



Environmental Assessments & Approvals

April 15, 2019

AEC 11-237

Orangeville Highlands Limited c/o
Ventawood Management Inc.
2458 Dundas Street W
Mississauga ON
L5K 1R8

Attention: Carmen Jandu, MCIP RPP

Re: **Addendum to Environmental Impact Study and Management Plan
Orangeville Highlands Phase 2
East Half of Lot 3, Concession 2,
Town of Orangeville, County of Dufferin**

Dear Ms. Jandu:

The purpose of this letter is to provide a response to comments circulated by the Town of Orangeville within their November 29, 2018 letter related to Orangeville Highlands Phase 2. This response addresses comments from the County of Dufferin, Town of Orangeville, public comments obtained through written submission to the Town and from the September 10, 2018 public meeting, and Credit Valley Conservation (CVC) related to environmental matters associated with the proposed development for the abovementioned property. This response addresses each comment related to the Environmental Impact Study (EIS) and Management Plan (MP) – Orangeville Highlands Phase 2. For your convenience, the original comments are provided in italics and Azimuth's response is provided below.

County of Dufferin (July 25, 2018)

5.2 Planning, Economic Development and Culture

Under Schedule E (Natural Heritage Features) a portion of the site is identified as Provincially Significant Wetlands (S.5.3.1), Woodlands (S.5.3.4), and Watercourses (S.5.3.8). Per Section 5.3.1 (b)(c), no development or site alteration will be permitted within Provincially Significant Wetlands and an EIS will be required for all development proposals within 120m.

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Azimuth Response: Azimuth has identified several significant natural heritage features associated with the property including Provincially Significant Wetland, woodland and watercourses (Figure 2). Azimuth's April 2018 EIS and MP for Orangeville Highlands Phase 2 in conjunction with the response below assess the impacts to the natural heritage features.

Per Policy 5.3(b), the Town should determine whether the woodland is considered to be a significant woodland.

Azimuth Response: Azimuth's 2018 EIS and MP determined that the woodland could be considered to be significant based on its:

- Overall size;
- Presence of woodland interior;
- Proximity to other woodlands or other habitats;
- Presence of linkage function;
- Water protection; and
- Economic and Social Value.

Regardless, appropriate setbacks for a significant woodlot have been determined as per CVC policy, to protect the form and function of the woodland. The development constraints reflected on the proposed draft plan include the appropriate setbacks to this feature.

Per Policy 5.3.4, development and site alteration will not be permitted within or adjacent to significant woodlands unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions through the preparation of an EIS. Although no development is proposed within the portion of the site designated Provincially Significant Wetlands, Woodlands and Watercourses, the EIS must demonstrate that there will be no negative impacts on the natural features or their ecological functions and define that appropriate limits for development, to the satisfaction of the Town and Conservation Authority.

Azimuth Response: The environmental constraints to development have been highlighted within Figure 3 and the resulting development limits and proposed development is depicted within Figure 4. All development is proposed outside of the identified environmental constraint areas except for minor encroachment areas that are required for transition grading and to regularize the lot lines. These areas are further discussed below. Azimuth's April 2018 EIS and MP for Orangeville Highlands Phase 2 in conjunction with the response below assess the impacts to the abovementioned natural heritage features. The April 2018 report has been reviewed by the CVC and Azimuth addresses the CVC review comments below.



Town of Orangeville

9.3 Planning Division

Comment #10. Regarding the Environmental Impact Study and Management Plan (Azimuth Environmental Consulting Inc., April 2018), satisfactory comments are required from Credit Valley Conservation to confirm that the Natural Environmental policies of Section E5 and specifically the Environmental Impact Study policies of Section E5.3.15 and E5.3.16 are satisfied.

Azimuth Response:

Section E5.3.15 of the Town's Official Plan states:

Prior to granting draft approval to a plan of subdivision, Council will require that an Environmental Management Plan be prepared or updated, to the satisfaction of Credit Valley Conservation and the Town, for the tributary watershed area within which the subdivision is located. The Environmental Management Plan will identify the boundaries of the natural features and ecologic and hydrologic functions to be protected, areas to be restored to a natural condition, and the location, sizing and preliminary design of all stormwater management facilities. Methods to maintain or enhance pre-development groundwater infiltration volumes will be identified (Town of Orangeville Official Plan, 2018).

Section E5.3.16 of the Town's Official Plan states:

Where lands proposed for development or redevelopment are adjacent to lands designated Open Space Conservation, an Environmental Impact Study will be required for any development within a prescribed distance of these lands as per the Ministry of Natural Resources' Natural Heritage Reference Manual, or its successor. The Environmental Impact Study will determine or confirm the boundaries of the natural features to be protected, identify potential adverse impacts on the significant natural features, and recommend mitigation, enhancement or restoration measures. All Environmental Impact Studies will be conducted to the satisfaction of Credit Valley Conservation and the Town (Town of Orangeville Official Plan, 2018).

In order to satisfy Section E5.3.15 of the Town's Official Plan, an EIS and MP for Orangeville Highlands was prepared by Azimuth in April 2018. The EIS and MP, in conjunction with the updated figures appended and responses below have identified the boundaries of the natural features and ecologic and hydrologic functions to be protected, areas to be restored to a natural condition and the location, sizing and preliminary design of all stormwater management facilities. The EIS and MP in conjunction with the responses below assess the impacts to the abovementioned natural heritage features. Mitigation, restoration and enhancement measures have been proposed as a part of the proposed development. The April 2018 report was reviewed



by the CVC and their comments received November 1, 2018. Azimuth addresses the CVC review comments below.

Comment # 11. Further to the Ecology comment no. 5 of the CVC comment letter dated November 1, 2018, the Town of Orangeville Parks Master Plan (Trails Plan) recommends a primary trail system comprised of a paved multi-use trail system looping north of Hansen Boulevard through the northern portion of the site. The Town encourages this trail system to be implemented within the draft plan of subdivision pursuant to this recommendation of the Parks Master Plan. The Town requires that potential impacts associated with any such trail systems have been adequately addressed within the Environmental Impact Study to the satisfaction of the CVC in order to satisfy Policy E5.3.8 of the Official Plan.

Azimuth Response: Please refer to Azimuth response to address CVC comment #5 below.

Public Comments

Point #4 Concerns raised about impacts to wildlife and natural heritage features. Specific concerns related to the subject lands potentially containing habitat of threatened or endangered species despite survey and findings contained in Environmental Impact Study. Additional specific concerns have been raised regarding the elimination of existing habitat of wildlife within the subject lands. It has also been suggested that the proposed development lands serve as a connecting link between the natural areas within the northern portion of the site and existing natural areas to the south of the property (opposite to Hansen Boulevard) and the development of these lands will sever this connecting corridor and result in negative impacts to wildlife in the area.

Azimuth Response: Azimuth's April 2018 EIS and MP for Orangeville Highlands Phase 2 in conjunction with the response below have identified the boundaries of the natural features and ecologic and hydrologic functions to be protected and the areas to be restored to a natural condition. Appropriate buffers have been applied to these features which will be planted with native self-sustaining vegetation and dedicated to the public authority. The EIS and MP in conjunction with the responses below assess the impacts to the identified natural heritage features.

As part of the EIS & MP the Ministry of Natural Resources (MNR) was consulted to determine Species at Risk (SAR) that have the potential to occur on the property and within the general area and to obtain information related to the natural heritage features on and adjacent to the property (*i.e.* Significant Wetland, Middle Monora Creek). Our SAR assessment within the EIS & MP revealed two species protected according to Ontario's *Endangered Species Act (ESA)*,



Eastern Meadowlark (Threatened) and Butternut (Endangered), confirmed as being present/utilizing the property.

As per O. Reg 242/08 before beginning any part of the development activity, the proponent must prepare a development plan and submit it to the Ministry. Once submitted, development may occur but no works can occur between May 1 and July 31 within identified Eastern Meadowlark habitat. Development activity should be carried out in accordance with the development plan in which new habitat is created or existing habitat is enhanced. As of April 1, 2019 the Ministry of Environment, Conservation and Parks (MECP) assumed responsibility for matters related to the ESA. Therefore, in order to ensure compliance with the ESA, the proponent will continue its dialogue with the province (now MECP) and submit the required development plan to MECP prior to the proposed works. CVC will be circulated all resulting correspondence with MECP.

Subsequent to the completion of the EIS & MP report, Butternut tree #1 was re-assessed and Butternut tree #2 was assessed as per provincial standard. The third Butternut located at the northern property limits was not assessed since it is not located within 50m of any proposed development. The resulting Butternut Health Assessment (BHA) revealed that Butternut tree #1 is a Category 2 tree while Butternut #1 is a Category 1 tree. The BHA has been submitted and accepted by the Ministry of Natural Resources and Forestry (MNR). Once the BHA is accepted by MNR, Category 1 Butternut individuals are afforded no protection status according to the ESA. Nonetheless, this tree will remain within the woodlot and no impacts to this tree are expected as a result of the proposed development. As per O. Reg 242/08, up to 10 Category 2 Butternut trees can be removed or 'harmed' provided the rules in the regulation under section 23.7 are adhered to. Since development is proposed within approximately 8m of the Category 2 Butternut a "Notice of Butternut Impact" form must be registered with the Province prior to works in proximity to the tree (*i.e.* within 25m). Therefore, in order to ensure compliance with the *ESA*, consultation with the Province (MECP) will continue, a Notice of Butternut Impact will be submitted and compensation in the form of plantings as per 23.7 of O. Reg 242/08 will be provided in order to permit works within 10m of the Category 2 Butternut tree. CVC will be circulated all resulting correspondence with MECP.

No additional Endangered or Threatened species listed in the *ESA* were confirmed as being present on the property.

The potential significance of the natural heritage features and functions associated with the property were assessed within the EIS and MP report. This assessment revealed the presence of significant woodland, significant wetland, watercourse (Middle Monora Creek) and floodplain. The proposed development has provided for the appropriate setback from these identified significant features to establish the development limit. Opportunities exist to further enhance the buffer lands through naturalization.



A wildlife movement corridor is habitat that links two or more wildlife habitat areas. Lands that are naturally vegetated of sufficient width typically provide greater opportunity for the movement of wildlife across the landscape. Lands adjacent to the west, south and east of the property are primarily developed for residential and commercial use thus precluding these areas to function as potential linkages or corridors. Connectivity for wildlife to the existing natural area to the south does not exist due to the lack of natural heritage features connecting these features (*i.e.* woodland, wetland, watercourse/riparian lands, valleyland) which effectively eliminates its value to facilitate the movement of wildlife across the landscape. Furthermore, the existing land use (*i.e.* temporary dog park, parking and agricultural lands) and physical divide of Hansen Boulevard are the intervening anthropogenic land uses that lack any wildlife linkage function. The Connectivity for wildlife, however, does exist from the northern portion of the property within the significant wetland/woodland to adjacent forested lands to the west and ultimately connects to Monora Park to the north. The northern portion of the property will be maintained within the Town's Natural Heritage System and will be dedicated into public ownership. This connection will continue to be maintained post-development.

