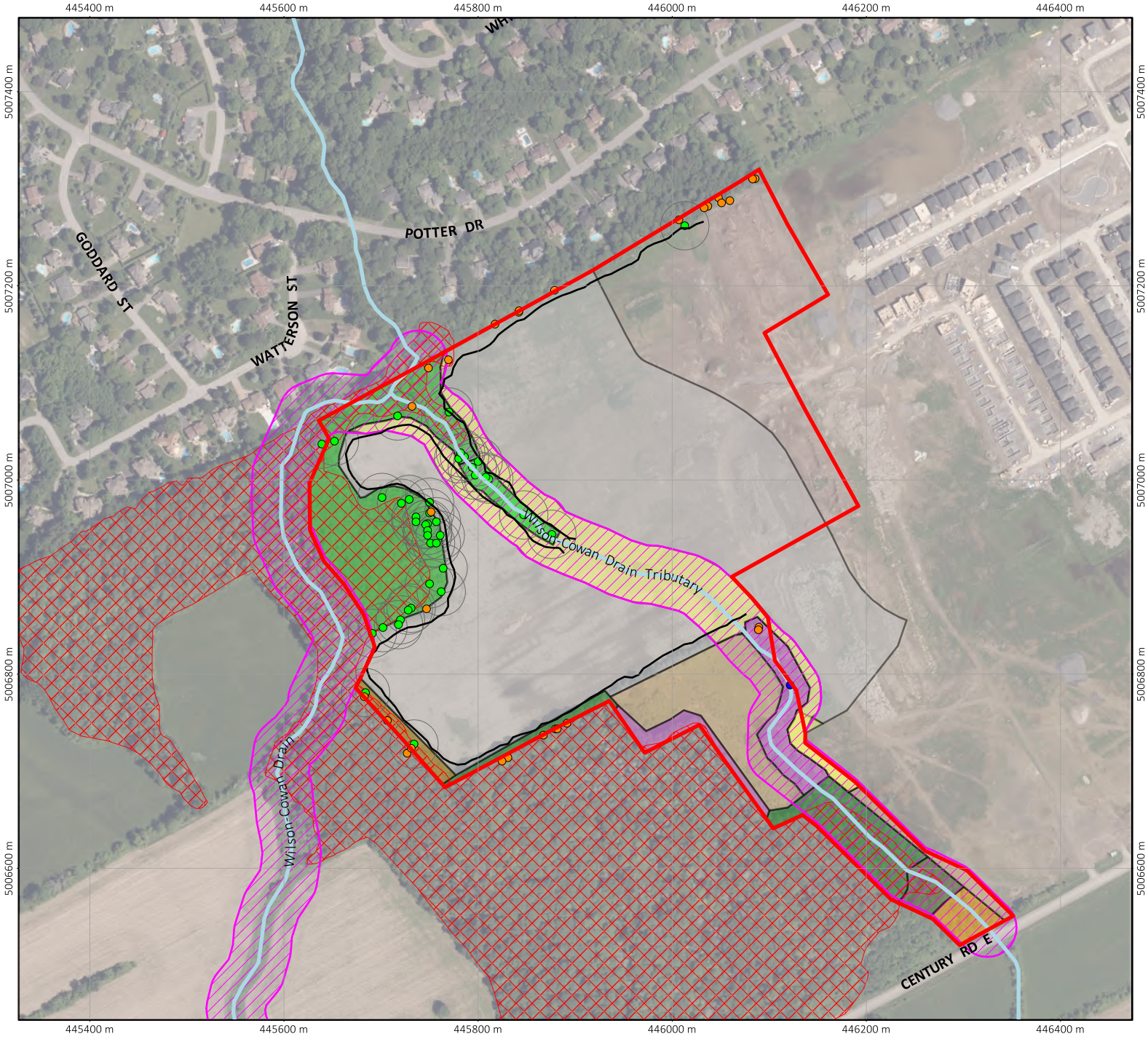

Figure 3 Existing Conditions

Legend

- Phase 4 Boundary
- Surface Water Feature
- Significant Woodland
- Category 2 Blanding's Turtle Habitat
- Black Ash
- Butternut
- Butternut Root Protection Zone
- Notable Trees
- 5 m CRZ Boundary

ELC

- FOD5-1
- FOD6
- FOD7-1
- FODM7-2
- FOM6-1
- MEMM
- OAG
- SWD3-1
- Cleared for Development
- CUT

N

0 200 m

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Map File: Minto 1623-2407b.map
Universal Transverse Mercator - Zone 18 (N)
Printed on: 2025-03-13

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The substrate comprised a mixture of clay and silt. Woody debris was abundant in the upstream reach and the downstream section of the downstream reach. Submergent vegetation was not present in either reach. During field studies in April 2017, the upstream reach was flooded but water was flowing slowly, whereas the downstream reach was in spate condition with fast-flowing water. By May, the upstream reach was still flooded but no flow was evident. The downstream reach had become heavily vegetated and had many woody fish barriers. In July, both reaches contained slow-flowing water. American Toad (*Anaxyrus americanus*), Gray Treefrog (*Dryophytes versicolor*), and Spring Peeper (*Pseudacris crucifer*) were heard calling in the forest surrounding the upstream reach and in previous years, directly along the downstream reach. No fish or turtles were observed in either reach in 2017. A Snapping Turtle was observed in the cleared area adjacent to the tributary on May 30, 2024. One Black Ash (*Fraxinus nigra*) tree was detected along the tributary corridor in the downstream portion.

5.3 Vegetation

The primary land uses within the Mud Creek Subwatershed Study are agriculture (63%) and woodlands (19%) (City of Ottawa, 2015). The remaining composition of the land use in this catchment is composed of settlements, transportation, wetlands, and aggregate sites at 10%, 5%, 2% and 1%, respectively. Primary land uses within the RRLIC SWS are agricultural (44%) and woodland (22%; (Rideau Valley Conservation Authority, 2016)). The remaining composition of the land use in this catchment is composed of settlements, transportation, wetlands, water, and grassland at 19%, 5%, 5%, 3%, and 2%, respectively.

5.3.1 Ecological Land Classification

A vegetation community assessment and ELC survey were completed for the full Mahogany site in 2017. At the time of the survey, the Site comprised a mosaic of cultivated cropland, treed hedgerows, fallow fields, forests, shrublands, and stream channels. Many of the trees within the hedgerows and forests on-site were apparent in the 1976 air photos (City of Ottawa, 2024) and larger trees are still abundant within the hedgerows and forests. The adjacent Manotick Drumlin Forest, owned by the City of Ottawa, will not be altered by this project. The central portion of the Phase 4 lands was subject to clearing and site regrading in late 2021/early 2022, however, the landcover peripheral to planned residential development areas has remained intact to date. The following sections describe the ELC units confirmed to be present and up-to-date in 2024. Note that ELC units described in previous reports that were associated with cleared lands or did not occur on or adjacent to the Phase 4 lands are not included in the descriptions below.

5.3.1.1 Dry – Fresh Sugar Maple Deciduous Forest (FODM5-1)

The Dry – Fresh Sugar Maple Deciduous Forest (FODM5-1) community forms the most prevalent vegetation cover on the Mahogany Lands, with more than one-third (38%) of the entire Mahogany study area comprising this community (Figure 3; Figure 4). In addition to the dominant Sugar Maple (*Acer saccharum*), other typical associated species include American Beech (*Fagus grandifolia*), Red Maple (*Acer rubrum*), Basswood (*Tilia americana*), Black Cherry (*Prunus serotina*), Bitternut Hickory (*Carya cordiformis*), and, in some areas, Butternut (*Juglans cinerea*). Saplings of Sugar Maple and Ironwood (*Ostrya virginiana*) dominate the mid-canopy. The shrub layer is characterized by Alternate-leaved Dogwood (*Cornus alternifolia*), Red Elderberry (*Sambucus racemosa*), and Prickly Gooseberry (*Ribes cynosbati*). The understorey comprises a diverse assemblage of species. The ephemeral spring flora includes abundant White Trillium (*Trillium grandiflorum*), Red Trillium (*Trillium erectum*), Blue Cohosh (*Caulophyllum thalictroides*), Dutchman's Breeches (*Dicentra*

cucullaria), Wild Leek (*Allium tricoccum*), Bloodroot (*Sanguinaria canadensis*), Spring Beauty (*Claytonia virginica*), and Yellow Trout-lily (*Erythronium americanum*). Blue Cohosh is particularly abundant and dominates large areas of the understorey. Other commonly found species include False Solomon's Seal (*Maianthemum racemosum*), Canada Mayflower (*Maianthemum canadense*), Lady Fern (*Athyrium filix-femina*), and Spinulose Woodfern (*Dryopteris carthusiana*). The regionally uncommon Hairy Wood Sedge (*Carex hirtifolia*) and Hitchcock's Sedge (*Carex hitchcockiana*) were also found in this community.

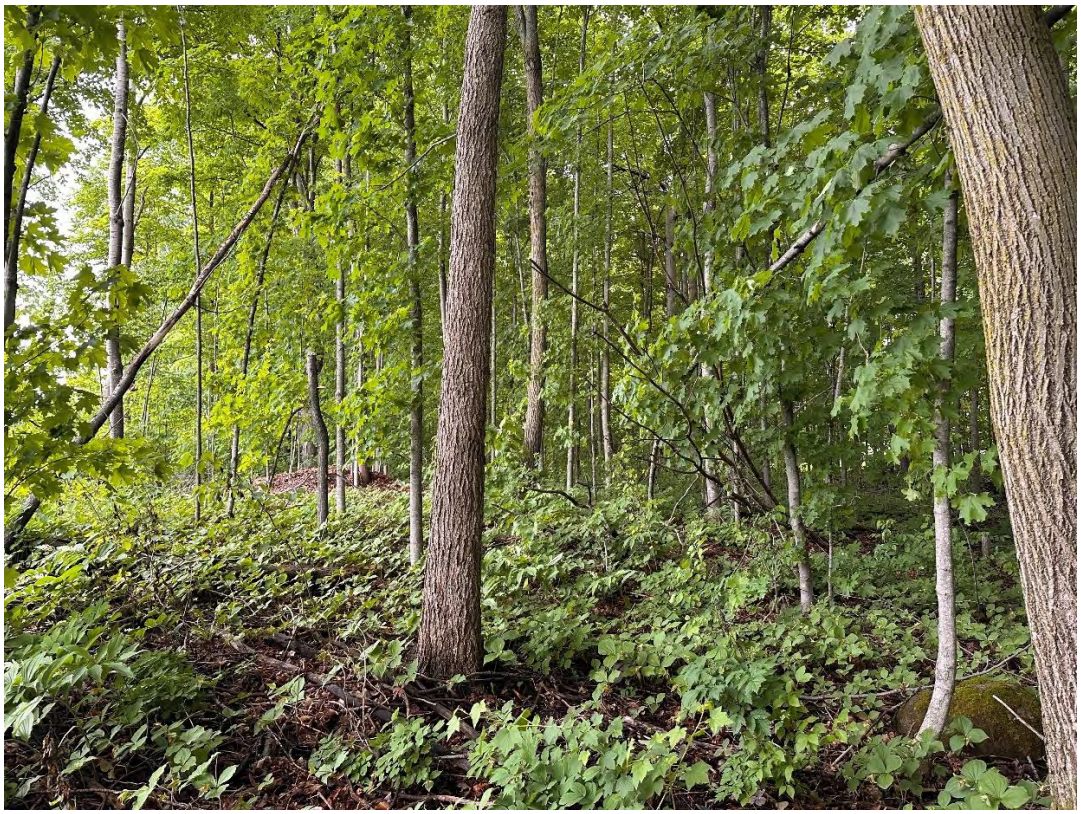

Figure 4 Dry – Fresh Sugar Maple Deciduous Forest (FODM5-1), showing edge conditions adjacent to the Phase 4 development lands; photo taken May 28, 2024

5.3.1.2 Fresh – Moist Sugar Maple – Hemlock Mixed Forest (FOMM6-1)

Although still containing Sugar Maple, the Fresh – Moist Sugar Maple – Hemlock Mixed Forest (FOMM6-1) vegetation community is distinctly different from other forested ELC units on the property. There were several pockets of Eastern Hemlock (*Tsuga canadensis*), such that they comprised more than 25% of the canopy cover, resulting in the mixedwood forest designation (Figure 3;Figure 5). The understorey was also distinctly sparser than in other forested communities, due to the shade provided by the Hemlock. This community had the most mature (oldest) trees of any unit on the Mahogany lands. There were several very large Sugar Maples within this community, some in excess of 80 cm DBH. Larger Yellow Birch (*Betula alleghaniensis*), American Beech, and Black Cherry trees were also scattered through the community. The sparse mid-storey contained Sugar Maple saplings and scattered shrubs including Red Elderberry and Gooseberries (*Ribes* spp.). Typical understorey species included Lady Fern, Canada Mayflower, Peduncled

Sedge (*Carex pedunculata*), and Jack-in-the-Pulpit (*Arisaema triphyllum*). Locally uncommon species found in this community included Rose Twisted-stalk (*Streptopus lanceolatus*), High-bush Cranberry (*Viburnum trilobum*), and Hobblebush (*Viburnum lantanoides*).

Figure 5 Fresh – Moist Sugar Maple – Hemlock Forest (FOMM6-1), showing edge conditions adjacent to the Phase 4 development lands; photo taken May 29, 2024

5.3.1.3 Fresh – Moist Sugar Maple Deciduous Ecosite (FOD6)

The Fresh – Moist Sugar Maple Deciduous Ecosite community was mapped to the Ecosite level as there were at least two main vegetation types (units) within it, although the boundaries of these were complex and not significant enough to map separately (Figure 3;Figure 6). In the southern section of the Site, this community represented an ecotone between the dry, sandy soils of the moraine (FODM5-1) and the low-lying and mostly flooded swamp community (SWD3-1). There was some vernal pooling within this polygon. At the south end of the Site near Century Road, there was a considerable amount of the regionally uncommon Black Maple (*Acer nigrum*). In other areas, there were stands of American Beech. Other diverse tree associates throughout included Basswood, Yellow Birch, and Red Maple, especially where the moist forest graded into swamp. The mid-storey throughout this community included young Sugar Maple, Ironwood, and Alternate-leaved Dogwood. Typical understorey species included a mixture of species from across the moisture gradient including Ostrich Fern (*Matteuccia struthiopteris*), Jack-in-the-Pulpit, American Yew (*Taxus canadensis*), Blue Cohosh, Foamflower (*Tiarella cordifolia*), Wild Ginger (*Asarum canadense*), Wild Black Currant (*Ribes*

americanum), Virginia Waterleaf (*Hydrophyllum virginianum*), Graceful Sedge (*Carex gracillima*), and both Red and White Trillium. The regionally uncommon species Hitchcock's Sedge was found in this community.

Figure 6 Fresh – Moist Sugar Maple Deciduous Forest (FOD6); photo taken July 15, 2024

5.3.1.4 Fresh – Moist Green Ash – Hardwood Lowland Deciduous Forest Type (FODM7-2)

A Fresh – Moist Green Ash – Hardwood Lowland Deciduous Forest Type (FODM7-2) community is situated along the Wilson Cowan Drain tributary, bisecting the Phase 4 development area (Figure 3; Figure 7). It is characterized as a relatively narrow treed corridor along the tributary, dominated by Green Ash (*Fraxinus pennsylvanica*), Manitoba Maple (*Acer negundo*), and American Elm (*Ulmus americana*) with Wild Red Raspberry (*Rubus ideaus*) in the shrub layer and grasses and forbs, including American Water-horehound (*Lycopus americanus*), Reed Canary Grass (*Phalaris arundinacea*), and Smooth Brome (*Bromus inermis*) dominating the groundcover.

Figure 7 Fresh – Moist Green Ash – Hardwood Lowland Deciduous Forest (FODM7-2) along the Wilson Cowan Drain Tributary; photo taken May 28, 2024

5.3.1.5 Mixed Meadow (MEMM)

A Mixed Meadow (MEMM) community is situated immediately south of the cleared Phase 4 development area, between deciduous swamp (SWDM3-1) and moist deciduous forest (FODM6). At the time of ELC survey in 2017, this area had been an agricultural field that had been left fallow and comprised a mixture of grass and forb species, many of which were invasive weed species. Observations in 2024 indicated an open, moist meadow area, dominated by tall grasses, such as Reed Canary Grass and Smooth Brome. The irregularly shaped ecosite is <1ha in size and is surrounded by trees.

5.3.1.6 Red Maple Mineral Deciduous Swamp (SWDM3-1)

A Red Maple Deciduous Swamp (SWD3-1) surrounded a surface drainage feature that conveyed water north to south through the center-east portion of the Site. Much of the community was flooded from early spring through mid-July (Figure 3;Figure 8). The area was hummocky, containing a mixture of wetland and upland species. Red Maple and Silver Maple (*Acer saccharinum*) dominated the wettest central portions of this community, with Red and Sugar Maple dominating toward the drier edges where it transitioned to the Fresh – Moist Sugar Maple (FOD6) community. Other associated tree species in the swamp were Black Ash, Green Ash, Black Maple, and American Elm. The understorey, where not flooded, typically included species such as Dwarf Raspberry (*Rubus pubescens*), Sensitive Fern (*Onoclea sensibilis*), Ostrich Fern, Fowl Manna-grass (*Glyceria striata*), Skunk Currant (*Ribes glandulosum*), Jewelweed (*Impatiens capensis*), False Nettle (*Boehmeria cylindrica*), and Stinging Nettle (*Urtica dioica*).

As part of the ELC confirmation and surface water studies in 2024, this community was revisited. It remained extensively flooded at the time of survey in July 2024. There was no indication of a defined drainage channel extending throughout the community, however, including at the southernmost extent of the Site at Century Road.

Figure 8 Red Maple Mineral Deciduous Swamp (SWDM3-1); photo taken July 15, 2024

5.3.2 Tree Studies

The Phase 4 tree survey took place concurrently with the ELC confirmation on May 28-30, 2024. Due to the contiguous forested area surrounding the cleared central portion of the Phase 4 lands, trees were assessed in groupings corresponding to ELC units. Within each grouping, tree species were noted and average DBH measurements were taken (Table 2). Overall, 10 species of trees with DBH measurements greater than 10 cm were noted on the Site, with DBHs ranging from 10 cm to 120 cm. Notable trees (e.g., trees larger than average, SAR trees, or trees representing species uncommon to the Site) were identified and characterized individually.

Table 2 Summary tree data

Tree Survey Polygons	Dominant Species	Average DBH (cm)
FODM5-1	Sugar Maple, with Basswood, American Beech and Balsam Poplar	30 cm (largest DBH: 120 cm)
FOMM6-1	Sugar Maple, Eastern Hemlock	40 cm (largest DBH 85 cm)
FOD6	Sugar Maple, with Black Maple, American Beech	30 cm (largest DBH 86 cm)
SWDM3-1	Red Maple, Silver Maple	30 cm (largest DBH 48 cm)
FODM7-2	Green Ash, American Elm	20 cm

Butternut trees were searched for along the margins of forested communities (i.e., where the trees may be removed or their CRZs may be impacted). A total of 40 Butternut trees were observed on the Site (Figure 3). Thirty-six of the trees were determined to be Category 1, three trees were Category 2, and one tree was dead at the time of assessment (Appendix D).

One Black Ash was observed during the tree survey, along the Wilson Cowan Drain tributary feature (Figure 3). Its DBH was 9 cm and while it showed some evidence of Emerald Ash-borer, it appeared to be a relatively healthy tree; as such, protections apply. Black Ash are discussed further in Section 5.5.2 below.

5.4 Wildlife

Field surveys were completed for the broader Mahogany lands in 2017 to assess general wildlife and SAR use of the Site. These surveys included breeding bird surveys, Eastern Whip-poor-will nocturnal surveys, anuran nocturnal calling surveys, basking turtle surveys, and acoustic bat surveys. The results of these 2017 surveys are described below, with an emphasis on the Phase 4 area. It is important to note that the central portion of the Phase 4 lands no longer comprises agricultural fields, as it did in 2017; at the present time, it is a cleared area, prepared for future development.

5.4.1 Breeding Birds

Three rounds of breeding bird surveys were conducted on June 14, June 27, and July 6, 2017. A total of ten breeding bird stations were established in representative habitats (Figure 2 Survey Stations, 2017). Note that Stations BBS4, BBS5, BBS6, BBS7, BBS8, and BBS9 are situated within the Phase 4 area and immediately adjacent lands. A summary of the weather conditions during the breeding bird surveys are provided in Table 3

Table 3 Weather conditions during breeding bird surveys at the Mahogany site in 2017

Date	Temperature	Weather conditions	Wind Speed (km/hr)
14-June-2017	22°C	Mostly sunny, no precipitation	12 km/hr
27-June-2017	17°C	Mostly cloudy, no precipitation	10 km/hr
06-July-2017	28°C	Mostly cloudy, no precipitation	11 km/hr

A total of 41 bird species were observed on the Site during the breeding bird surveys (Table 4). Two listed species, Eastern Wood-Pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*), were observed at Stations BBS8 and BBS6, respectively. BBS8 is located within the Drumlin Forest. BBS6 is located within a former forested area that has since been cleared. Regardless, these species are designated as Special Concern under the ESA. These species are not afforded any specific legal protections as SAR. Song Sparrow (*Melospiza melodia*) was the most abundant species onsite, followed by Red-winged Blackbird (*Agelaius phoeniceus*) and Cedar Waxwing (*Bombycilla cedrorum*).

Most of the birds observed onsite were common species with a high likelihood of breeding onsite. Birds classified with a moderate likelihood of breeding are common breeders in the area but only a limited amount of preferred breeding habitat was observed onsite. Birds classified with a low likelihood of breeding may breed in the local area but no preferred breeding habitat was observed onsite.

