Figure 4b: Confirmed and Candidate SWH

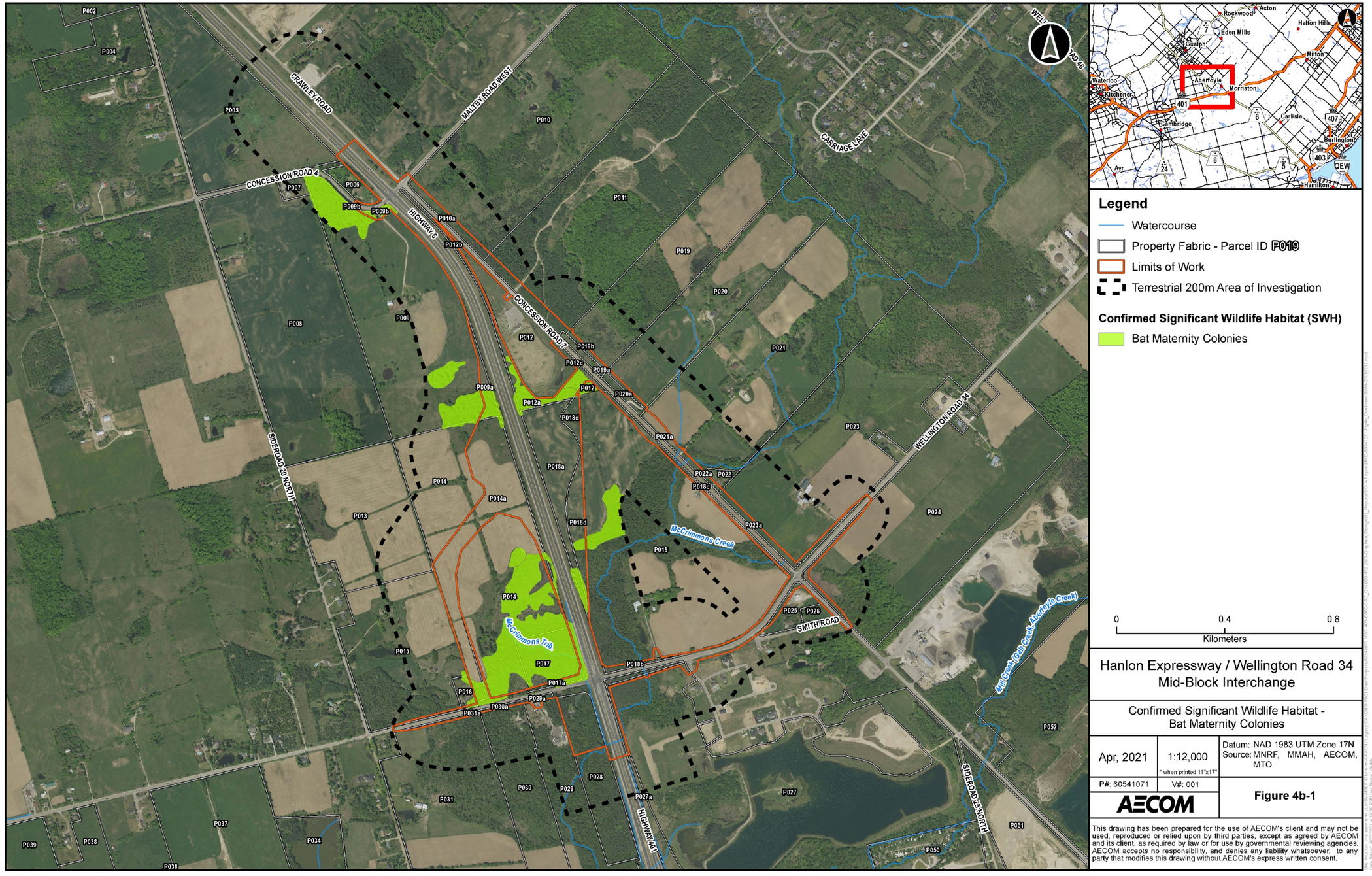
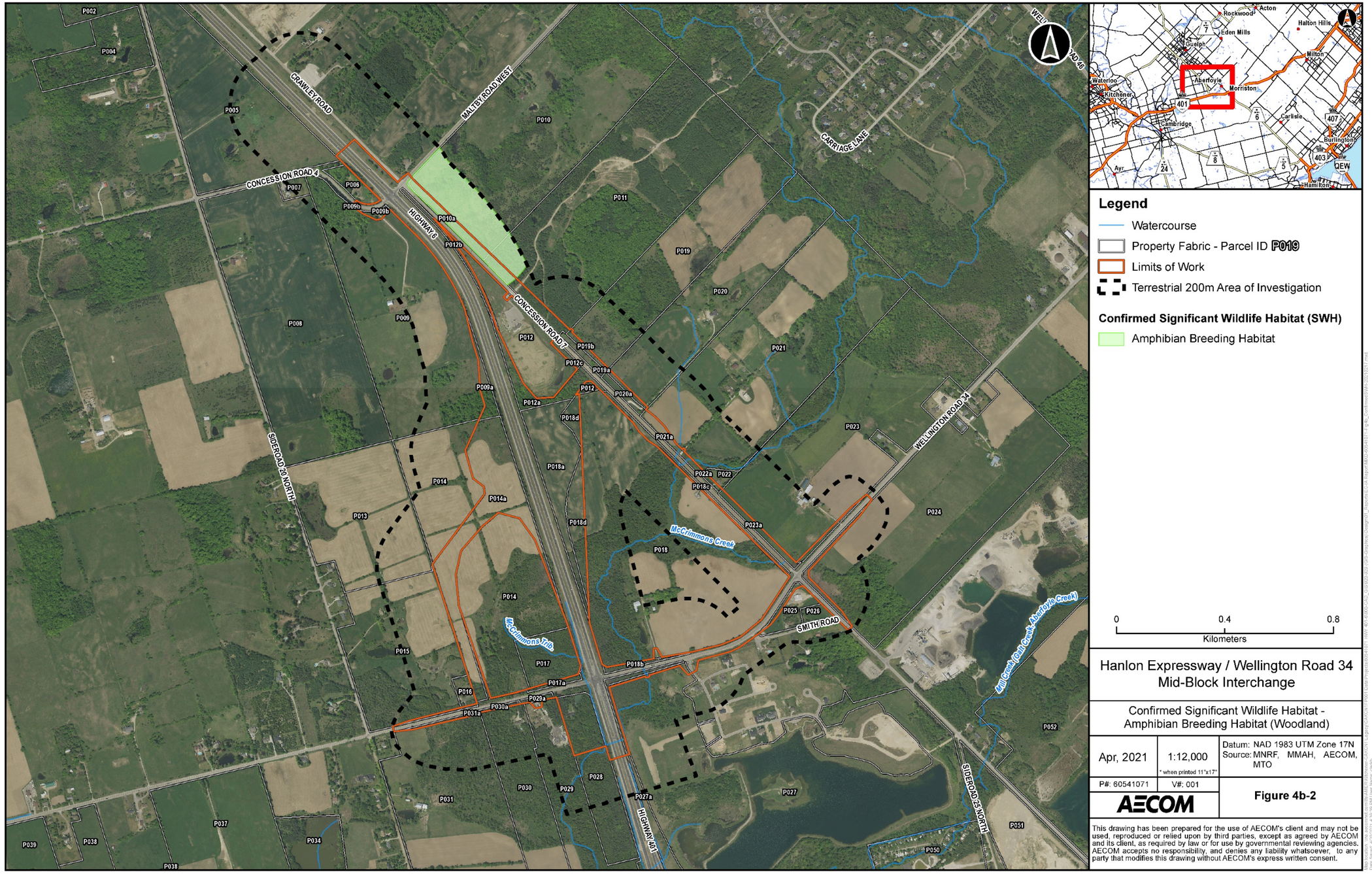


Figure 4b: Confirmed and Candidate SWH



Hanlon Expressway / Wellington Road 34 Mid-Block Interchange

Confirmed Significant Wildlife Habitat - Amphibian Breeding Habitat (Woodland)

Apr, 2021	1:12,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: MNRF, MMAH, AECOM, MTO
P#: 60541071	V#: 001	**Figure 4b-2**

