

CITY OF WINDSOR

PRELIMINARY WILDLIFE CROSSING STUDY OJIBWAY PRAIRIE COMPLEX

AUGUST 28, 2023





PRELIMINARY WILDLIFE CROSSING STUDY

OJIBWAY PRAIRIE COMPLEX

CITY OF WINDSOR

PROJECT NO.: IM22104012
DATE: AUGUST 28, 2023

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“Effective September 21, 2022, Wood Environment & Infrastructure Solutions Canada Limited is now operating as WSP E&I Canada Limited. No other aspects of our legal entity, contractual terms or capabilities have changed in relation to this report submission.”

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1 INTRODUCTION

1.1 PURPOSE AND OBJECTIVE

The Ojibway Prairie Complex (the Complex) is a collection of six closely situated natural areas within the City of Windsor: Black Oak Heritage Park, Ojibway Park, Tallgrass Prairie Heritage Park, Ojibway Prairie Provincial Nature Reserve, Spring Garden Natural Area, and Oakwood Natural Area. All the sites, with exception of Oakwood Natural Area, are designated part of the Ojibway Prairie Remnants Area of Natural and Scientific Interest (ANSI) and Environmentally Significant Area (Figure 1). They all contain significant natural heritage features including rare vegetation communities, species of conservation concern, significant wetlands, and significant wildlife habitat. The Complex is recognized for its tremendous biodiversity, with more than 4,000 species recorded in the area, including over 200 provincially rare flora and fauna (Gardener Costa et. al 2014).

The Ojibway Prairie Complex is approximately 365 hectares and sits within an urban landscape that is fragmented by residential and commercial land uses, and a road network of local, collector, and arterial roads. As a result, there are often wildlife – motor vehicle collisions that result in wildlife mortality. Wildlife species with large home ranges or that rely on different habitat types to carry out daily, seasonal and basic life processes (i.e. breeding/nesting, foraging, hibernation) are especially susceptible because they will attempt to cross roads to meet their biological needs. Reptiles (snakes and turtles) and amphibians are especially at risk for road mortality in the Complex, but other common and abundant small to large mammal species are also affected. Road mortality is widely known to have harmful effects on wildlife populations, especially at-risk species. However, in addition to direct mortality, other indirect effects such as isolation, low reproduction rates, and inbreeding can also significantly affect populations and underscore the need to maintain and restore essential movements of wildlife across fragmented habitats.

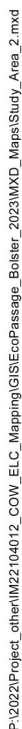
The Ojibway Prairie Complex is a mosaic of different ecosystems including tallgrass prairie, savannah and woodland, forest, swamp and marsh. Moving from west to east, the Complex is bisected by three major roads running north-south and three roads running east-west (Figure 1):

- Ojibway Parkway bisects Black Oak Heritage Park (west) and Ojibway Park (east);
- Matchett Road separates Ojibway Park (west) from Tallgrass Prairie Heritage Park (east) and Ojibway Prairie Provincial Nature Reserve (east);
- Malden Road runs between the Ontario Provincial Prairie Nature Reserve (west) and Spring Garden Natural Area (east);
- Spring Garden Road is adjacent to the northern boundary of Spring Garden Natural Area;

- Armanda Street separates Tallgrass Prairie Heritage Park (south) and Chappus Natural Area (north); and
- Todd Lane separates Spring Garden Natural Area (north) from parks further south, including Town Centre Woodlot and LaSalle Woodlot/Brunet Park in the Town of LaSalle.

WSP Environment and Infrastructure Canada Limited (WSP) was retained by the City of Windsor (the City) to collect preliminary baseline data on wildlife species crossing the above listed roads and rights of way (ROW). The purpose of the wildlife crossing study was three-fold:

- 1). To identify species and their crossing locations along roads that bisect the Ojibway Prairie Complex using mortality surveys, winter track studies and trail cameras;
- 2). To identify potential movement corridors and/or connection points where ongoing monitoring of wildlife is recommended; and
- 3). Compile a GIS database and maps of wildlife sightings, tracks and mortality records to better inform future potential crossing designs and placement locations.



A horizontal scale bar with tick marks at 0, 0.25, 0.5, 1, 1.5, and 2. The unit 'Kilometres' is written at the right end.

DATE: August 2023

2 METHODS

WSP biologists conducted the following wildlife surveys on City of Windsor municipal roads and ROW adjacent to the Ojibway Prairie Complex.

2.1 ROAD MORTALITY SURVEYS

Road mortality surveys were conducted at the following locations: along Matchett Road, from Highway 401 south to Sprucewood Avenue; Malden Road, from Highway 401 south to Todd Lane; Armanda Street, between Matchett Road and Malden Road; Spring Garden Road, north of the Spring Garden Natural Area; and Todd Lane, south of the Spring Garden Natural Area between Malden Road and 10th Street (Figure 1).

Mortality surveys were conducted shortly after sunset. Biologists walked the road ROW in both directions and recorded all deceased animals encountered, including species name and location (using GPS). The ROW were surveyed three times each between October and November 2022 after rain events (Appendix A). All living wildlife observed in the ROW and/or crossing the road were similarly recorded.