Credit Valley Conservation (November 1, 2018)

Ecology

1. *There are concerns with encroachment (i.e. placement of fill) in the buffer to the provincially significant wetland and the potential negative impacts. It must be demonstrated that there will be no negative impacts on the form and function of the provincially significant wetland due to encroachment (i.e. placement of fill) into the buffer. Please reconfigure the site plan to move all development (i.e. all grading) out of the buffer to this provincially significant wetland.*

Azimuth Response: All proposed development has been moved out of the buffer of the wetland with the exception of two small areas of encroachment that are anticipated in order to facilitate the proposed development. The areas that have been identified where grading may be required into the buffer of the wetland are listed below:

- a) Encroachment (approximately 31m²) has been proposed in proximity to the existing trail (*i.e.* Block 27) that connects the property to Brucedale Boulevard to the north in order to match exiting trail grades and to meet accessibility standards. The Town of Orangeville has expressed a desire to maintain and formalize the existing trail connection. At its closest point, grading will be approximately 24m from the wetland boundary (*i.e.* encroach 6m into the 30m buffer). The grading is proposed within an area that has been historically disturbed due to the presence of the existing informal trail. The maximum slope within the buffer will be 3:1.
- b) Potential encroachment (approximately 63m²) may be required into the wetland buffer to the north of Block 5 and 6. At its closest point, grading may be approximately 29m from



the wetland boundary (*i.e.* encroach 1m into the 30m buffer). The maximum slope within the buffer will be 3:1.

At the locations where encroachment is proposed, an increased buffer (*i.e.* addition of approximately 149m² to the Natural Heritage System) is also proposed. The additional buffer at these locations will range from 4m in proximity to the trail to 2m to the north of Block 5 and 6. These areas will also be graded with a maximum 3:1 slope. The areas of transition grading encroachment have been identified on Figure 4 and will be subject to CVC review and comments. Proper sediment and erosion controls should be installed prior to any site alteration or disturbance. All lands disturbed through grading activities and all lands within the buffer will be restored post-construction and will be planted with native self-sustaining vegetation. The buffer adjacent to the wetland will function to attenuate nutrients and sediment and screen the wetland from adjacent anthropogenic land use. As per the EIS and MP, it is recommended that fencing is installed adjacent to the Natural Heritage System (*i.e.* woodland, wetland, watercourse) where residential development is proposed.

2. *CVC has concerns that the EIS does not adequately demonstrate that there will be no negative impacts on the form and function of the significant woodland due to encroachment into the buffer and removal of a portion of the significant woodland. Provide an addendum to the EIS that includes the following:*

- (a) *Reconfigure the site plan to move all development (*i.e.* all grading) out of the buffer to the significant woodland.*

Azimuth Response: All proposed development has been moved out of the buffer to the significant woodland, with the exception of two locations where encroachment is proposed in order to regularize the lot lines (Figure 4) on the northern limit of Block 20.

A buffer of 7.62m at the northwest corner of Block 20 and a buffer of 9.15m at the northeast corner of Block 20 is proposed. The total area of the proposed development encroachment beyond the constraint limit is 50m². This is offset through the addition of buffer lands in-between these areas where the buffer will be increased by 2m for a total of 24m² (Figure 4).

A setback from the dripline of the woodland will ensure protection of the critical root zone for the trees within the woodland. This zone is essential in order to maintain the health of individual trees. According to Johnson (1999), the critical root zone can be estimated through measuring the tree's Diameter Breast Height in inches. This number is then multiplied by 1 or 1.5 for tolerant or sensitive species respectively. The resulting number is the number of feet that should be left undisturbed from the base of the tree.

Coincidentally, the location of the greatest encroachment (*i.e.* 7.62m) is the location of the Butternut. The Butternut has a Diameter Breast Height (DBH) is 37cm (14 inches). Butternut is



also considered to be a sensitive species. Therefore, using 37cm as the DBH and the critical root zone multiplier for sensitive species (1.5), the following critical root zone equation illustrates that a 7.62m setback at one point is sufficient to protect the health of this Butternut individual:

$$\begin{aligned} 37\text{cm} &= \sim 14'' \\ 14 \times 1.5 &= 21 \text{ (expressed in feet)} \\ 21' &= 6.4\text{m} \\ \text{Critical root zone} &= 6.4\text{m} \end{aligned}$$

Therefore, this would also hold true for a larger trees and/or a tolerant tree along the edge of the woodland. Based on this information, at the location where the buffer has been reduced, there is still a sufficient setback to ensure protection of the tree (s) within the significant woodland. The buffer will help to protect the overall form and function of the woodland.

Nonetheless, as highlighted above, a “Notice of Butternut Impact” form must be registered with the Province prior to works within 25m of the Category 2 Butternut tree and compensation in the form of plantings as per 23.7 of O. Reg 242/08 will be provided in order to permit works in proximity to this individual.

All grading encroachment into the 10m woodland buffer has been removed with the exception of one area where transition grading will encroach into the buffer of the woodland in proximity to Block 4 (Approximately 33m², Figure 4). This grading encroachment is proposed in proximity to the existing trail (*i.e.* Block 27) that connects the property to Brucedale Boulevard to the north in order to match existing trail grades and to meet accessibility sandards. The Town of Orangeville has expressed a desire to maintain and formalize the existing trail connection. The maximum slope within the buffer at this location will be 3:1.

Additional buffer lands are proposed to the north of Blocks 1, 2, 3 and 4 with a total area of approximately 495m² (Figure 4). The proposed additional buffer lands (*i.e.* beyond the 10m setback) and one area of grading encroachment as highlighted above will be graded to 3:1 slopes in order to address CVC concerns with rehabilitation planting on engineered slopes. All lands within the woodland buffer will be restored post-construction and will be planted with native self-sustaining vegetation. As per the EIS and MP, it is recommended that fencing is installed adjacent to the Natural Heritage System (*i.e.* woodland, wetland, watercourse) where residential development is proposed.

(b) *As discussed on site, mapping of the significant woodland is to follow the 2011 staking completed by CVC and the consultant. Please update all mapping accordingly.*

Azimuth Response: All mapping has been updated with the 2011 dripline (Figure 3 and 4).



(c) *Provide a calculation of the area of significant woodland removed, using the 2011 staking as a reference.*

Azimuth Response: Utilizing the 2011 staking as a reference, approximately 0.11 ha of woodland was removed subsequent to this staking exercise (Figure 3).

(d) *Clearly identify how the loss of portions of the significant woodland will be mitigated through the restoration plan.*

Azimuth Response: Mitigation for the loss of woodland will be provided within Block 25 (Park). As per subsequent discussions with the Town of Orangeville (Town), the Town is amenable to compensation woodland within the Park block. The Restoration Plan will include planting specifications for this proposed woodland compensation area in addition to the buffer lands. The restoration area has been included in a Facility Fit Plan for Block 25.

(e) *To mitigate for the loss of significant woodland, the restoration plan should indicate that plant material is to be calculated at the ratio that meets forest targets – shrubs planted 0.75-1.0 on centre and trees 2.7-3.0m.*

Azimuth Response: A restoration plan will be prepared at detailed design stage that will include CVC specifications as described above.

(f) *It is understood that a detailed landscape plan will be developed at a later stage in the planning process, however the restoration plan in the EIS should indicate that only native species that are common to the watershed will be used. A list of acceptable species is available on the CVC website.*

Azimuth Response: The restoration plan will include only native species that are common to the watershed as per CVC's April 2018 Plant Selection Guideline. One exception may be for the inclusion of the CVC rare Clammy Groundcherry (*Physalis heterophylla*) and Purple-stemmed Beggarticks (*Bidens connate*), which were documented on the property but is not listed within the abovementioned document. Clammy Groundcherry and Purple-stemmed Beggarticks are further discussed within comment 10 below.

3. *There are concerns that will be impacts to groundwater flows to the wetland and Middle Monora Creek with the current water balance. The results of the water balance indicate that even with mitigation measures (i.e. roof top runoff), there will be an infiltration shortfall of approximately 38% in the post-development phase. This impact and measures to avoid, minimize or mitigate against the impact should be identified in the EIS. Refer to the*



hydrogeology and engineering comments for additional information related to site water balance and feature based water balance requirements.

Azimuth Response: A revised water balance has been provided in the Revised Hydrogeological Update Report (April, 2019). This revised water balance includes a feature based assessment as required by the CVC. The features, which were agreed upon with the CVC included the WHPA Q1/Q2 area, catchment that flows north towards Middle Monora Creek and the remaining tableland area which has been interpreted to have an easterly ground water flow path. This revised water balance also incorporated LID's presented in the Urbantech FSR, which have provided further reduction in the ground water infiltration deficit.

4. *Drainage Feature A and portions of Drainage Feature B are proposed for removal with no evaluation of impacts in the EIS, and no plan to maintain, relocate or enhance their ecological and hydrological function. Following the Evaluation Classification and Management of Headwater Drainage Feature Guidelines, the management recommendation for Drainage Feature A should be **Conservation**, and for Drainage Feature B, **Protection**. Provide an addendum to the EIS that includes the following:*

(a) *Provide discussion on the function of the drainage features. Based on knowledge of the site and a review of data provided in the EIS, CVC is of the opinion that both features are groundwater fed, provide intermittent (Feature A) or permanent (Feature B) flow, , support wetland vegetation, provide amphibian breeding habitat and contribute to the transport of allochthonous materials to downstream, cold water fish habitat.*

Azimuth Response:

The aquatic habitat survey completed in July 2017 identified two drainage features on the property, and one watercourse feature (Middle Monora Creek) to the north in the forested lands (Figure 2).

Using the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (CVC and TRCA, 2014), the assessment of Drainage Feature A and B has been updated to provide a description of their functions below.

Description of Function: Drainage Feature A

Drainage Feature A originates in a grassed field and was dry at the time of Azimuth's site visit (July 2017). Historical activities on the property have altered this feature, which only had a defined channel at the northern end near the forested lands, where it connects to Middle Monora Creek. The following functions can be attributed to Drainage Feature A based on the conditions of the overall property and the features associated with the feature itself:

- The shallow ground water conditions of the property within the proposed development area have been described within Hydrogeological Reports completed by Jagger Hims



(2007) and Azimuth's 2019 Update Report. High groundwater conditions present on the property would indicate that Feature A is groundwater fed.