Table 4 Breeding birds observed during field surveys at the Mahogany Site in 2017

Common Name	Scientific Name	Likelihood of Breeding	Common Name	Scientific Name	Likelihood of Breeding
American Crow	*Corvus brachyrhynchos*	High	Least Flycatcher	*Empidonax minimus*	Moderate
American Goldfinch	*Spinus tristis*	High	Mourning Dove	*Zenaida macroura*	Moderate
American Redstart	*Setophaga ruticilla*	High	Northern Cardinal	*Cardinalis cardinalis*	High
American Robin	*Turdus migratorius*	High	Northern Flicker	*Colaptes auratus*	High
Baltimore Oriole	*Icterus galbula*	High	Pileated Woodpecker	*Dryocopus pileatus*	High
Black-capped Chickadee	*Poecile atricapillus*	High	Red-bellied Woodpecker	*Melanerpes carolinus*	Moderate
Blue Jay	*Cyanocitta cristata*	High	Red-eyed Vireo	*Vireo olivaceus*	High
Cedar Waxwing	*Bombycilla cedrorum*	High	Red-winged Blackird	*Agelaius phoeniceus*	High
Chipping Sparrow	*Spizella passerina*	High	Ring-billed Gull	*Larus delawarensis*	Low

Common Name	Scientific Name	Likelihood of Breeding	Common Name	Scientific Name	Likelihood of Breeding
Common Grackle	*Quiscalus quiscula*	High	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Moderate
Downy Woodpecker	*Dryobates pubescens*	High	Savannah Sparrow	*Passerculus sandwichensis*	High
Eastern Kingbird	*Tyrannus tyrannus*	Moderate	Song Sparrow	*Melospiza melodia*	High
Eastern Wood-Pewee	*Cotopus virens*	High	Turkey Vulture	*Cathartes aura*	Low
European Starling	*Sturnus vulgaris*	Low	Warbling Vireo	*Vireo gilvus*	High
Field Sparrow	*Spizella pusilla*	Moderate	White-breasted Nuthatch	*Sitta carolinensis*	High
Gray Catbird	*Dumetella carolinensis*	Moderate	Wild Turkey	*Meleagris gallopavo*	High
Great Crested Flycatcher	*Myiarchus crinitus*	High	Wood Thrush	*Hylocichla mustelina*	Moderate
Hairy Woodpecker	*Leuconotopicus vilosus*	High	Yellow-bellied Sapsucker	*Sphyrapicus varius*	High
Indigo Bunting	*Passerina cyanea*	Moderate	Yellow Warbler	*Setophaga petechia*	High
Killdeer	*Charadrius vociferus*	High			

5.4.2 Nightjars

Three rounds of EWPW surveys were completed on the Site at three survey stations in 2017. Note that Stations EWPW2 and EWPW3 correspond to the Phase 4 area or immediately adjacent lands. Weather conditions during the three surveys are presented in Table 5. No EWPW were observed onsite or on adjacent lands during these surveys or incidentally during any other field survey.

Table 5 Weather conditions during Nightjar surveys at the Mahogany site in 2017

Date	Temperature (°C)	Weather Conditions	Wind Speed (km/hr)	Moon Visibility/ Moon Illumination
18-May-17	13	Mainly Clear	31-33	50%/45%
7-Jun-17	18	Clear	10	100%/98%
13-Jun-17	16	Clear	17-18	75%/80%

5.4.3 Anurans

Eight anuran stations were surveyed in wetland and aquatic habitats. Note that none of the anuran survey stations are situated within the Phase 4 area or immediately adjacent lands. Weather conditions for the three survey dates are presented in Table 6. No SAR amphibians were observed on the Site during the field visits.

Table 6 Weather conditions during amphibian calling surveys at the Mahogany site in 2017

Date	Temperature (°C)	Weather Conditions	Wind Speed (km/hr)
21-Apr-17	8	Mostly cloudy	10-14
18-May-17	17	Mainly clear	21-31
28-Jun-17	15*	Mostly cloudy	8-9

Temperatures had been >17C for several consecutive nights prior to the survey.

Amphibians were observed at all eight survey stations. Seven of the eight stations occurred in cultivated cropland in combination with hedgerows, drainage channels, and flooded field areas. Station 8 was situated at Mahogany Creek to the east of the Site.

Spring Peepers were the most abundant species onsite and were heard at all eight stations. American Toad (*Anaxyrus americanus*) was heard at seven stations and Gray Treefrog was heard at six stations. Northern Leopard Frog (*Lithobates pipiens*) was the least abundant, heard at just two stations. Frog presence within each HDF is discussed within Appendix C. Outside of specific HDFs, Gray Treefrogs were generally associated with swamp areas, and the downstream (i.e., north) end of the Wilson Cowan Drain Tributary. American Toads and Spring Peepers were both abundant within springtime puddles occurring throughout the active agricultural areas. These wet features are, however, by the nature of the existing land usage, shifting and ephemeral habitats. Accordingly, active agricultural areas are not considered to be significant amphibian breeding habitat per MNRF (2015a).

5.4.4 Turtles

Weather conditions during turtle basking surveys are presented Table 7. Note that Stations TUR3, TUR4, TUR5, and TUR6 are within the Phase 4 lands. Only Midland Painted Turtles (*Chrysemys picta marginata*) were observed on the Site. Turtles were not observed on the Site during the three surveys in May 2017 but were observed during the two surveys in June 2017. Specific HDFs supporting turtles are identified Appendix C. An incidental observation of a Snapping Turtle was documented adjacent to the Wilson Cowan Drain Tributary on May 30, 2024.

Table 7 Weather conditions and turtle observations during basking turtle surveys on the Mahogany site in 2017

Date	Temperature (°C)	Cloud Cover (%)	Weather Conditions	Wind Speed (km/hr)	Species Observed
9-May-17	21-23	70-90	Mostly cloudy with sunny patches	11-28	None
18-May-17	28-30	40-50	Partly cloudy with sunny patches	20-27	None
23-May-17	21-22	20-40	Mostly sunny with some cloud	21-28	None
13-Jun-17	20-25	60	Mostly cloudy with sunny patches	5-10	Midland Painted Turtles
15-Jun-17	22	60-80	Mostly cloudy with sunny patches	27-24	Midland Painted Turtles

5.4.5 Bats

Table 8 and Table 9 contain the results of the bat acoustic data analysis. Note that both Stations BAT1 and BAT2 are situated on Phase 4 lands or immediately adjacent areas. These data represent the count of recorded bat calls by the acoustic monitors each day. Importantly, these data do not represent a count of bats present on an individual level but instead indicate the number of passes that each species makes near the acoustic monitor. This can be considered a general measurement of habitat use by each species and an indication of presence. Presence on or near the site does not necessarily correspond to roosting on the site but only that these species were recorded foraging in the area around the acoustic monitor.

Four species of bats were recorded at Stations 1 and 2. Big Brown Bat (*Eptesicus fuscus*), followed by Silver-haired Bat (*Lasionycteris noctivagans*) had the most recording in the first round of monitoring. Hoary Bat (*Lasiurus cinereus*) and Eastern Red Bat (*Lasiurus borealis*) each accounted for less than 1% of total recordings at Station 1. Silver-haired Bat and Big Brown Bat had the most recordings in Round 2. Hoary Bat *(Lasiurus cinereus*) accounted for 11% of calls in Round 2 and Little Brown Myotis (*Myotis lucifugus*) only had one recorded call. The single recording is indicative of a transient individual rather than a resident bat. Eastern Red Bat, Hoary Bat, and Silver-haired Bat were listed as Endangered under the ESA as of January 25, 2025.

Table 8 Results of bat acoustic surveys during Round 1 in 2017

Date	Noise	No Identification	Low-Frequency Bats [A]	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	High-Frequency Bats [B]
6/15/2017	1	0	0	0	0	0	2	0
6/16/2017	2	26	0	24	0	1	6	0
6/17/2017	6	78	2	109	0	0	42	0
6/18/2017	10	56	0	48	0	2	23	1
6/19/2017	7	34	1	27	0	1	7	0
6/20/2017	2	8	0	0	2	0	5	1
6/21/2017	0	1	0	0	0	0	0	0
Total	**28**	**203**	**3**	**208**	**2**	**4**	**85**	**2**

A = includes bats with call signatures under 40 kHz, which includes Big Brown Bat, Hoary Bat, and Silver-haired Bat.
B = includes bats with call signatures above 40 kHz, which includes Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, Eastern Red Bat, and Tri-colored Bat.

Table 9 Results of bat acoustic surveys during Round 2 in 2017

Date	Noise	No Identification	Low-Frequency Bats [A]	Big Brown Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis
6/23/2017	4	21	17	45	23	65	1
6/24/2017	21	34	17	16	24	57	0
6/25/2017	13	24	16	9	5	18	0
6/26/2017	10	18	7	11	5	19	0
6/27/2017	2	5	3	2	2	4	0
6/28/2017	0	1	1	0	0	1	0
Total	**50**	**103**	**61**	**83**	**59**	**164**	**1**

A = includes bats with call signatures under 40 kHz, which includes Big Brown Bat, Hoary Bat, and Silver-haired Bat.

5.5 Species at Risk

The Preliminary SAR Screening updated in 2024 identified 31 Species at Risk with known records in the vicinity of the Site (Appendix B). After consideration of habitat availability on the Site, the potential for (and/or likely timing of) the presence of individuals, and the likelihood for interactions under minimum standard best practices, of those 41 species, 19 were initially considered to have some potential to interact with the project (Table 10; Appendix B) SAR presented in Table 1 that are not listed or are listed as Special Concern under the ESA are not considered further as SAR in this report because they do not receive individual or habitat protection under the ESA (whereas Threatened and Endangered species do). However, individuals of these species are protected under other regulations addressing wildlife conservation generally, such as the FWCA, MBCA, and the PPS. In addition, species listed as Special Concern under the ESA may receive habitat protection if they are observed in habitats that meet the criteria for designation as SWH for Special Concern Species (MNRF, 2015a). Species of Special Concern will be discussed with SWH in Section 5.7.

Of the protected SAR reviewed, six were observed on the Site (Eastern Red Bat, Little Brown Myotis, Hoary Bat, Silver-haired Bat, Black Ash, and Butternut). Black Ash, and Butternut were detected in the 2024 field studies. These species are discussed further below.

Table 10 Species at risk with moderate or high potential to interact with the project

Common Name	Taxonomic Name	ESA Status	SARA Status	Observed On Site	Potential to Interact with Project
Birds					
Common Nighthawk	*Chordeiles minor*	Special Concern	Threatened	Not observed onsite during evening bird surveys in 2017	Low
Eastern Wood-Pewee	*Contopus virens*	Special Concern	Special Concern	Observed onsite during breeding bird surveys in 2017	Low (presence limited to adjacent forest areas)
Evening Grosbeak	*Coccothraustes vespertinus*	Special Concern	Special Concern	Not observed onsite during breeding bird surveys in 2017	Low
Golden-winged Warbler	*Vermivora chrysoptera*	Special Concern	Threatened	Not observed onsite during breeding bird surveys in 2017	Low
Olive-sided Flycatcher	*Contopus cooperi*	Special Concern	Threatened	Not observed onsite during breeding bird surveys in 2017	Low
Wood Thrush	*Hylocichla mustelina*	Special Concern	Threatened	Observed onsite during breeding bird surveys in 2017	Low (presence limited to adjacent forest areas)
Mammals					
Eastern Red Myotis	*Lasiurus borealis*	Endangered (January 2025)	Not Listed	Detected during acoustic monitoring in 2017 (tree stand subsequently cleared)	High
Eastern Small-footed Myotis	*Myotis leibii*	Endangered	Not Listed	Not detected during acoustic monitoring	Moderate
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Detected during acoustic monitoring in 2017 (tree stand subsequently cleared)	High
Hoary Bat	*Lasiurus cinereus*	Endangered (January 2025)	Not Listed	Detected during acoustic monitoring in 2017 (tree stand subsequently cleared)	High
Northern Myotis	*Myotis septentrionalis*	Endangered	Endangered	Not detected during acoustic monitoring	Moderate
Silver-haired Bat	*Lasionycteris noctivagans*	Endangered (January 2025)	Not Listed	Detected during acoustic monitoring in 2017 (tree stand subsequently cleared)	High
Tri-colored Bat	*Perimyotis subflavus*	Endangered	Endangered	Not detected during acoustic monitoring	Moderate
Reptiles					
Blanding's Turtle	*Emydoidea blandingii*	Threatened	Endangered	Not observed onsite during basking surveys in 2017; however, known occurrences within the Wilson Cowan Drain Tributary onsite (California Academy of Sciences and National Geographic Society, 2024) f	High
Eastern Milksnake	*Lapropeltis triangulum*	Not Listed	Special Concern	Not observed onsite during basking surveys in 2017	Low
Midland Painted Turtle	*Chrysemys picta marginata*	Not Listed	Special Concern	Observed onsite in 2017	High
Snapping Turtle	*Chelydra serpentina*	Special Concern	Special Concern	Observed onsite in 2024	High
Vascular Plants					
Black Ash	*Fraxinus nigra*	Endangered	No Status	Observed onsite in 2024	High

Common Name	Taxonomic Name	ESA Status	SARA Status	Observed On Site	Potential to Interact with Project
Butternut	*Juglans cinerea*	Endangered	Endangered	Observed onsite in 2024	High

[1] Rows highlighted in yellow indicate species ranked as Threatened or Endangered under the ESA that have a moderate to high likelihood of occurring on the Site.

5.5.1 SAR Bats

The Committee on the Status of Species at Risk in Ontario (COSSARO) has updated the provincial status for the Hoary Bat, Silver-haired Bat, and Eastern Red Bat to Endangered. These species will receive general habitat protection on or prior to January 31, 2025. Although these species are not officially listed at the time of preparing this EIS, it is anticipated that protections will apply throughout a future development timeline. As such, these species are considered and assessed as Endangered species in this EIS.

Eastern Red Bat, Little Brown Myotis, Hoary Bat and Silver-haired Bat were detected through acoustic monitoring on the Site. Little Brown Myotis was detected as a single recording at a single monitoring station. Eastern Red Bat was detected at two of the three monitoring stations, as single or only two recordings. Hoary Bat and Silver-haired Bat were detected at all three monitoring stations; both species were detected as over 100 recordings at two of the stations, with considerably fewer recordings at the third station. As such, all three species likely forage and/or roost in proximity to the Site. The low numbers of detections for Eastern Red Bat and Little Brown Myotis suggest only a limited transient presence over most of the site, with little evidence of maternal roosting activity or habitat. Hoary Bat and Silver-haired Bat were observed with a higher number of recordings, suggesting greater overall presence and potential use of the Site. As Endangered species, listed bats receive "general habitat protection" under the ESA.

5.5.2 Blanding's Turtle

Blanding's Turtle inhabit shallow water usually in large wetlands or shallow lakes. They can be found far from water bodies if searching for mates or nesting sites, which usually contain gravel, cobble, and/or sand. The review of data from the preliminary SAR screening includes a record for Blanding's Turtle in the vicinity of the Site (Ontario Nature, 2019), and the City of Ottawa provided additional information on a Blanding's Turtle sighting associated with the Wilson Cowan Drain.

Blanding's Turtle habitat is defined based on three categories (MECP, 2021a). Category 1 Habitat includes nesting and overwintering areas. Category 2 includes suitable aquatic/wetland areas and a 30 m buffer around them. These areas are protected under the ESA as places in which Blanding's Turtles will spend most of their active time (i.e., general summer habitat). Category 3 Habitat extends 220 m beyond the Category 2 areas to identify potential travel corridors.

The Category 2 designation is intended to protect features upon which Blanding's Turtles depend for life processes including feeding, mating, thermoregulation, movement, and protection from predators (MECP, 2021a). Category 2 habitat is captured within the 30 m buffer along the Wilson Cowan Drain Tributary despite the lack of Blanding's Turtle observations during daytime turtle basking surveys. The 220 m Category 3 habitat that extends beyond the 30 m buffer includes much of the Phase 4 development lands, which have already been cleared for development. As such, the Category 3 habitat onsite, intended to provide a travel corridor, does not provide such functionality.

5.5.3 Black Ash

Black Ash (*Fraxinus nigra*), listed as *Endangered* under the ESA and with no status under the SARA, are a medium-sized shade-intolerant hardwood tree primarily found in wetland environments like swamps, floodplains and fens. Black Ash can also occur in moist upland forests (COSEWIC, 2018). Black Ash received protection under the ESA on January 24, 2024. O.Reg 6/24 and O.Reg 7/24 set out individual and habitat protection. Black Ash habitat is defined as a radial distance of 30 m from the stem of every Black Ash that is over 8 cm at 1.37 m.

One healthy Black Ash with a DBH of 9 cm was detected on the Site, in the deciduous swamp community south of the Phase 4 development lands. The stem is located within the protected Wilson Cowan Tributary corridor and is situated >30 m from the Phase 4 development. Therefore, no impact to this stem is anticipated and no approval under the ESA is required.

5.5.4 Butternut

Butternut (*Juglans cinerea*), endangered under the ESA and SARA, are often found along stream banks as they prefer to grow in moist, well-drained loams; however, the species can tolerate a large range of soil types. Butternut are intolerant of shade and competition, as they require ample sunlight to grow (Poisson & Ursic, 2013).

A total of 40 Butternut trees were observed on the Site during the ELC and tree survey conducted in May 2024. Of the 40 trees, 3 were determined to be Category 2, 36 were Category 1, and 1 tree was dead at the time of assessment. Under the ESA (O. Reg. 829/21), the Act does not apply to confirmed Category 1 trees, or dead trees. Thus, all Category 2 trees are protected under the ESA.

Additional tree clearing on the north and west sides of the Site is not required to accommodate the Phase 4 development. However, the CRZ of 39 trees encroaches within the development area; three of which are Category 2. As such, three Butternuts are anticipated to be impacted by Phase 4 development. The BHA (Appendix D) may be used to support a project registration through the Ontario Conservation Fund in accordance with O. Reg 829/21. Completion of the registration through this process would permit the CRZ impact of Butternut trees as required to proceed with Site development while ensuring an overall net benefit for the species.

5.6 Significant Wildlife Habitat

The Significant Wildlife Habitat (SWH) Criteria Schedule for Ecoregion 6E (MNRF, 2015a) identifies four main types of significant wildlife habitat: seasonal concentration areas, rare vegetation communities, specialized habitat for wildlife, and habitats of Species of Conservation Concern.

5.6.1 Seasonal Concentration Areas

Seasonal concentration areas include stopover and staging areas for waterfowl, shorebirds, landbirds and butterflies, wintering areas for raptors, bat hibernacula, bat maternity colonies, wintering areas for turtles, reptile hibernacula, breeding habitats for colonially-nesting birds, and deer yarding and congregation areas. No seasonal concentration areas were observed on the Phase 4 lands.

5.6.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare Vegetation Communities

Rare vegetation communities typically include those that have developed on cliff and talus slopes, sand barrens, shallow soils over limestone bedrock (alvar), old growth forests, savannahs, and tallgrass prairies. No rare vegetation communities were observed on the Phase 4 lands.

Specialized Wildlife Habitat

Specialized wildlife habitat includes waterfowl nesting areas, Bald Eagle and Osprey nesting, foraging and perching habitat, woodland raptor nesting habitat, turtle nesting areas, seeps and springs, woodland amphibian breeding habitat, wetland breeding habitat, and woodland area-sensitive bird breeding habitat.

No candidate or confirmed specialized wildlife habitat was observed on the Phase 4 lands. The forested and swamp areas around the perimeter of the Phase 4 development lands (i.e., the City-owned Manotick Drumlin Forest) have potential for amphibian breeding habitat (woodland and wetland). These areas are not included in the Phase 4 development areas, and therefore no impact to potential SWH is anticipated. There is potential for turtle nesting within the cleared areas and exposed mineral soils on the Site. However, the Site does not contain the candidate ELC ecosites, and therefore no rare local turtle nesting areas qualifying as candidate SWH are present on the Site.

Habitats of Species of Conservation Concern

Habitats of species of conservation concern include marsh breeding bird habitat, open country bird habitat, shrub/early successional bird breeding habitat, terrestrial crayfish, and special concern and rare wildlife species. Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened species as identified by the ESA. Our background review did not identify the presence of marsh bird breeding habitat, open country bird habitat, shrub/early successional bird breeding habitat or terrestrial crayfish.

MNRF (2015) defines candidate SWH for special concern and rare wildlife species as an element occurrence is identified within a 1 or 10 km grid and suitable candidate habitat is found on-site based on ELC, with confirmation of this SWH type following observations of the presence of Special Concern species. As such, the Drumlin Forest provides Confirmed SWH for Eastern Wood-Pewee and Wood Thrush and the Wilson Cowan Drain (but not the Wilson Cowan Tributary) provides Confirmed SWH for Snapping Turtle.

5.7 Other Natural Heritage Features

The Manotick Drumlin Forest that borders the Phase 4 lands contains significant woodland that provides important habitat to wildlife species. The Manotick Drumlin Forest is owned by the City of Ottawa and the feature will be fully retained. The Phase 4 lands do not contain significant wetlands, significant coastal wetlands, significant valleylands, or ANSIs (life/earth science). No other significant natural heritage features are located within 120 m of the Site.

6.0 DESCRIPTION OF THE PROPOSED PROJECT

The proposed community design and street layout for Phase 4 are presented in Figure 9. The Phase 4 development comprises single-family residences, with supporting infrastructure. The broader Mahogany community will include some areas of higher-density residences, 7.0 ha of park space and a new school site.

Full 30 m setbacks will be included along both the Wilson Cowan Drain and the Wilson Cowan Drain Tributary, with existing vegetation preserved. Currently unvegetated riparian areas within the setback lands will be enhanced with additional plantings as required. A culvert allowing for turtle passage is proposed along the Wilson Cowan Drain Tributary under Bridgeport Avenue. The culvert will be a minimum of 22 m in length and will measure approximately 2400 mm x 900 mm. Two 600 mm x 600 mm open grate chimney skylights allowing for additional daylighting are proposed to be installed in suitable locations within the boulevard areas along Bridgeport Avenue that also accommodate for roadway, servicing, and utility infrastructure. Concrete retaining walls ($\geq$60 cm high) with railings will be constructed along the upstream and downstream ends of the culvert to prevent turtles from exiting the drain corridor and accessing Bridgeport Avenue. Culvert specifications are included in Appendix E.

The approximate CRZ limit of trees mapped in the City forest will be respected and maintained. Shallow swales will be constructed where required at the rear of the lots, within the 5 m CRZ limit to ensure that runoff from the community will not alter the hydrology of the adjacent City forest. Depending on location, runoff will either be directed to the community stormwater collection system or by overland flow to a downstream watercourse (i.e., Wilson Cowan Drain or its tributary) or dry pond.

Two stormwater management facilities (dry ponds) are proposed along the north edge of the Phase 4 development. They will direct runoff as required toward the north end of the Wilson Cowan Drain Tributary.

The Manotick Drumlin Forest will be retained in its current configurations (i.e., same footprint). It is anticipated to become an important resource to the residential culture of the neighbourhood. The forest is to be managed following the development of a Woodland Management Plan (WMP) in such a way as to protect the feature and its extensive floral richness while allowing residence of the area and of Ottawa generally to access the feature for recreation and education.