AECOM

Figure 4b: Confirmed and Candidate SWH

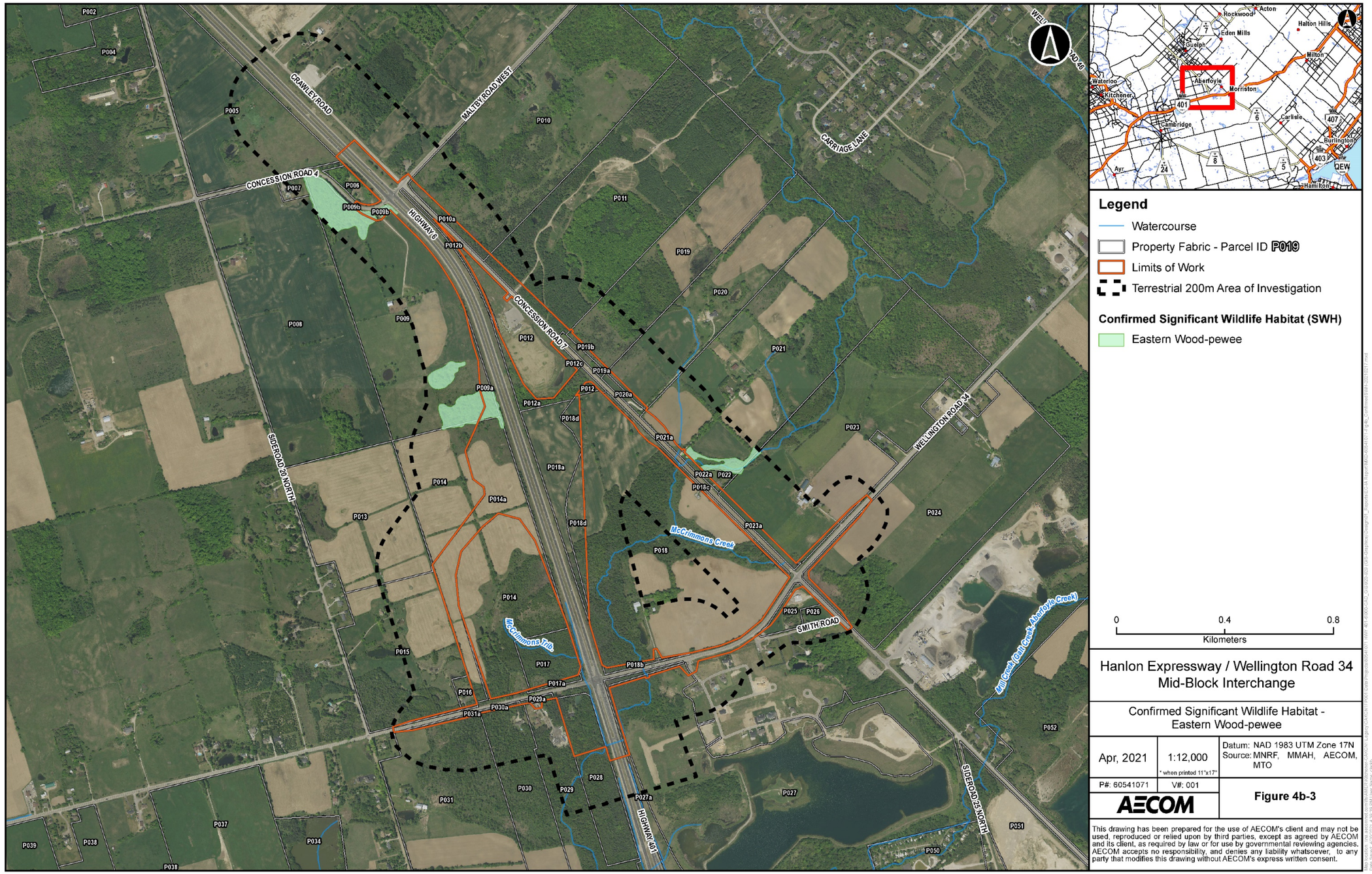


Figure 4b: Confirmed and Candidate SWH

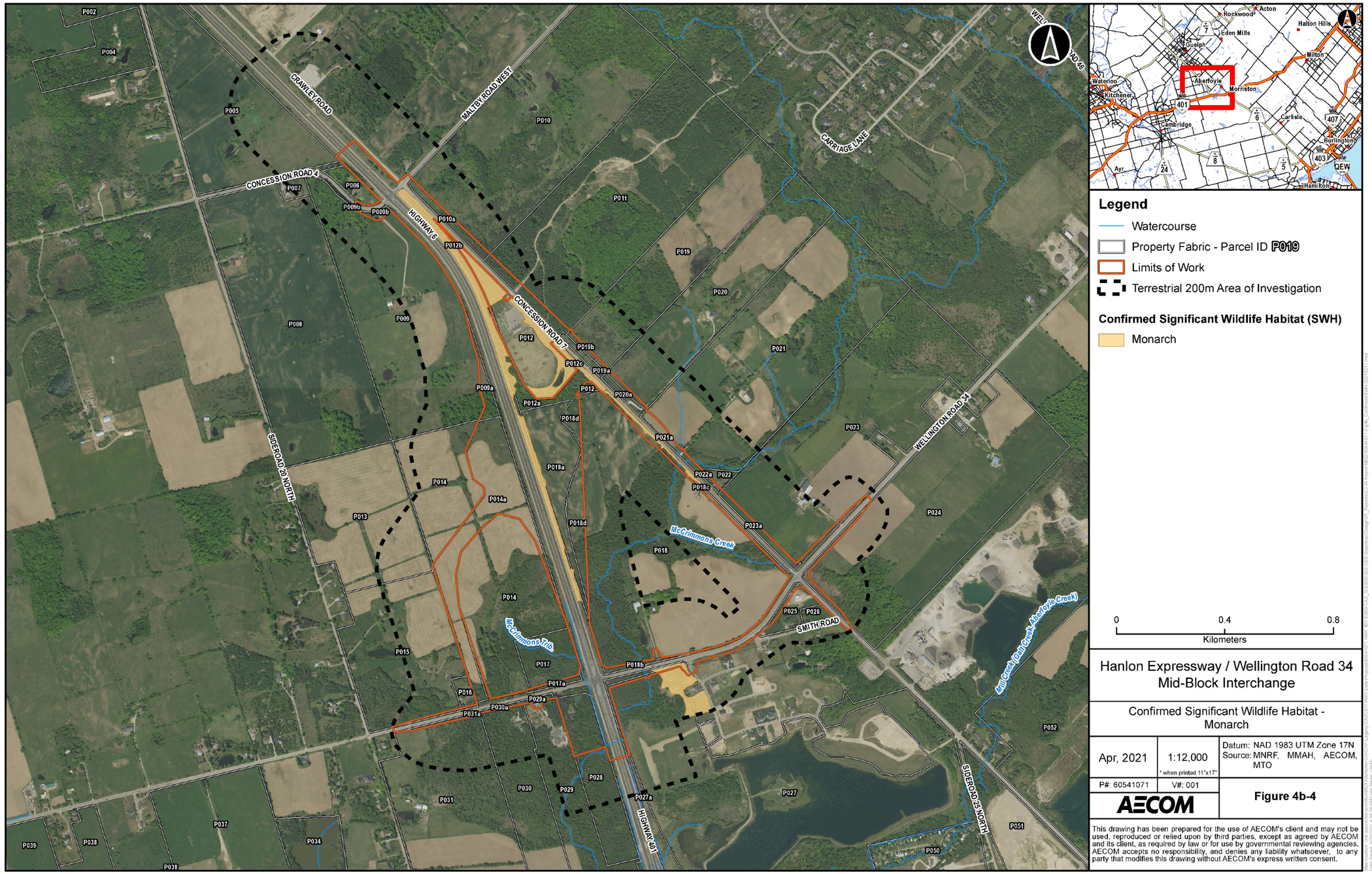


Figure 4b: Confirmed and Candidate SWH

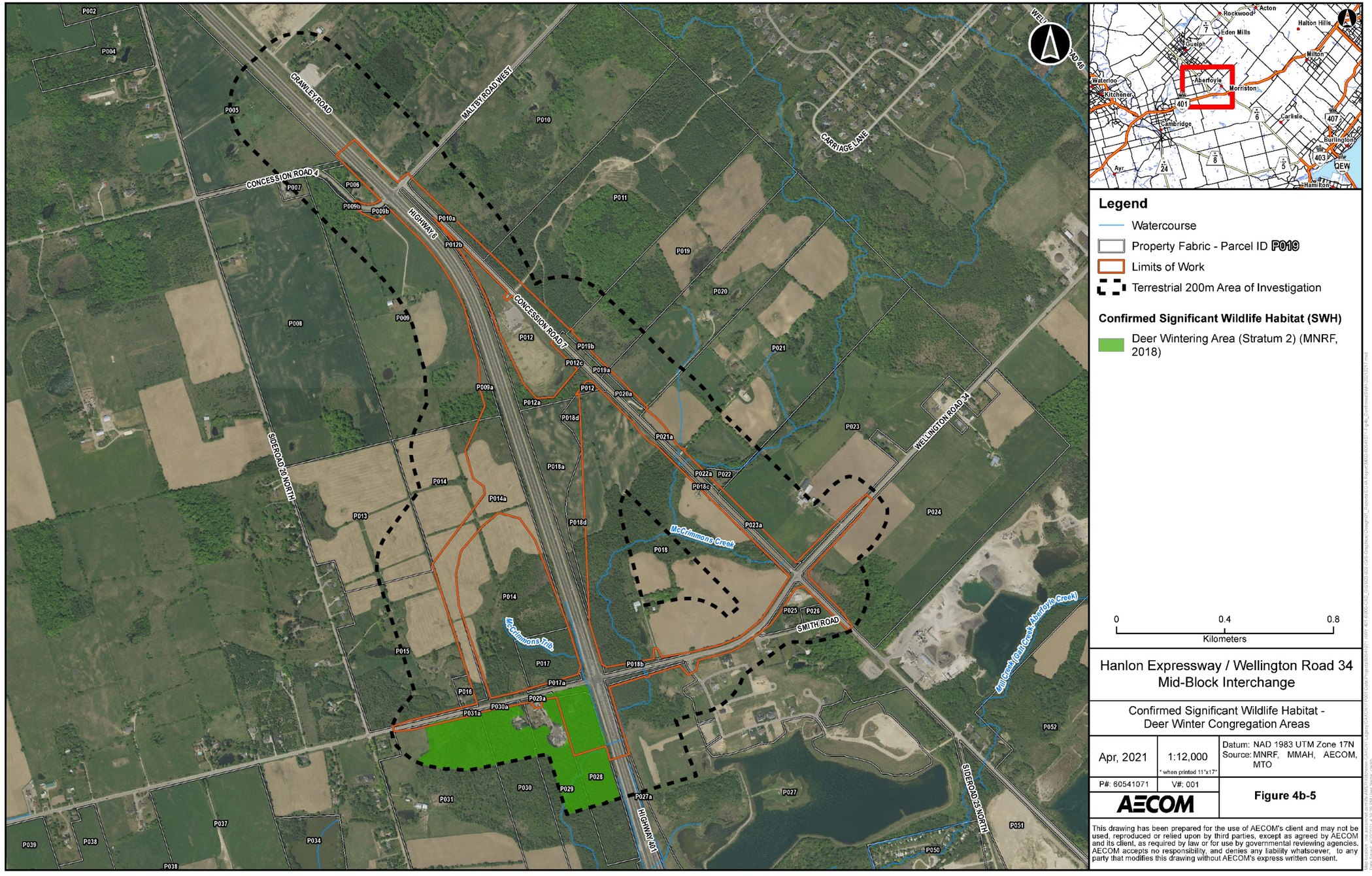
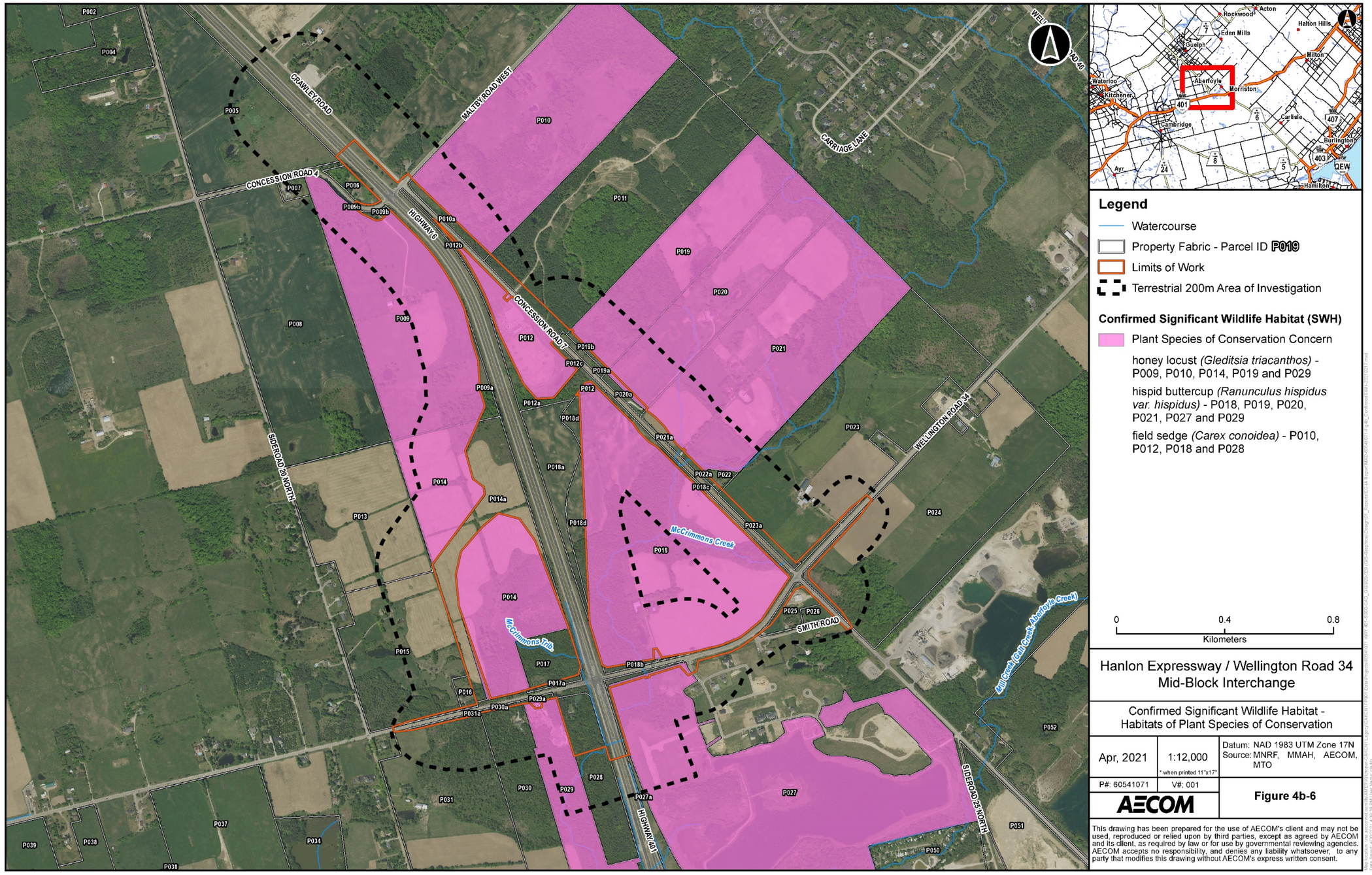