- Intermittent portion of Drainage Feature A as identified on Figure 2 could be classified as having a Recharge Function due to the lack of surface flow and defined channel. A key function is groundwater recharge and maintenance of downstream aquatic functions via groundwater connections to streams. Conditions documented within the abovementioned Hydrogeological Reports indicate that groundwater discharge is occurring within the creeks (*i.e.* Middle Monora and Lower Monora), which is at least partially sourced from infiltration in the open upland area of the property (*i.e.* agricultural lands, CUM1-1, disturbed lands and temporary dog park), however, ground water infiltration would also be sourced more regionally within the watershed, which is estimated to be approximately 40 times larger than the proposed development area of the property.
- Permanent portion of Drainage Feature A as identified on Figure 2 could be classified as having a Valued Functions – Intermittent. Although not confirmed, due to the presence of a defined channel at this location, it is presumed to flow in the spring under high groundwater conditions and during spring freshet.
- A wetland (approximately 0.05ha in size) is present along a portion of Drainage Feature A thus it provides Important Riparian Function due to the presence of wetland vegetation.
- Contributing Functions would be attributed to the transport of allochthonous materials to downstream fish habitat. Drainage feature A does not host coldwater fish habitat and/or Brook Trout. Although permanent in the northern section and directly connected to Middle Monora Creek, this feature lacks the required baseflow and habitat to host fish hence, provides indirect or contributing functions to Middle Monora Creek.
- As highlighted above, wetland habitat occurs within the corridor, but Azimuth's 2018 field investigation confirmed that there is no amphibian breeding function associated with this wetland pocket (refer to Azimuth's October 16, 2018 document "Additional Information related to Orangeville Highlands" for results of surveys). Therefore, the wetland could be considered general amphibian habitat.

Description of Function: Drainage Feature B

Drainage Feature B is an anthropogenic feature that was created during the construction of the Orangeville Mall and has been historically dredged for maintenance purposes.

Drainage Feature B originates near the southern property boundary as a grassed swale. No water was present in the southern portion of this feature during Azimuth's field investigation (July 2017), which is characterized as 'intermittent' on Figure 2. However, standing water and fish (Cyprinids) were observed in the northern portion of this feature, which was characterized as a 'permanent' drainage feature. The wetted width of the northern portion of the feature was approximately 4m, and had a maximum depth of 40cm. Human activities (historical dredging) on the property have altered the riparian lands and drainage feature itself, which may have resulted in the pooling of water and creation of permanent fish habitat. The following functions



can be attributed to Drainage Feature B based on the conditions of the overall property and the features associated with the feature itself:

- The shallow ground water conditions of the property within the proposed development area have been described within Hydrogeological Reports completed by Jagger Hims (2007) and Azimuth's 2019 Update Report. High groundwater conditions present on the property would indicate that Feature B is groundwater fed.
- The intermittent portion of Drainage Feature B as identified on Figure 2 could be classified as having a Recharge Function due to the lack of surface flow and defined channel. A key function is groundwater recharge and maintenance of downstream aquatic functions via groundwater connections to streams. Conditions documented within the abovementioned Hydrogeological Reports indicate that ground water discharge is occurring within the creeks (*i.e.* Middle Monora and Lower Monora), which is at least partially sourced from infiltration in the open upland area of the property (*i.e.* agricultural lands, CUM1-1, disturbed lands and temporary dog park), of the property, however, ground water infiltration would also be sourced more regionally within the watershed, which is estimated to be approximately 40 times larger than the proposed development area of the property.
- The permanent portion of Drainage Feature B as identified on Figure 2 could be classified as having Important Functions – Perennial. This portion of Drainage Feature B is permanent as evidenced through the presence of standing water throughout the year.
- Riparian vegetation is associated with the permanent portion of Drainage Feature B thus it provides Important Riparian Function that would include provision of shading, input of organic matter etc.
- Valued Functions would be associated with the riparian corridor along the intermittent portion of Drainage Feature B (Figure 2) as the riparian areas are dominated by disturbed meadow.
- Important Functions are associated with the permanent section of Drainage Feature B as water/fish habitat is present year round and fish (tolerable warmwater minnow species) were observed within this section of the feature. Although Drainage Feature B does not host coldwater fish habitat and/or Brook Trout, it remains permanent in the northern section and is directly connected to Middle Monora Creek. Drainage Feature B lacks the required baseflow, water quality, and habitat to host Brook Trout hence it is limited to providing indirect or contributing functions to Middle Monora Creek.
- Contributing Functions along the entire feature would be attributed to the transport of allochthonous materials to downstream fish habitat.
- Azimuth's 2018 amphibian surveys revealed the presence of amphibian breeding activity within the portion of the permanent portion of the feature as two (2) Spring Peepers, three (3) Grey Tree Frogs and one (1) Green Frog were observed (refer to Azimuth's October 16, 2018 document "Additional Information related to Orangeville Highlands" for results



of surveys). Therefore, the permanent section of Drainage Feature B would have Important Functions as per the Terrestrial Habitat Classification.

- There is no terrestrial habitat present associated with the intermittent portion of Drainage Feature B hence only provides Limited Functions.

(b) Identify how the form and function of the drainage features and their riparian corridors will be replicated or enhanced on site. CVC has no objection to the restoration taking place within the buffer to the significant woodland, however the feature should be created a minimum 7-10m from the dripline of the significant woodland to minimize impacts to the root zone and the width of the buffer should be sized appropriately.

Evaluation: Drainage Feature A

The recommended management for Drainage Feature A is derived from the Headwater Drainage Guidelines (CVC and TRCA 2014) based on the functions that have been described above. The resulting management recommendation for Drainage Feature A would be “Protection” within the northernmost permanent section (Figure 2) and “Conservation” associated with the identified intermittent portion of Drainage Feature A (Figure 2). With this information in hand, it is proposed that the permanent portion of Drainage Feature A be maintained and protected for the long-term in its current condition. A buffer has been maintained around this portion of the feature. Groundwater and surface water flows originating from the property will continue to be directed towards this feature and ultimately to Middle Monora Creek.

In order to compensate for the loss of wetland, wetland conditions will be created within the buffer lands as identified on Figure 4. The excavation of soils to the water table (or in proximity to) will be required in order to maintain wetland conditions. The proposed feature is located approximately 7m from the dripline to avoid impact to adjacent woodland vegetation. The area proposed for wetland creation is approximately 0.05ha in size which is intended to replace the area of wetland that was lost as a result of the proposed development. As indicated earlier, a restoration plan will be prepared at detailed design as per CVC standard which will include a planting plan for the proposed wetland area. Appropriate mitigation measures including the implementation of sediment and erosion controls will be required. Such details will be included within the restoration plan.

Evaluation: Drainage Feature B

The recommended management for Drainage Feature B is derived from the Headwater Drainage Guidelines (CVC and TRCA 2014) based on the functions that have been described above. The resulting management recommendation for Drainage Feature B would be “Protection” along the permanent portion of this feature (Figure 2) and “Recharge Protection” for the identified intermittent portion of the Drainage Feature B (Figure 2).



Using the CVC model, the approximate floodline elevation associated with Drainage Feature B has been updated. The resulting floodline differs from the original depiction within our 2018 submission. In order to maintain floodplain storage on the property and to improve aquatic conditions within Middle Monora Creek through the reduction in the temperature of water being discharged from Drainage Feature B, the re-grading the ditch into an engineered channel is proposed. Therefore, grading is proposed within the 10m buffer in addition to within Drainage Feature B itself. A 10m buffer along the proposed floodplain with a maximum 3:1 slope will be applied to the majority of the permanent section of Drainage Feature B. A reduced buffer is proposed at the NE section of Block 26 (SWM Pond) whereby a setback of approximately 7m will be maintained (Figure 4). In order to offset for this encroachment, additional buffer is proposed along the northern segment of Drainage Feature B as depicted on Figure 4. The 7-13 buffer in addition to the areas within the channel itself will be re-vegetated with native self-sustaining vegetation post-construction.

The stormwater pond will exist adjacent to the areas where a reduced 7m buffer is proposed. As per CVC's Watershed Planning and Regulation Policies (2010) [Section 7.1], 'CVC recognizes that certain types of development or interference must be located within hazardous lands and associated setbacks'. This encroachment into the 10m buffer is required in order to accommodate the proposed SWMP to provide adequate water quality and quantity controls. The reduction in floodplain buffer will not impact the conservation of land. The identified natural heritage functions are largely associated with the Natural Heritage lands to the north that include significant woodland, significant wetland and Middle Monora Creek. With the implementation of adequate mitigation measures (*i.e.* in-water works timing restrictions, siltation controls etc.), there should be no impacts to the downstream aquatic habitat.

Based on the preliminary design concept contained within the FSR, it is our understanding that post-construction the engineered Drainage Feature B should:

- Remain permanent (*i.e.* maintain a wetted width) within portion identified as Permanent Drainage Feature (Figure 2);
- All disturbed areas including the riparian vegetation and buffer areas ranging from 7-13m will be re-vegetated with native self-sustaining vegetation in order to provide riparian function such as shading and input of organic matter;
- Attempt to reduce "ponding" thus reduce water temperatures discharging to Middle Monora Creek;
- Provide input of allochthonous materials into the aquatic system, and ultimately into Middle Monora Creek; and
- Maintain water within this feature throughout the year thus providing potential for amphibian breeding function.

In water works are now proposed within the northern limits of Drainage Feature B. All in water works, including stormwater tie-ins and grading should be completed within the coldwater construction timing window (June 15 – September 15). A few additional points to consider:



- Fish relocation may be required prior to dewatering/excavation in areas where fish are found. This will require an MNR Licence to Collect;
- A Department of Fisheries and Oceans (DFO) Fisheries Act “Request for Review” will be required due to the nature of the proposed works (channel alteration); and
- A wildlife search/salvage/relocation may be required prior to dewatering/excavation.

A detailed impact assessment should be required as a draft condition once the details of the channel design are known.

The intermittent drainage function of the southern portion of Drainage Feature B should be maintained post-development, with the understanding that this drainage feature will be utilized to convey the proposed Stormwater Management facility discharge. As per the Functional Servicing Report (Urbantech, 2019), in order to mitigate thermal impacts from the Stormwater Management facility, the wet cell of the pond has been deepened to 2.5m in an effort to facilitate thermal stratification within the pond in conjunction with use of a reverse slope outlet pipe to pull the deeper, cooler water from the bottom of the pond. These pond design mitigation measures, in combination with proposed channel improvements, planting and shading of the drainage feature, will assist in the mitigation of thermal impacts associated with the Stormwater Management facility and its direct connection/use of Drainage Feature B.

(c) Demonstrate that there will be sufficient water in the restored feature to replicate the ecological and hydrologic function of the drainage feature proposed to be removed.

Azimuth Response: As detailed in the revised Feature Based Water Balance, provided in the Revised Hydrogeological Update Report (April, 2019) prepared by Azimuth, the proposed LID ground water infiltration trenches across the Site have reduced the infiltration deficits from those previously presented. Although a minor deficit remains for the feature / catchment contributing to the proposed wetland compensation area (5%) and Channel B (6-9%), additional contributions such as snow melt, which were not considered in the water balance as their values are difficult to quantify, would provide additional contributions. This would likely bring a pre and post development ground water infiltration match, thus replicating the ecological and hydrologic function of the drainage feature.

Although ground water has been determined to be the primary contributions to these features, it is also noted that surface runoff will be maintained to both features with runoff actually increasing slightly (5 to 7%) to Middle Monora Creek NHS including Feature A. Feature B will have a much larger increase as a result of the outlet from the SWMP. It is noted that this information is provided in the Urbantech FSR (2019).