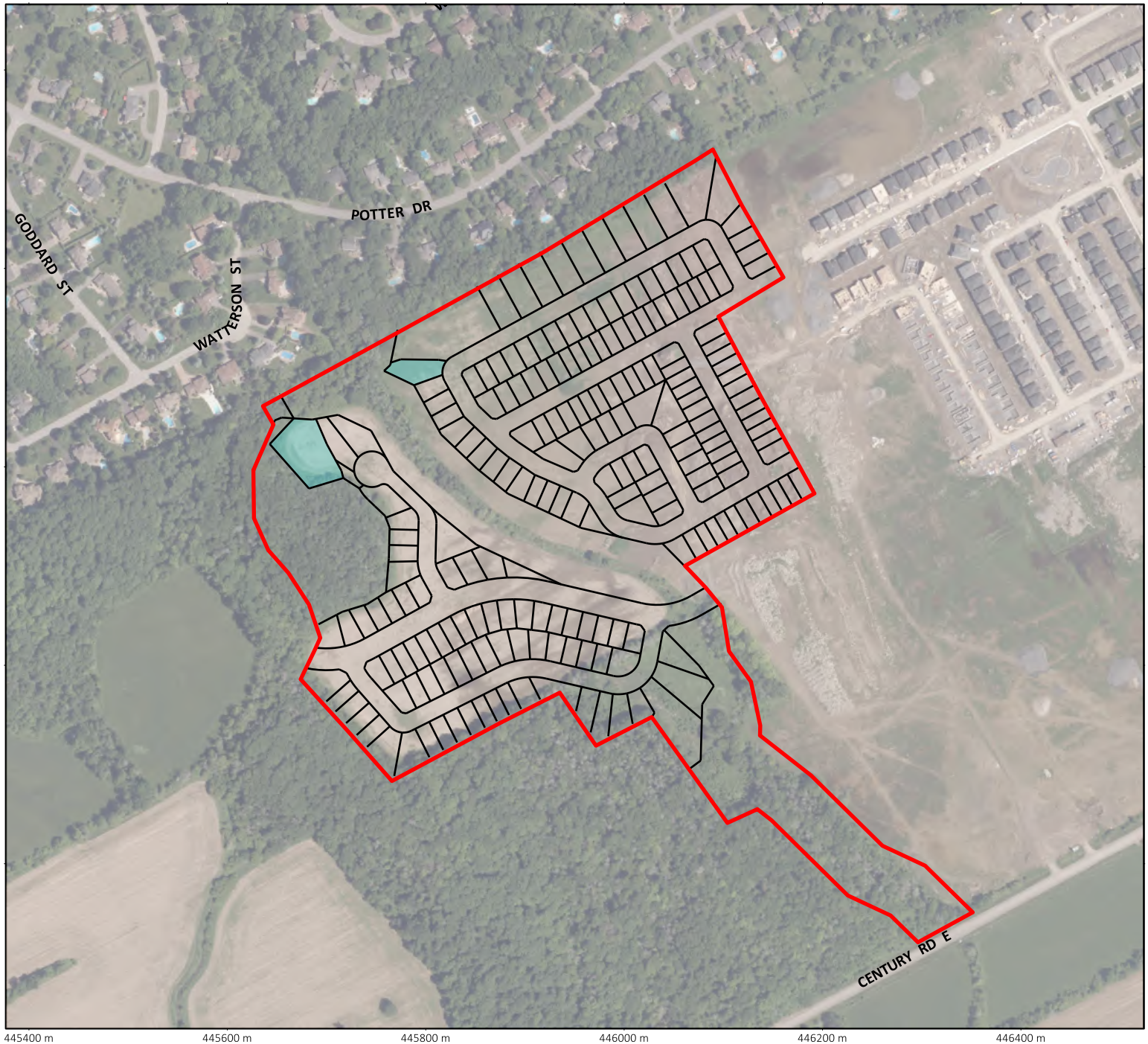

Figure 9 Proposed community

Legend

- Proposed Development
- Dry Ponds
- Phase 4 Boundary

N

0 200 m

Project: Minto 1623-2407b
Created By: TH
Checked By: AF
Universal Transverse Mercator - Zone 18 (N)
Printed on: 3/7/2025

KILGOUR & Associates

7.0 IMPACT ASSESSMENT AND MITIGATION

7.1 Surface Water

All development proposed for the Mahogany Phases 2, 3 and 4 was planned to respect 30 m setbacks for Mahogany Creek and both of the Wilson Cowan Drain features to protect these reaches. The proposed Phase 4 development continues to respect those required aquatic setbacks for the Site.

Wetland portions of the Manotick Drumlin Forest are limited to the southeastern portion of the main forest block. Hydrological connection eastward to the Wilson Cowan Drain Tributary appeared to be limited to overland flow during the spring freshet.

Residential lots abut the forest along the west and south edges of the Phase 4 lands. Grading along the rear edge of these lots will be such that any drainage from the lots towards the Drumlin Forest, and any drainage from the Drumlin Forest towards the lots will collectively be conveyed eastward along the rear of the lots to a downstream watercourse or dry pond, away from the forested areas. These overland flow routes along the forest edge are designed to ensure that additional water inputs from the Phase 4 development will be managed to avoid ponding and/or water impoundment within the adjacent forest, and that existing flows from the forest northward are not unduly retained, thereby maintaining the existing hydrology of the forest. Should runoff enter the forest (e.g., during 100 year storm events), ponding will be minimal, the collected water will be dissipated within 24 hours and thus will not remain impounded (Appendix F). Any minor grading required for the construction of swales within the 5 m CRZ limit will be limited to the highest extent feasible to limit impacts to the CRZ of Drumlin Forest trees.

Homeowners of properties abutting the Drumlin Forest must be informed of the importance of the critical root zone and intended drainage pattern supported by the grading within their rear yards.

The Phase 4 development plan includes two dry stormwater management ponds along the north edge of the Site. The ponds will discharge toward the Wilson Cowan Drain at the northernmost edge of the Site and direct flows northwards off the Phase 4 lands.

With appropriate setbacks from the major surface water features in place, the proposed development is expected to have minimal impacts on surface water, groundwater, and fish habitat.

To further protect the surface water features onsite and the broader catchment area during future development of the Site, an erosion and sediment control (ESC) plan will be required and must be developed to the satisfaction of RVCA. The ESC plan should include:

- A multi-faceted approach to provide ESC;
- Silt fencing paired with high-visibility, sturdy orange construction fence along the project perimeter to protect adjacent habitats, CRZs, the Manotick Drumlin Forest, and surface water features in the vicinity (i.e., Mud Creek, the Wilson Cowan Drain and its tributary, Mahogany Creek, and the Rideau River). This fencing can also act as a wildlife exclusion measure for smaller and less mobile animals that may occupy or traverse through the Site, such as turtles, snakes, and amphibians;

- Regularly inspecting and maintaining the ESC measures during all phases of the project;
- Retention of existing vegetation and stabilization of exposed soils with native vegetation where possible;
- Keeping the ESC measures in place until all disturbed ground has been permanently stabilized;
- Using biodegradable ESC materials where possible and removing all exposed non-biodegradable ESC materials once the Site is stabilized;
- Limiting the duration of soil exposure and phasing project works;
- Limiting the size of disturbed areas by minimizing nonessential clearing and grading;
- Minimizing the total slope length and the gradient of disturbed areas;
- Refueling of machinery should occur >30 m from surface water features and all machinery will remain on the project-side of silt and construction fence;
- Maintaining overland sheet flow and avoiding concentrated flows;
- Storing/stockpiling materials >30 m away from the wetland and other surface water features;
- Fencing or tarping all stockpiled material (<150 millimeter gravel) during the turtle nesting period (late May to early July; (MECP, 2021a) to prevent turtles from nesting in stockpiles. If the stockpile is within a properly fenced area (i.e., the project footprint) additional fencing is not necessary for turtle management, but is recommended for ESC if piles will be left unused for extended periods;
- Regularly inspecting the Site for signs of sedimentation during all phases of work and taking corrective action if required;
- Developing a response plan to be implemented immediately in the event of a spill of a deleterious substance;
- Keeping an emergency spill kit on the Site;
- Stopping work and containing deleterious substances to prevent dispersal; and
- Reporting any spills of sewage, oil, fuel, or other deleterious material whether near or directly into a surface water feature.

7.2 Vegetation

The Manotick Drumlin Forest that borders the west edge of the Phase 4 lands contains older forest areas that provide important habitat for wildlife species. This feature will be fully retained and maintained in its current condition. The Drumlin Forest is connected to the Rideau River on its northern edge by a riparian zone along the Wilson Cowan Drain. This connection will also be maintained. At present, the Drumlin Forest is

surrounded by cleared lands, isolated from other natural areas. As such, it likely serves as an island habitat and the end of the north-side drain connection. This configuration will not be altered.

The Phase 4 development area was previously cleared of vegetation to accommodate future development. Trees within adjacent forested communities surrounding the development area will be protected to the extent possible; the approximate CRZ of edge trees were mapped as part of the updated tree survey in 2024. Impacts within that zone will be avoided, and required minor grading for the construction of swales will be minimized to the extent feasible. Additional Site tree clearing will be required within the Phase 4 development area.

Lots backing onto the forested areas will have shallow swales along the rear of the lots to capture surface runoff and direct it to a downstream watercourse or dry pond. Proposed swales will be shallow to minimize the need for grading encroachment on the CRZ of adjacent trees. Homeowners of properties abutting the Drumlin Forest must be informed of the importance of the critical root zone and intended drainage pattern supported by the grading within their rear yards.

A WMP will be developed in consultation with the City for the Manotick Drumlin Forest. The purpose of the WMP is to provide a detailed assessment of how to: 1) protect the native flora (and fauna) of the feature, 2) permit access by residents to the forest area in a manner that balances minimizing impacts to the forest while maximizing the potential for recreational enjoyment of the area, and 3) identify appropriate maintenance activities to be conducted within the feature to achieve the first two goals in a safe and effective manner. With the implementation of the WMP, there is anticipated to be a net gain of social value to the forest (improved public access but controlled and limited to the least vulnerable portions) with minimal negative impact to the ecological functioning of the forest (trees will only be removed as required to construct and safely maintain a trail system, and forest edges along the most sensitive areas are buffered by the drain corridor).

The following general protection measures are recommended during site preparation and construction to limit impacts to trees during development:

- Erect a fence beyond the critical root zone (CRZ; i.e., 10x the diameter at breast height) of trees to be retained. 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;
- Ensure swales along the edge of the forested area are shallow, with limited grading within the CRZ;
- Ensure that additional water inputs, if any, (e.g., runoff) that enter the forested areas are dissipated within 24 hours and will not remain impounded;
- 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 toward any tree's canopy.
- Ensure equipment is clean prior to vegetation removal to avoid introducing invasive species to the Site, and clean equipment prior to leaving Site to avoid spreading invasive species elsewhere; and
- Incorporate native plants into Site landscaping to the extent possible for the benefit of local wildlife and pollinators (e.g., milkweed for Monarch). It is recommended that plantings encompass a variety of native flowering species with different blooming periods to provide varied food sources for native pollinators. Further, the use of herbicides should be limited within and surrounding the planted habitat.

A tree planting plan for the Mahogany development will be created and will call for planting densities equivalent to one tree per lot, with additional tree plantings in public areas. Given the very low tree stem density currently within the Phase 4 development area (outside of the forest features to be retained), these measures are anticipated to generate a significant increase in municipal tree canopy cover. The expected increase in canopy density will be determined as part of the final landscape plan.

7.3 Species at Risk

Six SAR ranked as Threatened or Endangered under the ESA were observed on the Site and assessed as having a high potential to interact with future development on the Site. The detected SAR are Eastern Red Bat, Hoary Bat, Silver-haired Bat, Black Ash, and Butternut. Blanding's Turtles were not detected during turtle surveys in 2017; however, a known occurrence is associated with the Wilson Cowan Drain on-site. Mitigation measures for Blanding's Turtles are also discussed below.

The general wildlife mitigation measures provided in Section 7.5, while not species-specific, are anticipated to protect the SAR that may potentially occur on the Site. Additional species-specific mitigation measures, however, are provided below.

7.3.1 SAR Bats

Potential impacts to individual at-risk bats directly can be mitigated by clearing trees outside of the roosting season (April 1 to September 30, inclusive; MECP, 2024). Following this tree-clearing window would also avoid potential interactions with birds and bird nests protected under the *Migratory Birds Convention Act* (Government of Canada, 1994). As such, Eastern Red Bat, Hoary Bat, and Silver-haired Bat individuals would not be impacted by site development in Phase 4. With no further removals of large trees anticipated, and the preservation of the Manotick Drumlin Forest, continued development within the Phase 4 would not reduce or otherwise impact the habitat of these species.

Additional general mitigation measures are included in Section 7.5 below.

7.3.2 Black Ash

Black Ash over 8 cm DBH and 1.37 m in height and their habitat are regulated under the ESA. One Black Ash individual (DBH 9 cm) was observed in the forested area south of the Phase 4 development lands. It is not anticipated that this individual or its habitat (i.e., the area comprising a 30 m radius from the individual) will be affected by the proposed development. As such, associated permits and approvals under the ESA are not required, and no impacts to Black Ash otherwise prohibited under the ESA will occur under this project.

If Site development does not take place within two years, the Site must be reassessed for Black Ash. If development plans change and the detected individual is anticipated to be impacted a *Black Ash Health Assessment Report Worksheet* is required for submission to the MECP, alongside an *Information Gathering Form* (IGF).

7.3.3 Butternut

Butternut and their associated root-harm prevention zone are regulated under the ESA (Government of Ontario, 2007; Poisson & Ursic, 2013). A total of 40 Butternut trees were observed on the Site in May 2024. The Butternut Expert's Report (Appendix E) indicates that 36 trees are Category 1, 3 are Category 2, and 1 was dead at the time of assessment. Additional tree clearing along the north and west side of the Site is not anticipated, and none of the 40 Butternuts will be removed. All Category 2 trees are protected under the ESA. As such, three Category 2 Butternuts are anticipated to be impacted (i.e. "harmed" but not killed) by Phase 4 development. The BHA (Appendix E) may be used to support a project registration through the Ontario Conservation Fund in accordance with O. Reg 829/21. Completion of the registration through this process would permit the CRZ impact of Butternut trees as required to proceed with Site development while ensuring an overall net benefit for the species.

The Butternut Expert's Report is valid for two years. If the proposed development requires their removal after May 30, 2026 (i.e., two years after the Butternut Health Assessment was completed), the trees must be reassessed.

7.3.4 Blanding's Turtle

The occurrence of Blanding's Turtle observations associated with the Wilson Cowan Drain and its tributary designate those features as Category 2 Habitat for the species (MECP, 2021a). The Category 2 designation is intended to protect features upon which Blanding's Turtles depend for life processes, including feeding, mating, thermoregulation, movement, and protection from predators (MECP, 2021a). As a municipal drain and a former farm drain, these features have historically been subject to regular cleanouts and the surrounding areas were mostly farm fields (and are now all residential developments to the north). As such, these drainage features themselves can (and evidently do) provide travel corridors for the species but are unlikely to provide, or to have historically provided regular "living space". Regardless, Phase 4 will retain a 30 m setback from the Wilson Cowan Drain Tributary and, as such, will retain the Category 2 Habitat associated with that feature.

The community plan orients development such that the entire length of the Wilson Cowan Drain Tributary corridor (i.e., the Category 2 Blanding's Turtle Habitat) is bounded by rear yards. These rear yards as well as potential community access points will be fenced or terraced along their entire length abutting the corridor

using fencing materials and structures consistent with MNRF guidelines to sufficiently prevent turtles from exiting the corridor and accessing the adjacent community.

The Wilson Cowan Drain Tributary will pass through a culvert under Bridgeport Avenue near the south end of the Phase 4 development area (Appendix). The culvert will be a minimum of 22 m in length and will measure approximately 2400 mm x 900 mm. Two 600 mm x 600 mm open grate chimney skylights allowing for additional daylighting and active use by turtles are proposed to be installed in suitable locations within the boulevard areas along Bridgeport Avenue that also accommodate for roadway, servicing, and utility infrastructure. Concrete retaining walls ($\geq$60 cm high) with railings will be situated along the upstream and downstream ends of the culvert to prevent turtles from exiting the drain corridor and accessing the community.

Category 3 habitat for Blanding's Turtle extends 220 m beyond Category 2 areas and serves to identify potential travel corridors. This includes much of the Phase 4 development lands. The areas identified as potential Category 3 habitat likely do not provide functional habitat. Removal of the former farm fields (nominally Category 3) would not impede travel within the broader area via the corridor (nominally Category 2). Regardless, due to development within Category 3 areas, an Information Gathering Form (IGF) will be submitted to the MECP for further review.

Impacts to potential transient Blanding's Turtles can be further minimized or eliminated by implementing the following mitigation measures:

- Temporary exclusion fencing should be installed prior to the turtle active season (April 1 – October 31, inclusive; MECP, 2021a) and should follow recommendations in Reptile and Amphibian Exclusion Fencing: Best Practices (MECP, 2021c). Temporary exclusion fence (e.g., silt fence) may be paired with ESC measures and should be installed along the perimeter of the project area. Temporary exclusion measures should be inspected and repaired weekly by a qualified biologist during the turtle active season; and

- If a turtle is encountered, the project biologist should be contacted for advice. If a turtle is in immediate harm's way, it should be safely and humanely relocated to appropriate habitat. Encounters with Threatened and Endangered species should be reported to the MECP within 24 hrs.

With the above mitigation measures in place, there is not anticipated to be impacts to individual turtles and no loss of functional turtle habitat as a result of the Phase 4 development.

7.4 Significant Natural Heritage Features

7.5 General Wildlife Mitigation

The following mitigation measures are recommended be implemented during future construction to generally protect wildlife and potential SWH areas:

- Areas shall not be altered or cleared during sensitive times of year for wildlife unless mitigation measures are implemented and/or the habitat has been inspected by a qualified Biologist;

  - Clearing of trees and/or vegetation should not take place April 1 to September 30 inclusive unless a qualified Biologist has determined that no birds are nesting or suitable bat roosting trees are present. The bird nest sweep would be valid for five days:

    - The MBCA protects the nests and young of migratory breeding birds in Canada. The timing of nesting for birds in the area spans April 1 to August 31 (Government of Canada, 1994);

    - No SAR bat species were detected during acoustic bat surveys. The Site contains suitable foraging and roosting habitat, however, due to the lack of detections, it is not expected that SAR bats are utilizing the Site. To eliminate and mitigate any possibility of impacts to at-risk bats directly, tree clearing is recommended to take place outside of the roosting season (April 1 to September 30 inclusive; MNRF, 2017). The breeding and roosting period for bats is recognized as April 1 to September 30 (MNRF, 2015b; MECP (C. Hann) personal communication with KAL (K. Black), July 30, 2021);

- Temporary exclusion fence should be installed prior to the turtle active season (April through October; MECP, 2021a) and should follow recommendations in Reptile and Amphibian Exclusion Fencing: Best Practices (MECP, 2021c). Temporary exclusion fence (e.g., silt fence) may be paired with ESC measures and should be installed along the perimeter of the project area. Temporary exclusion measures should be inspected and repaired weekly by a qualified biologist during the turtle active season;

- Develop an ESC plan. Install sediment control fence and inspect/maintain it periodically and after each rain event to ensure its integrity and continued function;

- Ensure that a qualified biologist develops a wildlife management plan for the construction process and delivers environmental compliance and biodiversity training to all site workers to implement the plan. The plan should include (but not be limited to) requirements to:

  - Utilize silt fence paired with sturdy construction fence along the project perimeter and around soil stockpiles to serve as a wildlife exclusion measure to prevent smaller animals from accessing/utilizing temporary habitats on the Site (e.g., prevent turtles from nesting in stockpiles on the Site);

  - Check the entire work site for wildlife prior to beginning work each day;

  - Do not harm, feed, or unnecessarily harass wildlife;

  - Manage waste to prevent attracting wildlife to the work site. Effective mitigation measures include litter prevention and keeping all trash secured in wildlife-proof containers and promptly removing it from the work site, especially during warm weather;

  - Enforce a speed limit of 20 km/h during the active season (April 1 to September 30) to reduce wildlife mortality; and

- Manage stockpiles and equipment at the work 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.

Once construction is complete and the residences are occupied, KAL recommends that new residents are encouraged through signage and public education to keep pets on leash during the bird breeding season (April 1 to August 31) and reptile active season (April 1 to October 31). It is recommended that landowners be provided with educational resources about keeping cats on a leash or indoors, as cats are one of the largest threats to bird populations (Blancher, 2013).

8.0 CONCLUSION

This report provides a set of mitigation measures recommended for employment in the design and construction of the proposed development. The assessment of the potential for impacts to the natural heritage system is based on the implementation of these mitigation measures. It is our professional opinion that the proposed development is not anticipated to have negative impacts to existing natural features or ecological functions if the recommended mitigation measures provided in this report are implemented.

9.0 CLOSURE

This report was prepared for exclusive use by Minto Communities and may be distributed only by Minto Communities. Questions relating to the data and interpretation can be addressed to the undersigned.

Respectfully submitted,

KILGOUR & ASSOCIATES LTD.

p.p. Anthony Francis

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Appendix A Qualifications of Report Authors

Kesia Miyashita, MSc (Senior Biologist)

Ms. Miyashita has over ten years of experience in environmental consulting and more than thirteen seasons of field experience in ecosystems in Ontario, Alberta, and British Columbia. During her career in environmental consulting, Ms. Miyashita has completed environmental assessments for a variety of major infrastructure projects and urban developments. Her expertise is in vascular and non-vascular plant ecology, with experience in both terrestrial and wetland ecosystems; she has performed vegetation community inventories, rare plant surveys, and invasive weed surveys in a variety of natural environments, including native forest, urban nature preserves, grasslands, and wetlands. Ms. Miyashita joined Kilgour & Associates Ltd. in May of 2021 and has since authored Environmental Impact Studies and Tree Conservation Reports and undertaken field surveys for flora and fauna, delineation of natural heritage features, and SAR surveys. Ms. Miyashita is a Professional Biologist with the Alberta Society of Professional Biologists and a Qualified Wetland Science Practitioner in the province of Alberta.

Maren Nielsen, BES, EMA (Biologist, Project Manager)

Maren is a Biologist and Project Manager with over eight years of comprehensive field, laboratory, and consulting experience. She has worked extensively in the environmental sector, assisting clients through complex land development, ecological restoration, species at risk, and fisheries permitting and approvals processes, ensuring compliance with key environmental regulations while achieving project goals. She carries out field programs for the collection, analysis, and monitoring of water, fish, benthos, sediment, and soils as well as a variety of vegetation, wetland, wildlife surveys, and construction monitoring. Maren plays a key role in delivering high-quality assessments, including the delivery of Environmental Impact Studies (EIS), Environmental Assessments (EA), Species at Risk (SAR) assessments, Headwater Drainage Feature Assessments (HDFA), Existing Conditions Reports, and Environmental Constraints Analyses. Since joining Kilgour & Associates Ltd. in 2023, Maren has contributed her expertise to a diverse portfolio of land development and environmental monitoring projects for government agencies and private industry. Maren is a certified wetland evaluator under the Ontario Wetland Evaluation System (OWES).

