APPENDIX D:
TERRESTRIAL HABITAT

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
SEASONAL CONCENTRATION AREAS			
Waterfowl Stopover and Staging Area (Terrestrial and Aquatic)	Field with evidence of annual spring flooding from meltwater or runoff; aquatic habitats such as ponds, marshes, lakes, bays, and watercourses used during migration, including large marshy wetlands.	Vegetation and wildlife habitat assessments completed on July 28, 2020 in addition to air photo interpretation was used to assess features in proximity to the proposed pipeline replacement that may support waterfowl stopover and staging areas.	Pond present in study area, east of Trafalgar Road. Results of habitat assessment determined habitat not suitable due to a lack of aquatic vegetation. Other suitable staging habitat absent in proximity to the proposed pipeline replacement.
Shorebird Migratory Stopover Area	Beaches and un-vegetated shorelines of lakes, rivers, and wetlands.	Vegetation and wildlife habitat assessments completed on July 28, 2020 were used to assess features in proximity to the proposed pipeline replacement that may support migratory shorebirds.	Natural unvegetated shoreline habitat is absent in proximity to the proposed pipeline replacement.
Raptor Wintering Area	Combination of fields and woodland (>20 ha).	Vegetation and wildlife habitat assessments completed on July 28, 2020 in addition to air photo interpretation were used to assess features in proximity to the proposed pipeline replacement that may support wintering raptors.	Suitable upland habitat is absent in proximity to the proposed pipeline replacement.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and karsts.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation were used to assess features in proximity to the proposed pipeline replacement that may support bat hibernacula.	Crevices, caves or abandoned mines are absent in proximity to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
Bat Maternity Colonies	Maternity colonies considered significant wildlife habitat are found in forested ecosites.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 were used to assess features in proximity to the proposed pipeline replacement that may support bat maternity colonies. A bat roost survey was conducted on December 9, 2020 to record candidate bat maternity colonies in the forested communities in the Study Area.	Forest habitat is present in proximity to the proposed pipeline laydown area and replacement footprint. Large diameter trees were observed during July 2020 site investigations in the pipe laydown area and a large bur oak was identified adjacent to the HDD entry location. During December 2020 bat tree roost survey nine candidate bat maternity roost trees were identified in the forested communities adjacent to the proposed pipeline laydown area and two candidate bat maternity roost trees were identified in the forested community adjacent to the pipeline replacement footprint. Removal of these candidate trees is not anticipated as part of the pipeline replacement project.
Turtle Wintering Areas	Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen. Water has to be deep enough not to freeze and have soft mud substrate.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation were used to assess features in proximity to the proposed pipeline replacement that may support areas of permanent standing water but not deep enough to freeze.	East Sixteen Mile Creek may provide turtle overwintering habitat.
Reptile Hibernaculum	Rock piles or slopes, stone fences, crumbling foundations	Vegetation and wildlife habitat assessments conducted on July 28, 2020 were used to document features in proximity to the proposed pipeline replacement that may support snake hibernacula.	Rock piles/fences and crumbling foundations are absent in proximity to the proposed pipeline replacement.
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, steep slopes, rock faces or piles	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation was used to assess features in proximity to the proposed pipeline replacement that may support bank and cliff colonial bird breeding habitat.	Suitable bank and cliff habitat are absent in proximity to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
Colonial-Nesting Bird Breeding Habitat (Tree/Shrubs)	Dead trees in large marshes and lakes, flooded timber, and shrubs, with nests of colonially nesting heron species.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 were used to assess features in proximity to the proposed pipeline replacement that may support tree and shrub colonial bird breeding habitat.	LIO identified the presence of mixed wader nesting colonies. Tree/shrub colonial bird nests were absent in proximity to the proposed pipeline replacement.
Colonial-Nesting Bird Breeding Habitat (Ground)	Rock islands and peninsulas in a lake or large river.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 were used to assess features in proximity to the proposed pipeline replacement that may support ground colonial bird breeding habitat.	Nests for ground-nesting colonial birds were absent in proximity to the proposed pipeline replacement.