Based on this information, the wetland conditions within the restored wetland area can be maintained. Therefore, the general amphibian habitat function and presence of wetland vegetation can be maintained.

- 5. The EIS did not appropriately address the impact associated with the increased use of trails through the Significant Woodland. The Draft Plan of Subdivision identifies a walkway (Block 27) leading into the Significant Woodland, thereby encouraging residents to use the woodland for recreational purposes. CVC recommends either formalizing a trail system to manage usage and minimize impacts to the significant woodland, or removing the walkway from the plan. If the trail system is formalized, the EIS should identify trail design measures to minimize impacts to the woodland (e.g. minimize trail width, route the trail through the buffer of the woodland and increase the width of the buffer accordingly, close unsanctioned trails, etc.). CVC recommends further consultation with the Town of Orangeville to ensure conformance with the Town of Orangeville Trails Master Plan.*

Azimuth Response: It is incumbent on the proponent to find a balance between the interests of the Town for the establishment of a trail with good connectivity to surrounding lands and existing trail systems, and the establishment of a trail that satisfies the interests of CVC in protecting sensitive natural heritage features within the subject lands. In this regard, meetings were convened with the CVC and the proponent, and with the Town of Orangeville and the proponent. The latter meeting included a discussion of the Town's update of their Master Trails Plan. As it relates to the Orangeville Highlands Phase II property; a letter was submitted to the Town and their consultant, Dillon Consulting, who is helping with the update. The submission included information presented through the Environmental Impact Study and Environmental Management Plan (EIS&MP) prepared by Azimuth and suggested that a multi-use trail traversing the site in an east-west direction was not supportable ecologically through the natural heritage system within the subject lands. The final draft Master Trails Plan has not yet been released and, accordingly, it is not clear what the final trail routes will be. It is expected that the proponent's submission (dated January 15, 2019) will be acknowledged and responded to through the final draft Trails Plan release.

Through consultation with the Town and their consultant, it has been acknowledged that detailed works related to specific trail locations, design, surface materials and feasibility has not been completed and that the trail locations as depicted within the new Master Plan will be conceptual. Moreover, it was noted that ensuring connectivity would be a priority through the Master Trails Plan.

With this information in hand, in conjunction with the environmental works completed to date, a conceptual trail system proposed by Orangeville Highlands Phase II is depicted within the appended Figure prepared by Williams and Stewart Associated Limited. The proposed trail



system utilizes a combination of sidewalks and existing informal trails in order to provide the connections envisioned by the Town.

As outlined within the EIS and MP report, confirmed and potential significant natural heritage features including Provincially Significant Wetland (Orangeville PSW), woodland, valleyland, Significant Wildlife Habitat, fish and fish habitat, habitat of Endangered or Threatened species, hydrologically sensitive features (*i.e.* wetland and Middle Monora Creek) and floodplain are present on the property and/or adjacent lands. In order to minimize impacts to the significant natural heritage features, the majority of the trail system has been proposed outside of the Natural Heritage System (*i.e.* away from significant features and associated buffers).

Therefore, provided that recommended mitigation measures are implemented (as described below) there is no expectation that there will be impacts to the significant features as a result of the proposed trail system. Moreover, it is submitted that the proposed trail system for this development will satisfy the Town's priority connections within (and beyond) the subject lands.

It is our understanding that the Town wishes to maintain the current connection from the property through the woodland to Brucedale Boulevard (Figure 4). This is an existing informal trail that is currently utilized by the local population. Therefore, in order to satisfy the Town's request, Orangeville Highlands Phase II is proposing to maintain this connection and formalize this segment of trail. It is recognized that increased usage of this trail connection will likely result post-development, therefore, provided that the recommended mitigation measures are implemented, additional impacts associated with increased use can be avoided. As per the original Orangeville Parks Master Plan (Draft 2015), walking/hiking or low-impact multi-use trails would be appropriate within buffer areas and dry woodland areas. It is recommended that the trail be maintained as a low impact trail and the width itself should be minimized to allow for the intended use. Trail surface should be natural, woodchips or possibly crushed limestone. The current trail at this location appears to be of sufficient width to facilitate its intended use. It is anticipated that no tree removals will be required through the formalization of this segment of trail, with the exception of any potential hazard trees along the edge of the existing trail that should be assessed and removed to ensure safety. The trail should be well marked to direct people in the appropriate direction. Unsanctioned trails within the significant woodland can be decommissioned through the placement of large debris at the access point of the trails and intermittently along the length of the trail.

It is our understanding that the Town wishes to create a second connection from the Orangeville Highlands Phase 2 lands to the existing development to the west. Currently an informal trail exists on adjacent lands and through the natural area in the northwest section of the subject lands. This informal trail is currently accessed from Lisa Marie Drive. The proposed connection would originate from Block 25 (*i.e.* Park) with minimal width (*i.e.* narrow



walking path) with a natural mulch surface. Tree removals will be minimized and/or altogether avoided through and the length of the trail also be minimized to that required to connect to the trail on adjacent lands. The intent of this trail is to allow for adjacent residents to access the local park facilities.

The creation of any additional trail system through the NHS including the significant natural heritage features and associated buffers is strongly discouraged. Our analysis revealed that connection to the Orangeville Mall to the east via the NHS is not possible nor is it recommended due to the convergence of the significant natural heritage features at this location including significant woodland, Middle Monora Creek, the permanent portion of Drainage Feature A and Drainage Feature B and associated buffering lands. This is also the location of the proposed wetland compensation area which makes it undesirable for trail usage.

At this time, consultation between the proponent and the Town is ongoing as it relates to the proposed trail system and achieving desired connectivity through the Orangeville Highlands Phase II property. Through consultation with the Town, should the trail system deviate from what is currently proposed, an updated impact assessment may be required to assess the impacts to the natural heritage features and functions associated with the property. CVC should be included in the review of any updates to the impact assessment.

6. *The addendum to the EIS is to include an analysis of the buffer to the significant woodland and wetland to ensure that it is of an appropriate width to satisfactorily mitigate all impacts associated with the development (e.g. loss of significant woodland, loss of drainage features, impacts associated with the development and occupancy, trail development etc).*

Additional analysis related to the proposed woodland and wetland buffer has been provided above. Impact associated with the loss of the significant woodland will be mitigated through the creation of woodland habitat within Block 25 (Figure 4). The loss of a portion of Drainage Feature A will be mitigated through the creation of wetland habitat within the buffer lands (Figure 4). It is recommended that fencing is installed adjacent to the significant woodland/wetland/watercourse where residential development is proposed. It is also recommended that unsanctioned trails are closed and that the trail system is located away from the Natural Heritage System and associated buffer lands.

7. *Potential occurrences of Jefferson Salamander, Canada Warbler, Golden-winged Warbler, and Rugulose Grape Fern were noted in Appendix 3, however these species were not discussed in the report. Please clarify whether habitat for these species is on the property. If habitat is present, identify measure to avoid, minimize or mitigate impacts.*



Azimuth Response: The MNRF's online NHIC database has been consulted (February 2019) and it the database has been updated since 2013. According to the updated information, there are records within the general area for Eastern Meadowlark and Rugulose Grapefern only. Nonetheless, Table 5 has been updated (appended) to address the species highlighted within our 2013 information request to MNRF.

Rugulose Grape Fern is an S2 species associated with old pastures, meadows and successional forests. Rugulose Grape Fern was not documented on the property during Azimuth's field investigations.

8. *The EIS indicates that Eastern Meadowlark has been confirmed breeding within the cultural meadow community on the property, however a thorough impact assessment was not included within the report. As per O. Reg 242/08, if the habitat for Eastern Meadowlark is proposed to be removed or destroyed, a development plan is required in which new habitat is to be created or enhanced. An addendum is to be submitted that includes details of this plan, including the following:*
- a) *Identification of the area of habitat removed and/or destroyed by the development.*
 - b) *Identification of the size of the habitat to be created or enhanced. As per the regulation, this is to be an area equal to or greater than the size of the habitat that the development activity is likely to damage or destroy.*
 - c) *Identification of the location of habitat to be created or enhanced. The MNRF requires the location of the new habitat to be within the same ecoregion; CVC strongly recommends the location of the new habitat also be within the CVC watershed and within the Town of Orangeville.*
 - d) *Details on the planting plan. See O. Reg 242/08/(5) for further information on specific requirements of the plan.*
 - e) *Confirm that all raw data and details of the development plan have been submitted to MNRF Midhurst.*

Azimuth Response: All conditions outlined within O. Reg. 242/08 need to be met in order to avoid contravention of the *Endangered Species Act* as it relates to habitat of Eastern Meadowlark. The landowner will work in consultation with MECP on this matter to ensure compliance. The resulting correspondence can be forwarded to CVC for your records.

9. *Azimuth's October 16, 2018 memo notes one retainable and one non-retainable Butternut to have been assessed on the property. According to the memo the retainable tree is within 10m of the development and is thus proposed to be 'harmd'. As per O. Reg 242/08, up to 10 retainable Butternut trees can be removed provided listed conditions are met. An addendum is to be submitted that includes:*
- a) *Confirmation that a notice of butternut impact has been submitted to MNRF.*
 - b) *Details of the required planting plan for the harm of a category 2 butternut over 15cm DBH, as per 23.7 (10) of O.Reg 242/08.*



Azimuth Response: All conditions outlined within O. Reg. 242/08 need to be met in order to avoid contravention of the *Endangered Species Act* as it relates to Butternut. The landowner will work in consultation with MECP on this matter to ensure compliance. The resulting correspondence can be forwarded to CVC for your records.

10. Table 2 identifies 10 species identified as rare in the CVC watershed (including *Physalis heterophylla*, which was not recorded as rare in the table). Provide a discussion of these species, and mitigation measures if they are impacted by the proposed development.

Azimuth Response:

CVC Rare Species	Location (See Figure 2)	Action Required (y/n)	Assessment
Purple-stemmed Beggarticks (<i>Bidens connate</i>)	Drainage Feature B	Yes	Species documented at a location where alterations are proposed. A 7-13m buffer will remain adjacent to Drainage Feature B. Species will be incorporated into Restoration Plan associated with Drainage Feature B.
Yellow Sedge (<i>Carex flava</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Hitchcock's Sedge (<i>Carex hitchcockiana</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Dwarf Scouring-rush (<i>Equisetum scirpoides</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Canada Horse-balm (<i>Collinsonia canadensis</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Common Wood-sorrel (<i>Oxalis montana</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Black Spruce (<i>Picea mariana</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Peach-leaved Willow (<i>Salix amygdaloides</i>)	SWC/SWM	No	Species documented at a location that will be retained post-development. A 30m buffer will remain adjacent to the wetland.
Black Willow (<i>Salix nigra</i>)	FOM 4-2	No	Species documented at a location that will be retained post-development. A 10m buffer will remain adjacent to the woodland.
Clammy Ground-cherry (<i>Physalis heterophylla</i>)	CUM1-1/Disturbed	Yes	Species will be incorporated into Restoration Plan.