2.2 WINTER TRACK SURVEYS

Winter track surveys were conducted along Matchett Road, Malden Road, Armanda Street, Spring Garden Road, and Todd Lane in the same locations of the earlier wildlife mortality surveys. The ROW was surveyed three times between January and February 2023 after snowfall events. Wildlife track locations were recorded, including species name and location (using GPS). Any encounters with deceased wildlife at this time were similarly recorded. Photos of wildlife tracks are provided in Appendix B.

2.3 TRAIL CAMERA MONITORING

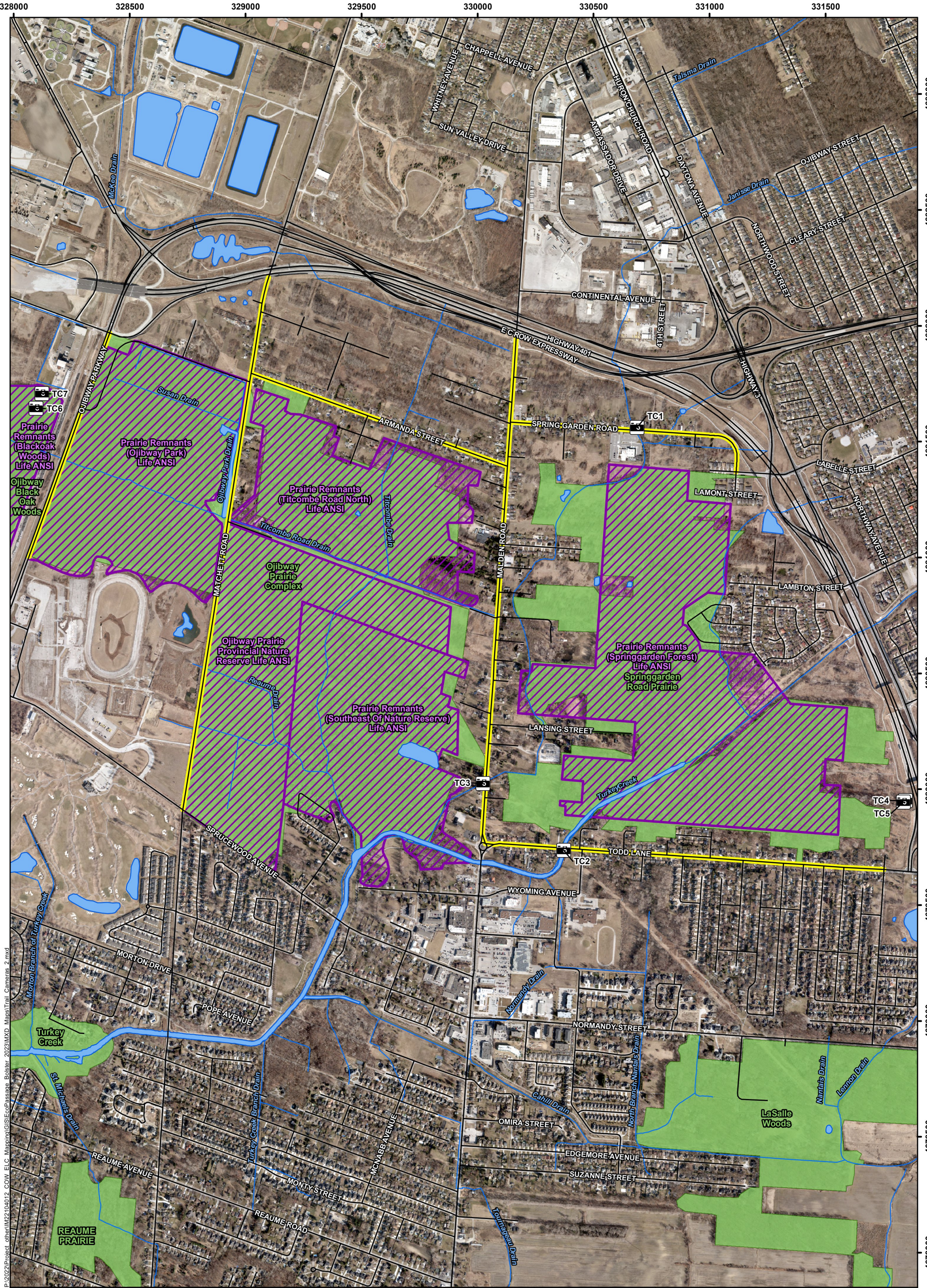
In addition to the above surveys, WSP installed a trail camera in selected areas to determine wildlife use of existing infrastructure such as culverts, bridges, and ecopassages, at potential road crossing locations. These built features can provide movement corridors for wildlife to safely access areas otherwise fragmented by roadways and residential developments.

The trail camera was strategically placed in suspended positions to capture target habitat on either side of the crossing (Figure 2). Trail camera locations included:

- North side of Spring Garden Road at the Basin Drain culvert (TC1);
- Todd Lane at the Turkey Creek bridge crossing, under the bridge (TC2);
- West side of Malden Road at the Basin Drain culvert (TC3);
- Spring Garden Natural Area at Tunnel Top 5 (T5 ecopassage)(TC4 & TC5); and

- Within Black Oak Heritage Park near proposed Ojibway Parkway ecopassage landing location (TC6 & TC7).