Migratory Butterfly Stopover Areas	Meadows and forests that are a minimum of 10 ha and are located within 5km of Lake Ontario.	GIS analysis was used to measure distance from the Lake Ontario shoreline.	Not located within 5 km of Lake Ontario.
Landbird Migratory Stopover Areas	Woodlands of a minimum size located within 5 km of Lake Ontario.	GIS analysis was used to measure distance from the Lake Ontario shoreline.	Not located within 5 km of Lake Ontario.
Deer Winter Congregation Areas	Deer winter congregation's areas are mapped by MNRF and species use surveys are not required.	The LIO database was used to identify deer winter congregation areas.	Deer wintering areas absent in proximity to the proposed pipeline replacement.
RARE VEGETATION COMMUNITIES			
Sand Barren, Alvar, Cliffs and Talus Slopes	Sand barren, Alvar, Cliff and Talus ELC Community Classes, and other areas of exposed bed rock and patchy soil development, near vertical exposed bedrock and slopes of rock rubble.	Vegetation surveys conducted on July 28, 2020 and air photo interpretation were used to assess vegetation communities in proximity to the proposed pipeline replacement.	Barren, alvar, cliff, and talus slopes absent in proximity to the proposed pipeline replacement.
Old-growth Forest	Relatively undisturbed, structurally complex; dominant trees > 100 years' old.	Vegetation surveys conducted on July 28, 2020 and air photo interpretation were used to assess vegetation communities in proximity to the proposed pipeline replacement.	Old-growth forests absent in proximity to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
Tallgrass Prairie and Savannah	Open canopy habitats (tree cover < 60%) dominated by prairie species.	Vegetation surveys conducted on July 28, 2020 and air photo interpretation were used to assess vegetation communities in proximity to the proposed pipeline replacement.	Prairie and savannahs absent in proximity to the proposed pipeline replacement.
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities listed by the NHIC.	Vegetation surveys conducted on July 28, 2020 and air photo interpretation were used to assess vegetation communities in proximity to the proposed pipeline replacement.	Rare vegetation communities absent in proximity to the proposed pipeline replacement.
SPECIALIZED HABITAT FOR WILDLIFE			
Waterfowl Nesting Area	Upland habitats adjacent to wetlands (within 120m).	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation were used to assess features in proximity to the proposed pipeline replacement that may support waterfowl nesting.	Wetlands absent in proximity to the proposed pipeline replacement.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	Treed communities adjacent to rivers, lakes, ponds, and other wetlands with stick nests of Bald Eagle or Osprey.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation were used to assess features in proximity to the proposed pipeline replacement that may support Bald Eagle and Osprey nesting.	Bald Eagle and Osprey nests absent in proximity to the proposed pipeline replacement.
Woodland Raptor Nesting Habitat	Forested ELC communities >30 ha with 10 ha of interior habitat.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation and GIS analysis were used to assess features in proximity to the proposed pipeline replacement that may support nesting habitat for woodland raptors.	Suitable forests (i.e., >10 ha of interior habitat) absent within proximity to the proposed pipeline replacement. .
Turtle Nesting Areas	Exposed soil, including sand and gravel in open sunny areas near wetlands.	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation was used to assess features in proximity to the proposed pipeline replacement that may support turtle nesting areas.	Exposed soils absent within proximity to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
Seeps and Springs	Any forested area with groundwater at surface within the headwaters of a stream or river system	Site investigations conducted on July 28, 2020 and air photo interpretation was used to assess areas/features of groundwater upwelling, including seeps and springs.	Seeps and springs absent within proximity to the proposed pipeline replacement.
Amphibian Breeding Habitat (Woodland and Wetland)	Treed uplands with vernal pools, and wetland ecosites	Vegetation and wildlife habitat assessments conducted on July 28, 2020 in addition to air photo interpretation were used in proximity to the proposed pipeline replacement that may support woodland breeding amphibians.	Wetland and vernal pools absent within proximity to the proposed pipeline replacement.
Woodland Area-sensitive Bird Breeding Habitat	Large mature forest stands, woodlots >30ha and >200m from the forest edge.	Vegetation assessments conducted on July 28, 2020 in addition to air photo interpretation and GIS analysis were used to determine whether woodlots that occurred in proximity to the proposed pipeline replacement were >30 ha with interior habitat present (>200 m from edge).	Suitable forests (with interior habitat) absent in proximity to the proposed pipeline replacement.