11. *It is recommended that opportunities to contribute to the Natural Heritage System by naturalizing portions of Park Block 25 and/or shifting the development 5m to the west in order to increase the width of the buffer of Drainage Feature B be explored.*

Azimuth Response: Based on consultation with the Town, they are amenable to the naturalization of a portion of the Park Block. This is reflected on the updated Draft Plan and proposed Facility Fit Plan. An increased buffer is proposed along a portion of Drainage Feature B (Figure 4).

12. *The addendum to the EIS is to provide a comprehensive restoration plan that summarized all restoration/mitigation measures proposed.*

Azimuth Response: Once all areas of restoration/mitigation are agreed upon, the Restoration Plan can be incorporated into an updated EIS & MP. The Restoration Plan will be prepared during detailed design.

13. *CVC supports the recommendation made in the EIS to install fencing adjacent to the significant woodland where residential development is proposed. In order to reduce potential encroachment, CVC recommends gate-less fencing. This recommendation should be carried through to the detailed design phase of the project.*

Azimuth Response: Comment noted.

14. *CVC supports the recommendation made in the EIS to complete all works involving Drainage Features A and B, including stormwater tie-ins and grading, within the coldwater construction timing window. Please note that the dates provided in the EIS are incorrect, and should read June 15-Sept 15 (instead of July 1 – Sept 30).*

Azimuth Response: Comment noted.

We trust the information provided above will satisfy your concerns regarding Azimuth's EIS & MP related to the proposed Orangeville Highlands Phase 2. Should you require further information or have any questions, please contact the undersigned.

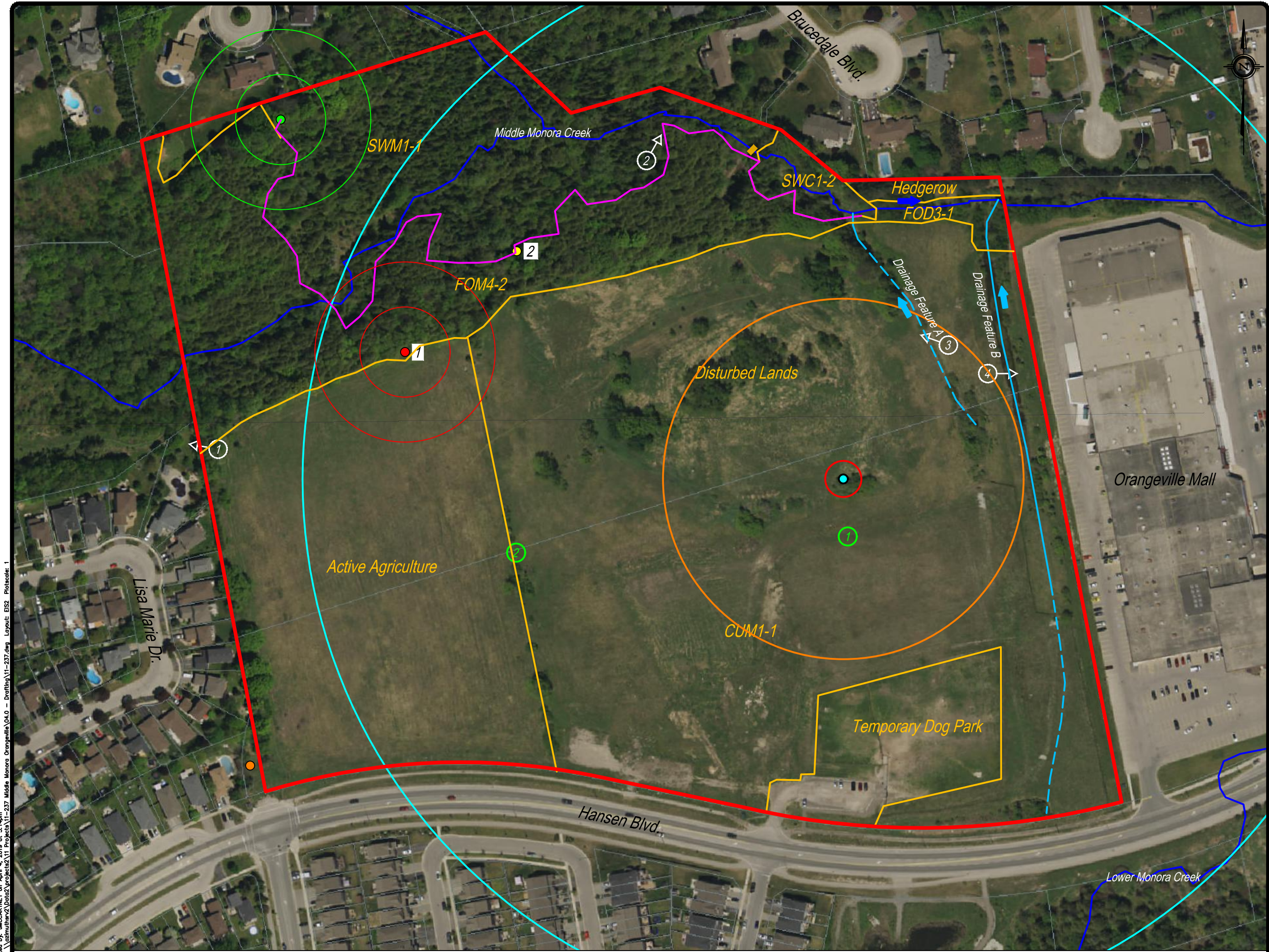
Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Lisa Moran, B.Sc.Env.
Terrestrial Ecologist

Matt Stuart, B.Sc.Env.
Aquatic Ecologist



Attach: Azimuth Figure 2: Environmental Features (April 2019)
Azimuth Figure 3: Environmental Constraints (April 2019)
Azimuth Figure 4: Proposed Development (April 2019)
Proposed Conceptual Trail Plan (Williams and Stewart, April 2019)
Azimuth Updated Table 5



LEGEND:

- Approx. Property Boundary
- Watercourse (Monora Creek)
- Culvert
- Permanent Drainage Feature
- - - Intermittent Drainage Feature
- ➔ Flow Direction
- Orangeville Provincially Significant Wetland
- Category 1 Butternut Location (2018 Assessment)
- Category 2 Butternut Location with 25m and 50m Buffers (2018 Assessment)
- Butternut Location (Not Assessed) with 25m and 50m Buffers
- Hybrid Butternut Location
- ⊕ Bird Point Count Station
- ⊕ Amphibian Survey Locations (white)
- Vegetation Communities
- CUM1-1* Dry-Moist Old Field Meadow Type
- FOD3-1* Dry-Fresh Poplar Deciduous Forest Type
- FOM4-2* Dry-Fresh White Cedar-Poplar Mixed Forest Type
- SWC1-2* White Cedar-Conifer Mineral Coniferous Swamp Type
- SWM1-1* White Cedar-Hardwood Mineral Mixed Swamp Type
- Eastern Meadowlark Territory
- Approx. Centre of Eastern Meadowlark Territory
- Category 1 Habitat (0 - 10m)
- Category 2 Habitat (10 - 100m)
- Category 3 Habitat (100 - 300m)

30m 0 60m
HORIZONTAL SCALE 1:2,000

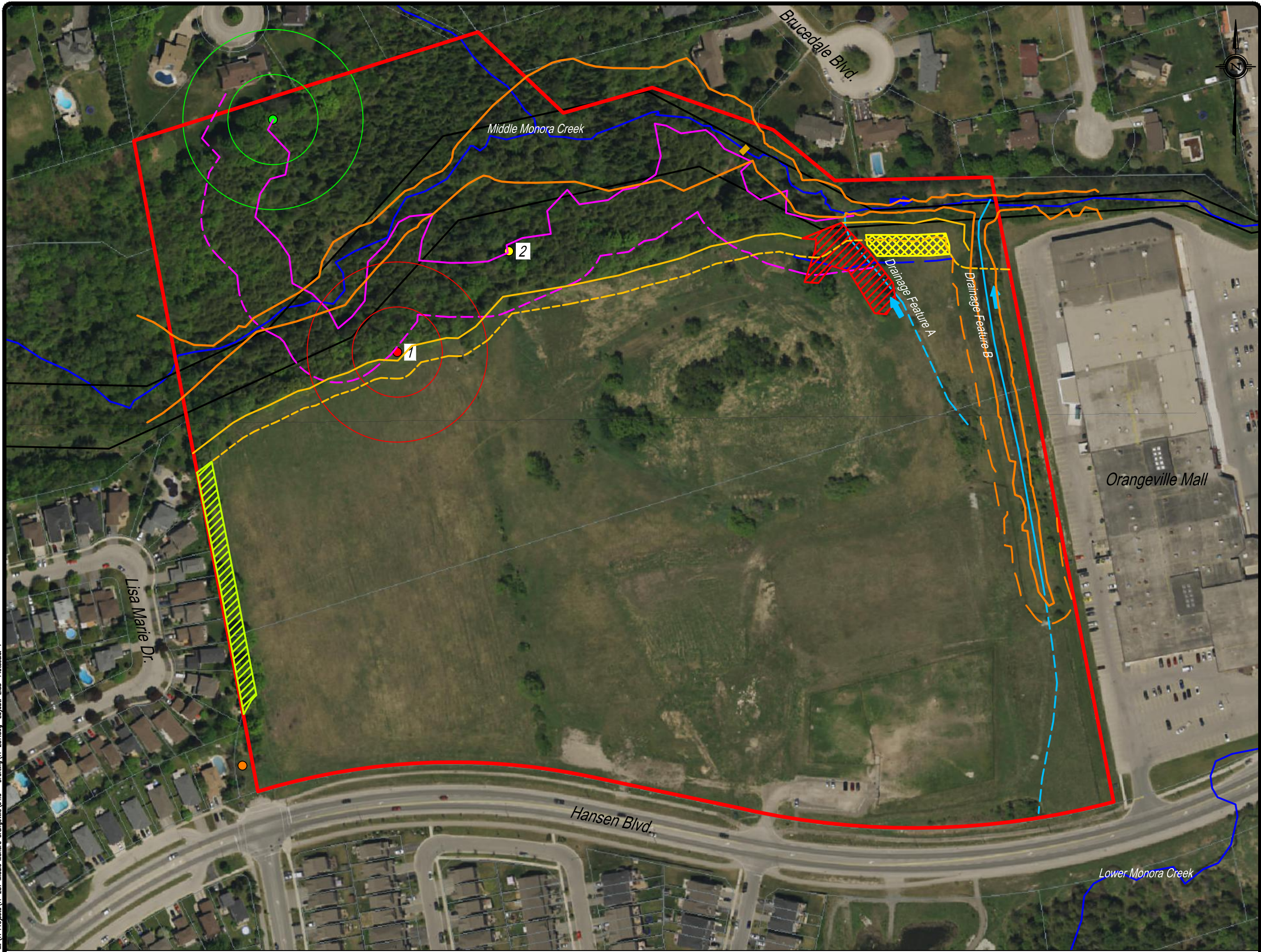
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Environmental Features