Figure 4b: Confirmed and Candidate SWH



A total of 32 species were observed incidentally during field investigation. These included two (2) amphibian, 13 bird, 11 insect, three (3) mammal and three (3) reptile species. These observations include barn swallow, a species designated as Threatened under the *ESA*, as well as monarch and snapping turtle, both of which are designated as Special Concern. SAR are discussed in **Section 4.4** below, while SOCC are addressed through SWH as discussed above in **Section 4.3**. The remaining 29 species observed are considered common and secure in Ontario. A complete list of the species observed incidentally is provided in **Appendix F.**

Wildlife Passage

While riparian vegetation along the watercourses within the Study Area provide some level of crossing opportunity for wildlife; the existing culverts are small with openness ratios varying from 0.01 to 0.08. These openness ratios[2] indicate that typically only the smallest wildlife, such as amphibians or snakes, could use these structures to safely cross under the road. A summary of the dimensions and openness ratios of the existing culverts within the Study Area is provided in **Table 8**. The location of culverts are illustrated on **Figure 3**.

The riparian corridors along Mill Creek, particularly at the crossing of Wellington Road 34 (SR-4), offer the greatest potential to maintain wildlife linkages to larger forests, wetlands and other natural habitats within the broader landscape. Mill Creek connects many otherwise isolated wetland features of the Mill Creek Puslinch PSW complex, particularly on the east side of Highway 6. Furthermore, downstream of the SR-4 and outside of the Study Area, there is a large rehabilitated quarry in which an abundance of turtles were noted. Considering these factors, it was assumed that SR-4 permits the movement of wetland dependant species, such as turtles between the Mill Creek Puslinch PSW features and the rehabilitated quarry. It is also anticipated that this culvert will be replaced with a larger concrete box culvert through detail design process. Design considerations and landscape treatments to enhance wildlife passage associated with this culvert will be provided in **Section 5.3.2**.

The crossings of McCrimmon's Tributary (SR-6, SR-7(A&B) and H6-2) also offer crossing opportunities. They link several otherwise isolated wetlands features of the Mill Creek Puslinch PSW complex on the west side of Highway 6. However, SR-6 and SR7-b are located closer to the intersection of Wellington Road 34 and Highway 6, thus exposing wildlife to additional risk of wildlife-vehicle collisions. No work is currently proposed at H6-2, so there are currently no opportunities to increase wildlife passage at this location.

2. Openness ratios calculate for CSP's using the following formula. OR = [πr2]/Length *where π= 3.14 and r= radius of the CSP opening. However were culverts were elliptical in shape, the largest dimension was treated at the diameter for calculations of radius..

Table 8: Summary of Existing Culverts Within the Limits of Work

Culvert ID	Size (m)	Length (m)	Openness Ratio	Material	Notes
H6-2	1.58 X 2.13	45	0.07	CSP	Existing culvert that conveys flows across Hanlon Expressway, and is located along McCrimmons Tributary. There is no proposed work on this culvert. Culvert is elliptical in shape.
SR-4	1	38	0.02	CSP	-
SR-5	1	20.15	0.04	-	Existing culvert will be replaced with an open bottom concrete box culvert.
SR-6	0.8	43.18	0.01	-	Existing culvert will be replaced with a new culvert. No information available.
SR-7A	1	24.41	0.03	-	Existing culvert located along a tributary of McCrimmons Creek. This culvert will be replaced with an open bottom concrete box culvert.
SR-7B	0.75	24.48	0.02		Existing culvert conveys flows along the west side ditch of Highway 6N. This culvert will be replaced.
CR7-1	1	11.91	0.07	CSP	-
CR7-2	0.45	12	0.01	CSP	-
CR7-3	0.50 x 0.35	12.95	0.01	CSP	Culvert is elliptical in shape.
CR7-4	0.30 x 0.15	26	0.01	CSP	Culvert is elliptical in shape.

4.3.3 Determination of Significance

A total of seven (7) candidate SWH types and four (4) confirmed SWH types were identified within the Study Area. Candidate habitat for 11 SOCC and confirmed habitat for five (5) SOCC was found to be present within the Study Area. A summary of the identified SWH types is provided in **Table 9**.

Table 9: Summary of SWH Within the Study Area

Candidate SWH Type	Confirmed SWH Type
■ bat maternity colonies ■ marsh breeding bird habitat ■ reptile hibernacula ■ terrestrial crayfish ■ turtle wintering areas ■ waterfowl nesting area ■ Special Concern and rare wildlife species: – monarch, west Virginia white, Canada warbler, golden-winged warbler, eastern wood-pewee, plant SOCC (honey locust, hispid buttercup and field sedge), red-headed woodpecker, eastern ribbonsnake and snapping turtle	■ amphibian breeding habitat (woodland) ■ bat maternity colonies ■ deer winter areas ■ Special Concern and rare wildlife species: – monarch, eastern wood-pewee and plant SOCC (honey locust, hispid buttercup and field sedge),

4.4 Species at Risk

4.4.1 Background Data

The background review and consultation with the MNRF identified the potential for 18 SAR to reside within the vicinity of the Study Area. Of these 18 records, eight (8) are species listed as Endangered, eight (8) are species listed as Threatened, and one (1) record is listed as Extirpated. One (1) restricted[3] species record was also identified. A status of Extirpated is defined as a species that is no longer present in Ontario. The restricted species was dated from 1985. Given that the record is greater than 20 years old, it is considered a historical record and the species is not considered likely to persist within the Study Area. As such, neither the Extirpated nor the historical restricted species records were carried forward in the consideration of SAR potentially present within the Study Area.

A SAR habitat assessment was undertaken on the remaining 16 records to determine if suitable SAR habitat for these 16 species was present within the Study Area. This assessment was based on the characterization of vegetation communities using aerial photo interpretation and then further refined considering the results of the field investigations. The SAR habitat assessment is provided in **Appendix H** and includes habitat preferences, potentially suitable habitat within the Study Area and an assessment of potential occurrence in the Study Area. Based on the SAR assessment provided in **Appendix H**, it was determined that suitable habitat for 12 SAR may occur within the Study Area (refer to **Table 10**).

3. Restricted species are commercially exploited or sensitive to disturbance; these species could be harmed if data aren't stored and shared securely. The names of the species are withheld from publicly available data.

Table 10: SAR Potentially Present within the Study Area

Taxa	Common Name	Latin Name	S-Rank[1]	SARO Status[2]	SARA Status[3]	Source
Amphibians	Jefferson salamander	*Ambystoma jeffersonianum*	S2	END	END	ORRA, MNRF Correspondence
Amphibians	unisexual ambystoma	*Jefferson salamander dependant population*	S2	END	-	ORRA, MNRF Correspondence
Birds	barn swallow	*Hirundo rustica*	S4B	THR	THR	OBBA, MNRF Correspondence
Birds	bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	OBBA, MNRF Correspondence
Birds	eastern meadowlark	*Sturnella magna*	S4B	THR	THR	OBBA, MNRF Correspondence
Birds	eastern whip-poor-will	*Antrostomus vociferus*	S4B	THR	THR	OBBA, MNRF Correspondence
Mammals	eastern small-footed myotis	*Myotis leibii*	S2S3	END	-	BCI, MNRF Correspondence
Mammals	little brown myotis	*Myotis lucifugus*	S4	END	END	BCI, MNRF Correspondence
Mammals	northern myotis	*Myotis septentrionalis*	S3	END	END	BCI, MNRF Correspondence
Mammals	tri-colored bat	*Pipistrellus subflavus*	S3?	END	END	BCI, MNRF Correspondence
Plant	butternut	*Juglans cinera*	S3?	END	END	N/A
Reptile	Blanding's turtle	*Emydoidea blandingii*	S3	THR	THR	ORRA, MNRF Correspondence

[1] ***S-rank:*** *The natural heritage provincial ranking system (provincial S-rank) is used by the MNRF Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities.* The following status definitions were taken from NatureServe Explorer's (2015) National and Subnational Conservation Status Definitions available at http://explorer.natureserve.org/nsranks.htm:

SX - Presumed Extirpated—Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

SH- Possibly Extirpated (Historical)—Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become SH without such a 20 to 40 year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for.

S1 - Critically Imperiled—Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.

S2-Imperiled—Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.

S3 - Vulnerable—Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 - Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 - Secure—Common, widespread, and abundant in the nation or state/province.

SNR - Unranked—Province conservation status not yet assessed.

SU - Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNA - Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#S# - Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

Breeding Status Qualifiers

B - Breeding—Conservation status refers to the breeding population of the species in the province.

N - Nonbreeding—Conservation status refers to the non-breeding population of the species in the province.

M - Migrant—Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.

Note: A breeding status is only used for species that have distinct breeding and/or non-breeding populations in the province. A breeding-status S-rank can be coupled with its complementary non-breeding-status S-rank if the species also winters in the province, and/or a migrant-status S-rank if the species occurs regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. The two (or rarely, three) status ranks are separated by a comma (e.g., "S2B,S3N" or "SHN,S4B,S1M").

Other Qualifiers

? -Inexact or Uncertain—Denotes inexact or uncertain numeric rank. (The ? qualifies the character immediately preceding it in the S-rank.)