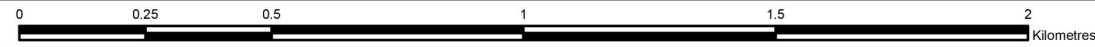
The camera used was a Reconyx HyperFire 2 Covert IR camera. Photographs were taken when the camera's motion and temperature sensors were triggered. All photographs were reviewed and the best images were arranged into a log that included date, time, location, species name and other observations for each site (Appendix C and D).



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LEGEND

- Study Area
- Trail Camera Locations
- ANSI
- Environmentally Significant Area
- Roads
- Watercourse / Drain
- Waterbody



NOTES:
- Aerial imagery extracted from County of Essex interactive web map, 2021.

Datum: NAD83
Projection: UTM Zone 17N

WILDLIFE CROSSING STUDY

Trail Camera Locations

PROJECT N^o: IM22104012

SCALE: 1:15,000

FIGURE: 2

DATE: August 2023

3 RESULTS AND DISCUSSION

3.1 ROAD MORTALITY SURVEYS

Table 1 below includes the results of road mortality surveys and incidental observations of wildlife crossing the roadways in the Ojibway Prairie Complex in October and November 2022. Although all wildlife were part of the surveys, only mammal species were observed during this time.

A total of five different deceased wildlife species were recorded: Northern Raccoon, Striped Skunk, Eastern Cottontail, Eastern Grey Squirrel, and Virginia Opossum. Two additional species were observed successfully crossing the roadways during surveys: White-tailed Deer and Domestic Cat. In total, 17 mortalities were recorded, and seven observations of living wildlife were also noted (Table 1). Most wildlife mortality belonged to Eastern Grey Squirrel (5) and Striped Skunk (5), followed by Virginia Opossum (4), Northern Raccoon (3) and Eastern Cottontail (1).

Overall, the road that had the highest number of wildlife observations was Matchett Road. There were 10 observations in total, with six mortalities and four observations of living wildlife crossing the road (Table 1). This road represented the second highest number of mortalities observed during the surveys. Malden Road had eight observations in total, with seven mortalities and one observation of living wildlife crossing the road. Malden Road had the highest number of recorded mortalities during the surveys (Table 1). Todd Lane had the third most observations, five in total with three mortalities and two observations of living wildlife crossing the road (Table 1). Armanda Street had the least number of observations, with only one mortality recorded (Table 1). There was no wildlife mortality or living wildlife noted along Spring Garden Road during the surveys.

The locations of wildlife deaths did not appear clustered at certain points on the road ROW; however, the mortalities were generally found where undeveloped or open land occurred on either side of the road, or near the intersection with undeveloped road or utility easements (Figure 3).

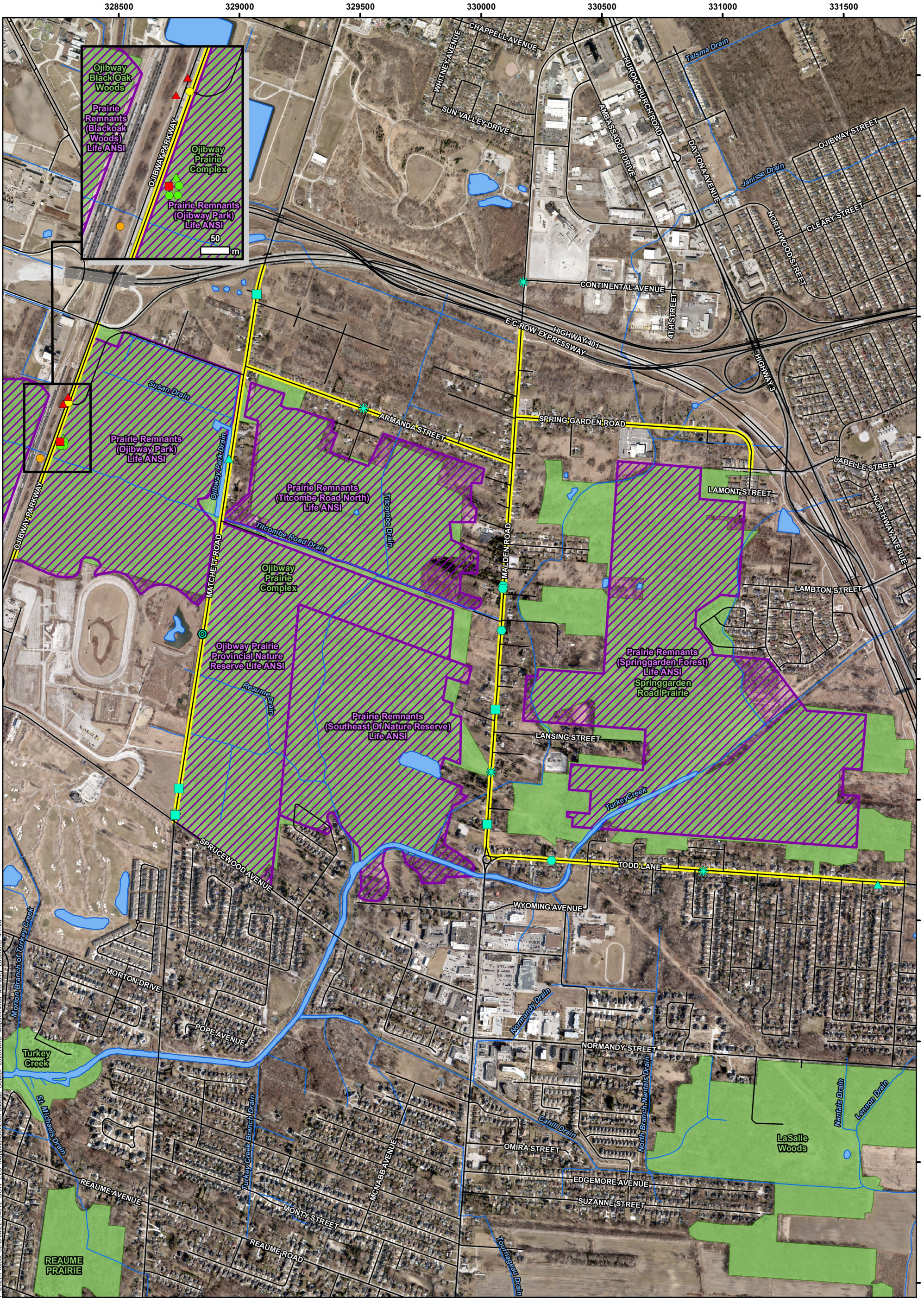
WSP also mapped additional mortality data collected during 2020 field investigations for the Ojibway Parkway Wildlife Overpass Class Environment Assessment (Wood 2022). These data are also presented in Figure 3. Along Ojibway Parkway, wildlife mortality was clustered at two points, one near the intersection with Broadway Street and one at an opening in the fence that runs north-south between Ojibway Parkway and Ojibway Park (Figure 3). The environmental conditions at these two locations indicate the presence of openings in a fence that runs north-south along Ojibway Parkway. Fencing is known to be effective at preventing road mortality and in funneling wildlife to safer crossing areas. However, openings or breaches in fences can have harmful effects where wildlife are then unintentionally directed