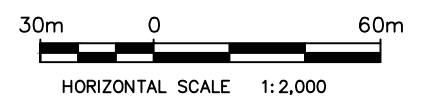
**Orangeville Highlands Phase 2
Orangeville, ON**

DATE ISSUED: March 2019	Figure No.
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PROJECT NO.: 11-237	
REFERENCE: First Base Solutions	

Plotted by: MCCARTNEY on April 4, 2019 at 3:14pm
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- LEGEND:**
- Approx. Property Boundary
 - Watercourse (Monora Creek)
 - - - 30m Watercourse Buffer
 - Permanent Drainage Feature
 - - - Intermittent Drainage Feature
 - ➔ Flow Direction
 - Orangeville Provincially Significant Wetland
 - - - 30m Wetland Buffer
 - 2011 Dripline
 - - - 10m Dripline Buffer
 - ▨ Removed Woodland (0.11ha)
 - ▨ Potential Woodland Compensation (0.11ha)
 - ▨ Proposed Wetland Compensation (0.05ha)
 - Flood Line (Water's Edge, 2019)
 - - - 10m Floodline Buffer
 - Significant Valleyland (Meander Belt Width, Water's Edge 2013)
 - Culvert
 - Category 1 Butternut Location (2018 Assessment)
 - Category 2 Butternut Location with 25m and 50m Buffers (2018 Assessment)
 - Butternut Location (Not Assessed) with 25m and 50m Buffers
 - Hybrid Butternut Location

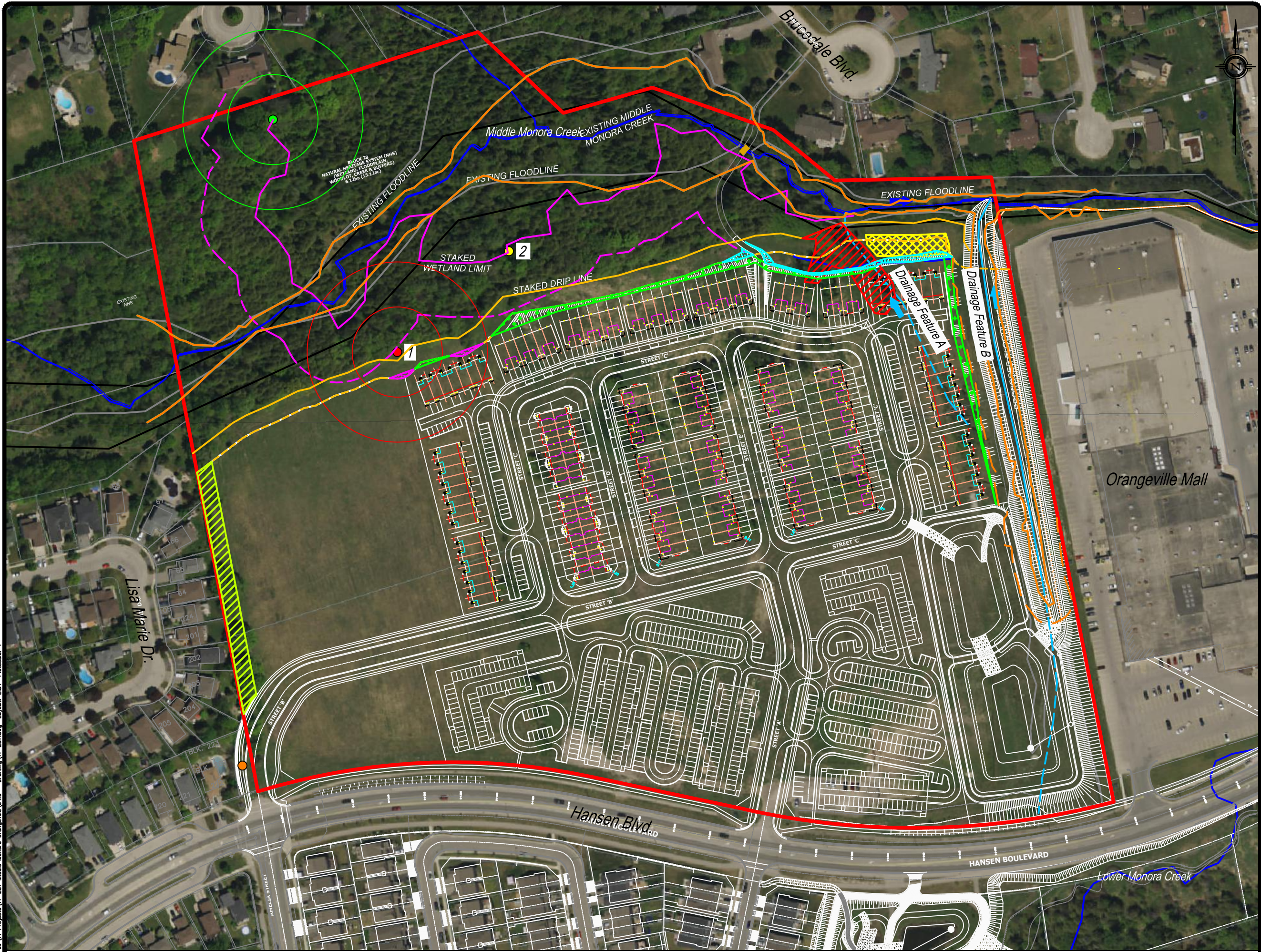


Environmental Constraints

Orangeville Highlands Phase 2
Orangeville, ON

DATE ISSUED:	March 2019	Figure No.
CREATED BY:	JLM	3
PROJECT NO.:	11-237	
REFERENCE:	First Base Solutions	

Plotted by: MCCARTNEY on April 15, 2019 at 12:00pm
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LEGEND:

- Approx. Property Boundary
- Watercourse (Monora Creek)
- - - 30m Watercourse Buffer
- Permanent Drainage Feature
- - - Intermittent Drainage Feature
- ➔ Flow Direction
- Orangeville Provincially Significant Wetland
- - - 30m Wetland Buffer
- 2011 Dripline
- - - 10m Dripline Buffer
- Flood Line (Water's Edge, 2019)
- - - 10m Floodline Buffer
- Significant Valleyland (Meander Belt Width, Water's Edge 2013)
- ▨ Removed Woodland (0.11ha)
- ▨ Potential Woodland Compensation (0.11ha)
- ▨ Proposed Wetland Compensation
- Culvert
- Category 1 Butternut Location (2018 Assessment)
- Category 2 Butternut Location with 25m and 50m Buffers (2018 Assessment)
- Butternut Location (Not Assessed) with 25m and 50m Buffers
- Hybrid Butternut Location
- ▨ Development Encroachment beyond Constraint Limit
- ▨ Transition Grading Encroachment beyond Constraint Limit
- + Developable area to be Dedicated to NHS

Note:
Constraint limit is based on outermost limit of 10m dripline buffer, 10m floodplain buffer, 30m watercourse buffer, and 30m wetland buffer.

30m
0
60m

HORIZONTAL SCALE 1:2,000

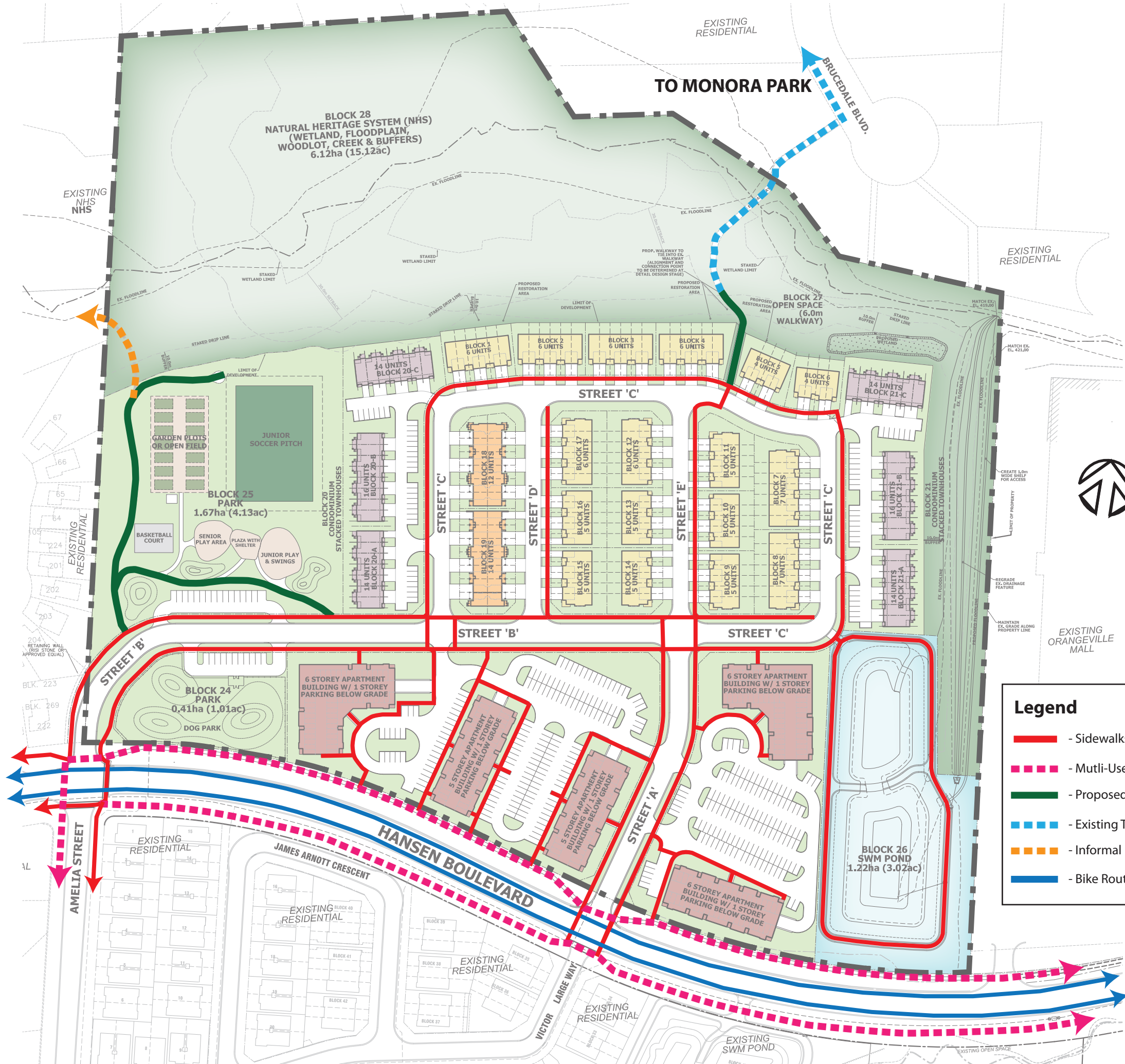
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Proposed Development