[2]ESA Status: *The Endangered Species Act 2007 (ESA) protects species listed as Threatened and Endangered on the SARO List on provincial and private land. The Minister lists species on the SARO list based on recommendations from the Committee on the Status of Species at Risk in Ontario (COSSARO), which evaluates the conservation status of species occurring in Ontario. The following are the categories of at risk:*

END *(Endangered) – A species facing imminent extinction or extirpation in Ontario.*

THR *(Threatened) – Any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a large portion of its Ontario range if the limiting factors are not reversed.*

SC *(Special Concern) – A species that may become threatened or endangered due to a combination of biological characteristics and identified threats.*

NAR *(Not at Risk) – A species that has been evaluated and found to be not at risk.*

Note: *species with "-" represent those that were not evaluated by COSSARO.*

[3] SARA Sched. 1 Status:

The SARA protects and ensures the recovery of SAR listed on Schedule 1 as Extirpated, Endangered and Threatened, and their critical habitats at a federal level; these species are protected on federal lands (First Nations reserves, national parks, etc.). Schedule 1 of the SARA classifies SAR as follows:

*Extirpated (**EXP**) - a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild (SARA Registry, 2012).*

*Endangered (**END**) - a wildlife species that is facing imminent extirpation or extinction (SARA Registry, 2012).*

*Threatened (**THR**) - a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction (SARA Registry, 2012).*

*Special Concern (**SC**) - a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats (SARA Registry, 2012).*

4.4.2 Field Investigations

At the request of MNRF Guelph district and as identified throughout the Notice of Approval to Proceed *with the Undertaking* (2009), species specific surveys were undertaken for the following SAR and SOCC:

- bat SAR (little brown myotis, northern myotis, eastern small-footed myotis and tri-colored bat)
- butternut
- crepuscular bird SAR (eastern whip-poor-will)
- grassland bird SAR (bobolink and eastern meadowlark)
- Henslow's sparrow
- Jefferson salamander and the unisexual ambystoma (Jefferson salamander dependant population)

Additional details pertaining to the results of these species-specific surveys are provided in the SAR Survey Memos in **Appendix B**. It should be noted that the presence of barn swallow was assessed through breeding bird surveys and incidental wildlife observations.

A total of five (5) SAR (bobolink, eastern meadowlark, little brown myotis, eastern small-footed myotis, and tri-colored bat) were confirmed during field investigations completed in 2017, 2018, 2019 and 2021. Barn swallows were also observed foraging within the Study Area; however, observations of foraging does not confirm nesting habitat (i.e., that which is protected under the *ESA)* given that the species may forage widely from its nesting habitat. The following SAR were confirmed absent during the field investigations conducted from 2018-2021: butternut, eastern whip-poor-will, common nighthawk, Henslow's sparrow, Jefferson salamander and unisexual ambystoma (Jefferson salamander dependant population).

Table 11 provides a summary of SAR observations. The results of the SAR surveys are further documented in the SAR Survey Memos in **Appendix B**.

Table 11: Summary of SAR Observations and Confirmed SAR Habitat

Species	ESA Status	No. of Individuals
bobolink	THR	■ Bobolink was confirmed in suitable habitat (CUM1-1) and another bobolink was confirmed on a mown field within the Study Area. The majority of the field had been mown at the time of the observation (i.e., June 12, 2018). While the habitat was not deemed suitable in 2018, due to crop rotation and/or changes to mowing frequency, the species may nest in this location in the future.

Species	ESA Status	No. of Individuals
eastern meadowlark	THR	■ An eastern meadowlark was observed singing on June 5, 2018 within the Study Area. During the second survey on June 18, 2018, a second eastern meadowlark was observed. During the final visit, two (2) eastern meadowlark were observed. ■ Eastern meadowlark was also noted at the same site in 2017 during standard breeding bird surveys.
little brown myotis, eastern small-footed myotis and tri-colored bat	END	■ There were 326 recorded passes of little brown myotis, 17 recorded passes of western small-footed myotis, and three (3) recorded passes of tri-colored bat. ■ These data reflects the number of times ultrasonic noise from a bat was recorded by the acoustic monitor (i.e., the number of times a bat flew by the acoustic monitor's microphone). This type of data confirms species presence and does not provide an indication of the number of individuals present.

Notes: Refer to the notes under Table 10.

4.4.2.1 Henslow's Sparrow

As previously stated in **Section 1.4**, in 2009, the MECP issued a Notice of Approval to Proceed with the undertaking subject to a set of conditions to be addressed during the detailed design phase of the project, including one of which relates to the potential presence of Henslow's sparrow and its habitat within the Study Area (Condition 5).

During the 2017 and 2018 field investigations, Henslow's Sparrow was not encountered, and no appropriate habitat areas of sufficient size were found (refer to **Table 12**). As such, this species is highly unlikely to be present within the Study Area. MNRF Guelph District was informed of the Condition 5 and that neither Henslow's Sparrow or suitable habitat was observed during the 2017 and 2018 field investigations.

Table 12: Status of Requirements under the Notice of Approval to Proceed with the Undertaking – Condition 5: Henslow's Sparrow

#	Condition	Status
5.1	■ The proponent shall update and verify the Henslow's sparrow (*Ammodramus henslowii*) habitat investigations documented in the Addendum issued November 1997 to confirm that the proposed highway ROW continues to have no potential impacts on the habitat for Henslow's Sparrow.	Completed. No habitat areas of sufficient size were found during field investigations. ■ Refer to the Henslow's sparrow Survey Results Memo provided in **Appendix B**.

#	Condition	Status
5.2	■ The proponent shall update the investigations described in Condition 5.1 by conducting additional investigations within appropriate time periods (i.e., during nesting and breeding season) during the detailed design phase. If the above investigation is undertaken within one year of construction, an additional investigation would not be required immediately prior to construction.	■ Completed. No habitat areas of sufficient size were found during field investigations. No additional investigations immediately prior to construction for Henslow's sparrow are required given that no habitat was found for this species. Henslow's sparrow is highly unlikely to occur. ■ Refer to the Henslow's sparrow Survey Results Memo provided in **Appendix B**
5.3	■ In the event that the investigations do demonstrate potential impacts, the proponent shall notify the MNRF and Environment Canada and consider all direction provided by the MNRF and Environment Canada.	■ Completed. MNRF was informed of the condition and that the species and habitat are not present. ■ Refer to the Henslow's sparrow Survey Results Memo provided in **Appendix B**

4.4.3 Determination of Significance

Confirmed SAR habitat for two (2) grassland bird SAR (bobolink and eastern meadowlark) and three (3) bat SAR (little brown myotis, eastern small-footed myotis and tri-colored bat) were identified within the Study Area. Habitat for bat SAR was confirmed at 18 properties and consisted of deciduous forest, cultural plantation, coniferous swamp and mixed swamp. Bobolink and eastern meadowlark were both observed calling within suitable habitat (CUM1-1). Bobolink was also observed calling in a mown agricultural field in 2018. While at the time of survey, the meadow was mowed; due to crop rotation and/or changes to mowing frequency, the species may nest in this location in the future.

5. Impact Assessment, Mitigation Measures and Future Commitments

The proposed works for the Project are described in **Section 1.1**. Project activities will be undertaken within the Limits of Works. The potential impacts associated with the proposed works include:

- Impacts to Designated Natural Areas (i.e., deer winter areas (Stratum 2) and the Mill Creek PSW);
- Loss of vegetation cover;
- Disturbance of wildlife including SAR and SOCC through excess light and noise generated by the construction activities;
- Accidental mortality of wildlife including SAR and SOCC through vehicle collision and vegetation removals;
- Loss of wildlife habitat including SAR and SOCC through vegetation removals; and
- Reduction of wildlife passage opportunities and further fragmentation of naturally vegetated areas upon the landscape through the installation of the new Midblock Interchange and associated road improvements.

It should be noted that that the installation of stormwater management pond the area southwest of Highway 6 and Wellington Road 34 (i.e., P028) has been considered in the calculation of impacts presented here. However, the alternative options for the proposed stormwater management pond is currently under review and impacts associated with this infrastructure are anticipated to be reduced.

A general discussion of the potential impacts and the mitigations measures recommended to avoid or minimize these potential impacts is provided in the following sections.

5.1 Designated Natural Areas

5.1.1 Assessment of Potential Impacts

The potential impacts to Designated Natural Areas are described as follows:

- **Loss and / or damage to Designated Natural Areas**:
  Up to 3.4 ha of deer winter areas (Stratum 2) will be affected due to edge vegetation removals along Wellington Road 34 and the installation of a

stormwater management pond in the area southwest of Highway 6 and Wellington Road 34. Up to 7.0 ha of the Mill Creek Puslinch PSW complex will be removed due to the installation of a stormwater management pond in the area southwest of Highway 6 and Wellington Road 34 and edge vegetation removals along Wellington Road 34, Highway 6, and Concession Road 7 due to road improvements.

- **Dust, fill and sediment deposition within Communities and Plants:**
  During grading of the site, fill and sediment runoff from the active construction area may enter vegetation communities and/or watercourses associated with deer winter areas and the Mill Creek Puslinch PSW. Dust may also be generated by the movement of vehicles and other construction activities, which could negatively impact adjacent vegetation communities, wetlands and watercourses associated with deer winter areas and the Mill Creek Puslinch PSW.

- **Soil or water contamination (including groundwater):**
  Oil, gasoline, grease and other materials from construction equipment, materials, onsite storage and onsite handling may enter vegetation communities and/or watercourses associated with deer winter areas and the Mill Creek Puslinch PSW.

- **Introduction or spread of invasive species:**
  Of the 321 plants recorded within the Study Area a total of 102 (32%) are non-native, which includes highly invasive species such as common reed, glossy buckthorn, and common buckthorn. These species can easily spread into a variety of habitat types and outcompete native species for required resources. As a result, these species degrade the vegetative quality of natural areas. For example: common reed is an aggressive non-native and invasive wetland plant that forms dense monoculture stands, displacing native species and degrading habitat. The movement of equipment may further perpetuate the spread and establishment of these species and/or introduce invasive species not currently present within the Study Areas.

Potential impacts to Designated Natural Areas can be minimized through the avoidance and mitigation measures prescribed in **Section 5.1.2**.

5.1.2 Mitigation

Proposed Avoidance and Mitigation Measures for Designated Natural Areas:

To assist in mitigating potential impacts, the following mitigation measures and MTO Provisions and operational constraints should be utilized, at a minimum:

- Ontario Provincial Standard Specification (OPSS) 180: General Specification for the Management of Excess Materials;
- OPSS 201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders;
- OPSS. MUNI.506 Construction Specifications for Dust Suppression
- OPSS. PROV 801 Construction Specification the Protection of Trees;
- OPSS. PROV 803 Construction Specification for Vegetative Cover;
- OPSS. PROV 804 Construction Specification for Temporary Erosion Control;
- OPSS. PROV 805 Construction Specification for Temporary Sediment Control;
- OPSS. PROV 100 General Conditions of Contract
- Non-Standard Special Provision (NSSP) CMOOC001 – Operational Constraint (OC) (Environmental) – Hazardous Plants Special Provision;
- Special Provision No. ENVR0011 – Invasive and Noxious Vegetation Spraying, Invasive and Noxious Vegetation Cutting
- NSSP Invasive Species Prevention
- SP 199F12 Environmentally Sensitive Areas OC (Environmental) Control measures during Removal of Concrete/Structure, Structure Repair/Construction, and Concrete Saw cutting
- NSSP Equipment Refuelling, Maintenance and Washing
- SP 199S56 Control of Emissions During Structural Work SP 110F10 Use of Air Cooled Blast Furnace Slag as Granular Material
- OC Spill Prevention and Response Contingency Plan

The MTO Specifications, Special Provisions and Operational Constraints noted above will, at a minimum, ensure the following mitigation measures are implemented and followed to avoid impacts to Designated Natural Areas:

- Vegetation removal will be kept within the Limits of work.
- An emergency spills plan should be developed and implemented.