near roadways without additional mitigation. Further discussion of wildlife movement and potential crossing locations is provided in Section 3.2 below.

Table 1: Roadway Wildlife Observations

Common Name	Scientific Name	Date	Coordinates	Observations
Matchett Road				
Striped Skunk	<i>Mephitis mephitis</i>	Oct 18 2022	Ojibway Nature Centre parking lot	Walking through parking lot at Ojibway Nature Centre
Northern Raccoon	<i>Procyon lotor</i>	Oct 18 2022	42.26616677 N 83.0739412 W	Deceased on road
White-tailed Deer	<i>Odocoileus virginianus</i>	Oct 24 2022	42.252870 N 83.076201 W	Deer crossed the road from Ojibway Prairie Provincial Natural Reserve
Northern Raccoon	<i>Procyon lotor</i>	Oct 24 2022	42.266303 N 83.073858 W	Alive in a tree near edge of pond and roadside
White-tailed Deer	<i>Odocoileus virginianus</i>	Oct 24 2022	42.266303 N 83.073858 W	Two does crossed the road from Ojibway Park
Striped Skunk	<i>Mephitis mephitis</i>	Nov 1 2022	42.272315 N 83.072734 W	Deceased on road
Striped Skunk	<i>Mephitis mephitis</i>	Nov 7 2022	42.253841 N 83.076045 W	Deceased on road
Striped Skunk	<i>Mephitis mephitis</i>	Nov 9 2022	42.252841 N 83.076194 W	Deceased on road
Eastern Cottontail	<i>Sylvilagus floridanus</i>	Nov 9 2022	42.259604 N 83.075038 W	Deceased on road
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Nov 9 2022	42.252889 N 83.076176 W	Deceased on road
Malden Road				
Striped Skunk	<i>Mephitis mephitis</i>	Oct 18 2022	42.2639686 N 83.0599367 W	Alive near west side of the road
Virginia Opossum	<i>Didelphis virginiana</i>	Oct 18 2022	42.2600184 N 83.0600366 W	Deceased on road

Common Name	Scientific Name	Date	Coordinates	Observations
Striped Skunk	<i>Mephitis mephitis</i>	Oct 24 2022	42.252779 N 83.060539 W	Deceased on road
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Oct 26 2022	42.273007 N 83.059378 W	Deceased on road
Virginia Opossum	<i>Didelphis virginiana</i>	Nov 1 2022	42.261688 N 83.060020 W	Deceased on road
Virginia Opossum	<i>Didelphis virginiana</i>	Nov 1 2022	42.261576 N 83.060033 W	Deceased on road
Striped Skunk	<i>Mephitis mephitis</i>	Nov 1 2022	42.257066 N 83.060264 W	Deceased on road
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Nov 1 2022	42.254731 N 83.060393 W	Deceased on road
Todd Lane				
Northern Raccoon	<i>Procyon lotor</i>	Oct 21 2022	42.251329 N 83.055414 W	Crossed road from east, heading west
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Oct 21 2022	42.251216 N 83.049631 W	Deceased on road
Northern Raccoon	<i>Procyon lotor</i>	Oct 21 2022	42.250887 N 83.040874 W	Deceased on road
Virginia Opossum	<i>Didelphis virginiana</i>	Oct 24 2022	42.251488 N 83.057270 W	Deceased on road
Domestic Cat	<i>Felis catus</i>	Nov 7 2022	42.250770 N 83.039492 W	Crossed road from east to west at intersection
Armanda Street				
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Oct 18 2022	42.2681481 N 83.0672340 W	Deceased on road