Anthony Francis, PhD (Senior Ecologist, Director of Land Development)

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 (SAR), 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. Dr. Francis' academic background is in spatial ecology with a focus on tree species diversity. As a Senior Ecologist at KAL, he regularly completes TCRs, Environmental Impact Statements, and Integrated Environmental Reviews for land development projects throughout Ottawa and eastern Ontario. He is also a certified Butternut Health Assessor (BHA #104).

Appendix B Species at Risk Screening and Assessment

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Birds								
American White Pelican (*Pelecanus erythrorhynchos*)	**Threatened**	**Not at Risk**	Cornell Lab of Ornithology (2024): 2 km from Site	Nest in groups on remote, sparsely vegetated islands in lakes, reservoirs or on large rivers.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Bank Swallow (*Riparia riparia*)	**Threatened**	**Threatened**	Cornell Lab of Ornithology (2024): 1 km from Site	Colonial nester; burrows in eroding silt or sand banks, sand pit walls, and human-made sand piles. Often found on banks of rivers and lakes.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Barn Swallow (*Hirundo rustica*)	**Special Concern**	**Threatened**	Cornell Lab of Ornithology (2024): 600 m from Site	Nests on barns and other structures. Forages in open areas for flying insects. Lives in close association with humans and prefers to nest on structures such as open barns, under bridges, and in culverts.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Black Tern (*Chlidonias niger*)	**Special Concern**	**Not at Risk**	Cornell Lab of Ornithology (2024): 2 km from Site	Build floating nests in loose colonies in shallow marshes with abundant emergent vegetation, especially in cattails.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Bobolink (*Dolichonyx oryzivorus*)	**Threatened**	**Threatened**	Cornell Lab of Ornithology (2024): 1 km from Site	Breeds in hayfields, pastures, agricultural fields, and abandoned fields with tall grass that are ≥5 ha, and preferably >30 ha.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Canada Warbler (*Cardellina canadensis*)	**Special Concern**	**Threatened**	Bird Canada et al. (2009): within 10 km of Site	Prefers moist forests with dense shrub layers. Nests located on or near the ground on mossy logs or roots, along stream banks or on hummocks. Area-sensitive species that usually require a minimum of 30 ha of continuous forest for breeding habitat (OMNR, 2000).	Moist forests on-site around the Phase 4 development area may provide suitable habitat, although adjacent forested lands are currently <30 ha (~24 ha).	Low	Low	Low
Chimney Swift (*Chaetura pelagica*)	**Threatened**	**Threatened**	Cornell Lab of Ornithology (2024): 2 km from Site	Nests in traditional-style open brick chimneys (and rarely in hollow trees). Tends to stay close to water.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Common Nighthawk (*Chordeiles minor*)	**Special Concern**	**Threatened**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Nests in a 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.	Open fields onsite may provide suitable habitat.	Moderate	Moderate	Moderate
Eastern Meadowlark (*Sturnella magna*)	**Threatened**	**Threatened**	Cornell Lab of Ornithology (2024): 1.2 km from Site	Breeds in hayfields, pastures, agricultural fields, and abandoned fields with tall grass that are ≥5 ha, and preferably >30 ha.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Eastern Whip-poor-will (*Antrostomus vociferus*)	**Threatened**	**Threatened**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Suitable breeding habitats generally include open and half treed areas and often exhibit a scattered distribution of treed and open space. Lays eggs directly on the forest floor. Roosts are typically located in forest habitat on a low branch or directly on the ground. Home range size varies from 20 to 500 ha (mean 136 ha) (ECCC, 2018a).	Forested areas onsite adjacent to Phase 4 development area may provide suitable habitat.	Low	Low	Low
Eastern Wood-Pewee (*Contopus virens*)	**Special Concern**	**Special Concern**	Cornell Lab of Ornithology (2024): 250 m from Site	Woodland species often found in the mid-canopy layer near clearings and edges of intermediate age and mature deciduous and mixed forests with little understory.	Forested areas onsite adjacent to the Phase 4 development area may provide suitable habitat.	Moderate	High	High
Evening Grosbeak (*Coccothraustes vespertinus*)	**Special Concern**	**Special Concern**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Nests in trees or large shrubs. Prefers mature coniferous forests (fir and/or spruce dominated), but will also use deciduous forests, parklands, and orchards. Its abundance is strongly linked to the cycle of Spruce Budworm.	Forested areas onsite adjacent to the Phase 4 development lands may provide suitable habitat.	Moderate	Moderate	Moderate
Golden Eagle	**Endangered**	**Not at Risk**	California Academy of Sciences and National	Nests in remote, undisturbed areas, usually building their	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
(*Aquila chrysaetos*)			Geographic Society (2024): 2.4 km from Site	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. Migration only; no reported nests in Ottawa.				
Golden-winged Warbler (*Vermivora chrysoptera*)	**Special Concern**	**Threatened**	Cornell Lab of Ornithology (2024): 2.5 km from Site	Ground-nests in areas of young shrubs surrounded by mature forest. Often found in areas that have recently been disturbed such as field edges, hydro or utility right-of-ways, or logged areas. Requires >10 ha of habitat (OMNR, 2000).	Forested areas onsite adjacent to the Phase 4 development area may provide suitable habitat.	Moderate	Moderate	Moderate
Grasshopper Sparrow (*Ammodramus savannarum*)	**Special Concern**	**Special Concern**	Cornell Lab of Ornithology (2024): 1.5 km from Site	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.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Least Bittern (*Ixobrychus exilis*)	**Threatened**	**Threatened**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. They prefer larger marshes >5 ha in size and are intolerant of loss of habitat and human disturbance (OMNR, 2000).	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Lesser Yellowlegs (*Tringa flavipes*)	**Threatened**	**No Status**	Cornell Lab of Ornithology (2024): 800 m from Site	Breeds in boreal wetlands. Nests on dry ground or forest openings near peatlands, marshes, and ponds in the boreal forest and taiga (Government of Canada, 2021). Migrant only; nests in far north.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Olive-sided Flycatcher (*Contopus cooperi*)	**Special Concern**	**Threatened**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Found along coniferous or mixed 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.	Forested areas onsite adjacent to the Phase 4 development area may provide suitable habitat.	Moderate	Moderate	Moderate

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Peregrine Falcon (*Falco peregrinus*)	**Special Concern**	**Special Concern**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Nests 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.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	**Endangered**	**Endangered**	Cornell Lab of Ornithology (2024): 2.7 km from Site	Lives in open woodland and woodland edges and is often found in parks, golf courses, and cemeteries. These areas typically have many dead trees, which the birds use for nesting and perching.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Red-necked Phalarope (*Phalaropus lobatus*)	**Special Concern**	**Special Concern**	Cornell Lab of Ornithology (2024): 3.7 km from Site	Lives in coastal and inland marshes where it feeds in shallow ponds and nests on the grassy edges. Always near water during migration. Migrant only; nests in far north.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Rusty Blackbird (*Euphagus carolinus*)	**Special Concern**	**Special Concern**	Cornell Lab of Ornithology (2024): 1.5 km from Site	Prefers wet wooded or shrubby areas. Nests at edges of boreal wetlands and coniferous forests. These areas include bogs, marshes, and beaver ponds.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Short-eared Owl (*Asio flammeus*)	**Threatened**	**Special Concern**	Cornell Lab of Ornithology (2024): 1.8 km from Site	Prefer a mosaic of grasslands and wetlands. Lives in open areas such as grasslands, marshes, and tundra where it nests on the ground and hunts for small mammals (Environment Canada, 2016c).	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Wood Thrush (*Hylocichla mustelina*)	**Special Concern**	**Threatened**	Cornell Lab of Ornithology (2024): 300 m from Site	Lives in mature deciduous and mixed forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing and perching. Prefers nesting in large forest mosaics, but will also use fragmented forests. Usually build nests in Sugar Maple or American Beech.	Forested areas onsite adjacent to the Phase 4 development area may provide suitable habitat.	Moderate	High	High
Mammals								
Eastern Red Bat (*Lasiurus borealis*)	**Endangered (January 2025)**	**Not Listed**	COSEWIC (2023) – in region	Typically roost among foliage, selecting areas that have overhead foliage for cover and open flight space below. Use both deciduous and coniferous forests of any age class.	The forests adjacent to the Phase 4 development area may provide suitable roosting habitat, while the forest edges and open areas may provide suitable foraging habitat.	Moderate	Moderate	Moderate

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
				Maternity roosts tend to be in large-diameter, tall trees.				
Eastern Small-footed Myotis (*Myotis leibii*)	**Endangered**	**Not Listed**	Humphrey (2017) – in region	In the spring and summer, Eastern Small-footed Myotis 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.	The forests adjacent to the Phase 4 development area may provide suitable roosting habitat, while the forest edges and open areas may provide suitable foraging habitat.	Moderate	Moderate	Moderate
Hoary Bat (*Lasiurus cinereus*)	**Endangered (January 2025)**	**Not Listed**	COSEWIC (2023) – in region	Typically roost among foliage, selecting areas that have overhead foliage for cover and open flight space below. Use both deciduous and coniferous forests of any age class. Maternity roosts tend to be in large diameter, tall trees	The forests adjacent to the Phase 4 development area may provide suitable roosting habitat, while the forest edges and open areas may provide suitable foraging habitat.	Moderate	Moderate	Moderate
Little Brown Myotis (*Myotis lucifugus*)	**Endangered**	**Endangered**	Humphrey and Fotherby (2019) – in region	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.	The forests adjacent to the Phase 4 development area may provide suitable roosting habitat, while the forest edges and open areas may provide suitable foraging habitat.	Moderate	Moderate	Moderate
Northern Myotis / Northern Long-eared Bat (*Myotis septentrionalis*)	**Endangered**	**Endangered**	Humphrey and Fotherby (2019) – in region	Associated with deciduous and mixed forests, choosing to roost under loose bark and in the cavities of trees. They forage along and within forests as well as in hayfields and pastures adjacent to mixed forests.	The forests adjacent to the Phase 4 development area may provide suitable roosting habitat, while the forest edges and open areas may provide suitable foraging habitat.	Moderate	Moderate	Moderate
Silver-haired Bat (*Lasionycteris noctivagans*)	**Endangered (January 2025)**	**Not Listed**	COSEWIC (2023) – in region	Typically roost under bark and in tree cavities, typically in large, decaying coniferous and deciduous trees. May roost in or on buildings.	The forests adjacent to the Phase 4 development area may provide suitable roosting habitat, while the forest edges and open areas may provide suitable foraging habitat.	Moderate	Moderate	Moderate

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Tri-colored Bat / Eastern Pipistrelle (*Perimyotis subflavus*)	**Endangered**	**Endangered**	Humphrey and Fotherby (2019) – in region	Roosts mainly in trees during summer; overwinters in caves and mines along with other species, but often uses deeper parts of the hibernaculum. Foraging occurs in forested riparian areas, over water, and within gaps in forest canopies.	Forested areas onsite adjacent to the Phase 4 development area may provide suitable roosting habitat.	Moderate	Moderate	Moderate
Reptiles								
Blanding's Turtle (*Emydoidea blandingii*)	**Threatened**	**Endangered**	California Academy of Sciences and National Geographic Society (2024): on-site	Quiet lakes, streams, and wetlands with abundant emergent vegetation. Also frequently occurs in adjacent upland forests.	Streams onsite and adjacent forests may provide suitable habitat.	Moderate	Moderate	Moderate
Eastern Musk Turtle / Stinkpot (*Sternotherus odoratus*)	**Special Concern**	**Special Concern**	Ontario Nature (2019): within 10 km of Site	Found in lakes, ponds, marshes, and rivers that are generally slow-moving, have abundant emergent vegetation, and muddy bottoms that they burrow into for winter hibernation.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Midland Painted Turtle (*Chrysemys picta marginata*)	**Not Listed**	**Special Concern**	California Academy of Sciences and National Geographic Society (2024): 960 m from Site	Inhabits waterbodies, such as ponds, marshes, lakes, and slow-moving creeks that have a soft bottom and provide abundant basking sites and aquatic vegetation. Often bask on shorelines or on logs and rocks that protrude from the water.	Streams onsite may provide suitable habitat.	Moderate	Moderate	Moderate
Northern Map Turtle (*Graptemys geographica*)	**Special Concern**	**Special Concern**	California Academy of Sciences and National Geographic Society (2024): 270 m from Site	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.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Snapping Turtle (*Chelydra serpentina*)	**Special Concern**	**Special Concern**	California Academy of Sciences and National Geographic Society (2024): 920 m from Site	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.	Streams onsite may provide suitable habitat.	Moderate	Moderate	Moderate
Arthropods								

Species Name (*Taxonomic Name*)	Status under *Endangered Species Act* (ESA)	Status under Schedule 1 of the *Species at Risk Act* (SARA)	Closest Species Occurrence Record to the Site	General Habitat Requirements	Site Suitability	Potential for Protected Elements[1]		Potential for Negative Interactions with Protected Elements[2]
						Habitat	Individuals	
Monarch (*Danaus plexippus*)	**Special Concern**	**Special Concern**	California Academy of Sciences and National Geographic Society (2024): 700 m from Site	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.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Fish								
Bridle Shiner (*Notropis bifrenatus*)	**Special Concern**	**Special Concern**	DFO (2023): within 10 km of Site	Prefers clear water with abundant vegetation over silty or sandy substrate.	The Site does not appear to contain suitable habitat.	Negligible	Negligible	Negligible
Vascular Plants								
Black Ash (*Fraxinus nigra*)	**Endangered**	**No Status**	MNRF (2024a): within 5 km of Site	Predominantly a wetland species found in swamps, floodplains, and fens.	Moist forests within the swamp and along the tributary onsite may provide suitable habitat.	Moderate	Moderate	Moderate
Butternut (*Juglans cinerea*)	**Endangered**	**Endangered**	MNRF (2024a): within 5 km of Site	Commonly found in riparian habitats but is also found on rich, moist, well-drained loams and well-drained gravels, especially those of limestone origin.	Moist forests adjacent to the Phase 4 development area may provide suitable habitat.	Moderate	Moderate	Moderate

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1 The potential for occurrence of protected habitats and individuals within the project area is estimated based on the following considerations:

	Habitat	Individuals
None	It is not possible for the habitat of the species to occur in proximity to the project site	The species is documented as no longer occurring in the ecoregion or could not occur in proximity to the project area.
Negligible	The usage of the project site as habitat is possible but would be highly unlikely/unusual.	Transient occurrence near the project area is possible but is very unlikely.
Low	The project site includes areas that could be used by the species as habitat, but such usage is considered unlikely given the quality of the feature, a lack of individuals in the broader area, or other (relative) site considerations.	Transient occurrence near the project area possible, but the species would be unlikely to use or require the area.
Moderate	The project site includes areas that could reasonably be expected to provide confirmed or defined habitat within a time frame relevant to the project.	The species occurs in the vicinity and could actively use the site, or transient occurrence should be anticipated.
High	The project site includes areas confirmed to actively provide habitat or to constitute habitat based on official habitat description guidance documents.	The species is confirmed as present on, and actively using the site.

2 The potential for negative project interaction with species and/or their habitat is estimated considering both the likelihood of presence and the general details of the project (e.g., timing, extent), and following the definitions below. If the potential differs for habitat and individuals, the higher value is reported, unless otherwise justified

	Habitat	Individuals
None	It is not possible for the species to occupy the site area due to access barriers.	The species is documented as no longer occurring in the ecoregion
Negligible	Negligible habitat potential, or low habitat potential and the project would not be anticipated to alter the habitat.	Negligible occurrence potential for presence, or absence during the entire span of the project.

Low	Low habitat potential, or medium habitat potential and the project would not be anticipated to alter the habitat.	Low occurrence potential for presence, or the project design excludes individuals in a non-harassing manner by default.
Moderate	Medium habitat potential, or high habitat potential and the project would not be anticipated to alter the habitat (as expressed by MECP).	Medium occurrence potential for presence, or the project design excludes individuals in accordance with agency guidelines/directives by default (i.e., outside of mitigation measures prescribed in this report).
High	The project area will alter identified habitat.	The project will interact with individuals.

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Appendix C Headwater Drainage Features Assessment

Headwater Drainage Feature Assessment
Minto's Mahogany Community Phase 2 Development

October 4, 2017

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1.0 INTRODUCTION

This report is a Headwater Drainage Feature Assessment written by Kilgour & Associates Ltd. (KAL) on behalf of Minto in support of the proposed Phase 2 residential developments on Minto's Mahogany community in Manotick, Ontario. The report provides a detailed description of the headwater drainage features (HDFs) crossing the Minto property following the field methodologies identified with the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (CVC & TCRA, 2013), herein the HDF Guidelines. Assessment and evaluation of the HDFs will be conducted by the RVCA based on descriptions provided in this report.

2.0 HEADWATER DRAINAGE FEATURES

2.1 Overview

This study identifies and describes 20 HDFs (or sub-reaches thereof) located on, or in close proximity to, the Minto property. These include several perennial streams/drains as well as intermittent or ephemeral agricultural drainage ditches. These features all flow in different directions depending on the topography and range from minor wetted depressions to large Municipal drains. All of the reaches eventually feed into two Municipal drains flowing northwards along the eastern (Ruisseau Mahogany Creek) and the western (Wilson Cowan Drain) sides of the property. In addition to these reaches, there are also temporary wetted areas on the north-east side of the property.

A brief visual inspection of the site on February 22, 2017, coupled with the close proximity to the Rideau River, suggested the possibility of fish being present in many of the reaches on site, though water levels in most were found likely to be intermittent. Channel form was clearly well defined within many of the reaches, apparently having been dug as linear drainage channels. During a spring site visit on April 5, 2016, water in most reaches appeared to have flow. Accordingly, the HDF Guidelines require a "Standard" level survey type of the area.

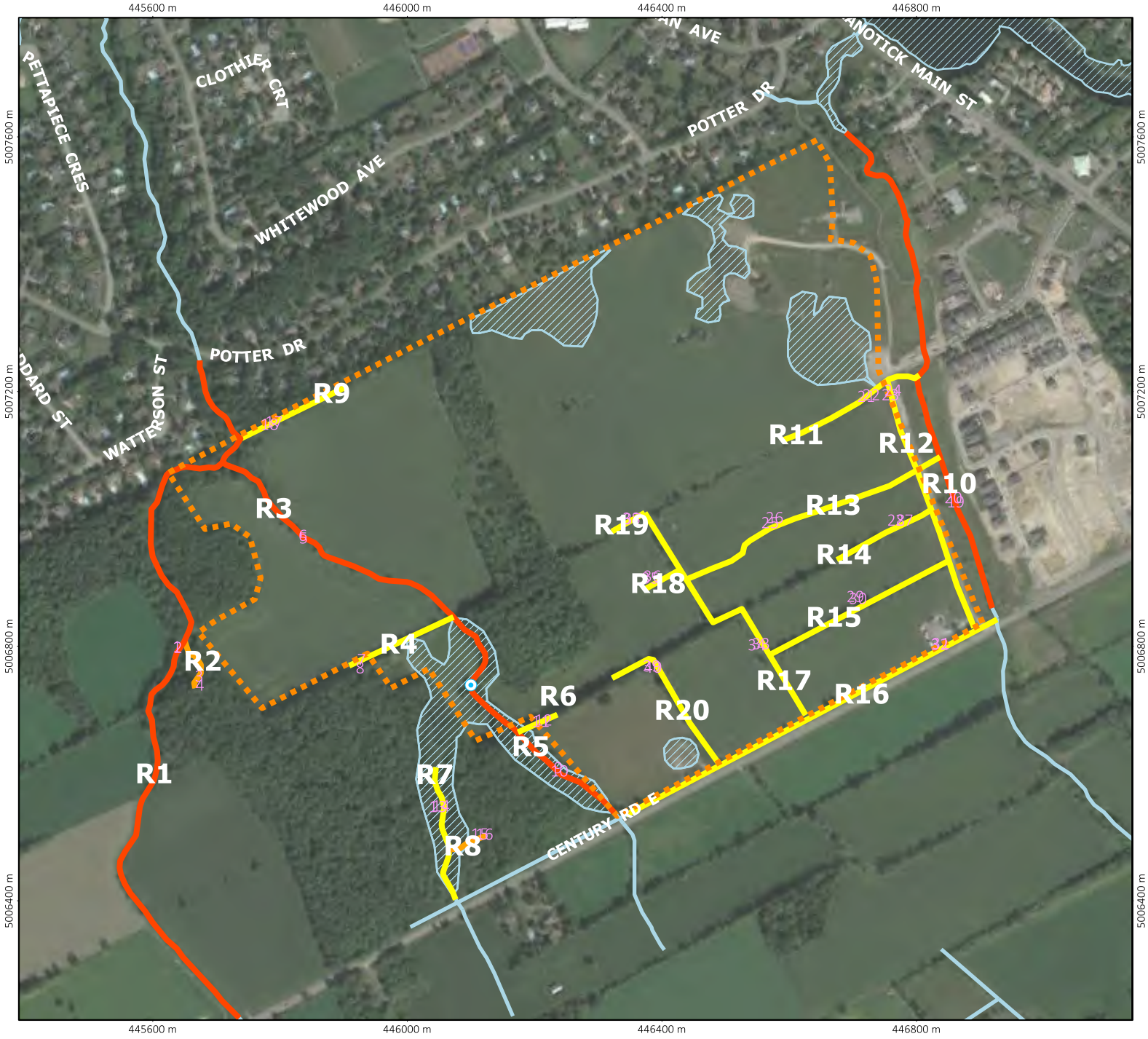


Figure 1 Headwater drainage channels on the Mahogany site

Legend

- **Property Boundary**
- **HDFs**
  - Wet Area
  - Mitigation
  - Conservation
  - Protection
- **# Site Photo (See Appendix A)**

N

0 250 m

Project: Minto 595 - HDFA Map
Created By: RB
Checked By: AF
Universal Transverse Mercator - Zone 18 (N)
Printed on: 2017-10-04

KILGOUR & Associates

2.2 Assessment Methodology

The Standard level of assessment follows Ontario Stream Assessment Protocol (OSAP) methodologies for descriptions of flow conditions, riparian vegetation and site features that are important components of habitat (headwater sampling protocol OSAP S4.M10), and includes an electrofishing survey to describe fish and fish habitat (OSAP S4.M10). Additionally, an ecological land classification (ELC) must be applied to the riparian zone of each segment as a means of documenting community type and an assessment of amphibian breeding should be conducted following the Marsh Monitoring Protocol (MMP). A turtle survey was also completed according to the Ministry of Natural Resources and Forestry's (MNRF) protocol.