- Best management practices are used to prevent spills to the environment, including:
  - Re-fuelling stations should be constructed to prevent soil and/or surface and groundwater contamination from any leaks or spills.
  - An emergency response kit should be made available at each refuelling station in case of a spill.
  - All onsite crew members operating construction vehicles should be appropriately trained in handling a potential spill.
  - All chemical transfer/maintenance should be conducted within the refuelling station areas.
- Temporarily disturbed areas should be restored as soon as possible following construction.
- Entry of heavy equipment into designated natural areas within the limits of work shall be limited to the extent possible;(per NSSP Designated Natural Areas);
  - Where entry must occur, the use of swamp mats is recommended to reduce potential damage to the feature.
- Where feasible, the Limits of Work shall be delineated with tree protection fencing outside the dripline of trees, prior to the initiation of construction activities; (per OPSS.PROV 801).
- The Design Build Contractor shall delineate the boundary of any impacted PSWs. Delineation will be completed by an Ontario Wetland Evaluation System (OWES) certified Ecologist and must be completed prior to the initiation of vegetation removal;(per OPSS.PROV 801).
- Install Erosion and Sediment Control (ESC) measures along the Limits of Work prior to the initiation of construction activities, to reduce potential sediment release and reduced the potential of accidental intrusion.
- All ESC measures should remain in place until restoration is complete and disturbed areas are stabilized.
- Excess ESC material should be maintained onsite, prior to the commencement of grading operations and throughout the duration of the construction, so it is readily available in the case of an emergency or repair.
- Protect all exposed surfaces and control all runoff during construction;
- Runoffs should be directed away from Designated Natural Areas and naturalized vegetation communities; (per OPSS 805).

- Watercourse banks disturbed by construction activities should be immediately stabilized by any activity associated with the project to prevent erosion and/or sedimentation, through re-vegetation with native species suitable for the site;
- Any accidentally damaged trees shall be pruned in accordance with accepted arboricultural practices; (OPSS.PROV 801).
- Disturbed portions of PSWs within the Limits of Work shall be restored to a wetland community in order to reduce overall impacts on PSWs in the Study Area; (per NSSP 'Designated Natural Areas').
- To avoid the spread of invasive species, the Design Build Contractor should follow the Clean Equipment Protocol for Industry (Halloran et.al, 2013).

5.1.3 Future Commitments

The following future commitments are also required in the next stages of Detail Design which will be undertaken by the Design Builder:

- Impacts to Designated Natural Areas inside the Limits of Work shall be reduced where feasible through the detail design process.
- The Limits of Work associated with the Stormwater Pond installation ion the area southwest of Highway 6 and Wellington Road 34 should be minimized to the extent possible. The detail design of the SWM stormwater management pond should consider naturalization of the pond including the use of native seeds, plants and trees;

5.2 Vegetation Communities and Plants

5.2.1 Assessment of Potential Impacts

The potential impacts to vegetation communities and plants are described as follows:

- **Loss and / or damage to Vegetation Communities and Plants**:
  The construction activities, including vegetation removals, will impact up to 38.3 ha of vegetation communities delineated within the Limits of Work. Most impacts (i.e., 22.4 ha) will be located within Dry – Moist Old Field Cultural Meadow (CUM1-1) communities that already exhibit anthropogenic disturbance. **Table 13** below provides a detailed summary of the vegetation communities that will be affected. In addition to the ELC communities described herein, 10.7 ha of agricultural lands, 17.7 ha of anthropogenically

disturbed areas, 1.6 ha of hedgerow and 0.93 ha of manicured lawns will also be impacted by the proposed works.

- **Dust, Fill and sediment deposition within Communities and Plants:** During grading of the site, fill and sediment runoff from the active construction area may enter vegetation communities and adjacent watercourses and wetlands**.** Dust may also be generated by the movement of vehicles and other construction activities, which negatively impact adjacent vegetation communities.
- **Soil or water contamination (including groundwater):** Oil, gasoline, grease and other materials from construction equipment, materials, storage and handling may enter vegetation communities and/or watercourses (i.e., Mill Creek and McCrimmon's Tributary).
- **Introduction or spread of invasive species:** Of the 321 plants recorded within the Study Area a total of 102 (32%) are non-native, which includes highly invasive species such as common reed, glossy buckthorn, and common buckthorn. These species can easily spread into a variety of habitat types and outcompete native species for required resources thus, degrading the vegetative quality of natural areas. The movement of equipment may further perpetuate the spread and establishment of these species and/or introduce invasive species not currently present within the Study Areas.

Potential impacts to Vegetation Communities and Plants can be minimized through the avoidance and mitigation measures prescribed in **Section 5.2.2**).

Table 13: Impacts to Vegetation Communities Within the Limits of Work

ELC Code	ELC Name	Affected Area (ha)
CUM1-1	Dry - Moist Old Field Cultural Meadow	22.4
CUP3	Coniferous Plantation	1.0
CUP3-2	White Pine Coniferous Plantation	0.6
CUP3-3	Scotch Pine Coniferous Plantation	1.2
CUT1	Mineral Cultural Thicket	0.7
CUW1	Mineral Cultural Woodland	0.4
FOC2-2	Dry - Fresh White Cedar Coniferous Forest	0.6
FOD5-2	Dry - Fresh Sugar Maple Deciduous Forest	1.2
FOD5-6	Dry-Fresh Sugar Maple-Basswood Deciduous Forest	1.3
FOD6-4	Fresh-Moist Sugar Maple-White Elm Deciduous Forest	0.2
FOD7	Fresh - Moist Lowland Deciduous Forest	0.1
MAM2-2	Reed-canary Grass Mineral Meadow Marsh	0.4
MAS2-1	Cattail Mineral Shallow Marsh	1.0
OAO	Open Aquatic	0.1
SWC3-1	White Cedar Organic Coniferous Swamp	2.5

ELC Code	ELC Name	Affected Area (ha)
SWD3	Maple Mineral Deciduous Swamp	0.1
SWD7	Birch – Poplar Organic Deciduous Swamp	0.2
SWD7-1	White birch-Poplar Organic Deciduous Swamp	0.1
SWM	Mixed Swamp	0.0
SWM3	Birch – Poplar Mineral Mixed Swamp	0.1
SWM4-1	White Cedar-Hardwood Organic Swamp	2.3
SWT2	Mineral Thicket Swamp	0.1
SWT2-5	Red-osier Mineral thicket Swamp	0.1
SWT3	Organic Thicket Swamp	1.5
SWT3-1	Alder Organic Thicket Swamp	0.1
	Grand Total	**38.3**

5.2.2 Mitigation

To assist in mitigating potential impacts, the MTO Provisions and operational constraints should be utilized, at a minimum:

- Ontario Provincial Standard Specification (OPSS) 180: General Specification for the Management of Excess Materials;
- OPSS 201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders;
- OPSS.MUNI.506 Construction Specifications for Dust Suppression
- OPSS. PROV 801 Construction Specification the Protection of Trees;
- OPSS. PROV 803 Construction Specification for Vegetative Cover;
- OPSS. PROV 804 Construction Specification for Temporary Erosion Control;
- OPSS. PROV 805 Construction Specification for Temporary Sediment Control;
- OPSS 100 General Conditions of Contract
- Non-Standard Special Provision (NSSP) CMOOC001 – Operational Constraint (OC) (Environmental) – Hazardous Plants Special Provision;
- Special Provision No. ENVR0011 – Invasive and Noxious Vegetation Spraying, Invasive and Noxious Vegetation Cutting
- NSSP Invasive Species Prevention
- SP 199F12 Environmentally Sensitive Areas OC (Environmental) Control measures during Removal of Concrete/Structure, Structure Repair/Construction, and Concrete Saw cutting
- NSSP Equipment Refuelling, Maintenance and Washing

- SP 199S56 Control of Emissions During Structural Work SP 110F10 Use of Air Cooled Blast Furnace Slag as Granular Material
- OC Spill Prevention and Response Contingency Plan; and
- NSSP Operational Constraints (Environmental) - Migratory Bird Protection

The MTO Specifications, Special Provisions and Operational Constraints noted above will, at a minimum, ensure the following mitigation measures are implemented and followed to avoid impacts to Vegetation Communities and Plants:

- Vegetation removal will be limited to within the Limits of Work
- The Limits of Work should be delineated outside the dripline of trees, prior to the initiation of construction activities;(per OPSS.PROV.801).
- Vegetation beyond the Limits of Work should be retained and protected, using ESC measures and/or tree protection fence (installed at or beyond the drip-line of trees).
  - The location of ESC measures, tree protection fences should be shown on the ESC design drawings and the Landscape Plan, receptively. These drawings will be submitted to the Contracting Authority.
- Install ESC measures along the Limits of Work prior to the initiation of construction activities, to reduce potential sediment release and reduced the potential of accidental intrusion;
- All ESC measures should remain in place until restoration is complete and disturbed areas are stabilized.
- Excess ESC material should be maintained onsite, prior to the commencement of grading operations and throughout the duration of the construction, so it is readily available in the case of an emergency or repair.
- Protect all exposed surfaces and control all runoff during construction.
- Runoffs shall be directed away from Designated Natural Areas and naturalized vegetation communities.
- Watercourse banks disturbed by construction activities should be immediately stabilized by any activity associated with the project to prevent erosion and/or sedimentation, through re-vegetation with native species suitable for the site.
- Vegetation removal shall occur outside of sensitive wildlife timing windows (i.e., breeding bird season April 1 – August 31, bat maternity roosting season (April 1 – September 30)); per NSSP ‘Operational Constraints (Environmental) - Migratory Bird Protection’’, and ;(per Operation Constraint

(Environmental) NSSP General Environmental Protection; unless otherwise advised by the MECP.

- Use of heavy equipment be limited to the Limits of Work; (per Operation Constraint (Environmental) NSSP General Environmental Protection.
- Any accidentally damaged trees should be pruned in accordance with accepted arboricultural practices.
- Any trees/shrubs that are felled within areas where active construction is being undertaken shall be mulched as soon as possible, especially during the breeding bird season in order to prevent birds from nesting; (per NSSP 'Operational Constraints (Environmental) - Migratory Bird Protection''
- Earth movement immediately adjacent to woodlands should be restricted during periods of high dust generation (i.e., high winds). The Design Build Contractor should apply dust suppressants during dry periods to those areas which generate large amounts of dust.
- To the extent feasible, affected areas shall be re-seeded and re-vegetated and restored to pre-disturbance conditions, using native species appropriate for the community type disturbed;
  - Trees and shrubs should be planted in a naturalized manner, in a random configuration and in groups rather than in rows.
  - Generally, trees should be planted at 5 m on centre and shrubs at 1.0 m on centre. The precise spacing may be adjusted to suit species selected and area available.
  - Seed mixes should be applied using the manufacturers recommended application rate.
- To avoid the spread of invasive species, the Design Build Contractor should follow the Clean Equipment Protocol for Industry (Halloran et.al, 2013).

5.2.3 Future Commitments

The following future commitments are also required in the next stages of Detail Design which will be undertaken by the Design Builder:

- In advance of vegetation removals and/or other construction activities, a Tree Protection Plan shall be prepared and implemented.