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Study Area

ANSI

Environmentally Significant Area

Roads

Watercourse / Drain

Waterbody

Deer

Northern Raccoon

Striped Skunk

Virginia Opossum

Eastern Grey Squirrel

Eastern Cottontail

2016

2018

2019

2020

2022

Datum: NAD83
Projection: UTM Zone 17N

N

E

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W

PROJECT N^o: IM22104012

FIGURE: 3

SCALE: 1:14,500

DATE: August 2023

THE CITY OF

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WSP

WILDLIFE CROSSING STUDY

Animal Mortality Locations

NOTES:
-Aerial imagery extracted from County of Essex interactive web map, 2021.

3.2 WINTER TRACK SURVEYS

Figure 4 below includes the combined results of the winter 2023 track surveys along Matchett Road, Malden Road, Armanda Street, Todd Lane, Spring Garden Road, Broadway Street and Ojibway Parkway, and the winter and spring 2021 track surveys previously conducted along Matchett Road and Malden Road, south of Titcombe Road (Wood 2021).

Tracks observed during the winter 2023 surveys included White-tailed Deer, Coyote (*Canis latrans*), Eastern Grey Squirrel, Northern Raccoon, and Wild Turkey (*Meleagris gallopavo*). Matchett Road yielded the most observations of wildlife tracks. There were nine recorded points where wildlife species approached Matchett Road to access the natural areas on either side (Figure 4). In most cases, tracks were found in front of breaks in a fence or at drainage features that created openings in the vegetation that wildlife could use to access the ROW. Most tracks recorded on Matchett Road were White-tailed Deer, with Coyote, Eastern Grey Squirrel, and Northern Raccoon also observed. Previous surveys conducted in 2021 by Wood also revealed several White-tailed Deer and small mammal trails south of Titcombe Road, at the Reaume Drain crossing, and at fence openings (Figure 4).

Similar to Matchett Road, wildlife tracks observed along Broadway Street and Ojibway Parkway in winter 2023 were associated with fence breaks and drainage features. On Broadway Street, Eastern Grey Squirrel tracks were observed coming out of Ojibway Park through a hole in the fence and crossing to a residential property on the other side of the street. Further west, White-tailed Deer and Northern Raccoon tracks were found at a fence break and where an unnamed drain runs underneath the fence parallel to Broadway Street. On Ojibway Parkway, White-tailed Deer were moving through a large opening in the fence where Titcombe Road Drain exits Ojibway Park (Figure 4).

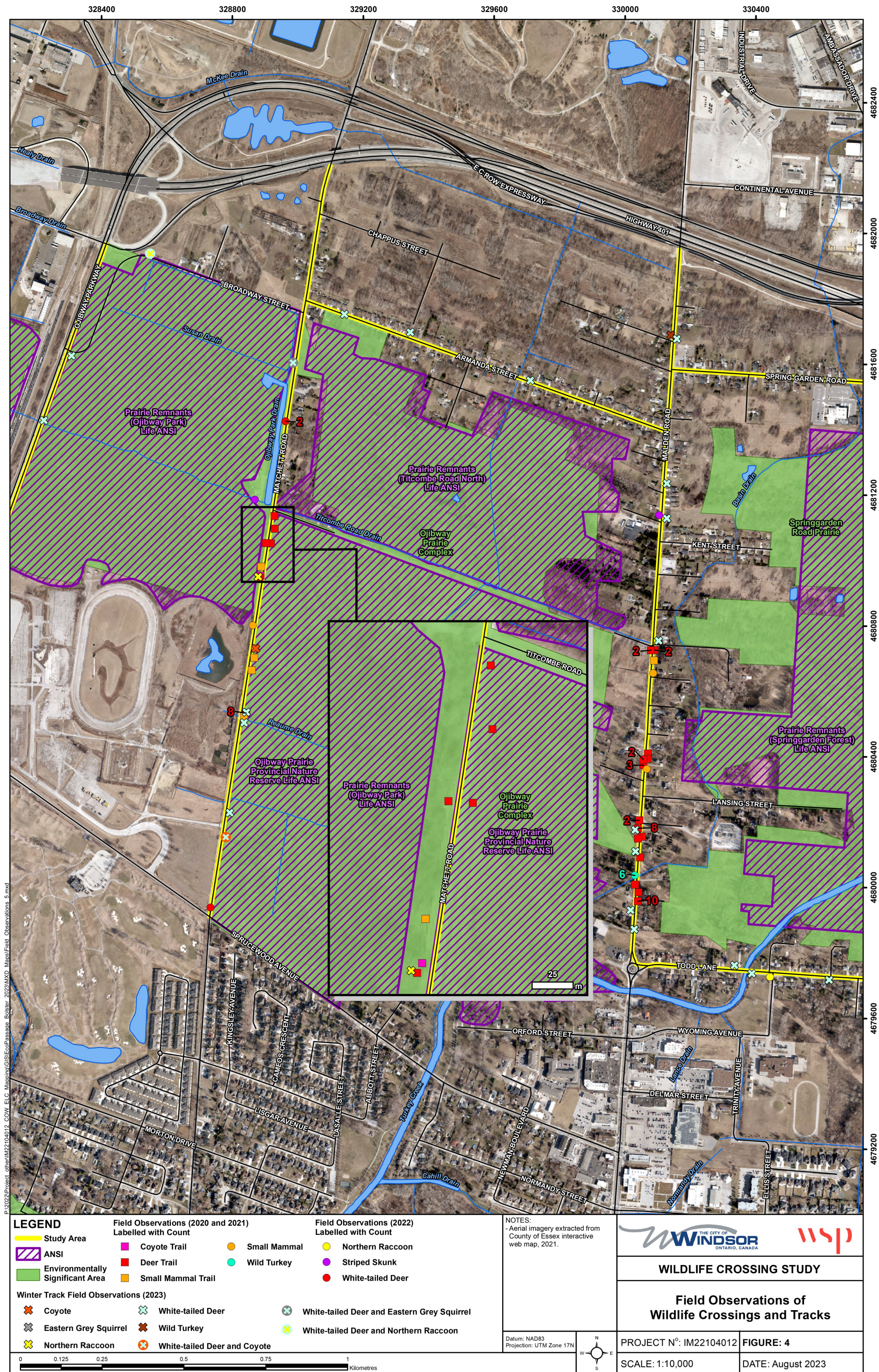
Unlike the roadways described above, Malden Road has no fenced borders along the ROW, with exception of an approximately 190-meter stretch south of the Titcombe Road entrance to the Ojibway Prairie Provincial Nature Reserve. Although Malden Road has residences on either side of the ROW, there is still undeveloped, open habitat between the homes and property boundaries allowing wildlife to cross between the Ojibway Prairie Provincial Nature Reserve and the Spring Garden Natural Area.