OSAP investigations of HDFs were conducted on April 5, 2017 by KAL biologists Ross Breckels and Terry Hams, and electrofishing surveys were conducted on May 9 and 10, 2017 by KAL biologists Ross Breckels and Robert Hallett. General ELC descriptions were provided by Terry Hams based on a broader vegetation survey of the property on July 6, 2017. The assessments of amphibian breeding, following the MMP, were conducted by KAL biologists Anthony Francis, Ross Breckels, Liza Hamilton, and/or Heather Lindsay on April 21, May 18, and June 28, 2017, and turtle surveys were conducted, following MNRF protocol, by KAL biologists Ross Breckels or Rob Hallett on May 9, 18, and 23, and June 13 and 15, 2017. A final site visit by Terry Hams on July 6, 2017 looked at early summer water levels in the reaches.

2.3 General Reach Descriptions

Images of the Reaches 1 through 20 are available in Appendix A.

2.3.1 Wilson Cowan Drain

Reach 1

Reach 1, the Wilson Cowan Drain, is a Municipal drain that flows north, passing close to the north-west corner of the property. In this location, the reach runs through forest on both sides. Instream vegetation is minimal and both banks are covered with a mixture of grasses, shrubs, and trees.

The substrate consists of silt and clay. Woody debris and submergent vegetation are present in patches throughout. Reach 1 was fast flowing in April, May, and July, and was too deep to fish at the time of the fishing surveys. In the Mud Creek Watershed Study conducted by the City of Ottawa in 2015 they observed 16 fish in the Wilson Cowan Drain in the proximity of Mahogany Lands; four each of Blacknose Shiner (*Notropis heterolepis*), Brook Stickleback (*Culaea inconstans*), Central Mudminnow (*Umbra limi*), and Creek Chub (*Semotilus atromaculatus*; Ottawa 2015). No frogs or turtles were observed in this reach during site studies this year, though snapping turtles have previously been noted here.

Reach 2

Reach 2 is a 90 m depression conveying flow northwards from the upland forest area to the west of the property into Reach 1, the Wilson Cowan Drain. The reach runs through dense forest on both banks. Both banks consist of bare earth; there is no Instream vegetation, only leaf litter.

The substrate consists of silt and clay. Woody debris is present but submergent vegetation is absent. Reach 2 had discernable flow in April, yet by May, the reach was completely dry. In July, this reach was characterized by small areas of pooled water after heavy rains. No fish, frogs, or turtles were observed in this reach.

Reach 9

Reach 9 is a 181 m agricultural drainage ditch that conveys flow south-west from the upland area along the northern property border to Reach 3 near the north-west corner of the property. The north bank runs along residential developments while the south bank is adjacent to cropped land. The downstream most end however, drops down through the forested corridor of the lower end of the Wilson Cowen Drain Tributary into Reach 1. Instream vegetation and both banks consist of bare earth covered in leaf litter with the occasional shrub and tree.

The substrate consists of silt and clay. Woody debris is abundant but submergent vegetation is absent. Reach 9 had standing water in April but was dry in May and July. No fish, frogs, or turtles were observed in this reach.

2.3.2 Wilson Cowen Drain Tributary

Reaches 3 and 5

The 875 m length of the agricultural drainage feature that flows northwestwards from the south west corner of property to the northwest corner of the property (in some instances referred to as the Wilson Cowen Drain Tributary) was divided for this study into two reaches; Reaches 3 and 5. The upstream portion, Reach 5, is 450 m long and flows through forest, whereas the downstream reach, Reach 3, is 425 m long and flows through cropped land. Reach 5 has no instream vegetation, whereas Reach 3 is inundated with instream vegetation, consisting of grasses, and some sedges, shrubs, and trees. Both banks of Reach 5 are dominated by trees. Both banks of Reach 3 are dominated by grass in the upstream portion, with shrubs and trees becoming more prevalent in the downstream portion of the reach.

The substrate of both reaches consists of a mixture of clay and silt. Woody debris was abundant in Reach 5 and the downstream section of Reach 3, but not as abundant in upstream section of Reach 3. Submergent vegetation was not present in either reach. During the April survey, Reach 5 was flooded but water was flowing slowly, whereas Reach 3 was in spate conditions with fast flowing water. By May, Reach 5 was still flooded but no flow was evident. Reach 3 had become heavily vegetated and had many woody fish barriers. In July, Reaches 3 and 5 contained slow flowing water. No fish or turtles were observed in these reaches. American Toads, Gray Treefrogs, and Spring Peepers were heard calling in the forest surrounding Reach 5 and in previous years along Reach 3.

Reach 4

Reach 4 is a 180 m agricultural drainage ditch located in the central-western portion of the property. The reach conveys flow north-east from the high ground to the west to Reach 5. The reach runs along cropped land to the north. To the south, the reach runs along forest in the upstream section, with a wetted meadow further downstream. Instream vegetation is not present upstream. The north bank is covered by

a mixture of grasses and shrubs, whereas the south bank is dominated by trees in the upstream portion and a mixture of grasses, shrubs, and trees in the downstream portion.

The substrate consists of a mixture of clay and silt. Woody debris was abundant throughout. Submergent vegetation was minimal. Reach 4 was slow flowing in April, with some standing water in May. In July, there was only water in the downstream most end of the reach from Reach 5. The upstream section of this reach was dry. No fish, frogs, or turtles were observed in this reach.

Reach 6

Reaches 6 is a 60 m agricultural drainage ditch located in the centre to south-western portion of the property. It drains south-west through cropped land to its confluence with Reach 5. Both banks are covered by grasses and trees forming a narrow, scattered hedge between the farm fields. The substrate consists of a mixture of clay and silt. Woody debris and submergent vegetation were both absent. The reach contained standing water in April but by May, the reach was dry. It was somewhat wet again in July (small puddles, no flow) but only because of rains just prior to the site visit. No fish survey was conducted at this reach as it was dry in May. No frogs or turtles were observed along the reaches. American Toads, Gray Treefrogs, and Spring Peepers, however, were heard calling in the forest beyond Reach 6.

2.3.3 Drumlin Forest

Reach 7

Reach 7 is a 200 m long series of semi-connected pools/wetland areas through the south-central portion of the Drumlin Forest. The feature peters out halfway through the forest and there is no channel or even swale-like structure connecting it to the waters of the Wilson Cowen Drain Tributary (i.e. Reaches 3 & 5), though much of the eastern portion of the forest was underwater during the peak of the spring freshet. Any hydrological connection between this and other reaches to the north was gone by early May. Reach 7 has dense forest on both banks. Instream vegetation and both banks are bare earth covered in leaf litter.

The substrate consisted of silt and clay. Woody debris is present but submergent vegetation is absent. Reach 7 was flooded and appeared to have some flow in April, yet in May and July, the reach was limited to standing water, well separated from Reach 5. No fish or turtles were observed in this Reach 7. American Toads, Gray Treefrogs, and Spring Peepers were heard calling in the forest surrounding this reach.

Reach 8

Reach 8 is a 50 m depression conveying flow southwestwards from the upland forest area to the west of the property into Reach 7. The reach runs through dense forest on both banks. Instream vegetation and both banks are bare earth covered in leaf litter.

The substrate consists of silt and clay. Woody debris is present but submergent vegetation is absent. Reach 8 had standing water with no apparent flow in April, and was completely dry in May and July. No fish or turtles were observed in this reach. American Toads, Gray Treefrogs, and Spring Peepers were heard calling in the forest surrounding Reaches 7 and 8.

2.3.4 Mahogany Creek

Reach 10

Reach 10, i.e. Mahogany Creek, is a Municipal drain that flows northwards along the eastern border into the Rideau River. The following descriptions are based on observations made through the spring and summer of 2017. In late summer however, Minto began rebuilding and are aligning this entire reach (within the existing corridor) as part of improvement program for the feature under an existing permit to alter a waterway from the RVCA as part of the adjacent Mahogany Phase 1 development. The reach runs through a meadow in between and residential developments to the east and an access road to the west. Instream vegetation and both banks are covered in grasses.

The substrate consisted of silt and clay, with some gravel and cobble, becoming more prevalent downstream. Woody debris was scarce but submergent vegetation was present. Reach 10 was very high and had fast flow in April. By May, the water levels in the reach had dropped yet this reach was still characterized by fast flowing water. In July, the flow had slowed, but surface flow was still evident. No fish were observed in this reach. Gray Treefrogs and Spring Peepers were heard calling from the vicinity of Reach 10, and two Painted Turtles (*Chrysemys picta*) were observed.

Reach 12

Reach 12 is a 412 m roadside ditch conveying flow from Reaches 15, 13, 11, and 14 into Reach 10, the Ruisseau Mahogany Creek. At periods of extreme water, the Reach could also join Reach 16, but this section was dry even during the April survey. The reach runs along a temporary construction access road to the east and cropped lands to the west. The ditch is regularly disturbed as the gravel construction road is reworked and adjusted. Instream vegetation and both banks are covered in grasses where works have not been recently conducted.

The substrate consisted of silt and clay. Woody debris and submergent vegetation is absent. In April, this reach had no apparent flow and consisted of disconnected pools of standing water in May and July. No fish, frogs, or turtles were observed in this reach.

Reaches 11, 13, 14, and 15

Reaches 11, 13, 14, and 15 are 190, 450, 164, and 320 m agricultural drainage ditches, respectively, in the south-eastern portion of the property that flow north-east through cropped land until their confluences with Reach 12. Both banks of Reaches 14 and 15 are dominated by a mixture of grasses, shrubs, and trees, whereas both banks of Reaches 11 and 13 are dominated by grasses with the occasional shrub. Instream vegetation consists mainly of grasses in Reaches 11 and 13 but was not present in Reaches 14 and 15.

The substrate consists of a mixture of clay and silt. Woody debris was highly abundant in Reaches 14 and 15 but was not present in Reaches 11 and 13. Submergent vegetation was not present in these reaches. All four reaches had minimal flow during the April survey period. In May, Reaches 11 and 14 were dry, while Reach 13 was very shallow and densely vegetated. Water was only present there because of a check dam downstream. Similarly, Reach 15 has limited shallow areas of stagnant water due to piles of woody debris acting as check dams. These dams would all serve as fish barriers. In July, the reaches were all damp

after heavy rains but had no flow. Reach 15 was the only one deemed sufficiently wet in May to provide some potential as fish habitat, but no fish were found there. No frogs, or turtles were observed in any of these four reaches, yet limited numbers of Gray Treefrogs were heard north of Reach 11 and several American Toads and Northern Leopard Frogs (*Lithobates pipiens*) were noted in the vicinity of Reach 15.

Reach 16

Reach 16 is a roadside ditch running along Century Road East for the full 660 m of the southern border of the property. The majority of this reach flows north-east until the confluence with Reach 10 to the east of the property. To the west, however, waters in this reach flow south-west to the confluence with Reach 5 to the west of the property. The north bank of Reach 16 runs through cropped land with the occasional tree towards the western edge of the property. The southern bank runs along Century Road East for the whole length of the southern border of the property. Instream vegetation consists of mainly grasses. Both banks are covered with grasses, with some shrubs and trees to the western edge of the property.

The substrate consists of a mixture of clay and silt, and woody debris and submergent vegetation was not present. During the spring freshet survey in April, this reach was fairly shallow and slow flowing. By May, there was no water in the reach. In July, this reach was damp after heavy rains. No fish, frogs, or turtles were observed in this reach, yet American Toads (*Anaxyrus americanus*) and Gray Treefrogs (*Hyla versicolor*) were observed calling nearby from the field south of Century Road East.

Reaches 17 and 20

Reaches 17 and 20 are 447 and 265 m agricultural drainage ditches, respectively, that flow south-east through cropped land until their confluences with Reach 16. Both banks of Reaches 17 and 20 are dominated by grasses and some trees. Instream vegetation consists of grasses.

The substrate consists of a mixture of clay and silt. Woody debris was abundant in both reaches. Submergent vegetation was not present in either reach. Both reaches had minimal flow during the April survey period. In May, both reaches were heavily vegetated with limited pockets of water and no flow. In July, both reaches held more water after heavy rains, but still had no apparent flow. Reach 17 was not fished due to the very low water levels and many fish barriers. Reach 20 was fished but no fish were observed. No turtles were observed either in either of these reaches. Several of each of American Toads, Gray Treefrogs, and Spring Peepers (*Pseudacris crucifer*) were heard calling along Reach 17. No frogs were heard in Reach 20.

Reaches 18 and 19

Reaches 18 and 19 are 60 and 70 m long agricultural drainage ditches located in the centre to south-western portion of the property that both drain north-east to the upstream section of Reach 17. Both run through cropped land with grasses, some scattered trees and the odd shrub, on their banks.

Substrates consist of a mixture of clay and silt. Woody debris was not present in Reach 18, but was abundant in Reach 19. Submergent vegetation was not present in either reach. These reaches were both very short with standing water only in the April survey period. By May, they were dry. As with other

reaches on the site, they were damp again in July following heavy rains but had no flow. No fish surveys were conducted here as they were both dry in May. No frogs or turtles were observed along the reaches.

2.4 Component Classifications

The following tables summarize the functions provided by the 20 reaches.

Table 1. Hydrology Classification

Drainage Feature	Survey Date	Flow Conditions (OSAP Code)	Flow Classification	Feature Type Code	Modifiers	Hydrological Function
Reach 1	April 5 May 9 July 6	Surface flow (5) Surface flow (5) Surface flow (5)	Perennial	1		**Important Functions**
Reach 2	April 5 May 9 July 6	Surface flow (4) Dry (1) Standing water (2)	Ephemeral	7	No source other than spring run-off and after heavy rain.	**Contributing Functions**
Reach 3	April 5 May 9 July 6	Surface flow (5) Interstitial flow (3) Surface flow (4)	Perennial	1		**Important Functions**
Reach 4	April 5 May 9 July 6	Surface flow (4) Standing water (2) Dry (1)	Ephemeral	2	Water was likely higher here than usual due to heavier than average rainfalls in 2017.	**Contributing Functions**
Reach 5	April 5 May 9 July 6	Surface flow (5) Standing water (2) Surface flow (4)	Perennial	1		**Important Functions**
Reach 6	April 5 May 9 July 6	Standing water (2) Dry (1) Standing water (2)	Ephemeral	2	Water in July was due to heavier than average rainfalls in 2017.	**Contributing Functions**
Reach 7	April 5 May 9 July 6	Surface flow (4) Standing water (2) Standing water (2)	Perennial	6	Only connected to downstream features by overland flow during the spring freshet.	**Valued Functions**
Reach 8	April 5 May 9 July 6	Standing water (2) Dry (1) Dry (1)	Ephemeral	7		**Limited Functions**
Reach 9	April 5 May 9 July 6	Standing water (2) Dry (1) Dry (1)	Ephemeral	2		**Contributing Functions**
Reach 10	April 5 May 9 July 6	Surface flow (5) Surface flow (5) Surface flow (5)	Perennial	1	This channel is currently being realigned.	**Important Functions**
Reach 11	April 5 May 9 July 6	Surface flow (4) Dry (1) Dry (1)	Ephemeral	2		**Contributing Functions**
Reach 12	April 5 May 9 July 6	Standing water (2) Standing water (2) Standing water (2)		8	Water was likely higher here than usual due to heavier than average rainfalls in 2017.	**Contributing Functions**

Drainage Feature	Survey Date	Flow Conditions (OSAP Code)	Flow Classification	Feature Type Code	Modifiers	Hydrological Function
Reach 13	April 5 May 9 July 6	Surface flow (4) Standing water (2) Dry (1)	Ephemeral	7	Spring runoff water was retained in this feature for an extend by a temporary check dam.	**Contributing Functions**
Reach 14	April 5 May 9 July 6	Surface flow (4) Dry (1) Dry (1)	Ephemeral	2		**Contributing Functions**
Reach 15	April 5 May 9 July 6	Surface flow (4) Standing water (2) Dry (1)	Ephemeral	2	Spring runoff water was retained in this feature for an extend by a temporary debris piles.	**Contributing Functions**
Reach 16	April 5 May 9 July 6	Surface flow (4) Dry (1) Standing water (2)	Ephemeral	8	Water in July was due to heavier than average rainfalls in 2017.	**Contributing Functions**
Reach 17	April 5 May 9 July 6	Surface flow (4) Standing water (2) Standing water (2)	Intermittent	2	Water was likely higher here than usual due to heavier than average rainfalls in 2017.	**Contributing Functions**
Reach 18	April 5 May 9 July 6	Standing water (2) Dry (1) Dry (1)	Ephemeral	2		**Contributing Functions**
Reach 19	April 5 May 9 July 6	Standing water (2) Dry (1) Dry (1)	Ephemeral	2		**Contributing Functions**
Reach 20	April 5 May 9 July 6	Surface flow (4) Standing water (2) Standing water (2)	Intermittent	2	Water was likely higher here than usual due to heavier than average rainfalls in 2017.	**Contributing Functions**

Table 2. Riparian Classification

Drainage Feature	OSAP Descriptions	OSAP Riparian Codes	ELC Codes	Riparian Conditions
Reach 1	RUB – Cropped land/Forest LUB – Cropped land/Forest	RUB – 3/6 LUB – 3/6	OAG/FOM OAG/FOM	**Important Functions**
Reach 2	RUB – Forest LUB – Forest	RUB – 6 LUB – 6	OAG OAG	**Important Functions**
Reach 3	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 4	RUB – Cropped land LUB – (Mostly) Meadow/Forest	RUB – 3 LUB – 4/6	OAG CUM/FOM	**Valued Functions**
Reach 5	RUB – Forest LUB – Cropped land/Forest	RUB – 6 LUB – 3/6	FOM OAG/FOM	**Important Functions**
Reach 6	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 7	RUB – Forest LUB – Forest	RUB – 6 LUB – 6	FOM FOM	**Important Functions**
Reach 8	RUB – Forest LUB – Forest	RUB – 6 LUB – 6	FOM FOM	**Important Functions**
Reach 9	RUB – Cropped land LUB – Residential	RUB – 3 LUB – 1	OAG -	**Contributing Functions**
Reach 10	RUB – Meadow LUB – Meadow	RUB – 4 LUB – 4	CUM CUM	**Valued Functions (Note: currently being reconstructed)**
Reach 11	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 12	RUB – None (access road) LUB – Cropped land	RUB – 1 LUB – 3	- OAG	**Limited Functions**
Reach 13	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 14	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 15	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 16	RUB – Cropped land LUB – None (Century Road East)	RUB – 3 LUB – 1	OAG N/A	**Limited Functions**
Reach 17	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 18	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 19	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**
Reach 20	RUB – Cropped land LUB – Cropped land	RUB – 3 LUB – 3	OAG OAG	**Limited Functions**

RUB – right upstream bank
LUB – left upstream bank

Table 3. Fish and Fish Habitat Classification

Drainage Feature	Fish Observation • Fishing effort	Fish and Fish Habitat Designation*	Modifiers
Reach 1	Fish present, no SAR present. • Not fished as too deep, but fished in the vicinity of Mahogany Lands by the City of Ottawa in 2015 (Ottawa 2015)	**Important Functions**	According to Ottawa (2015), a total of 16 fish were observed (4 Blacknose Shiners, 4 Brook Stickleback, 4 Central Mudminnows, and 4 Creek Chub). All these species are very common and tolerant.
Reach 2	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 3	No fish present, no SAR present. • Not enough wet area to shock	**Valued Functions**	Likely some small forage fish present (MNRF record of Central Mudminnow) but dense veg and very shallow water through most areas precluded fishing.
Reach 4	No fish present, no SAR present. • 120 SS = 6.00 s/m^2 (mostly spot shocking… dense vegetation)	**Contributing Functions**	Dissolved oxygen in the reach was 5.8 mg/L, suggesting there will not be enough oxygen to support fish when water warms.
Reach 5	No fish present, no SAR present. • 420 SS = 4.00 s/m^2	**Contributing Functions**	Conductivity in the reach was 744 µS/cm, suggesting contamination through adjacent agricultural practices.
Reach 6	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 7	No fish present, no SAR present. • Not fished as no longer connected to Reach 5.	**Contributing Functions**	
Reach 8	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 9	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 10	No fish present, no SAR present. •	**Contributing Functions**	
Reach 11	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 12	No fish present, no SAR present. • Not enough water to shock	**Contributing Functions**	
Reach 13	No fish present, no SAR present. • 120 SS = 12.0 s/m^2 (mostly spot shocking where possible through dense vegetation)	**Contributing Functions**	
Reach 14	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 15	No fish present, no SAR present. • 200 SS = 20.0 s/m^2 (mostly spot shocking where possible through dense vegetation)	**Contributing Functions**	
Reach 16	No fish present, no SAR present. • Dry	**Limited Functions**	Conductivity in the reach in April was 1357 µS/cm, suggesting high levels of contamination through road run-off and agricultural practices.
Reach 17	No fish present, no SAR present. • Not enough wet area to shock	**Contributing Functions**	
Reach 18	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 19	No fish present, no SAR present. • Dry	**Contributing Functions**	
Reach 20	No fish present, no SAR present. • 120 SS = 16.0 s/m^2 (mostly spot shocking where possible through dense vegetation)	**Contributing Functions**	Dissolved oxygen in the reach was 5.0 mg/L, suggesting there is not enough oxygen to support fish.

*Fish and Fish Habitat Designation is constrained by the HDF Guidelines definitions. "Modifiers" provides significant caveats to those designations.
SS = shocking seconds

Table 4. Terrestrial habitat classification

Drainage Feature	Description	Amphibians	Terrestrial Classification
Reach 1	No adjacent wetland areas. There are no upstream wetland or forest areas and the banks are sparsely treed through active agricultural fields there, thus providing limited capacity as a corridor upstream of the site. Along its downstream end on the site however, it passes through significant woodlands areas providing robust riparian habitat.	Numerous frogs (individuals and species) were observed in previous years in adjacent forest areas.	**Valued Functions (downstream)** **Contributing Functions (upstream)**
Reach 2	No adjacent wetland areas. There feature is entirely forested but dries immediately after the freshet. Terrestrial habitat significance is not tied to the presence of the HDF.	No frogs were observed in the vicinity of the feature.	**Contributing Functions**
Reach 3	No adjacent wetland areas left or right of the channel, though the feature itself is wetland-like in parts. It provides a corridor connection to wetland and forest areas of the east Drumlin Forest.	Numerous frogs (individuals and species) were observed in previous years within the reach.	**Valued Functions**
Reach 4	No adjacent immediately wetland areas. There is forest and wetland upstream thus the riparian zone has potential to provide a corridor connection.	Frogs were observed near to but not in this feature.	**Contributing Functions**
Reach 5	Reach 5 runs through a flooded forest. The riparian zone is thus good breeding habitat.	American Toads, Gray Treefrogs, and Spring Peepers were observed in the vicinity of this reach.	**Important Functions**
Reach 6	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 7	This reach is a wet land.	American Toads, Gray Treefrogs, and Spring Peepers were observed here.	**Important Functions**
Reach 8	Immediately adjacent to wetland and within a forest. The amphibian breeding likely extends into this feature while it is wet.	American Toads, Gray Treefrogs, and Spring Peepers were observed in the vicinity of this reach.	**Valued Functions**
Reach 9	No adjacent wetland areas. There are no upstream wetland features but there are forest areas on the north side of this reach thus the riparian zone has potential to provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Contributing Functions**
Reach 10	No adjacent wetland areas. There are wetland features downstream thus the riparian zone provides a corridor connection.	Gray Treefrogs and Spring Peepers were observed in this feature.	**Valued Functions**
Reach 11	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 12	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 13	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in this reach, yet a Gray Treefrog was observed in the vicinity of the feature.	**Limited Functions**

Drainage Feature	Description	Amphibians	Terrestrial Classification
Reach 14	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 15	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the reach, yet several American Toads and Northern Leopard Frogs were observed in vicinity of the feature.	**Limited Functions**
Reach 16	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 17	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	Several American Toads, Gray Treefrogs, and Spring Peepers were observed in the feature.	**Contributing Functions**
Reach 18	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 19	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**
Reach 20	No adjacent wetland areas. There are no upstream forest or wetland features thus the riparian zone does not provide a corridor connection.	No frogs were observed in the vicinity of the feature.	**Limited Functions**

2.5 Reach Summary

Dimensions of the HDF reaches are summarized in Table 5.