- Design Build Contractor shall determine area that can be restored based upon the final highway design.
  - Design Build Contractor shall retain a sufficient amount of topsoil onsite for use in in restoration, if possible. If retaining topsoil is not feasible, clean topsoil which is free of invasive species can be used to facilitate planting activities.
- Where possible edge management plantings shall be considered along the newly exposed forest edges:
  - native tree and shrub species shall be used, those selected shall be similar to native species already present in the area;
  - clearing shall only be undertaken near areas identified for edge management and incorporate narrow ‘no-grubbing’ zones (in order to stimulate suckering and edge creation) and edge plantings to help buffer exposed forest interiors from wind, sun and salt spray.
- As described in **Section 4.2.3**, a total of three (3) provincially rare and 13 regionally rare plant species were identified within the Study Area, to ensure the protection of regionally rare plants, the Design Build Contractor should:
  - undertake pre-construction field investigations (by a Qualified Ecologist / Botanist) to confirm the locations of rare plant species within the Study Area and determine if protection is feasible;
  - where the species cannot be protected, the specimens should be relocated to a suitable vegetation community within a restoration area in the Study Area at the discretion of the Qualified Ecologist / Botanist. Alternatively, seeds or vegetative cuttings, dependent on each specimen’s reproductive biology, shall be collected for relocation. Should relocation be unfeasible (i.e., construction activities during the winter season), the Design Build Contractor should make efforts to source the same species from a local nursery to include in a suitable restoration area.

5.3 Wildlife and Wildlife Passage

Potential permanent impacts associated with the proposed project within the proposed grading limits related to Wildlife and Wildlife Habitat is discussed below.

5.3.1 Assessment of Potential Impacts

- **Disturbance or Displacement of Migratory Birds and Destruction of Their Nests:**
  While no nests of *MBCA* protected species were observed on, under or in structures within the Limits of Work; there is potential for them to occur given time lapsed since field investigations. Culvert replacements or rehabilitation may result in the disturbance or displacement of birds protected under the *MBCA* and destruction of their nests if conducted during the overall bird nesting period of April 1 to August 31.

  As well, vegetation removal has the potential to disturb or displace nesting birds, including SOCC and/or species protected under the *MBCA* and destroy their active nests where there are trees or shrubs or where suitable ground cover occurs if activities are conducted during the overall bird nesting period of April 1 to August 31.

- **Disturbance to Wildlife**:
  Construction activities within the Limits of Work could result in excess noise and lighting which can potentially disturb breeding birds, bats and other residential wildlife within the adjacent natural areas.

- **Loss of and/or Damage to Wildlife Habitat (including SWH):**
  Vegetation removal will result in the direct loss of up to 79.3 ha of candidate SWH features and up to 19.4 ha of confirmed SWH features. **Table 14** below provides a detailed summary of the SWH features that will be affected.

- **Reduction of Wildlife Passage Opportunities and Further Fragmentation of Naturally Vegetated Areas:**
  Installation of the new Midblock Interchange and the associated road improvements will result in further fragmentation of naturally vegetated areas in the Study Area and the broader landscape. It will also reduce the ability of wildlife to safely cross Highway 6 and Wellington Road 34 in order to travel between habitats.

- **Accidental Mortality of Wildlife:**
  The risk of wildlife morality may be increased during construction, resulting from collisions with vehicles or heavy equipment.

Potential impacts to Wildlife and Wildlife Passage can be minimized through the avoidance and mitigation measures prescribed in **Section 5.3.2.**

Table 14: Impacts to Candidate and Confirmed SWH Features within the Limits of Work

SHW Features Type	Affected Area (ha)
Candidate SWH Type: **Bat maternity colonies**	1.3
Candidate SWH Type: **Reptile hibernacula**	19.1
Candidate SWH Type: **Waterfowl nesting area**	0.7
Candidate SWH Type: **Marsh breeding bird habitat**	31.0
Candidate SWH Type: **Terrestrial crayfish**	3.2
Candidate SWH Type: **Habitats for SOCC: eastern ribbonsnake**	8.4
Candidate SWH Type: **Habitats for SOCC: monarch**	6.4
Candidate SWH Type: **Habitats for SOCC: west Virginia white**	0.5
Candidate SWH Type: **Habitats for SOCC: Canada warbler**	3.7
Candidate SWH Type: **Habitats for SOCC: golden-winged warbler**	1.8
Candidate SWH Type: **Habitats for SOCC: eastern wood-pewee**	3.0
Candidate SWH Type: **Habitats for SOCC: red-headed woodpecker**	0.2
Total Impacts to Candidate SWH:	**79.3**
Confirmed SWH: **Bat maternity colonies**	5.0
Confirmed SWH: **Amphibian breeding habitat (woodland)**	1.8
Confirmed SWH: **Habitats for SOCC: eastern wood-pewee**	1.1
Confirmed SWH: **Habitats for SOCC: monarch**	5.8
Confirmed SWH: **Deer Winter Areas**	3.4
Confirmed SWH: **Plant SOCC**	2.3
Total Impacts to Confirmed SWH:	**19.4**

5.3.2 Mitigation

To assist in mitigating potential impacts, the following general mitigation and compensation measures are required to avoid impacts to Wildlife and Wildlife Passage:

5.3.2.1 Proposed Avoidance and Mitigation Measures Migratory Birds

To avoid possible contravention of the MBCA (1994) the following provisions are to be included in the contract:

- NSSP Monitoring of Existing Structure for Barn Swallow Nests; and
- NSSP Operational Constraints (Environmental) - Migratory Bird Protection

The above provisions will require the contractor to adhere to the following mitigation:

- All vegetation removal shall occur outside breeding bird season (April 1 to August 31);

- If vegetation removal cannot be scheduled outside of the breeding bird season; an Avian Biologist will be deployed to conduct a nest survey in the area to be cleared in 'simple habitats[4]';
  - If the active nests of migratory birds are located, then the nest will be noted using handheld GPS and vegetation clearing will be delayed allowing for fledging;
  - To avoid potential nest abandonment and/or predation, nests shall only be physically flagged if they are located close to an active construction zone and are a risk of accidental damage; and,
  - The Design Build Contractor shall consult and follow the MBCA (1994).
- Furthermore, while no nests were found in/on/or above structure within the Study Area in 2018, it is recommended that the Design Build Contractor re-inspect all the culverts for the presence of nesting birds prior to construction activities. If it is suspected that these culverts are used for migratory bird nesting, schedule their removal outside of the migratory bird nesting period.

5.3.2.2 Proposed Avoidance, Mitigation and Compensation Measures for Wildlife and SWH

To address impacts to SWH and Wildlife the following provisions are to be included in the contract:

- OC(Environmental) – Wildlife and Wildlife Habitat are recommended;
- OC (Environmental) SP ENVR0007: Protection of Species at Risk;
- OC (Environmental) – General Environmental Protection

4. Some examples of 'simple habitats' include:
   - A previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil, for instance); or
   - A structure such as a bridge, a beacon, a tower or a building (often chosen as a nesting spot by robins, swallows, phoebes, Common Nighthawks, gulls and others) (ECCC, 2019).

   In addition to within 'simple habitats', nest searches can also be considered when investigating:
   - Conspicuous nest structures (such as nests of Great Blue Herons, Bank Swallows, Chimney Swifts);
   - Cavity nesters in snags (such as woodpeckers, goldeneyes, nuthatches); or
   - Colonial-breeding species that can often be located from a distance (such as a colony of terns or gulls) (ECCC, 2019).

The above provisions will require the contractor to adhere to the following mitigation:

- Where candidate or confirmed SWH features will be affected, the Limits of Work shall be delineated outside the dripline of trees, prior to the initiation of any vegetation removal or construction activities, (per OPSS. PROV 801);
  - Retained portions of these features will be protected, using Erosion and Sediment Control (ESC) measures and/or tree protection fence (installed at or beyond the drip-line of trees). The location of ESC measures, tree protection fences shall be shown on the ESC design drawings and the Landscape Plan submitted to the Contracting Authority.
- If, during construction, any wildlife are observed within the Limits Work (per NSSP-General Environmental Protection, and NSSP 001A860 Operational Constraint (Environmental)-Prevention of Wildlife Harassment):
  - Under no circumstances will any wildlife be knowingly harmed, harassed or otherwise disturbed. If an animal is encountered, it will be permitted to move away on its own;
  - If wildlife is observed within the work area, a qualified biologist or environmental monitor will determine if there is a concern about the significance of the species observed;
  - If the species is identified as SAR, do not handle the individual unless it is in immediate danger. A qualified Biologist shall contact the Contracting Authority and MECP immediately. In accordance with the ESA, no threatened or endangered species can be handled or relocated without the proper approvals / permitting and authorization from MNRF;
  - If the species is not identified as SAR, direct the species away from the construction zone into the nearest natural area (i.e., woodland, wetland, etc.); if unsure of where to move the species, contact a Qualified Biologist for guidance; and,
- Should an injured or orphaned animal be encountered, a Qualified Biologist will transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the MNRF or a member of the College of Veterinarians of Ontario.
  - Any injured wildlife will be immediately transported to a suitable wildlife rehabilitation centre.
  - Any amphibians or reptiles unearthed during their hibernation will also be immediately transported to a suitable wildlife rehabilitation centre.

Candidate and Confirmed Bat Maternity Colony SWH

All woodlands considered bat maternity colony SWH will receive the same avoidance and mitigation measures as prescribed for bat SAR and bat SAR habitat in **Section 5.4.2** below.

Candidate Reptile Hibernacula and Habitats of SOCC (eastern ribbonsnake)

Where feasible, vegetation removals within candidate reptile hibernacula and habitats of SOCC (eastern ribbonsnake) shall occur outside of the typical active season for snakes. The active season for eastern ribbonsnake in Ontario typically extends from April 1st to October 31st (EC, 2015); (per NSSP-Wildlife Protection-General).

Should any snakes be disturbed during winter hibernation, or found injured at any time of the year, a Qualified Biologist or Environmental Monitor will transport the animal to a wildlife a rehabilitation centre that is considered to be an approved Wildlife Custodian by the MNRF or a member of the College of Veterinarians of Ontario.

Deer Wintering Areas

Mitigation measures pertaining to deer wintering areas are provided in **Section 5.1.2**.

Candidate and Confirmed Avian SWH (Waterfowl Nesting Areas, Marsh Breeding Bird Habitat, Habitats of SOCC (Eastern Wood-pewee, Canada Warbler, Golden-winged Warbler, Red-headed Woodpecker)

Confirmed and candidate avian SWH features will receive the same avoidance and mitigation measures as prescribed for Migratory Birds Protected under the MBCA (1994) above.

Candidate Terrestrial Crayfish Habitat

Use ESC measures to retain portions of features designated as habitat and direct any water away from the features where possible; and,

Mitigation measures pertaining to wetlands provided in **Section 5.1.2** will also apply to candidate terrestrial crayfish habitat.

Candidate and Confirmed Habitats of Insect SOCC (monarch and west Virginal white)

Where project works will impact confirmed Insect SOCC, the following mitigation measures are recommended:

- Avoid the use of insecticides within monarch and west Virginia white SWH;
- Vegetation removal will be limited to the extent feasible within monarch and west Virginia white SWH; and,

- It is recommended that any vegetation removal within monarch SWH occur outside the window when the species may be present as eggs or larvae on milkweeds (May 25 – August 15); and,

Confirmed Amphibian SWH (Woodland Breeding Habitat):

Where project works will impact confirmed amphibian SWH, the following mitigation measures are recommended:

- Avoid driving within construction zones in proximity to amphibian breeding habitats at night between April 1 and June 30, and any rainy nights from spring to early autumn, wherever possible; and,
- Conduct construction activities during daylight hours for increased visibility as well as to avoid light pollution effects during the night, wherever possible;

Confirmed Habitat of Plant SOCC:

The mitigation measures for these rare plants are provided in **Section 5.2.2** above.