Most of the winter 2023 tracks observed along Malden Road were White-tailed Deer. A few Wild Turkeys were observed at the north end near Chappus Street. Combined with survey results from 2021, wildlife almost exclusively utilized undeveloped road easements (running east-west) and the utility corridor to cross Malden Road (Figure 4). It is important to note that all the observed crossing points appeared to have suitable habitat openings on both sides of the road. It was very rare to see wildlife tracks at the road edge that did not have unencumbered access to the natural areas behind the residences.

The Todd Lane survey results were all recorded at the west end of the road near Turkey Creek/Grand Marais Drain. All winter tracks were made by White-tailed Deer. Most of the tracks were within and near the utility corridor that runs southeast to northwest and provides a large opening for wildlife to move between the Spring Garden Natural Area and the Town Centre Woodlot in LaSalle. Additionally, there was one observation slightly east where White-

tailed Deer were crossing at an undeveloped road easement on the south side of Todd Lane to Bondy Avenue and into the Spring Garden Natural Area (Figure 4).

Lastly, all winter wildlife tracks along Armanda Street were made by White-tailed Deer. There were four locations where White-tailed Deer used undeveloped road easements to cross Armanda Street (Figure 4).



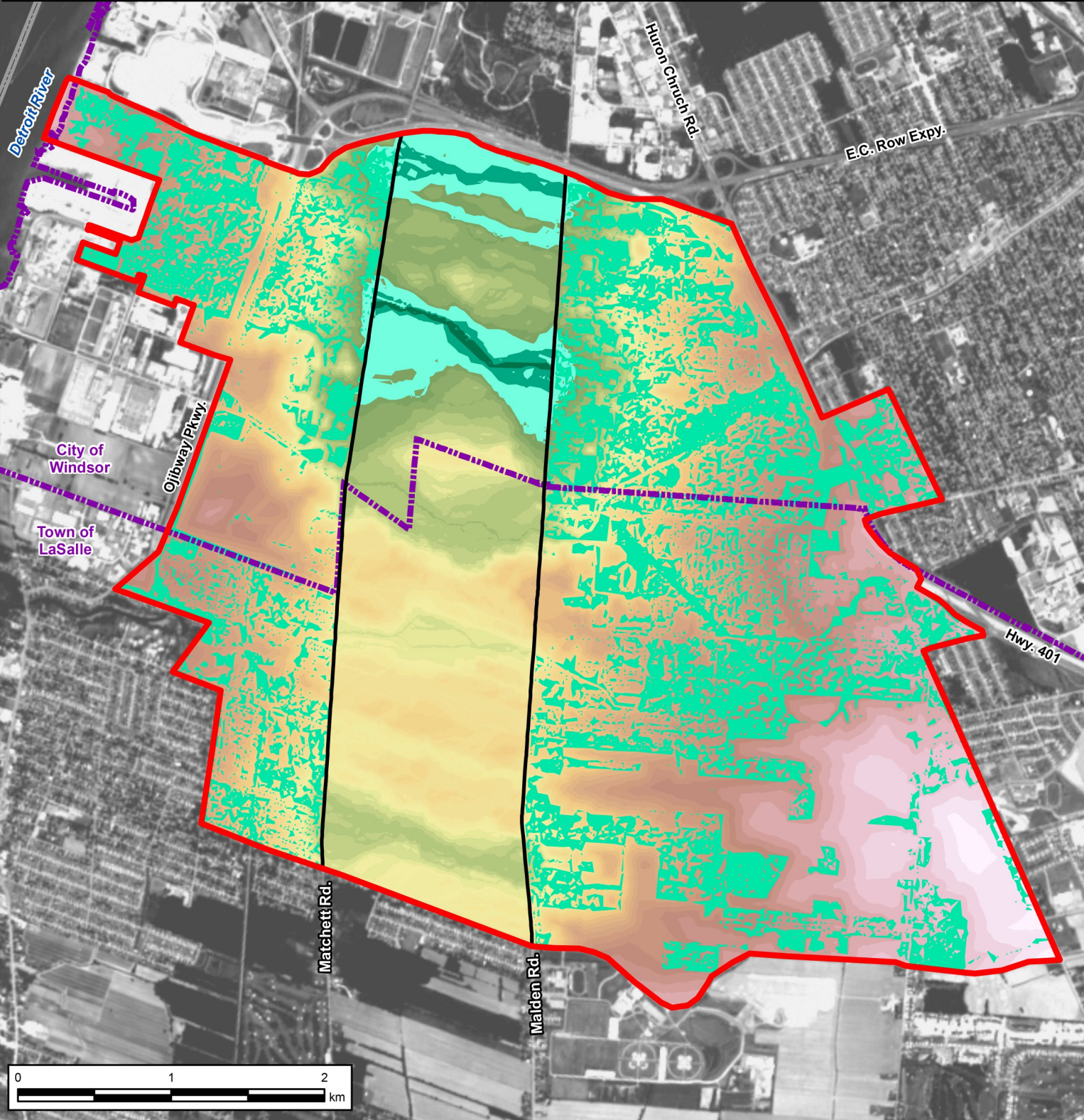
3.3 GEOSPATIAL CONNECTIVITY ANALYSIS