Table 5. Reach dimensions, April 5, 2017

Drainage Feature	Length (m)	Mean Bankfull Width (m)	Mean Wetted Width (m)	Mean Depth (m)
Reach 1	Not on property	5.00	4.10	0.44
Reach 2	90	Indeterminant	5.50	0.10*
Reach 3	425	5.40	4.80	0.33
Reach 4	180	2.70	2.50	0.28
Reach 5	450	Indeterminant	8.40	0.39
Reach 6	60	0.55	0.43	0.05
Reach 7	200	Indeterminant	Indeterminant	Too deep to measure
Reach 8	50	1.40	1.40	0.13
Reach 9	181	2.45	0.65	0.08
Reach 10	Not on property	2.90	8.10	0.44
Reach 11	190	1.40	1.40	0.16
Reach 12	412	1.60	2.10	0.16
Reach 13	450	1.90	1.70	0.18
Reach 14	164	0.65	0.55	0.10
Reach 15	320	2.60	2.00	0.09
Reach 16	660	3.70	2.20	0.12
Reach 17	447	1.40	1.80	0.21
Reach 18	60	1.50	2.20	0.15
Reach 19	70	1.35	0.90	*
Reach 20	265	2.10	1.30	0.14

*Presence of ice near the bottom of the feature made measurements difficult.

3.0 MANAGEMENT RECOMMENDATIONS

The classification categories identified in Section 2 provide the basis of the management recommendations provided here. The following flow chart (Figure 2) combines and translates the classification results to management recommendations.

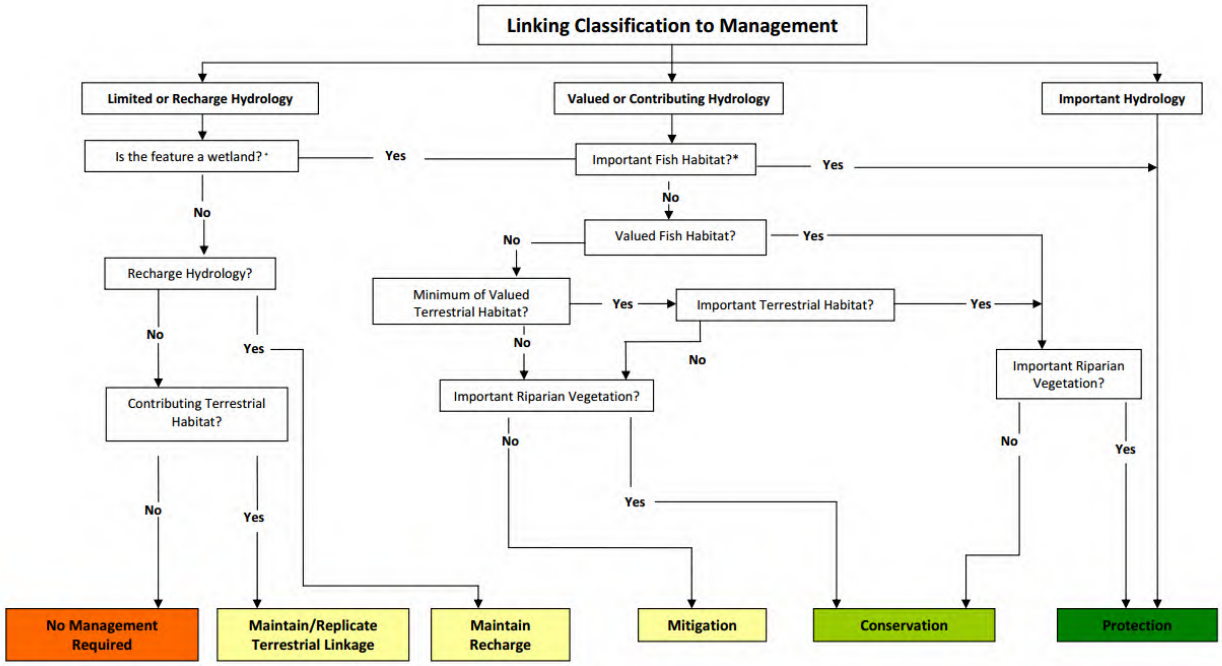


Figure 2. Headwater Drainage Feature Assessment (HDFA) flow chart providing direction on management options

3.1 Management Recommendations for Reach

3.1.1 Wilson Cowan Drain

Reach 1

This Municipal Drain is a perennial channel located partially within a forest ecosite. It provides direct habitat for fish and turtles. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), this reach:

1. Provides Important Hydrology.
    a. Provides Valued Fish Habitat;
    b. Provides Important Riparian Vegetation.

The first factor leads to a management directive of **Protection**. Other factors such as its fish habitat and riparian vegetation (at least in the forested part) add to this directive. As such, this reach may be maintained and/or enhanced, but cannot be relocated. The feature should be protected and its riparian zone enhanced where feasible. The hydro-period must be maintained. Use natural channel design techniques or wetland design to restore and enhance existing habitat features if and where needed. Stormwater management systems must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

Reach 2

Reach 2 is minor a swale conveying water only during the peak of the spring freshet, but is located within a forest. This reaches provide drainage from the adjacent community into Reach 1. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), this reach:

1. Provides Contributing Hydrology;
2. Do not provide Important or Valued Fish Habitat;
3. Do not provide Valued Terrestrial Vegetation.
4. Provides Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Conservation** for this reach. The feature may be maintained or, if necessary relocated, using natural channel design techniques to maintain or enhance overall productivity of the reach. In either case, the riparian corridors must be maintained or enhanced. If catchment drainage will be removed due to diversion of stormwater flows, lost functions should be restored through enhanced lot level controls (e.g. restore original catchment using clean roof drainage). External flows must be maintained or replaced and the drainage feature must (re)connect to downstream features.

Reach 9

Reach 9 is an agricultural drain contiguous with the adjacent backyards. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), this reach:

1. Provides Contributing Hydrology;
2. Does not provide either Valued or Important Fish Habitat;
3. Does not provide Valued (or greater) Terrestrial Habitat; and
4. Does not provide Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Mitigation** for this reach. This feature is not required to be maintained per se, but its functionality must be replicated or enhanced through lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets, or be replicated through constructed wetland features connected to downstream of the site. The stormwater plan for site development must replicate on-site flow and outlet flows at the top end of system. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage). Lot level conveyance measures (e.g. vegetated swales)

connected to the natural heritage system, and/or Low Impact Development (LID) options however are the preferred approaches for stormwater plan to the extent that they can be implemented.

3.1.2 Wilson Cowen Drain Tributary

Reaches 3 and 5

These reaches constitute a permanent agricultural drainage feature that flows northwestwards from the south west corner of property to the northwest corner of the property (in some instances referred to as the Wilson Cowen Drain Tributary). Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), these reaches:

1. Provides Important Hydrology.
    a. Provides Valued Fish Habitat;
    b. Provides Important Riparian Vegetation.

The first factor leads to a management directive of **Protection**. Other factors such as its fish habitat and riparian vegetation add to this directive. As such, these reaches may be maintained and/or enhanced, but cannot be relocated. The features should be protected and the riparian zone enhanced where feasible. The hydro-period must be maintained. Use natural channel design techniques or wetland design to restore and enhance existing habitat features if and where needed. Stormwater management systems must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

Reaches 4 and 6

These reaches are both small agricultural drains connected to the Wilson Cowen Drain Tributary (Reaches 3 and 5). Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), these reaches:

1. Provide Contributing Hydrology;
2. Do not provide either Valued or Important Fish Habitat;
3. Do not provide Valued (or greater) Terrestrial Habitat; and
4. Do not provide Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Mitigation**. The features are not required to be maintained per se, but their functionality must be replicated or enhanced through lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets, or be replicated through constructed wetland features connected to downstream of the site. The stormwater plan for site development must replicate on-site flow and outlet flows at the top end of system. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage). Lot level conveyance measures (e.g. vegetated swales) connected to the natural heritage system, and/or Low Impact Development (LID) options however are the preferred approaches for stormwater plan to the extent that they can be implemented.

3.1.3 Drumlin Forest

Reach 7

Reach 7 is linear stretch of swamps (i.e. wetland features). Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), this reach:

1. Provides Valued Hydrology;
2. Does not provide either Valued or Important Fish Habitat;
3. Provides Important Terrestrial Habitat; and
4. Provides Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Protection**. As such, this reach may be maintained and/or enhanced, but cannot be relocated. The feature should be protected and the riparian zone enhanced where feasible. The hydro-period must be maintained. Use natural channel design techniques or wetland design to restore and enhance existing habitat features if and where needed. Stormwater management systems must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

Reach 8

Reach 8 is directly connected to wetland areas. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), this reach:

1. Provides Limited Hydrology;
2. Is not generally a wetland but, as the adjacent wetland may spill over into it at times, should be treated as one;
3. Does not provide either Valued or Important Fish Habitat;
4. Provides Valued Terrestrial Habitat; and
5. Provides Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Conservation**. As such, the reach may be relocated, maintained and/or enhanced. Where catchment drainage will be removed due to diversion of stormwater flows, lost functions must be restored. This may be accomplished in part through enhanced lot level controls. Where channel realignments may be required they should be accomplished through natural channel design techniques to the to maintain or enhance overall productivity of the reach to the fullest extent possible.

3.1.4 Mahogany Creek

Reach 10

Reach 10, i.e. Mahogany Creek, is a Municipal drain that flows northwards along the eastern border into the Rideau River. The feature is currently being rebuilt and realigning (within its existing corridor). Management directives provided here are based on the understanding that the rebuilt feature will provide, and improve upon, the attributes and ecological functions of the feature as it previously existed.

Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), this reach:

1. Provides Important Hydrology.
    a. Provides Valued Fish Habitat;
    b. Provides Important Riparian Vegetation.

The first factor leads to a management directive of **Protection**. Other factors such as its fish habitat and riparian vegetation add to this directive. As such, these reaches may be maintained and/or enhanced, but cannot be relocated. The features should be protected and the riparian zone enhanced where feasible. The hydro-period must be maintained. Use natural channel design techniques or wetland design to restore and enhance existing habitat features if and where needed. Stormwater management systems must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

Reaches 11 Through 20

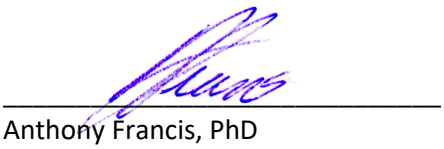
These reaches are all small agricultural drains or road side ditches that connected directly or indirectly to Mahogany Creek. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), these reaches:

1. Provide Contributing Hydrology;
2. Do not provide either Valued or Important Fish Habitat;
3. Do not provide Valued (or greater) Terrestrial Habitat; and
4. Do not provide Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Mitigation**. The features are not required to be maintained per se, but their functionality must be replicated or enhanced through lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets, or be replicated through constructed wetland features connected to downstream of the site. The stormwater plan for site development must replicate on-site flow and outlet flows at the top end of system. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage). Lot level conveyance measures (e.g. vegetated swales) connected to the natural heritage system, and/or Low Impact Development (LID) options however are the preferred approaches for stormwater plan to the extent that they can be implemented.

4.0 CLOSURE

This report provides detailed descriptions of the HDFs crossing the Minto property. These descriptions are provided to inform the assessment and valuation of the HDFs by the RVCA. Points of clarification can be addressed to the undersigned.



Anthony Francis, PhD
KILGOUR & ASSOCIATES LTD.

5.0 REFERENCES

Ottawa (City of Ottawa). 2015. Mud Creek Subwatershed Study – October 2015.

Appendix A: Site Photos

Reach 1

Image 1

Image 2

Reach 2

Image 3

Image 4

Reach 3

Image 5

Image 6

Reach 4

Image 7

Image 8

Reach 5

Image 9

Image 10

Reach 6

Image 11

Image 12

Reach 7

Image 13

Image 14

Reach 8

Image 15

Image 16

Reach 9

Image 17

Image 18

Reach 10

Image 19

Image 20

Reach 11

Image 21

Image 22

Reach 12

Image 23

Image 24

Reach 13

Image 25

Image 26

Reach 14

Image 27

Image 28

Reach 15

Image 29

Image 30

Reach 16

Image 31

Image 32

Reach 17

Image 33

Image 34

Reach 18

Image 35

Image 36

Reach 19

Image 37

Image 38

Reach 20

Image 39

Image 40

Appendix D Butternut Health Expert Report

Ontario

Ministry of the Environment, Conservation and Parks

Butternut Health Expert's Report Template – Version 2022

Instructions to Butternut Health Experts (BHEs):

Please enter the 6-character BHE Report number: MIY003

BHE Report numbering format:
BHE Report numbers are to be assigned by the BHE using the first 3 letters of BHE's last name, followed by BHE's own 3-digit report numbering system. If the BHE's last name has fewer than 3 letters, use the full last name and numbers for the remaining characters.

BHE Report Number: MIY003

Cover letter to client:
Insert your cover letter to your client here and include the below list of enclosures.

Enclosures:

1. Information from the Ministry of the Environment, Conservation and Parks about Butternut and the *Endangered Species Act, 2007*
2. Butternut Health Expert's Report, including the completed Butternut Data Collection Form

Ministry of the Environment, Conservation and Parks

Species at Risk Branch
40 St. Clair Avenue West
14th Floor
Toronto ON M4V 1M2

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des espèces en péril
40, avenue St. Clair Ouest
14e étage
Toronto ON M4V 1M2

Information for the Property Owner (or person(s) who requested the enclosed Butternut Health Expert's Report):

The enclosed Butternut Health Expert's Report (BHE Report) documents the results of the Butternut health assessment that was conducted by the Butternut Health Expert (BHE) identified in the top section of the report. If there are other Butternut trees (of any size or age) at the site that may be impacted by a proposed activity that are not identified in the enclosed BHE Report, they too must be assessed by a BHE before commencing any actions that may impact those Butternut trees or their habitat.

Butternut (*Juglans cinerea*) is listed as an endangered species in Schedule 2 of Ontario Regulation (O. Reg.) 230/08 "the Species at Risk in Ontario List". As an endangered species, the *Endangered Species Act, 2007* (ESA) prohibits adversely impacting Butternut and its habitat. A permit or agreement under the ESA is required before engaging in an activity that is otherwise prohibited under the ESA. The activity may be eligible for the Butternut conditional exemption in Part V of O. Reg. 830/21, provided the requirements of the regulation are met.

If the proposed activity is eligible for the conditional exemption in Part V of O. Reg. 830/21, the next step is to submit the BHE Report and the Butternut Data Collection Form enclosed in this package to the Ministry of the Environment, Conservation and Parks (MECP).

If the enclosed BHE Report does not identify which Butternut tree(s) are proposed to be killed, harmed or taken and the reasons for doing so (e.g., if "unknown" is indicated in Table 1) or if the information in the last two columns of Table 1 has changed since the date this BHE Report was produced, **do not edit the BHE Report to update this information**. Instead, the report must be submitted together with a cover letter that identifies which Butternut tree(s) are proposed to be killed, harmed or taken (by referencing the tree identification numbers) when you submit the BHE Report to MECP.

The BHE Report must be submitted to MECP at least 30 days before registering an activity in respect of the Butternut conditional exemption. MECP may need to examine the Butternut trees subject to the report during this 30-day period. **Adversely impacting Butternut trees during this 30-day period or before registration is completed is prohibited by the ESA**. Further, the conditional exemption for Butternut does not apply unless the requirements of Part V of O. Reg. 830/21 are being followed.

If the proposed activity is eligible for the Butternut conditional exemption, you may register the proposed activity using the "**Notice of Butternut Impact**" form after the 30-day period has elapsed.

If the proposed activity is not eligible for a regulatory exemption, please contact MECP to determine whether the proposed activity would require a permit or agreement under the ESA in order to proceed.

Please retain this information and a copy of the BHE Report for your records, along with any other documentation you may receive from MECP should an examination of the trees occur.

This information should not be relied upon to determine legal obligations. To determine your legal obligations, consult the *Endangered Species Act, 2007* and the relevant regulations made thereunder. These may be found at www.ontario.ca/laws. If legal advice is required, consult a legal professional. In the event of an error on this template or a conflict between this template and any applicable law, the law prevails.

If you have any questions, please contact MECP at SAROntario@ontario.ca.

Butternut Health Expert's Report (BHE Report)

BHE Report Number: MIY003

Butternut Health Expert Contact Information

Name of Butternut Health Expert

Last Name	First Name
Miyashita	Kesia

Mailing Address

Unit Number	Street Number	Street Name	PO Box
16C	2285	St. Laurent Boulevard	

City/Town	Province	Postal Code
Ottawa	ON	K1G 4Z6

Telephone Number	Email Address
613-260-5555	kmiyashita@kilgourassociates.com

Summary of qualifications as a Butternut Health Expert

a) expertise in relation to butternut

Kesia Miyashita has four years of experience conducting surveys for Butternut. She has received internal training from colleagues at Kilgour & Associates who are certified Butternut Health Assessors. She has undertaken three Butternut Health Assessments in 2024 as the lead botanist.

b) expertise, education, training and experience necessary to assess the health of butternut trees

Kesia Miyashita has four years of experience conducting surveys for Butternut and Butternut Health Assessments. She has received internal training from colleagues at Kilgour & Associates who are certified Butternut Health Assessors (having completed the MNRF Butternut Health Assessor Course). She has undertaken three Butternut Health Assessments in 2024 as the lead botanist.

Property Owner Contact Information

Name of Property Owner (or representative)

Last Name	First Name
Minto Communities - Canada	

Mailing Address

Unit Number	Street Number	Street Name	PO Box
200	180	Kent Street	

Lot Number	Concession	Township	Rural Route

City/Town	Province	Postal Code
Ottawa	ON	K1P -B6

Telephone Number	Email Address

Site Location

Unit Number	Street Number	Street Name	PO Box
	5651	First Line Road	

Lot Number	Concession	Township	Rural Route
4 and 5	Concession A	North Gower	

City/Town	Province	Postal Code

Additional Site Location Information

Property is situated in Manotick, Ottawa, immediately north of Century Road, and between Manotick Main Street and First Line Road.

Date(s) of Butternut health assessment

Start Date (yyyy/mm/dd) 2024/05/28

End Date (yyyy/mm/dd) 2024/05/29

Date BHE Report prepared (yyyy/mm/dd) 2024/08/27

Map datum used: ☑ NAD83 ☐ WGS84

Total number of trees assessed in this BHE Report 40

The assessed trees were numbered on site using white flagging tape

The numbers at the site correspond to the tree identification numbers referenced in this report.

This BHE Report includes the following tables:

- Table 1: Butternut trees assessed by the BHE
- Table 2: Trees determined by the BHE to be Butternut hybrids
- Table 3: Summary of Butternut health assessment results

Table 1: Butternut trees assessed by the BHE

Tree ID #	UTM coordinates	Accuracy (+/-)	Category[1] (1, 2 or 3)	Tree stem diameter[2] (cm)	Is tree stem shorter than 1.37 m? (Yes/No)	Cultivated? (Yes/No)	Proposed to be: (killed, harmed, taken, or unknown[3])	If tree is proposed to be killed, harmed or taken, indicate reason tree is to be killed, harmed or taken, if known
001	18N 445770m E, 5007070m N	5m	1	42	No	No	unknown	
002	18N 445800m E, 5007019m N	5m	1	16	No	No	unknown	
003	18N 445876m E, 5006944m N	5m	2	12	No	No	unknown	
004	18N 445847m E, 5006964m N	5m	1	26	No	No	unknown	
005	18N 445811 E, 5007001m N	5m	1	22	No	No	unknown	
006	18N 445794m E, 5007013m N	5m	1	12	No	No		
007	18N 445797m E, 5007005m N	5m	1	28	No	No		

Tree ID #	UTM coordinates	Accuracy (+/-)	Category[1] (1, 2 or 3)	Tree stem diameter[2] (cm)	Is tree stem shorter than 1.37 m? (Yes/No)	Cultivated? (Yes/No)	Proposed to be: (killed, harmed, taken, or unknown[3])	If tree is proposed to be killed, harmed or taken, indicate reason tree is to be killed, harmed or taken, if known
008	18N 445808m E, 5007003m N	5m	1	28	No	No		
009	18N 445780mE, 5007022m N	5m	2	5	No	No		
010	18N 445786m E, 5007024m N	5m	1	23	No	No		
011	18N 445782m E, 5007028m N	5m	1	17	No	No		
012	18N 445717m E, 5007066m N	5m	1	15	No	No		
013	18N 445652m E, 5007040m N	5m	1	33	No	No		
014	18N 445639m E, 5007037m N	5m	1	47	No	No		
015	18N 445701m E, 5006982m N	5m	1	22	No	No		
016	18N 445721m E, 5006976m N	5m	1	13	No	No		
017	18N 445729m E, 5006980m N	m	1	27	No	No		
018	18N 445750m E, 5006977m N	5m	1	18	No	No		
019	18N 445736m E, 5006962m N	5m	1	22	No	No		
021	18N 445748m E, 5006955m N	5m	1	31	No	No		

Tree ID #	UTM coordinates	Accuracy (+/-)	Category[1] (1, 2 or 3)	Tree stem diameter[2] (cm)	Is tree stem shorter than 1.37 m? (Yes/No)	Cultivated? (Yes/No)	Proposed to be: (killed, harmed, taken, or unknown[3])	If tree is proposed to be killed, harmed or taken, indicate reason tree is to be killed, harmed or taken, if known
022	18N 445746m E, 5006954 m N	5m	1	32	No	No		
023	18N 445748m E, 5006948m N	5m	1	27	No	No		
024	18N 445757m E, 5006957m N	5m	1	28	No	No		
025	18N 445750m E, 5006966m N	5m	1	33	No	No		
026	18N 445751m E, 5006935m N	5m	1	19	No	No		
027	18N 445748m E, 5006943m N	5m	1	22	No	No		
028	18N 445760m E, 5006935m N	5m	1	31	No	No		
029	18N 445757m E, 5006935m N	5m	1	28	No	No		
030	18N 445764m E, 5006909m N	5m	2	17	No	No		
031	18N 445762m E, 5006885m N	5m	1	26	No	No		
032	18N 445750m E, 5006893m N	5m	1	45	No	No		
033	18N 445731m E, 5006868m N	5m	1	40	No	No		
034	18N 445728m E, 5006866m N	5m	1	37	No	No		

Tree ID #	UTM coordinates	Accuracy (+/-)	Category[1] (1, 2 or 3)	Tree stem diameter[2] (cm)	Is tree stem shorter than 1.37 m? (Yes/No)	Cultivated? (Yes/No)	Proposed to be: (killed, harmed, taken, or unknown[3])	If tree is proposed to be killed, harmed or taken, indicate reason tree is to be killed, harmed or taken, if known
035	18N 445720m E, 5006856 m N	5m	1	29	No	No		
036	18N 445718m E, 5006851m N	5m	1	37	No	No		
037	18N 445702m E, 5006848m N	5m	1	17	No	No		
038	18N 445691m E, 5006842m N	5m	1	35	No	No		
039	18N 445684m E, 5006781m N	5m	1	36	No	No		
040	18N 445734m E, 5006728m N	5m	1	36	No	No		

[1] Details regarding the extent to which the tree is affected by Butternut Canker is presented in the Butternut Data Collection Form that accompanies this BHE Report.