5.3.3 Future Commitments

The following future commitments are also required in the next stages of Detail Design which will be undertaken by the Design Builder:

- the Design Build Contractor shall provide training to all onsite personnel and ensure that they are familiar with wildlife that may be present onsite as well as their responsibility to report wildlife and potential SAR observations to the qualified biologist or environmental monitor;
- the Design Build Contractor shall obtain any necessary permits / approvals in a timely manner and undertake such activities (i.e., handling of wildlife encounters). Permits and approvals which may be required include the Wildlife Scientific Collector's Authorization from MNRF and the Wildlife Animal Care Committee Authorization. Consultation with the respective regulating agencies will be required to determine the appropriate permits and approvals;
- the Design Build Contractor shall develop site-specific wildlife salvage and relocation plans based on the species that may be found within the Study Area. These plans will document the location of suitable relocation sites within the surrounding environment and include the contact information for a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the MNRF or a member of the College of Veterinarians of Ontario.

- the Design Build Contractor is responsible for reporting / handling any encounters with injured or deceased SAR; this is to be done in accordance with the Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders as prepared by the MNRF (N.D);

5.3.3.1 Candidate and Confirmed SWH Features

- **Candidate and Confirmed Bat Maternity Colony SWH**
  To the extent feasible, candidate and confirmed bat maternity colony SWH will be re-forested and edge management plantings shall be applied along the newly exposed woodland edges.
- **Candidate Reptile Hibernacula and Habitats of SOCC (eastern ribbonsnake)**
  To the extent feasible, candidate reptile hibernacula and habitats of SOCC (eastern ribbonsnake) shall be re-seeded and re-vegetated to restore to pre-disturbance conditions, using native species appropriate for the community type disturbed.
- **Deer Wintering Areas**
  To the extent feasible, deer winter areas will be re-forested and edge management plantings shall be applied along the newly exposed woodland edges.
- **Candidate and Confirmed Avian SWH (Waterfowl Nesting Areas, Marsh Breeding Bird Habitat, Habitats of SOCC (Eastern Wood-pewee, Canada Warbler, Golden-winged Warbler, Red-headed Woodpecker)**
  To the extent feasible, disturbed avian SWH shall be re-seeded and re-vegetated to restore to pre-disturbance conditions, using native species appropriate for the community type disturbed. For woodland features, edge management plantings will be installed upon the newly exposed edges.
- **Candidate Terrestrial Crayfish Habitat**
  To the extent feasible, disturbed terrestrial crayfish SWH shall be re-seeded and re-vegetated to restore to pre-disturbance conditions, using native species appropriate for the community type disturbed.
- **Candidate and Confirmed Habitats of Insect SOCC (monarch and west Virginal white)**
  To the extent feasible, disturbed Insect SOCC SWH shall be re-seeded and re-vegetated to restore to pre-disturbance conditions, using native species appropriate for the community type disturbed that includes and abundance of common milkweed (*Asclepias syriaca*), swamp milkweed (*Asclepias incarnata*) and/or two-leaved toothwort (*Cardamine diphylla*).

- **Confirmed Amphibian SWH (Woodland Breeding Habitat)**
  The final highway design should take into consideration potential light impacts on amphibian and amphibian breeding habitats; and, where feasible, any disturbed amphibian SWH shall be re-seeded and re-vegetated to restore to pre-disturbance conditions, using native species appropriate for the community type disturbed. For woodland features, edge management plantings will be installed upon the newly exposed edges.

5.3.3.2 Wildlife Passage

Maintaining habitat connectivity across the landscape is important for the preservation of local wildlife and may reduce potential wildlife-vehicle collisions. Specific culvert design and placements consideration can be used to mitigate these potential risks. It is anticipated that ten (10) new culverts will be installed (i.e., H6-1, SR-1, SR-2, SR-3, SR-8, HR-1, HR-2, HR-3, HR-4 and HR-5) and four (4) will be replaced or rehabilitated (SR-5, SR-6, SR-7A, SR-7B).The location of these culverts are illustrated on **Figure 3**. The Following Future Commitments and additional requirements for the eco-passage proposed at Mill Creek Crossing of Wellington Road 34 (SR-05):

Are also required in the next stages of Detail Design which will be undertaken by the Design Builder:

- The Design Build Contractor shall provide a culvert at SR-05 with a larger openness ratio than is current being provided. An openness ratio of 0.4 would permit usage by medium sized mammals. The minimum openness ratio to be considered should be 0.25, which would permit usage by reptiles such as turtles;
- Around the structure, avoiding the use of rip-rap or sharp rock protection and ensuring areas on both sides of the watercourse provide substrate materials conducive to animal movement;
  - If rip-rap must be used, fill the interstitial space with small materials which would provide appropriate footing for wildlife;
- Include natural substrates within the structure;
- Provide suitable cover elements adjacent to the structure (e.g., retained or planted vegetation) that can facilitate wildlife use of the structures (i.e., cover/shelter on route to structure) while not blocking the structure entrance,
- Wherever possible, ensure that entrance and exits to the structures are reasonably level (e.g., no major grade changes) to provide an unimpeded view through the structure and habitat beyond;

- Ensure that the elevation and slope of the structure does not result in flooding;
- Remove or reduce potential predator perches (i.e., ledges) to the extent possible;
- Avoid artificial light sources near the entrances/exit of the wildlife passage;
- Any landscaping and erosion control materials required shall not include materials known to accidentally entrap snakes or fish;
- Restore adjacent vegetation areas disturbed for construction access using native species;
- The final design shall consider eco-passage recommendations made in the Environmental Guide for Wildlife Mitigation (MTO, 2015); and,
- The Design Build Contractor is responsible for any consultation, design and restoration commitments pertaining to aquatic SAR as identified in the Fisheries Existing Conditions and Impact Assessment Report (AECOM, 2021b) provided under separate cover.

5.4 Species at Risk

The potential impacts to SAR are described as follows:

5.4.1 Assessment of Potential Impacts

- **Disturbance or displacement of Barn Swallow and destruction of their nests:** Given that no nests of this species were identified on, under or in structures likely affected by construction activities and that the Ontario's noted in the Study Area typically do not provide nesting habitat for the species; no impacts to barn swallow or their nests are anticipated.
- **Loss and / or damage to bobolink and/or eastern meadowlark habitat:** No confirmed Category 1, 2 or 3 bobolink or eastern meadowlark habitat will be affected by the project where the species were observed in the suitable cultural meadow habitat However, vegetation removal during construction activities may result in the loss of up to 0.90 ha of habitat where a bobolink was observed in a mown agricultural field. This includes 0.05 ha of mown cultural meadow and 0.85 ha of agricultural field. The vegetation clearing associated with the project is not anticipated to affect habitat availability and quality for these species or to eliminate or damage the function of the habitat for these species as only a very small portion of the disturbed edge habitat will be affected. Based on the location of the observed bobolink, if the habitat was deemed suitable the habitat removed would not fall into

Category 1 Habitat for the species. Only Category 3 Habitat will be affected by the vegetation removal. As defined in the General Habitat Description for Bobolink (MECP, 2019), Category 3 Habitat exhibits the highest level of tolerance to disturbance. Furthermore, as the area proposed for removal is already subjected to anthropogenic noise disturbance, it is unlikely that vehicle use associated with the Project, adjacent to the fields, will lead to a significant increase to disturbance or mortality of the species beyond what currently exists.

- **Possible Disturbance/displacement, mortality or injury to bobolink and/or eastern meadowlark**
  If conducted during the overall bird nesting period of April 1 to August 31 in potentially suitable habitat, vegetation removal has the potential to result in the disturbance, displacement, mortality and or injury of bobolink and/or eastern meadowlark.
- **Removal of Bat SAR habitat:**
  Vegetation removal will result in the direct loss of up to 11.15 ha of bat SAR habitat within the Limits of Work. This also includes the removal of up to 185 maternity roost trees suitable for use by bat SAR.
- **Possible disturbance/displacement, mortality or injury to bat SAR:**
  Bat SAR may be disturbed/displaced as a result of increased noise associated with construction or accidental damage of suitable maternity roost trees if proposed works occur during the bat roosting season between April 1st and September 30th. Bat SAR may be inadvertently killed or injured as a result of the removal of, or accidental damage to suitable maternity roost trees if vegetation clearing occurs during the bat roosting season between April 1st and September 30th.

Potential impacts to SAR can be minimized through the avoidance and mitigation measures prescribed in **Section 5.4.2.**

5.4.2 Mitigation

To address impacts to SAR and SAR Habitat the following provisions are to be included in the contract:

- OC(Environmental) – Wildlife and Wildlife Habitat are recommended;
- OC (Environmental) SP ENVR0007: Protection of Species at Risk;
- OC (Environmental) – General Environmental Protection;
- NSSP Monitoring of Existing Structure for Barn Swallow Nests; and
- NSSP Operational Constraints (Environmental) - Migratory Bird Protection

The above provisions and the requirements addressed in the permit and agreements procured through MECP will require the contractor to adhere to the following mitigation:

5.4.2.1 Bat SAR

- The avoidance and mitigation measures prescribed in **Section 5.2.2** for Vegetation communities also apply to bat SAR and bat SAR habitat.
- Any construction activities within 30 m of known maternity roost trees will be restricted to daylight hours when possible.
- Vegetation removal within confirmed and candidate bat SAR habitat will occur outside of the SAR bat maternity roosting window (April 1 – September 30); (Per ENVR0007).
- Construction activities will be limited to the Limits of Work; (Per ENVR0007).
- The Design Builder is required to adhere to the BAT SAR requirements and mitigations identified in MECP SAR C-Permit.

5.4.2.2 Bobolink and Eastern Meadowlark

- The avoidance and mitigation measures prescribed in **Section 5.2.2** for Vegetation communities also apply to bobolink and eastern meadowlark and their habitats;
- The avoidance and mitigation measures prescribed in **Section 5.3.2** for Migratory birds, also apply to bobolink and eastern meadowlark and their habitats;
- To ensure compliance with the Migratory Birds Convention Act (MBCA)(1994), limit vegetation removal to be outside of the active season for birds (April 1 – August 31); and,

5.4.3 Future Commitments

5.4.3.1 Bat SAR

Final highway design will take into consideration potential light impacts on bats and bat habitat:

- Limit the number of lights immediately adjacent to woodlands to the extent possible;
- Avoid the use of high-pressure sodium and LED lights immediately adjacent to woodlands as these types of lighting affect activity (Row *et al. al.*, 2015 & ILP, 2018);

- If feasible, turn off lighting or reduce the number of active lights immediately adjacent to woodlands during sensitive timing windows (i.e., April 1 – September 30);
  - Alternatively, lights could be placed on a part-night lighting (PNL) schedule. For example, a number of local authorities in the UK switch off lights in specified areas between midnight and 05.30 a.m. to reduce impacts to nocturnal wildlife, CO2 emissions and reduce costs ILP, 2018);
- Where feasible, any disturbed bat SAR habitat will be re-forested and edge management plantings shall be applied along the newly exposed woodland edges; and,
- Legislative Requirement:
  - Vegetation removals within the LOA identified areas can only occur upon MECP's agreement with the *Bat SAR ESA Contravention Avoidance Strategy* (AECOM, 2021c) and achievement of an Overall Benefit Permit under the Section 17 (2) (c) of the ESA.