In a previous wildlife crossing study conducted by Wood (2021), geospatial connectivity analysis was used to help determine the general areas where wildlife were more likely to cross Matchett Road and Malden Road to access adjacent natural areas. The connectivity analysis used the least resistive (lowest impedance) wildlife movement corridor habitat patch GIS modelling. Using multispectral satellite imagery (10 m by 10 m spatial resolution), an ISODATA (k-means) clustering algorithm, and known landscape features, a wildlife movement impedance surface was constructed and mapped. Patches of pixels categorized with the lowest wildlife impedance values were isolated in areas west of Matchett Road and east of Malden Road. These patches of land were considered “good” habitat fragments for general wildlife. A cumulative landscape wildlife movement resistivity surface was then generated extending outward from good habitat patches along Matchett Road and Malden Road. The resulting analysis identified the lowest cumulative impedance connectivity corridors crossing both roads. Potential primary, secondary, and tertiary corridors were identified (Figure 5).

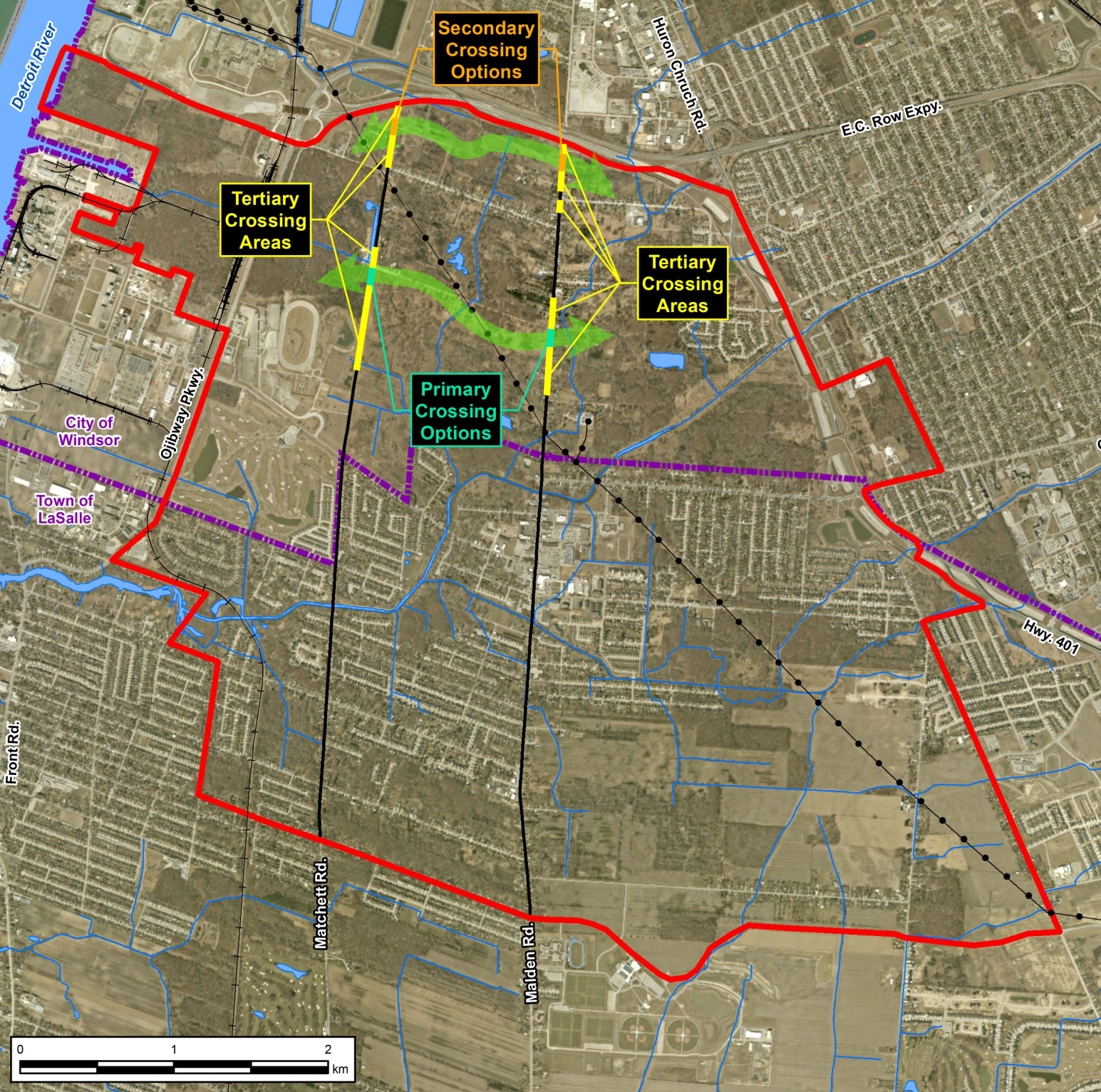
Wildlife track/trails data collected to date were evaluated with respect to these potential mapped corridors. The results along Matchett Road suggest that the primary crossing area south of the Ojibway Nature Centre entrance is where many wildlife species approach the road naturally. Further south along Matchett Road, the tertiary crossing area also appears to be where wildlife naturally approach the road based on field survey results (Figures 4 and 5).