[2] Diameter of the tree stem rounded to nearest cm, measured in accordance with the Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the *Endangered Species Act, 2007*

[3] In this column, "unknown" indicates that at the time of assessment and reporting, there are no proposals to kill, harm or take this tree that are known to the BHE.

Table 2: Trees determined by the BHE to be Butternut hybrids

Tree ID #	UTM coordinates	Method used (genetic testing or field identification)	Additional Comments on Method Used

Table 3: Summary of Butternut health assessment results

Result	Total number of trees in this category	Information for persons planning activities that may impact Butternut

Result	Total number of trees in this category	Information for persons planning activities that may impact Butternut
Category 1	36	• Category 1 Butternut tree — the Butternut tree is affected by Butternut Canker to such an advanced degree that retaining the tree would not support the protection or recovery of Butternut trees in the area in which the tree is located.
		• If the proposed activity will kill, harm or take one or more Butternut trees of any category (including Category 1), the BHE Report must be submitted to MECP at SARontario@ontario.ca.
Category 2	3	• Category 2 Butternut tree — the Butternut tree is not affected by Butternut Canker or the Butternut tree is affected by Butternut Canker but the degree to which it is affected is not as advanced as a Category 1 Butternut tree and retaining the tree could support the protection or recovery of Butternut trees in the area in which the tree is located.
		• Activities that may kill, harm or take up to a **maximum of fifteen (15)** Category 2 trees may be eligible for the conditional exemption in Part V of Ontario Regulation 830/21. Refer to the regulation for eligibility conditions and requirements that must be fulfilled.
		• If the proposed activity will kill, harm or take more than fifteen (15) Category 2 trees, **contact MECP** for information on how to seek an ESA authorization (e.g., a permit).
Category 3		• Category 3 Butternut tree — the Butternut tree may be useful in determining sources of resistance to Butternut Canker.
		• Activities that may kill, harm or take up to a **maximum of five (5)** Category 3 trees may be eligible for the conditional exemption in Part V of Ontario Regulation 830/21. Refer to the regulation for eligibility conditions and requirements that must be fulfilled.
		• If the proposed activity will kill, harm or take more than five (5) Category 3 trees, contact MECP for information on how to seek an ESA authorization (e.g., a permit).
Cultivated		• An activity that will kill, harm or take a cultivated Butternut tree that was required to be planted to fulfil a condition of an ESA permit or agreement, or a conditional exemption, is **not** eligible for the exemption for cultivated trees that is provided by subsection 25 (5) of O. Reg. 830/21. Refer to the regulation for eligibility conditions.
Hybrid		• Hybrid Butternut trees are not protected under the ESA but impacts to these trees may be subject to local municipal by-laws and other legislation.

Additional Information on Cultivated Tree Determination

Add

Please note:

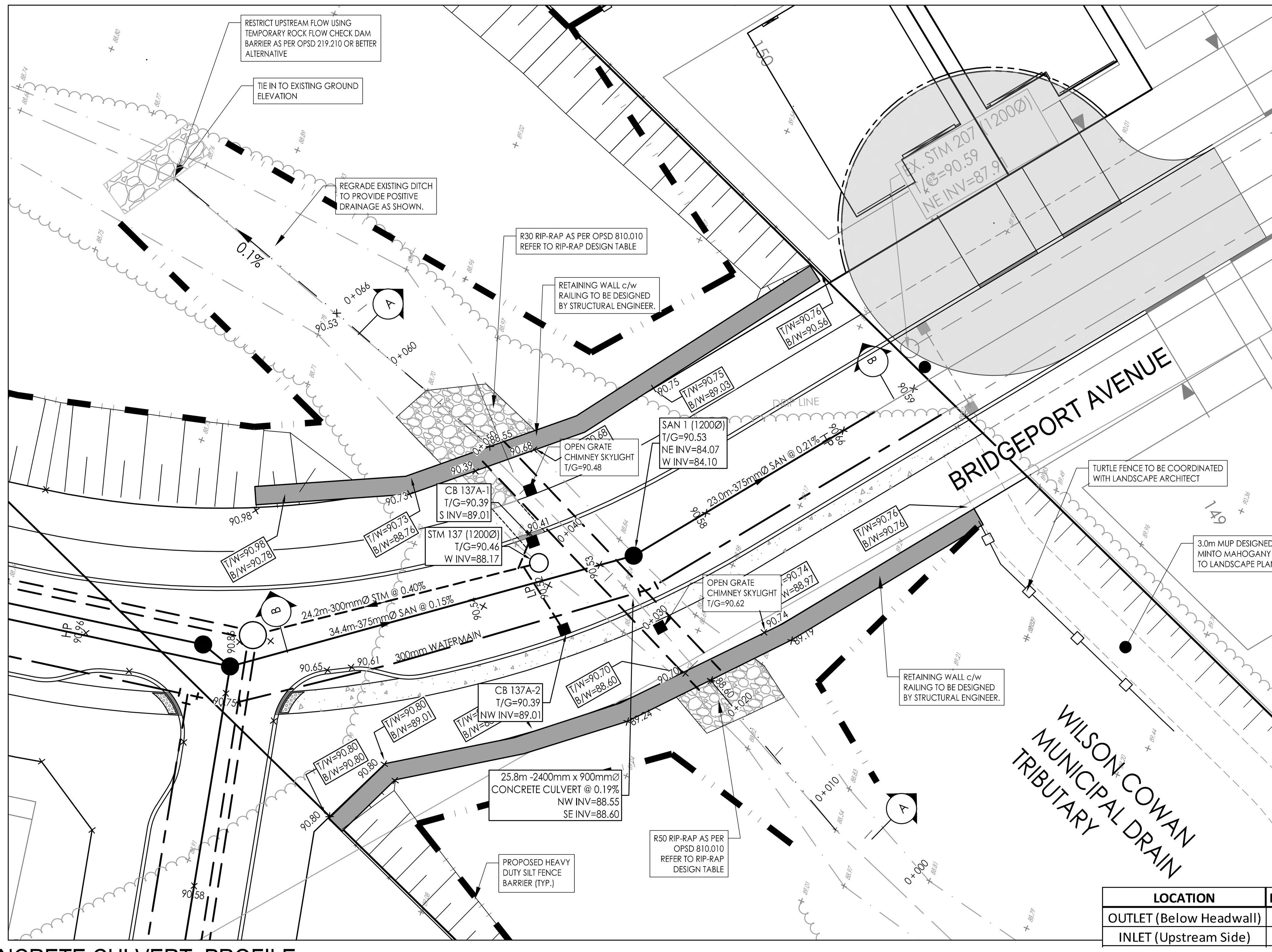
- A BHE Report that is submitted to MECP must include the completed Butternut Data Collection Form. As appropriate, please also ensure additional relevant documentation to support the assessment (e.g., completed Data Sheets for Field Identification of Butternut Hybrids, evidence that the Butternut was cultivated) and all relevant maps and photographs are provided.
- During the 30-day period that follows the submission of this BHE Report to MECP, no Butternut trees (of any category) may be killed, harmed or taken. MECP may need to examine the Butternut trees subject to the report during this 30-day period.

Butternut Health Expert's Comments
Note to BHEs: use this space to provide general comments.

Appendix E Bridgeport Culvert Turtle Mitigation Design

DRAFT CULVERT CROSSING FOR COORDINATION

PLAN VIEW
SCALE: 1:300

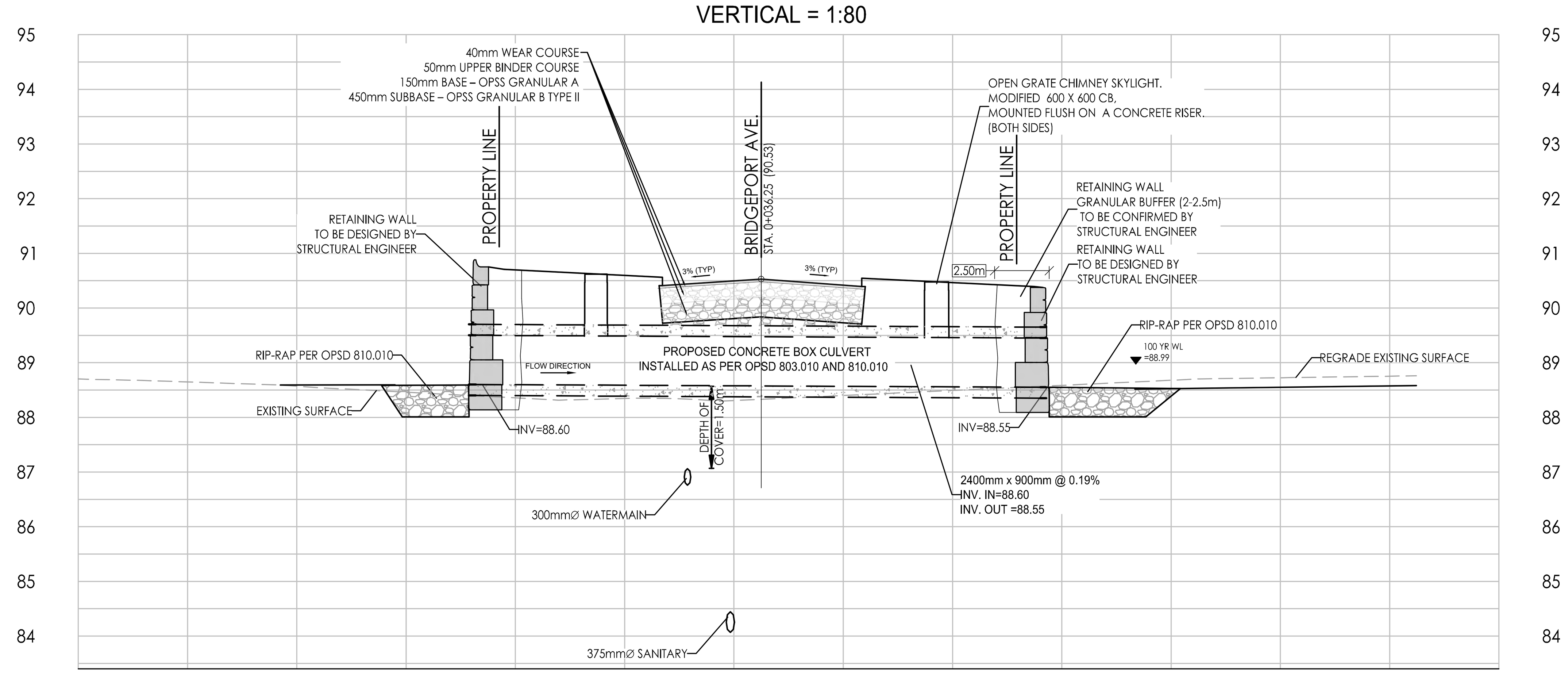


RIP-RAP DESIGN TABLE

LOCATION	RIP-RAP SIZE	LENGTH (m)	PURPOSE
OUTLET (Below Headwall)	R50	6	Energy dissipation, erosion protection
INLET (Upstream Side)	R30	4	Erosion protection, smooth water entry

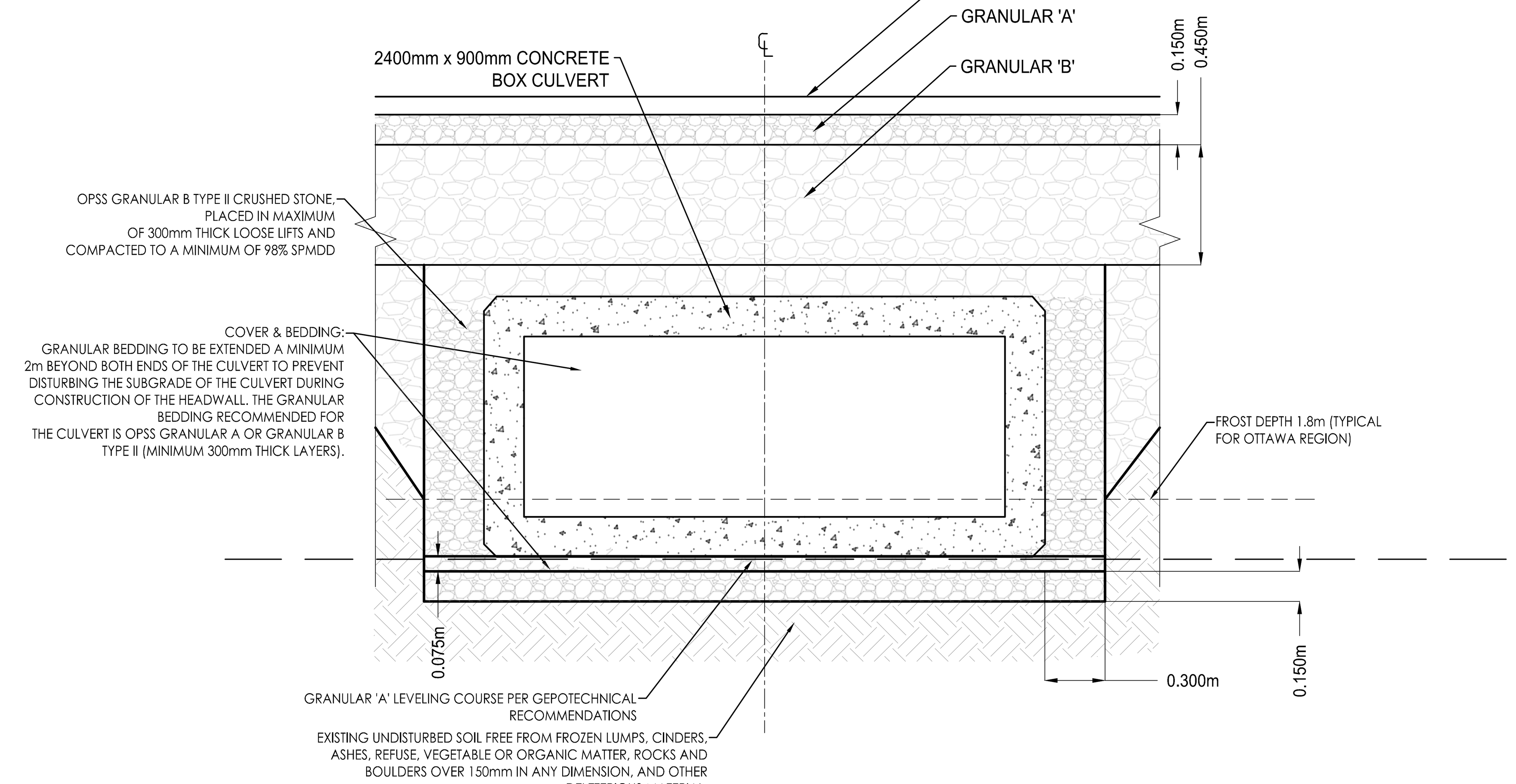
SECTION A - A : 2400 x 900 CONCRETE CULVERT PROFILE

HORIZONTAL = 1:200
VERTICAL = 1:80



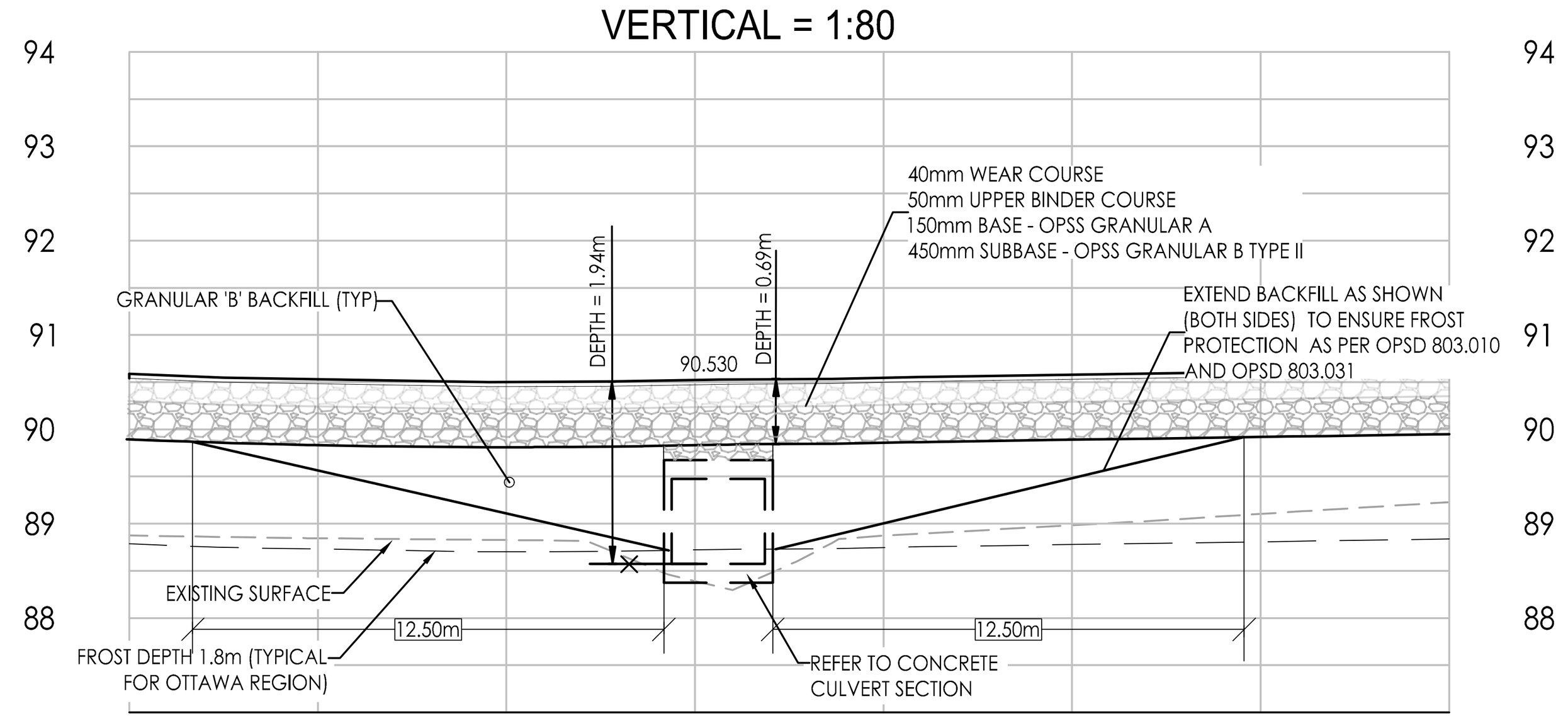
2400 x 900 CONCRETE CULVERT - SECTION

HORIZONTAL = 1:25
VERTICAL = 1:25



SECTION B - B : FROST PROTECTION

HORIZONTAL = 1:200
VERTICAL = 1:80



REVIEWED BY DEVELOPMENT REVIEW BRANCH

SIGNED: ____________

DATE: ____________

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- PROPOSED LIGHT DUTY SILT FENCE BOUNDARY AS PER OPSD 219.110 (REFER TO DETAIL ON DWG EC-2)
- PROPOSED HEAVY DUTY SILT FENCE BOUNDARY AS PER OPSD 219.130 (REFER TO DETAIL ON DWG EC-2)

Notes

Revision

		By	Appd.	YY.MM.DD
2	ISSUED FOR REVIEW	JP	AP/KS	25.01.29
1	ISSUED FOR REVIEW	JP	AP	23.09.21

File Name: 160401844-PH4-CLVT.dwg	JP	AP	JP	23.09.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