5.4.3.2 Bobolink and Eastern Meadowlark

Legislative Requirement: Vegetation removals can only occur upon MECP's agreement with the *Bobolink and Eastern Meadowlark ESA Contravention Avoidance Strategy* (AECOM, 2021d).

5.5 Net Effects

If the mitigation measures and future commitments identified in **Sections 5.1.2, 5.1.3, 5.2.2, 5.2.3, 5.3.2, 5.3.3, 5.4.2** and **5.4.3** are implemented, impacts to terrestrial ecosystems within the Study Area are anticipated to be low and not significant.

6. Limitation of the Report

The observations and results obtained during the terrestrial investigations are representative of the conditions encountered during the 2017, 2018, 2019 and 2021 field investigations only. Many of the species surveyed are migratory and may occur within the Study Area during some years and not others. Habitat (vegetation communities, SWH, SAR habitat, etc.) also change over time and may become more or less suitable for SAR or other wildlife. AECOM has used its best professional judgement to interpret the survey results and provide accurate conclusions.

7. Conclusions

Field investigations were conducted throughout 2017, 2018, 2019 and 2021.

The Study Area contains two (2) Designated Natural Heritage features:

- Deer Wintering Areas; and,
- The Mill Creek Puslinch PSW.

A total of three (3) provincially rare and 13 regionally rare plants were found within the Study Area, these include: honey locust, hispid buttercup, field sedge, marsh horsetail, meadow horsetail, wood horsetail, red pine, blue cohosh, wild coffee, hobblebush, one-sided shinleaf, ninebark, northern bedstraw, hairy beard-tongue, silvery sedge, and pointed broom sedge.

No bird nests were found in, on or above structures within the Study Area, though vegetation throughout the Study Area provides suitable nesting habitat for birds protected under the *MBCA*.

A number of candidate and confirmed SWH features are present within the Study Area, these include: Bat Maternity Colonies, Marsh Breeding Bird Habitat, Reptile Hibernacula, Deer Wintering Areas, Terrestrial Crayfish, Turtle Wintering Areas, Waterfowl Nesting Area, Amphibian Breeding Habitat (Woodland) and Habitats for Special Concern and Rare Wildlife Species (monarch, west Virginia white, Canada warbler, golden-winged warbler, eastern wood-pewee, plant SOCC (honey locust, hispid buttercup and field sedge), red-headed woodpecker, eastern ribbonsnake and snapping turtle):

- Impacts are anticipated the following candidate SWH types located within the Limits of Work : bat maternity colonies reptile hibernacula, waterfowl nesting area, marsh breeding bird habitat, terrestrial crayfish, habitats for SOCC: eastern ribbonsnake, monarch, west Virginia white, Canada warbler, golden-winged warbler, eastern wood-pewee and red-headed woodpecker.
- Impacts are anticipated the following Confirmed SWH types located within the Limits of Work : bat maternity colonies amphibian breeding habitat (woodland), Habitats for SOCC: monarch and eastern wood-pewee.

Habitat for the following SAR has been confirmed with the Study Area: bobolink, eastern meadowlark, little brown myotis, eastern small-footed myotis and tricolored bat.

- Authorizations and permitting under the *ESA* is required in advance of vegetation removals and other project activities within bobolink, eastern meadowlark or bat SAR habitats.

To assist in mitigating potential impacts a number of MTO *Provisions,* Special Provisions, Operational Constraints mitigation measures and future commitments have been recommended in **Sections 5.1.2, 5.1.3, 5.2.2, 5.2.3, 5.3.2, 5.3.3, 5.4.2** and **5.4.3.** Through the implementation of these is anticipated that low net effects will result from the project.

8. References

AECOM, 2021:
Hanlon Expressway / Wellington Road 34 Midblock Interchange (G.W.P. 3059-20-00) Tree Inventory Report. Prepared for the MTO, March 2021.

AECOM, 2021b:
Hanlon Expressway / Wellington Road 34 Midblock Interchange (G.W.P. 3059-20-00) Fisheries Existing Conditions and Impact Assessment Report. Prepared for the MTO, March 2021.

AECOM, 2021c:
Bat SAR ESA Contravention Avoidance and Mitigation Strategy for the Hanlon Expressway / Wellington Road 34 Midblock Interchange project (G.W.P 3059-20-00. Prepared for the MTO, March 2021.

AECOM, 2021d:
Bobolink and Eastern Meadowlark ESA Contravention Avoidance and Mitigation Strategy for the Hanlon Expressway / Wellington Road 34 Midblock Interchange project (G.W.P 3059-20-00. Prepared for the MTO, March 2021.

Bat Conservation International, 2021a:
Species Profiles: *Myotis leibii*. Available: http://www.batcon.org/resources/media-education/species-profiles/detail/2014.

Bat Conservation International, 2021b:
Species Profiles: *Myotis lucifugus*. Available: http://www.batcon.org/resources/media-education/species-profiles/detail/2040.

Bat Conservation International, 2021c:
Species Profiles: *Myotis septentrionalis*. Available: http://www.batcon.org/resources/media-education/species-profiles/detail/2306.

Bat Conservation International, 2021d:
Species Profiles: *Perimyotis subflavus*. Available: http://www.batcon.org/resources/media-education/species-profiles/detail/2345.

Bird Studies Canada, 2009:
Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. 2009 Edition. 13 pages. Published by Bird Studies Canada in co-operation with Environment Canada and the U.S. Environmental Protection Agency. February 2009

Cadman, M.D., D.A. Sutherland, G.G. Peck, D. Lepage, and A.R. Couturier, 2007:
Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. Toronto.

Calhoun, A.J.K. and P. deMaynadier, 2004:
Forestry habitat management guidelines for vernal pool wildlife. MCA Technical Paper No. 6, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

Environment Canada – Canadian Wildlife Service (EC-CWS), 2009:
Forest Bird Monitoring Program Survey Instructions & Codes. May 2009 edition.

Environment Canada (EC), 2015:
Management Plan for the Eastern Ribbonsnake (*Thamnophis sauritus*), Great Lakes population, in Canada. Species at Risk Act Management Plan Series. Environment Canada, Ottawa. Iv + 23 pp.

Environment Climate Change Canada (ECCC), 2019:
Guidelines to Reduce Risk to Migratory Birds. Available Online: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html

Halloran, J., H. Anderson and D. Tassie, 2013:
Clean Equipment Protocol for Industry. Peterborough Stewardship Council and Ontario Invasive Plant Council. Peterborough, ON. Available at: http://www.invasivespeciescentre.ca/SiteAssets/Files/WhatWeDo/LandownersKit/Clean_Equipment_Protocol_for_Industry.pdf

Institution of Lighting Professions (ILP), 2018:
Bats and artificial lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18.

Jefferson Salamander Recovery Team (JSRT), 2013:
Sampling Protocol for Determining the Presence of Jefferson Salamanders (*Ambystoma jeffersonianum*) in Ontario. Prepared June 2013

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurrary, 1998:
Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Linton, J, J. McCarter and H. Fotherby, 2018:
Recovery Strategy for the Jefferson Salamander (Ambystoma jeffersonianum) and Unisexual Ambystoma (Jefferson Salamander dependent population) (Ambystoma laterale - (2) jeffersonianum) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 58 pp.

Ministry of Natural Resources and Forestry (MNRF), No Date:
Ontario Species at Risk Handling Manual: For Endangered Species Act Authorization Holders Available online: http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_sar_hnd_mnl_en.pdf.

Ministry of Natural Resources and Forestry (MNRF), 2000:
Significant Wildlife Habitat Technical Guide. October 2000. 139 pp.

Ministry of Natural Resources and Forestry (MNRF), 2010:
Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer for Ontario. 248 pp.

Ministry of Natural Resources and Forestry (MNRF), 2012:
Bobolink Survey Methodology Document. Guelph District. April 2012

Ministry of Natural Resources and Forestry (MNRF), 2013:
Ontario Wetland Evaluation System, 2013. Southern Manual 3rd Edition, Version 3.2. Toronto: Queen's Printer for Ontario. 294 pp.

Ministry of Natural Resources and Forestry (MNRF), 2015a:
Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. January 2015. Peterborough: Queen's Printer for Ontario. 39 pp.

Ministry of Natural Resources and Forestry (MNRF), 2015b:
Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario. Species Conservation Policy Branch. Peterborough, Ontario. ii + 16 pp.

Ministry of Natural Resources and Forestry (MNRF), 2017:
Survey Protocol for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-colored Bat. Ontario Ministry of Natural Resources and Forestry. Guelph District, April 2017.

Ministry of Natural Resources and Forestry (MNRF), 2018:
Eastern Whip-poor-will (*Caprimulgus vociferous*) and Common Nighthawk (*Chordeiles minor)* Survey Protocol. Guelph District. 2018.

Ministry of Environment, Conservation and Parks, 2009:
Review and Approval of Preliminary Design, Highway 6 from Freelton Northerly 16.9 km to Guelph, WP 65-76-05]

Ministry of Environment, Conservation and Parks, 2019:
Bobolink General Habitat Description. Available Online:
https://www.ontario.ca/page/bobolink-general-habitat-description

Ministry of Natural Resources and Forestry (MNRF), 2021:
Make A Map: Natural Heritage Areas Application. Available:
http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US.

Ministry of Transportation (MTO), 1995:
Environmental Assessment and Preliminary Design Report for Highway 6 Freelton Northerly 16.9 km to Guelph W.P. 65-76-05. Prepared by Fenco Maclaren Inc. September 1995.

Ministry of Transportation (MTO), 1997:
Addendum - Environmental Assessment and Preliminary Design One Stage Submission, Highway 6 from Freelton Northerly 16.9 km to Guelph, WP 65-76-05. Prepared by Fenco Maclaren Inc. November 1997.

Ministry of Transportation (MTO), 2013:
Environmental Reference for Highway Design. MTO Environmental Policy Office. June 2013. 283 pp. Available:
http://www.raqsb.mto.gov.on.ca/techpubs/eps.nsf/0/e58d9ad002155fed85257f24005f3824/$FILE/Environmental%20Guide%20for%20Highway%20Design%20Final%202013_ACC.pdf.

Ministry of Transportation (MTO), 2015:
Environmental Guide for Wildlife Mitigation. Version March 2015. Part of the Environmental Standards and Practices. Issued by Environmental Policy Office. March 2015.

Ontario Breeding Bird Atlas, 2001:
Guide for Participants. Atlas Management Board, Federation of Ontario Naturalists, Don Mills.

Ontario Nature, 2019:
Ontario Reptile and Amphibian Atlas: Interactive Range Maps. Available: https://ontarionature.org/oraa/maps/.

Rowse, E.G., D. Lewanzik, E.L. Stone, S. Harris and G. Jones, 2015:
Dark Matters: The Effects of Artificial Lighting on Bats. *Bats in the Anthropocene: Conservation of Bats in a Changing World* pp 187-213. Available Online: https://link.springer.com/chapter/10.1007/978-3-319-25220-9_7

Rowe, J.S., 1972:
Forest Regions of Canada. Ottawa, Ontario: Government of Canada, Department of Environment, Canadian Forestry Service, Publication No. 1300.

Toronto Entomologists' Association (TEA), 2020:
Ontario Butterfly Atlas Online. Available: http://www.ontarioinsects.org/atlas_online.htm.