HABITAT FOR SPECIES OF CONSERVATION CONCERN			
Marsh Bird Breeding Habitat	Wetlands with shallow water and emergent aquatic vegetation.	Vegetation assessments conducted on July 28, 2020 in addition to air photo interpretation were used to identify marshes with shallow water and emergent vegetation in proximity to the proposed pipeline replacement that may support marsh breeding birds.	Wetlands absent in proximity to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
Open Country Bird Breeding Habitat	Large grasslands and fields (>30ha).	Vegetation assessments conducted on July 28, 2020 in addition to air photo interpretation and GIS analysis were used to identify grassland communities in proximity to the proposed pipeline replacement that may support area-sensitive breeding birds.	Large grasslands and fields absent in proximity to the proposed pipeline replacement.
Shrub/Early Successional Bird Breeding Habitat	Large shrub and thicket habitats (>10ha).	Vegetation assessments conducted on July 28, 2020 in addition to air photo interpretation and GIS analysis were used to identify large communities that may support shrub/early successional breeding birds.	Large shrub and thickets absent in proximity to the proposed pipeline replacement.
Terrestrial Crayfish	Wet meadows and edges of shallow marshes.	Vegetation assessments conducted on July 28, 2020 and air photo interpretation were used to identify shallow marsh and meadow marsh communities that occurred in proximity to the proposed pipeline replacement. Searches for crayfish chimneys were conducted during wildlife habitat assessments.	Terrestrial crayfish are absent in proximity to the proposed pipeline replacement.
SPECIES OF CONSERVATION CONCERN			
Eastern Milksnake	The Milksnake is frequently reported in and around buildings, especially old structures. However, it is found in a variety of habitats, including prairies, pastures, hayfields, rocky hillsides and a wide variety of forest types. Two important features of ideal habitat are proximity to water, and suitable locations for basking and egg-laying sites may include compost or manure piles, stumps, under boards, or in loose soil (COSEWIC, 2002).	Vegetation and habitat assessments conducted on July 28, 2020 were used to identify suitable habitat to support Eastern Milksnakes in proximity to the proposed pipeline replacement.	Suitable basking and nesting site absent in proximity to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
Eastern Wood-Pewee	The Eastern Wood-Pewee is a forest bird of deciduous and mixed woods. Nest-site selection favors open space near the nest, typically provided by clearings, roadways, water, and forest edges. Nests are cryptic as they are covered with lichens, typically appearing like a knot on top of a branch and little is known about nesting behavior (Cadman et al, 2007).	Vegetation and habitat assessments conducted on July 28, 2020 were used to identify suitable habitat to support Eastern Wood-pewee in proximity to the proposed pipeline replacement.	Suitable forested habitat is present adjacent to the proposed pipeline replacement.
Red-headed Woodpecker	The Red-headed Woodpecker Occupies a wide range of habitats, but most are characterized by open areas for feeding; snags for roosting, and a secure food supply. This species requires multiple snags for nesting, roosting, and foraging. Some of the habitats used are open deciduous and riparian woodlands, orchards, parks, agricultural lands, savanna-like grasslands, beaver ponds with snags, forest edges, burned forests, and flooded bottomland forests. Habitats are similar in both breeding and wintering range, but winter distribution most determined by presence of food. Have been known to move north in winter if mast is heavy (N.A.S., 2012; Smith et al, 2000).	Vegetation and habitat assessments conducted on July 28, 2020 were used to identify suitable habitat to support Red-headed Woodpecker in proximity to the proposed pipeline replacement.	Open woodlands absent in proximity to the proposed pipeline replacement.
Snapping Turtle	Snapping Turtles inhabit ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms. Females show strong nest site fidelity and nest in sand or gravel banks at waterway edges in late May or early June (COSEWIC, 2008).	Vegetation and habitat assessments conducted on July 28, 2020 were used to identify suitable habitat to support Snapping Turtles in proximity to the proposed pipeline replacement.	Eastern Sixteen Mile Creek may support summer and overwintering habitat for Snapping Turtles.
Wood Thrush	Wood Thrush prefer deciduous and mixed forests in southern Ontario, ranging from small and isolated to large and contiguous woodlots. The presence of tall trees and a thick understory are preferred (Cadman et al., 2007).	Vegetation and habitat assessments conducted on July 28, 2020 were used to identify suitable habitat to support Wood Thrush in proximity to the proposed pipeline replacement.	Suitable forested habitat is present adjacent to the proposed pipeline replacement.