MINTO GROUP INC.
200-180 KENT STREET

MAHOGANY SUBDIVISION
PHASE 4
OTTAWA, ON, CANADA

Title

BRIDGEPORT AVENUE CULVERT CROSSING

Project No. 160401844 | Scale AS SHOWN

Drawing No. CLVRT-1 | Sheet 22 of 42 | Revision 2

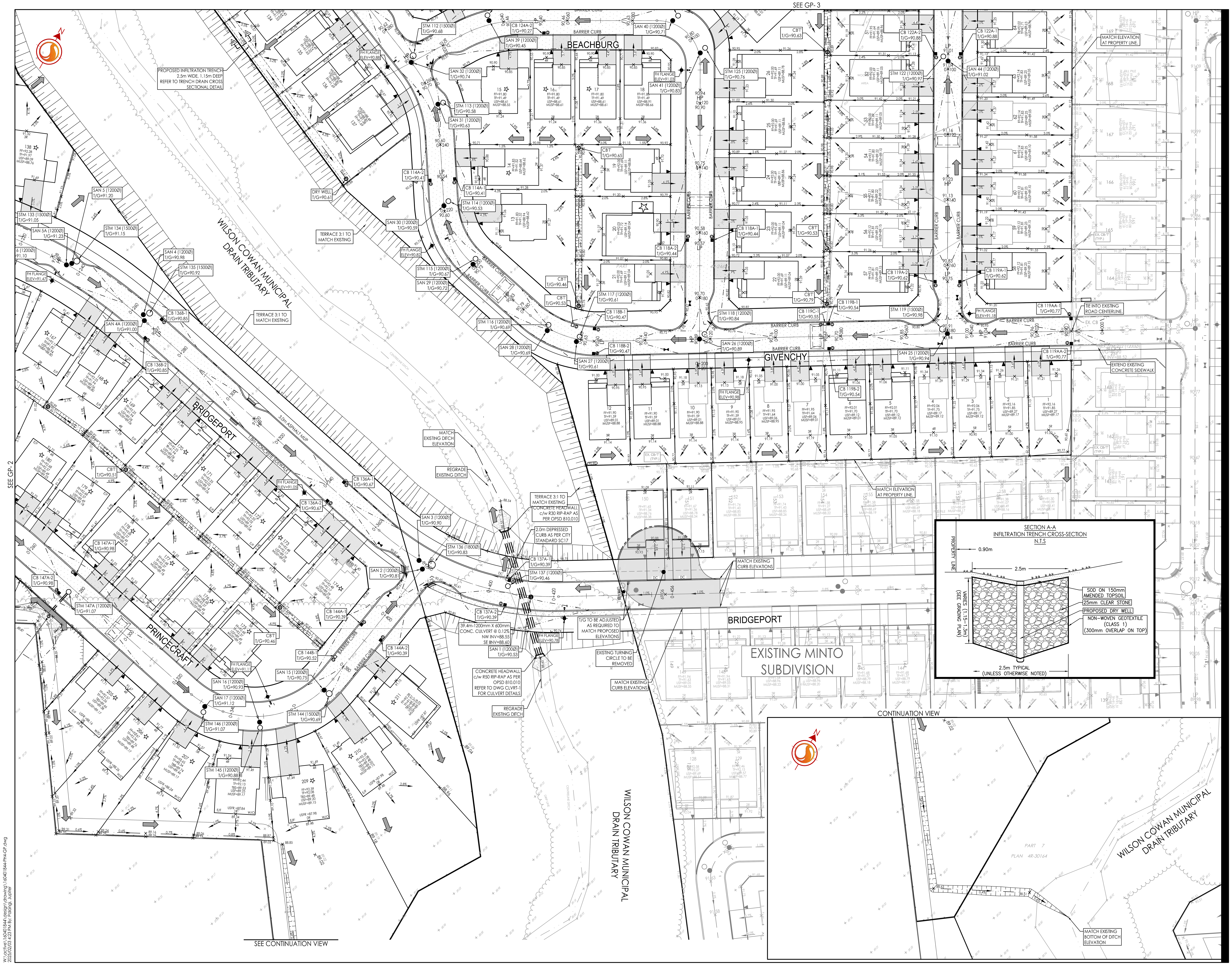
D07-16-17-0017

DWG# XXXXX

W:\active\160401844\design\drawing\160401844-PH4-CLVT.dwg 2025/03/04 11:33 AM By: Patangi, Jupiter

ORIGINAL SHEET - ARCH D

Appendix F Grading & Drainage Plan



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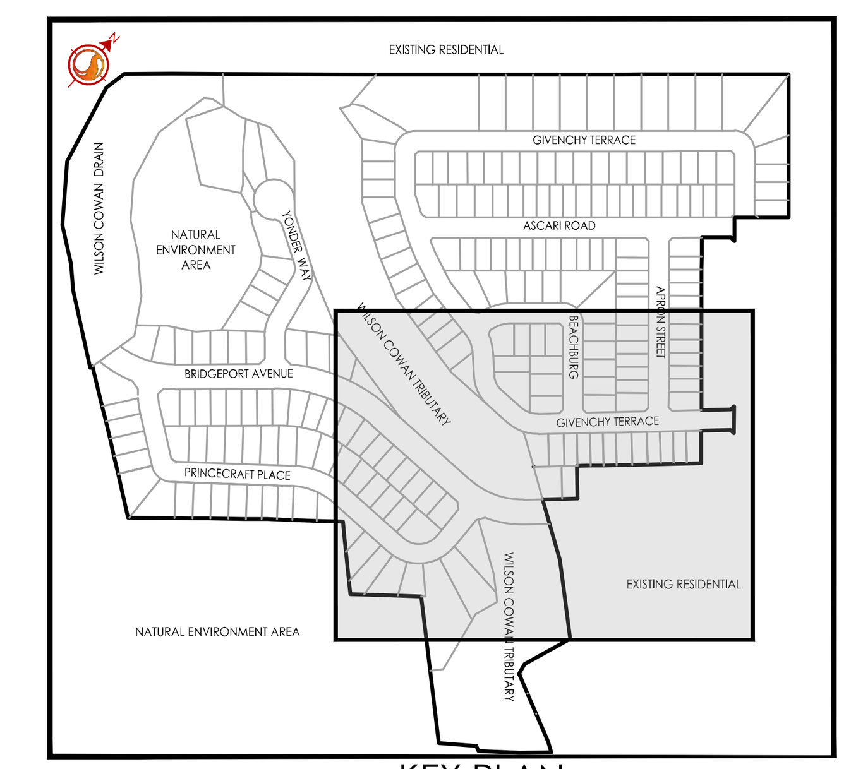
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

Symbol	Description
×99.99	ORIGINAL GROUND ELEVATION
99.99 ×	PROPOSED ELEVATION
×99.99 / 98.88	PROPOSED LOT CORNER ELEVATION / EXISTING ELEVATION AT LOT CORNER
2.0%	FLOW DIRECTION AND GRADE
FF=99.99	FINISHED FIRST FLOOR ELEVATION
TF=99.84	TOP OF FOUNDATION WALL ELEVATION
USF=97.14	UNDERSIDE OF FOOTING ELEVATION
3R	NUMBER OF RISERS
3:1	TERRACING 3:1 SLOPE MAXIMUM (UNLESS OTHERWISE SHOWN)
	PROPOSED SWALE
	DIRECTION OF OVERLAND FLOW
	PROPOSED VALVE BOX
	PROPOSED VALVE CHAMBER
	PROPOSED FIRE HYDRANT
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED STORM SEWER MANHOLE
	PROPOSED OGS UNIT
	PROPOSED CATCHBASIN
	PROPOSED CATCHBASIN c/w WATERTIGHT COVER AS PER CITY OF OTTAWA STD S19
	PROPOSED CATCHBASIN 'T' (S29,S30,S31)
	CATCHBASINS TO BE INSTALLED C/W INLET CONTROL DEVICE (SEE DWG NL-1)
	PROPOSED DEPRESSED CURB LOCATION
BARRIER CURB / MOUNTABLE CURB	PROPOSED MOUNTABLE/BARRIER CURB LOCATIONS
	INFILTRATION TRENCH LOCATION
	SERVICE LATERAL LOCATION
	UNITS THAT CAN ACCOMMODATE 9 FT BASEMENTS

NOTES:
1. LOT 191 TO BE DEVELOPED UPON REMOVAL OF TEMPORARY TURNING CIRCLE.
2. EXISTING GRADING INFORMATION FROM: STANTEC CONSULTING, MAHOGANY SUBDIVISION PHASE 3, DATED NOV 18, 2022



KEY PLAN
NTS

		By	Appd.	YY.MM.DD
2	ISSUED FOR REVIEW	JP	AP/KS	25.01.29
1	ISSUED FOR REVIEW	JP	AP	23.09.21

Revision

File Name: 160401844-PH4-GP.dwg	JP	AP	JP	23.09.10
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

MINTO GROUP INC.
200-180 KENT STREET

MAHOGANY SUBDIVISION
PHASE 4

OTTAWA, ON, CANADA

Title

GRADING PLAN

Project No. 160401844

Scale 1:500 (0 5 15 25m)

Drawing No. GP-1

Sheet 23 of 42

Revision 2

D07-16-17-0017

DWG# XXXXX

ORIGINAL SHEET - ARCH D

SEE GP- 4

EXISTING GRADES PRIOR TO CONSTRUCTION AND ENSURE COMPLIANCE WITH THIS REQUIREMENT DURING ALL GRADING ACTIVITIES. ANY DEVIATIONS EXCEEDING ±0.10m MUST BE REVIEWED AND APPROVED BY THE ENGINEER.

NATURAL ENVIRONMENT AREA

WILSON COWAN MUNICIPAL DRAIN

YONDER

BRIDGEPORT

PRINCECRAFT

WILSON COWAN MUNICIPAL DRAIN TRIBUTARY

3.0m ASPHALT MUP

1.8m CONCRETE SIDEWALK

PROPOSED INFILTRATION TRENCH 2.5m WIDE, 1.15m DEEP REFER TO TRENCH DRAIN CROSS SECTIONAL DETAIL

TERRACE 3:1 TO MATCH EXISTING

BARRIER CURB

LIMIT OF FULL HEIGHT CURB

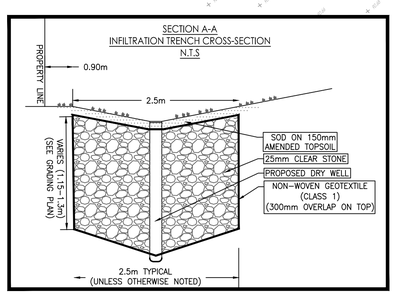
PROPOSED PROTECTIVE FENCE/GUARDRAIL TO BE COORDINATED WITH LANDSCAPE ARCHITECT

PROPOSED RIP-RAP OUTLET c/w TRASH RACK. REFER TO DWG DS-2 FOR WOODLOT OUTLET DETAILS

REGRADING ALONG THE PROPERTY LINE ADJACENT TO THE WOODLOTS SHALL NOT EXCEED A DEVIATION OF 0.10m FROM THE EXISTING ELEVATION. CONTRACTOR TO VERIFY EXISTING GRADES PRIOR TO CONSTRUCTION AND ENSURE COMPLIANCE WITH THIS REQUIREMENT DURING ALL GRADING ACTIVITIES. ANY DEVIATIONS EXCEEDING ±0.10m MUST BE REVIEWED AND APPROVED BY THE ENGINEER. (TYP.)

SEE GP- 1

SECTION A-A
INFILTRATION TRENCH CROSS-SECTION
N.T.S



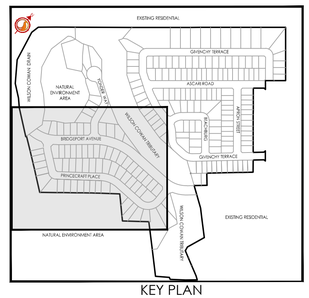
Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

99.99	ORIGINAL GROUND ELEVATION
98.99	PROPOSED ELEVATION
×99.99 98.88	PROPOSED LOT CORNER ELEVATION EXISTING ELEVATION AT LOT CORNER
2.0%	FLOW DIRECTION AND GRADE
FF=99.99	FINISHED FIRST FLOOR ELEVATION
TF=99.84	TOP OF FOUNDATION WALL ELEVATION
USF=97.14	UNDERSIDE OF FOOTING ELEVATION
3R	NUMBER OF RISERS
3:1	TERRACING 3:1 SLOPE MAXIMUM (UNLESS OTHERWISE SHOWN)
	PROPOSED SWALE
	DIRECTION OF OVERLAND FLOW
	PROPOSED VALVE BOX
	PROPOSED VALVE CHAMBER
	PROPOSED FIRE HYDRANT
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED STORM SEWER MANHOLE
	PROPOSED OGS UNIT
	PROPOSED CATCHBASIN
	PROPOSED CATCHBASIN c/w WATERTIGHT COVER AS PER CITY OF OTTAWA STD S19 PROPOSED CATCHBASIN 'T' (S29,S30,S31) CATCHBASINS TO BE INSTALLED C/W INLET CONTROL DEVICE (SEE DWG NI-1)
	PROPOSED DEPRESSED CURB LOCATION
BARRIER CURB MOUNTABLE CURB	PROPOSED MOUNTABLE/BARRIER CURB LOCATIONS
	INFILTRATION TRENCH LOCATION
	SERVICE LATERAL LOCATION
	UNITS THAT CAN ACCOMMODATE 9 FT BASEMENTS

NOTES:
1. LOT 191 TO BE DEVELOPED UPON REMOVAL OF TEMPORARY TURNING CIRCLE.
2. EXISTING GRADING INFORMATION FROM: STANTEC CONSULTING, MAHOGANY SUBDIVISION PHASE 3, DATED NOV 18, 2022



KEY PLAN
NTS

2	ISSUED FOR REVIEW	JP	AP/KS	25.01.29
1	ISSUED FOR REVIEW	JP	AP	23.09.21
Revision		By	Appd.	YY.MM.DD
File Name: 160401844-PH4-GP.dwg		JP	AP	23.09.10
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project

MINTO GROUP INC.
200-180 KENT STREET

MAHOGANY SUBDIVISION
PHASE 4

OTTAWA, ON, CANADA

Title

GRADING PLAN

Project No.	Scale	Sheet	Revision
160401844	1:500 (0 5 15 25m)	24 of 42	2
Drawing No.			
GP-2			

D07-16-17-0017

DWG# XXXXX

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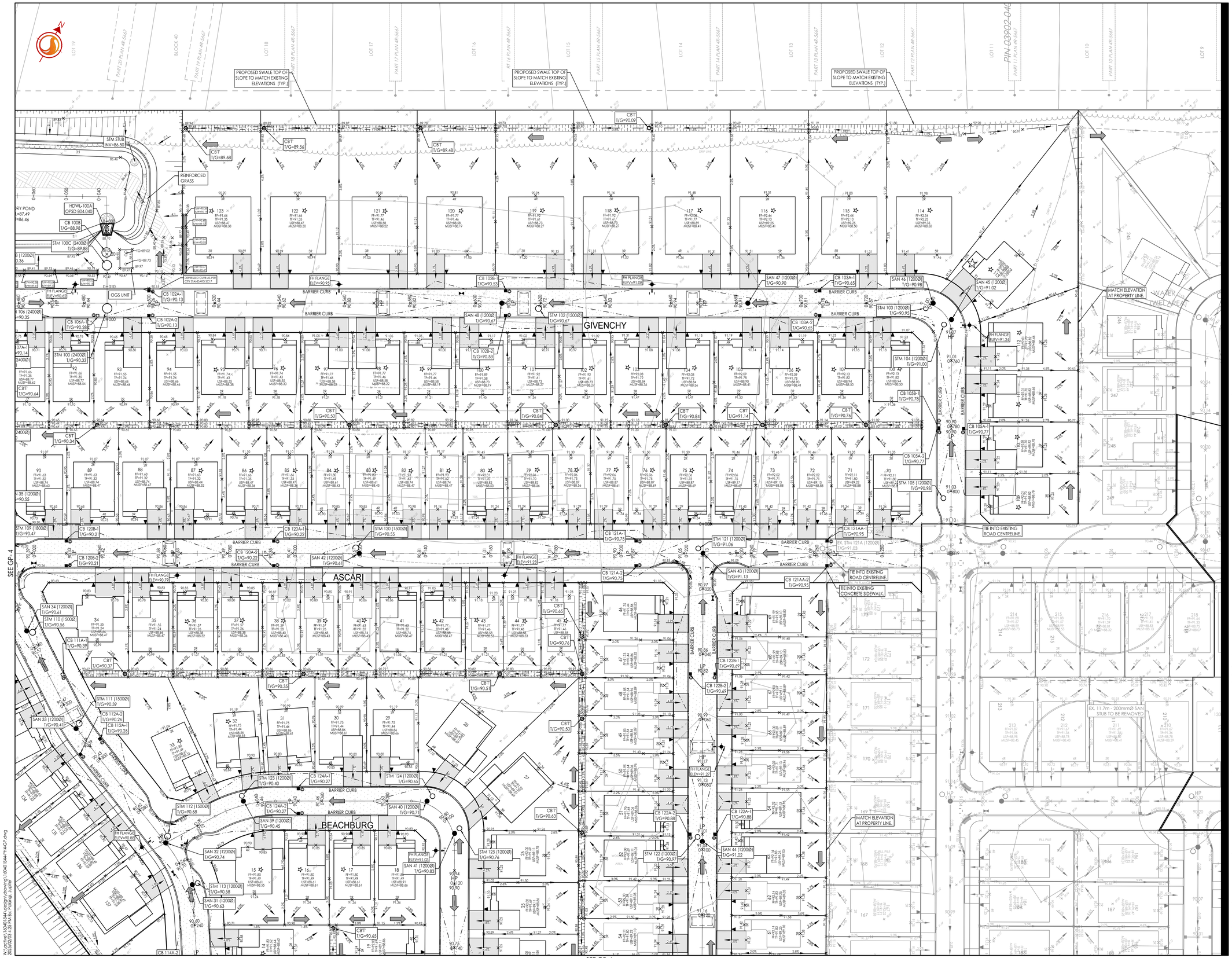

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

89.89	ORIGINAL GROUND ELEVATION
98.99	PROPOSED ELEVATION
×99.99 98.88	PROPOSED LOT CORNER ELEVATION / EXISTING ELEVATION AT LOT CORNER
2.0%	FLOW DIRECTION AND GRADE
FF=99.99	FINISHED FIRST FLOOR ELEVATION
TF=99.84	TOP OF FOUNDATION WALL ELEVATION
USF=97.14	UNDERSIDE OF FOOTING ELEVATION
3R	NUMBER OF RISERS
3:1	TERRACING 3:1 SLOPE MAXIMUM (UNLESS OTHERWISE SHOWN)
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	SERVICE LATERAL LOCATION
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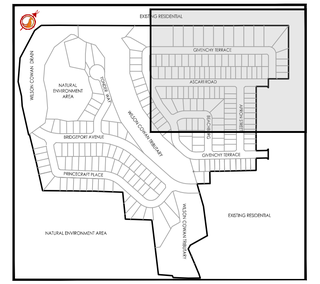

KEY PLAN
NTS

2	ISSUED FOR REVIEW		JP	AP/KS	25.01.29
1	ISSUED FOR REVIEW		JP	AP	23.09.21
Revision			By	Appd.	YY.MM.DD
File Name: 160401844-PH4-GP.dwg		JP	AP	JP	23.09.10
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
MINTO GROUP INC.
200-180 KENT STREET

MAHOGANY SUBDIVISION
PHASE 4
OTTAWA, ON, CANADA

Title
GRADING PLAN

Project No. 160401844	Scale 1:500 (0 5 15 25m)	
Drawing No. GP-3	Sheet 25 of 42	Revision 2

D07-16-17-0017

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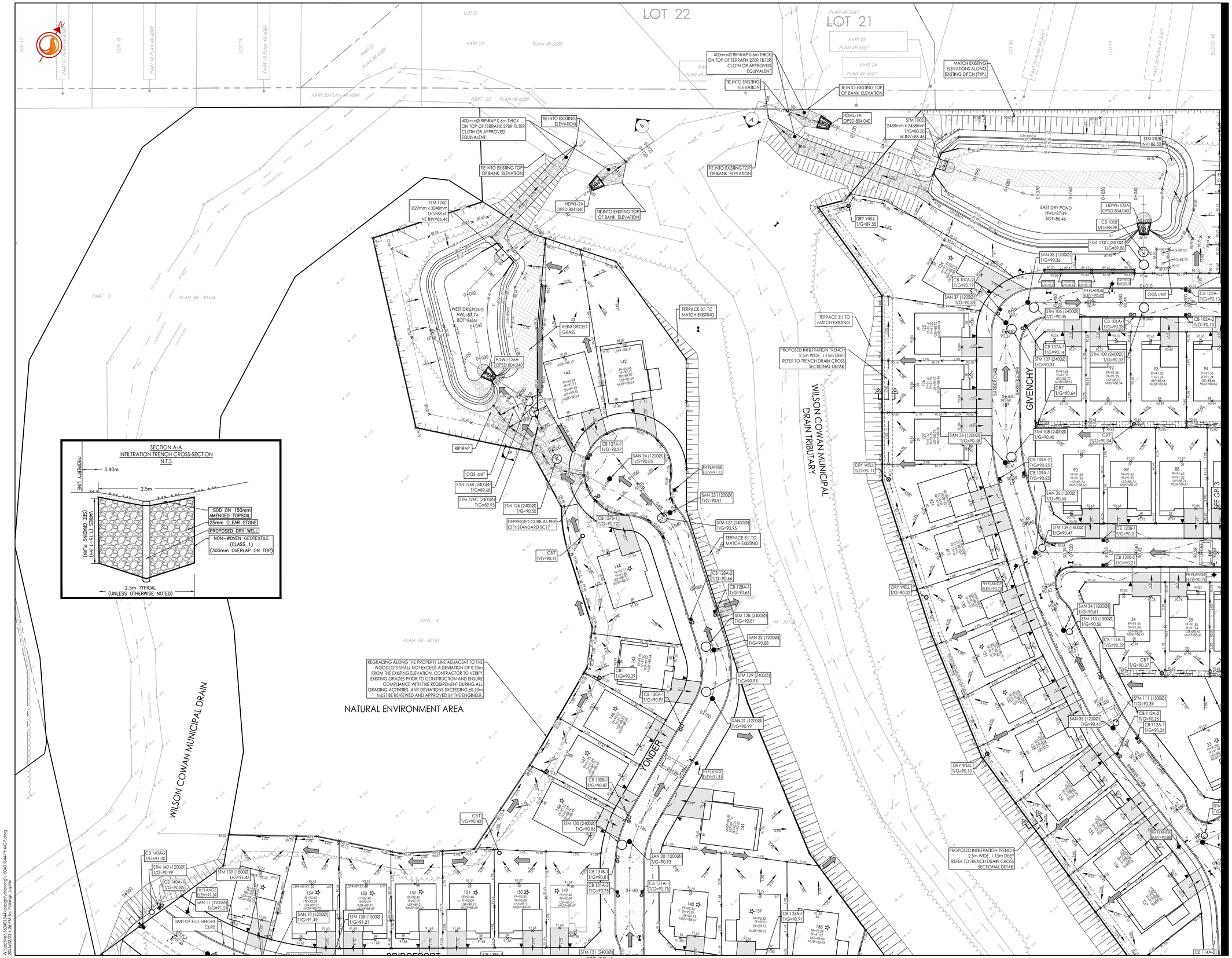

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
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www.stantec.com

Legend

100.00	ORIGINAL GROUND ELEVATION
98.99	PROPOSED ELEVATION
99.99 × 98.88	PROPOSED LOT CORNER ELEVATION EXISTING ELEVATION AT LOT CORNER
2.0%	FLOW DIRECTION AND GRADE
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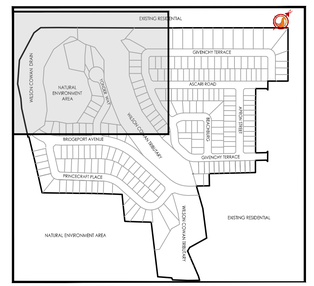

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File Name: 160401844-PH4-GP.dwg		JP	AP	23.09.10
		Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
MINTO GROUP INC.
200-180 KENT STREET

MAHOGANY SUBDIVISION
PHASE 4
OTTAWA, ON, CANADA

Title
GRADING PLAN

Project No.	Scale	Revision
160401844	1:500 (0 5 15 25m)	
Drawing No.	Sheet	
GP-4	26 of 42	2

D07-16-17-0017

DWG# XXXXX

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ORIGINAL SHEET - ARCH D