Orangeville Highlands Phase 2
Orangeville, ON

DATE ISSUED: March 2019	Figure No.
CREATED BY: JLM	4
PROJECT NO.: 11-237	
REFERENCE: First Base Solutions	

Plotted by: MCCARTNEY on April 15, 2019 at 12:00pm
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Legend

- - Sidewalks / Walkways
- - - - Multi-Use Path
- - Proposed Trail Connection
- - - - Existing Trail
- - - - Informal Footpath
- - Bike Routes



Table 5: Species at Risk Habitat Summary and Assessment, Orangeville Highlands Phase 2

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Assessment
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SC	No status	Nests are typically found near the shoreline of lakes or large rivers, often on forested islands (Cadman <i>et al.</i> , 2007). ESA Protection: N/A	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Bank Swallow	<i>Riparia riparia</i>	THR	No status	Nests in burrows excavated in natural and human-made settings with vertical sand and silt faces. Commonly found in sand or gravel pits, road cuts, lakeshore bluffs, and along riverbanks (COSEWIC, 2013c). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Barn Swallow	<i>Hirundo rustica</i>	THR	No status	Ledges and walls of man-made structures such as buildings, barns, boathouses, garages, culverts and bridges. Also nest in caves, holes, crevices and cliff ledges (COSEWIC, 2011d). ESA Protection: Species and general habitat protection	Potential habitat for Barn Swallow exists on the anthropogenic structures present in adjacent lands. However, the species was not observed on the property during targeted and non-targeted field surveys.
Black Tern	<i>Chlidonias niger</i>	SC	No status	Colonial nesters typically found within marshes. Its preferred nesting habitat is a hemi-marsh (<i>i.e.</i> a wetland with 50:50 open water and emergent vegetation). Nests are usually built on an upturned cattail root, floating vegetation mat or patch of mud (Cadman <i>et al.</i> , 2007). ESA Protection: N/A	Species not expected to occur on the property; habitat not representative of key habitat requirements.
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	THR	Blanding's Turtles are a primarily aquatic species that prefer wetland habitats, lakes, ponds, slow-moving streams, etc., however they may utilize upland areas to search for suitable basking and nesting sites. In general, preferred wetland sites are eutrophic and characterized by clear, shallow water, with organic substrates and high density of aquatic vegetation (COSEWIC, 2005a). ESA Protection: Species and general habitat protection	There are no known occurrences of Blanding's Turtle within 2km of the property. Based on this information, there is no expectation that Blanding's Turtle occurs on or adjacent to the property. Nonetheless, potential habitat for Blanding's Turtle exists within the drainage features and wetland communities present within the study area.
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	No Status	Nests primarily in forage crops (<i>e.g.</i> hayfields and pastures) dominated by a variety of species such as clover, Timothy, Kentucky Bluegrass, tall grass, and broadleaved plants. Also occurs in wet prairie, graminoid peatlands, and abandoned fields dominated by tall grasses. Does not generally occupy fields of row crops (<i>e.g.</i> corn, soybeans, wheat) or short-grass prairie. Sensitive to habitat size and has lower reproductive success in small habitat fragments (COSEWIC, 2010b). ESA Protection: Species and general habitat protection	Species not observed on the property by Aboud & Associates Inc. 2012 breeding birds surveys or within Azimuth's 2017 breeding bird surveys. Poor quality potential habitat with high forb content and minimal thatch development within the cultural meadow.
Broad Beech Fern	<i>Phygopteris hexagonoptera</i>	SC	SC	Rich soils in deciduous forests, such as Maple-Beech forests (MNRF, 2016). ESA Protection: N/A	Species not expected to occur on the property; habitat not representative of key habitat requirements.

Table 5: Species at Risk Habitat Summary and Assessment, Orangeville Highlands Phase 2

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Assessment
Butler's Gartersnake	<i>Thamnophis butleri</i>	END	THR	Old fields, disturbed sites, urban and industrial sites and Tallgrass Prairie. Essential habitat components includes a dense cover of grasses or herbs with a heavy thatch layer and an abundance of earthworms as prey (COSEWIC, 2010e). ESA Protection: Species and regulated habitat protection	Species not expected to occur on the property; habitat opportunities exist, but property is located outside of known distribution areas.
Butternut	<i>Juglans cinerea</i>	END	END	Commonly found in riparian habitats, but is also found in rich, moist, well-drained loams, and well-drained gravels. Butternut is intolerant of shade (COSEWIC, 2003a). ESA Protection: Species and general habitat protection	Three (3) individual Butternut were observed during field surveys. Additional potential habitat exists throughout the forest communities within the study area.
Canada Warbler	<i>Cardellina canadensis</i>	SC	THR	Wet, mixed deciduous-coniferous forests with a well developed shrub layer. Shrub marshes, Red-Maple stands, cedar stands, Black Spruce swamps, larch and riparian woodlands along rivers and lakes (COSEWIC, 2008b). ESA Protection: N/A	No suitable habitat present on the property as the forest communities do not have a well developed shrub layer typical for Canada Warbler. Canada Warbler was not documented during field surveys, including the dawn breeding bird surveys.
Cerulean Warbler	<i>Dendroica cerulea</i>	THR	SC	Associated with large tracts of mature deciduous forest with tall trees and an open understorey. Found in both wet bottomland forests and upland areas (COSEWIC, 2010a).	Despite the presence of potential habitat within the study area, no activity for this species was documented during breeding surveys.
Chimney Swift	<i>Chaetura pelagica</i>	THR	THR	Nests primarily in chimneys though some populations (<i>i.e.</i> in rural northern areas) may nest in cavity trees (COSEWIC, 2007a). Recent changes in chimney design may be a significant factor in recent declines in numbers (Cadman <i>et al.</i> , 2007). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Potential habitat for Chimney Swift exists on the anthropogenic structures present in adjacent lands.
Common Nighthawk	<i>Chordeiles minor</i>	SC	THR	Open habitats including sand dunes, beaches recently logged/burned over areas, forest clearings, short grass prairies, pastures, open forests, bogs, marshes, lakeshores, gravel roads, mine tailings, quarries, and other open relatively clear areas (COSEWIC, 2007d). ESA Protection: N/A	Potential habitat for Common Nighthawk exists within the cultural meadow community within the study area.
Eastern Meadowlark	<i>Sturnella magna</i>	THR	No status	Most common in grassland, pastures, savannahs, as well as anthropogenic grassland habitats, including hayfields, weedy meadows, young orchards, golf courses, restored surface mines, <i>etc.</i> Occasionally nest in row crop fields such as corn and soybean, but there are considered low-quality habitat. Large tracts of grassland are preferred over smaller fragments and the minimum area required is estimated at 5ha (COSEWIC, 2011c). ESA Protection: Species and general habitat protection	Eastern Meadowlark were observed within the cultural meadow during Azimuth's 2017 and Aboud's 2012 breeding bird surveys.

Table 5: Species at Risk Habitat Summary and Assessment, Orangeville Highlands Phase 2

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Assessment
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	SC	SC	Found in wetland habitats with both flowing and standing water such as marshes, bogs, fens, ponds, lake shorelines and wet meadows. Most sightings occur near the water's edge (COSEWIC, 2012c). ESA Protection: N/A	Potential habitat for Eastern Ribbonsnake exists within the drainage features and wetland communities present within the study area.
Eastern Small-footed Myotis	<i>Myotis Lleibii</i>	END	END	Generally occurs in mountainous or rocky regions as well as in buildings, on the face of rock bluffs and beneath slabs of rock and stones. Hibernation is typically confined to caves and old mines (Best and Jennings, 1997). ESA Protection: Species and general habitat protection	Species not expected to occur on the property; habitat not representative of key habitat requirements.
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	THR	THR	Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances, are preferred nesting habitats (COSEWIC, 2009a). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Eastern Wood-pewee	<i>Contopus virens</i>	SC	No status	Mostly in mature and intermediate-age deciduous and mixed forests having an open understorey. It is often associated with forests dominated by Sugar Maple and oak. Usually associated with forest clearings and edges within the vicinity of its nest (COSEWIC, 2012e). ESA Protection: N/A	Despite the presence of potential habitat for Eastern Wood-pewee within the deciduous and mixed forests within the study area, this species was not documented during breeding bird surveys.
Grasshopper Sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum pratensis</i>	SC	No status	Typically breeds in large human-created grasslands (≥ 5 ha), such as pastures and hayfields, and natural prairies, such as alvars, characterized by well-drained, often poor soil dominated by low, sparse perennial herbaceous vegetation (COSEWIC, 2013a). ESA Protection: N/A	Potential habitat for Grasshopper Sparrow exists within the cultural meadow present within the study area. However, breeding bird surveys did not detect this species.
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	SC	THR	Areas of early successional scrub surrounded by mature forests including dry uplands, swamp forests, and marshes (COSEWIC, 2006a). ESA Protection: N/A	No suitable habitat present on the property typical of Golden-winged Warbler. Golden-winged Warbler was not documented during field surveys, including the dawn breeding bird surveys.
Hart's-tongue Fern	<i>Asplenium scolopendrium</i> var. <i>americanum</i>	SC	SC	Grows on calcareous rocks in deep shade on slopes in deciduous forest. Most occurrences are in maple-beech forest (MNR, 2016).	Species not expected to occur on the property; habitat not representative of key habitat requirements.

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Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Assessment
Henslow's Sparrow	<i>Ammodramus henslowii</i>	END	END	Requires grassland habitat and occurs more frequently and at higher densities in large patches of suitable habitat. Nests in tallgrass prairie, wet meadow, and marsh habitats as well as agricultural grasslands, lightly grazed pasture and grasslands on reclaimed surface mines (COSEWIC, 2011a). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	END	THR	Deciduous or mixed upland forests containing, or adjacent to, suitable breeding ponds. Breeding ponds are normally ephemeral, or vernal, woodland pools that dry in late summer. Terrestrial habitat is in mature woodlands that have small mammal burrows or rock fissures that enable adults to over-winter underground below the frost line (COSEWIC, 2010e). ESA Protection: Species and general habitat protection	There is no regulated habitat for Jefferson Salamander associated with the property. There are no records for Jefferson Salamander within the current NHIC database (2019) and no records for this species according to the online Reptile and Amphibian Atlas. Jefferson Salamanders are often associated with intact deciduous forests with an undisturbed forest floor and unpolluted breeding ponds. They are found only in southern Ontario, mainly along the Niagara Escarpment. The property is not located along the Niagara Escarpment and contains mixed upland and wetland forested habitat. No ephemeral or vernal pools were documented within the woodland community thus precluding it as potential habitat for salamanders, including Jefferson Salamander.
King Rail	<i>Rallus elegans</i>	END	END	Wide variety of freshwater marsh habitat types with cattails. Large marshes, especially those that contain a range of water level conditions and a mosaic of habitats, are preferred (COSEWIC, 2011b). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Least Bittern	<i>Ixobrychus exilis</i>	THR	THR	Breed strictly in marshes of emergents (usually cattails) that have relatively stable water levels and interspersed areas of open water (COSEWIC, 2009b). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Little Brown Myotis	<i>Myotis lucifugus</i>	END	END	Forests and regularly aging human structures as maternity roost sites. Regularly associated with attics of older buildings and barns for summer maternity roost colonies. Overwintering sites are characteristically mines or caves, but can often include buildings (MNR, 2014) (COSEWIC, 2013b). ESA Protection: Species and general habitat protection	Potential habitat for Little Brown Myotis exists within the forest and swamp communities within the study area.