Appendix D-1 Wildlife Habitat Assessment in Proximity to Proposed Pipeline Replacement (Ecoregion 6E)

Wildlife Habitat Type	Criteria	Methods	Habitat Assessment
ANIMAL MOVEMENT CORRIDORS			
Amphibian Movement Corridor	Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland).	Identified after Amphibian Breeding Habitat - Wetland is confirmed. Movement corridors should be considered when amphibian breeding habitat is confirmed as SWH from Amphibian Breeding Habitat (Wetland).	Wetland and vernal pools absent within proximity to the proposed pipeline replacement.
Deer Movement Corridor	Corridors may be found in all forested ecosites. Determined based on MNRF identifying Deer Wintering Areas.	Movement corridors should be considered when Deer Wintering Areas are identified.	Deer wintering areas absent within proximity to the proposed pipeline replacement.

REFERENCES

MNRF. 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. January, 2015. 41 pp.

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

Ontario Nature. 2018. Ontario Reptile and Amphibian Atlas [web application]. Toronto, Ontario. Available online at www.ontarionature.org/atlas<http://www.ontarionature.org/atlas> Accessed July 2018.

COSEWIC 2002. COSEWIC assessment and update status report on the Milksnake Lampropeltis tirangulum in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. . vi + 29 pp.

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (eds). 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. 340-341 pp.

National Audubon Society (N.A.S), 2012. Red-headed Woodpecker *Melanerpes erythrosephalus.* Available Online at: http://birds.audubon.org/species/redwoo

Smith, K. G., J. H. Withgott, and P. G. Rodewald. 2000. Red-headed Woodpecker (*Melanerpes erythrocephalus*). *In* The Birds of North America, No. 518 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Appendix D-2: Habitat Potential for Threatened or Endangered Species in Proximity to the Proposed Pipeline Route

Species	Habitat Preference	Habitat Potential
PLANTS		
Butternut	Found in a variety of habitats throughout Southern Ontario, including woodlands and hedgerows (Farrar, 1995).	One butternut was identified near the edge of the woodland community at the southwest end of the pipe laydown area. The tree was within 25m of the laydown area.
Amphibians		
Jefferson Salamander	The Jefferson Salamander is terrestrial during the adult stage and inhabits upland deciduous forests with suitable breeding areas including limestone sinkhole ponds, kettle ponds, vernal pools and other natural basins. Breeding areas are often ephemeral and are fed by spring runoff, groundwater, or springs. In Canada, the species is associated with mature, Carolinian forests. Suitable habitat is often only available in fragmented deciduous woodlots of marginal agricultural land (COSEWIC, 2010).	Last recorded in 10 x 10 km square that overlaps with the proposed pipeline replacement in 1990 (MNR 2019b). Suitable breeding habitat (e.g., vernal pools) for this species is considered absent in proximity to the proposed pipeline route.
BIRDS		
Barn Swallow	Nest on walls or ledges of barns and other human-made structures such as bridges, culverts or other buildings; forages in open areas for flying insects (COSEWIC 2011).	Suitable nesting habitat is available in barns and old structures; however, no structures are proposed for removal.
Bobolink	Nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures (COSEWIC 2010).	Suitable grassland habitat is absent in the proximity to the proposed pipeline replacement.
Chimney Swift	Chimney Swifts primarily use chimneys for roosting and nesting, and only rarely nest in large hollow trees (Fitzgerald et al., 2014; Zanchetta et al., 2014).	Suitable nesting habitat may be available in residential chimneys; however, no structures are proposed for removal.
Eastern Meadowlark	Meadows, hayfields and pastures; also, other open habitat types including mown lawn (COSEWIC 2011). Prefers large (~5 ha), low-lying wet grasslands with abundant litter (COSEWIC 2011).	Suitable grassland habitat is absent in the proximity to the proposed pipeline replacement.