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Loggerhead Shrike	<i>Lanius ludovicianus</i>	END	END (<i>mirgrans</i> subspecies)	Breeding habitat characterized by open areas dominated by grasses and/or forbs, interspersed with scattered shrubs or small trees and bare ground. Suitable habitat includes pasture, old fields, prairie, savannah, pinyon-juniper woodland, shrub-steppe and alvar (COSEWIC, 2014a). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Louisiana Waterthrush	<i>Parkesia motacilla</i>	THR	SC	Occupies specialized habitat, showing a strong preferences for nesting and wintering along relatively pristine headwater streams and wetlands situated in large tracts of mature forest. Prefers running water, but also inhabits heavily wooded swamps and vernal or semi-permanent pools (COSEWIC, 2015a). ESA Protection: N/A	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Massasauga (Great Lakes - St. Lawrence population)	<i>Sistrurus catenatus</i>	THR	THR	In Georgian Bay, Massasaugas use bedrock barrens, conifer swamps, beaver meadows, fens, bogs, and shoreline habitats. On the upper Bruce Peninsula, forested habitats are used during hibernation and open, wetland, and edge habitat with canopy closure <50% in mid-late summer (COSEWIC, 2012a). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; distribution maps created by the Ontario Reptile and Amphibian Atlas (Ontario Nature, 2016) do not show the study area as being located within proximity to known population areas for this species.
Monarch	<i>Danaus plexippus</i>	SC	SC	Breeding habitat is confined to sites where milkweeds, the sole food of caterpillars, grow. Milkweeds grow in a variety of environments, including meadows in farmlands, along roadsides and in ditches, open wetlands, dry sandy areas, short and tall grass prairie, river banks, irrigation ditches, arid valleys, and south-facing hills (COSEWIC, 2010c). ESA Protection: N/A	Potential habitat for Monarch exists within the cultural meadow present in the study area.
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	SC	SC	Inhabits clear, coolwater streams. Adults are found in fast flowing riffles comprised of rock or gravel (MNRF, 2016). ESA Protection: N/A	Species not expected to occur on the property; habitat not representative of key habitat requirements.
Northern Myotis	<i>Myotis septentrionalis</i>	END	END	Maternity roost sites are generally located within deciduous and mixed forests and focused in snags including loose bark and cavities of trees. Overwintering sites are characteristically mines or caves (COSEWIC, 2013b). ESA Protection: Species and general habitat protection	Potential habitat for Northern Myotis exists within the forest and swamp communities within the study area.
Northern Map Turtle	<i>Graptemys geographica</i>	SC	SC	Inhabits rivers and lakes where it basks on emergent rocks, banks, logs and fallen trees. Prefer shallow, soft-bottomed aquatic habitats with exposed objects for basking (COSEWIC, 2012d). ESA Protection: N/A	Species not expected to occur on the property; habitat not representative of key habitat requirements.

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Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Assessment
Peregrine Falcon	<i>Falco peregrinus</i>	SC	SC (<i>anatum/tundrius</i>)	Most nest on cliff ledges or crevices, but some will use tall buildings or bridges near good foraging areas. Nests are typically close to bodies of water (COSEWIC, 2007e). ESA Protection: N/A	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	SC	THR	Occurs in open deciduous forests, particularly those dominated by oak and beech, grasslands, forest edges, orchards, pastures along rivers and roads, urban parks, golf courses, cemeteries, beaver ponds and timber stands that have been treated with herbicides (COSEWIC, 2007b). ESA Protection: N/A	Potential habitat for Red-headed Woodpecker exists within the deciduous forest (FOD3-1) community within the study area. However, this community is very limited in overall area, and not considered ideal. Furthermore, breeding bird surveys did not detect this species.
Redside Dace	<i>Clinostomus elongatus</i>	END	SC	Found in pools and slow-flowing sections of relatively small, clear headwater streams with both pool and riffle habitats and a moderate to high gradient. These streams typically flow through meadows, pasture or shrub overstory, and have abundant overhanging riparian vegetation (COSEWIC, 2007c). ESA Protection: Species and general habitat protection.	Species not expected to occur on the property; Department of Fisheries and Oceans Canada mapping does not identify any aquatic SAR within Middle Monora Creek (Appendix C); habitat not representative of key habitat requirements.
Snapping Turtle	<i>Chelydra serpentina</i>	SC	SC	Habitat is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Often located in ponds, sloughs, shallow bays or river edges and slow streams, or areas combining several of these wetland habitats (COSEWIC, 2008a). ESA Protection: N/A	Potential habitat for Snapping Turtle exists with the drainage features and wetland communities present within the study area.
Tri-colored Bat	<i>Perimyotis subflavus</i>	END	END	Maternity roost sites include forests and modified landscapes (barns or human-made structures). Overwintering sites include mines and caves (COSEWIC, 2013b). ESA Protection: Species and general habitat protection	Potential habitat for Eastern Tri-colored Bat exists within the forest and swamp communities within the study area.
Wood Thrush	<i>Hylocichla mustelina</i>	SC	No status	Found in moist, deciduous hardwood or mixed stands, often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches (COSEWIC, 2012b). ESA Protection: N/A	Despite the presence of potential habitat for Eastern Wood-pewee within the deciduous and mixed forests within the study area, this species was not documented during breeding bird surveys.
Yellow-breasted Chat	<i>Icteria virens</i>	END	SC	Dense riparian shrubland including early shrubby regrowth on abandoned agricultural fields, power-line corridors, clear-cuts, fencerows, forest edges and openings, and areas near streams, ponds and swamps (COSEWIC, 2011e). ESA Protection: Species and general habitat protection	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.

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Yellow Rail	<i>Coturnicops noveboracensis</i>	SC	SC	Nest in wet marshy areas of short grass-like vegetation. The habitat must remain wet throughout the breeding season (COSEWIC, 2009c). ESA Protection: N/A	Species not observed on the property during field surveys. Species not expected to occur on the property; habitat not representative of key habitat requirements.

¹ Habitat as outlined within the MNR's Species at Risk in Ontario website files (<https://www.ontario.ca/environment-and-energy/species-risk-ontario-list>), or Species Specific COSEWIC Reports referenced in this document.

Species at Risk in Ontario List (June 13, 2017)

Best, T., and J. Jennings. 1997. Mammalian Species, *Myotis leibii*. The American Society of Mammalogists. No. 547, pp. 1-6, 5 figs.

Cadman, M., D. Sutherland, G. Beck, D. Lepage and A. Couturier. 2007. Atlas of the Breeding Birds of Ontario 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field

COSEWIC. 2003a. COSEWIC assessment and status report on the Butternut *Juglans cinerea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 32 pp.

COSEWIC. 2005a. COSEWIC assessment and update status report on the Blanding's Turtle *Emydoidea blandingii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. viii + 40 pp.

COSEWIC. 2007a. COSEWIC assessment and update status report on the Chimney Swift *Chaetura pelagica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 49 pp.

COSEWIC. 2007b. COSEWIC assessment and status report on the Red-headed Woodpecker *Melanerpes erythrocephalus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 27 pp.

COSEWIC. 2007c. COSEWIC assessment and update status report on the Redside Dace *Clinostomus elongatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 59 pp.

COSEWIC. 2007d. COSEWIC assessment and status report on the Common Nighthawk *Chordeiles minor* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 35 pp.

COSEWIC. 2007e. COSEWIC assessment and status report on the Peregrine Falcon *Falco peregrinus* (*pealei* subspecies - *Falco peregrinus* and *pealei anatum/tundrius* - *Falco peregrinus anatum/tundrius*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 45 pp.

COSEWIC. 2008a. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.

COSEWIC. 2009a. COSEWIC assessment and update status report on the Whip-poor-will *Caprimulgus vociferus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 28 pp.

COSEWIC. 2009b. COSEWIC assessment and update status report on the Least Bittern *Ixobrychus exilis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 36 pp.

COSEWIC. 2009c. COSEWIC assessment and status report on the Yellow Rail *Coturnicops noveboracensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 32 pp.

COSEWIC. 2010a. COSEWIC assessment and update status report on the Cerulean Warbler *Dendroica cerulea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.

COSEWIC. 2010b. COSEWIC assessment and update status report on the Bobolink *Dolichonyx oryzivorus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 42 pp.

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COSEWIC. 2011a. COSEWIC assessment and update status report on the Henslow's Sparrow *Ammodramus henslowii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 37 pp.

COSEWIC. 2011b. COSEWIC assessment and update status report on the King Rail *Rallus elegans* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 32 pp.

COSEWIC. 2011c. COSEWIC assessment and update status report on the Eastern Meadowlark *Sturnella magna* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.

COSEWIC. 2011d. COSEWIC assessment and update status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.

COSEWIC. 2011e. COSEWIC assessment and update status report on the Yellow-breasted Chat *auricollis* subspecies *Icteria virens auricollis* and the Yellow-breasted Chat *virens* subspecies *Icteria virens virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xvi + 51 pp.

COSEWIC. 2012a. COSEWIC assessment and update status report on the Massasauga *Sistrurus catenatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 84 pp.

COSEWIC. 2012b. COSEWIC assessment and status report on the Wood Thrush *Hylocichla mustelina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp.

COSEWIC. 2012c. COSEWIC assessment and status report on the Eastern Ribbonsnake *Thamnophis sauritus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 39 pp.

COSEWIC. 2012d. COSEWIC assessment and status report on the Northern Map Turtle *Graptemys geographica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 63 pp.

COSEWIC. 2012e. COSEWIC assessment and status report on the Eastern Wood-pewee *Contopus virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp.

COSEWIC. 2013a. COSEWIC assessment and status report on the Grasshopper Sparrow *pratensis* subspecies *Ammodramus savannarum pratensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 36 pp.

COSEWIC. 2013b. COSEWIC assessment and update status report on the Little Brown Myotis *Myotis lucifugus*, Northern Myotis *Myotis septentrionalis* and Tri-colored Bat *Perimyotis subfalvus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp.

COSEWIC. 2013c. COSEWIC assessment and update status report on the Bank Swallow *Riparia riparia* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 48 pp.

COSEWIC. 2014a. COSEWIC assessment and update status report on the Loggerhead Shrike *Lanius ludovicianus* ssp. and the Prairie subspecies *Lanius ludovicianus excubitorides* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 51 pp.

COSEWIC. 2015a. COSEWIC assessment and status report on the Louisiana Waterthrush *Parkesia motacilla* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 58 pp.

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