Appendix D-2: Habitat Potential for Threatened or Endangered Species in Proximity to the Proposed Pipeline Route

Species	Habitat Preference	Habitat Potential
MAMMALS		
Little Brown Myotis	Trees, buildings and bridges for roosting; trees for nesting; caves and mines for hibernation (COSEWIC 2013).	Suitable roosting habitat is available in barns and old structures; however, no structures are proposed for removal. During the bat tree roost survey nine candidate bat maternity roost trees were identified in the forested communities adjacent to the proposed pipeline laydown area and two candidate bat maternity roost trees were identified in the forested community adjacent to the pipeline replacement footprint. Removal of these candidate trees is not anticipated as part of the pipeline replacement project.
Northern Myotis	Caves provide overwintering habitat (COSEWIC 2013). Rarely uses human-made structures for roosting (COSEWIC 2013).	Suitable roosting habitat is available in barns and old structures; however, no structures are proposed for removal. During the bat tree roost survey nine candidate bat maternity roost trees were identified in the forested communities adjacent to the proposed pipeline laydown area and two candidate bat maternity roost trees were identified in the forested community adjacent to the pipeline replacement footprint. Removal of these candidate trees is not anticipated as part of the pipeline replacement project.
Small-footed Myotis	Small-footed myotis hibernate in the fall in caves and abandoned mines after mating occurs near these communal sites. During summer months, this bat typically roosts in crevices and cracks associated with rocky sites (e.g. rip rap, rock piles, bluffs, bedrock outcrops) but also have also been found in old buildings (e.g., barns, and houses).	Suitable roosting habitat is available in barns and old structures; however, no structures are proposed for removal.
Tri-colored Bat	Found in a variety of habitats; caves provide overwintering habitat (COSEWIC 2013).	During the bat tree roost survey nine candidate bat maternity roost trees were identified in the forested communities adjacent to the proposed pipeline laydown area and two candidate bat maternity roost trees were identified in the forested community adjacent to the pipeline replacement footprint. Removal of these candidate trees is not anticipated as part of the pipeline replacement project.

REFERENCES

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

COSEWIC. 2010. COSEWIC assessment and status report on the Jefferson Salamander Ambystoma jeffersonianum in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 38 pp.

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

COSEWIC, 2011. COSEWIC assessment and status report on the barn swallow Hirunda rustica in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp. (www.sararegistry.gc.ca/status/status_e.cfm)

COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis Myotis lucifugus, Northern Myotis Myotis septentrionalis and Tri-colored Bat Perimyotis subflavus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

Farrar, J.L. 1995. Trees in Canada. Fitzhenry & Whiteside Limited and the Canadian Forest Service. Canada. 198 pp.

Fitzgerald, T. M., E. van Stam, J. J. Nocera, and D. S. Badzinski. 2014. Loss of nesting sites is not a primary factor limiting northern Chimney Swift populations. Population Ecology 56 (3):507-512. http://dx.doi.org/10.1007/s10144-014-0433-6

Zanchetta, Carolyn & Tozer, Doug & Fitzgerald, Trina & Richardson, Kristyn & Giesbrecht, Debbie. (2014). Tree cavity use by Chimney Swifts: implications for forestry and population recovery. Avian Conservation and Ecology. 9. 10.5751/ACE-00677-090201.