The results along Malden Road indicate a similar trend. Wildlife appear to approach the road naturally at the primary crossing area at the Titcombe Trail (east) entrance to the Ojibway Prairie Provincial Nature Reserve, and at the tertiary crossing points north of Lansing Street and Chappus Street. In addition, the intersection of Malden Road and the utility corridor also appears to be a favourable crossing location (Figures 4 and 5).

MAP A: Identified Wildlife Habitat Corridor Areas Crossing Malden and Matchett Road



MAP B: Primary, Secondary and Tertiary Crossing Options and Wildlife Movement Corridors Crossing Malden and Matchett Road



LEGEND

- Approximate Study Area
- Malden and Matchett Road Location within Study Area
- Railway
- Hydro Line
- City of Windsor Municipal Border
- National Border

MAP A:

- Low Impedance / Good Habitat Patches isolated to the west side of Matchett Road and east side of Malden Road
- Identified corridor Areas Crossing Malden and Matchett Road
- Primary Corridor Area (lowest wildlife movement resistivity from good habitat west of Matchett Rd. and east of Malden Rd.)
- Secondary Corridor Area (lower wildlife movement resistivity from good habitat west of Matchett Rd. and east of Malden Rd.)
- Tertiary Corridor Area (low wildlife movement resistivity from good habitat west of Matchett Rd. and east of Malden Rd.)

Combined Cumulative Landscape Wildlife Movement Resistivity Surface Indicating Overall Low/High Impedance Corridors from Good Habitat Patches West of Matchett Rd. and Good Habitat Patches East of Malden Rd.

- High Combined Cumulative Impedance Area moving across the landscape from good habitat patches
- Low Combined Cumulative Impedance Area moving across the landscape from good habitat patches

MAP B:

- Primary and Secondary Wildlife Movement Corridors crossing Malden Rd. and Matchett Rd.
- Primary Crossing Location
- Secondary Crossing Location
- Tertiary Crossing Area

NOTES:
- Road and Municipal border info extracted from Ontario GeoHub, NDMNRF 2021
- Sentinel 2A satellite data extracted from Copernicus Open Access Hub, European Space Agency, Scene Date is June 18, 2020.
L1C_T17TLG_A026063_20200618_T162536
- Aerial imagery (Map B) extracted from Essex County interactive map, 2019.

Datum: NAD83
Projection: UTM Zone 17N





WILDLIFE CROSSING STUDY
Resultant Wildlife Habitat Corridor Areas and Primary, Secondary and Tertiary Crossing Options and Wildlife Movement Corridors Crossing Malden and Matchett Road

PROJECT N°: IM22104012

SCALE: 1:35,000

FIGURE: 5

DATE: August 2023

3.4 TRAIL CAMERA MONITORING

As part of the crossing study, WSP installed a trail camera in selected culverts, under bridges, and in areas of interest to determine the use of existing infrastructure in facilitating wildlife movement (Figure 2). Below is a summary of the results at each trail camera location. The trail camera log and selected photographs are provided in Appendix C and D respectively.

North Side of Spring Garden Road at the Basin Drain Culvert

The trail camera was placed in this location from January 9 to 21, 2023. It was placed on the edge of the drain slope facing the culvert opening. The drain at this location has steep banks with small trees and shrubs growing along the edges. The surrounding area is mostly residential with large, manicured properties and the Spring Garden Natural Area approximately 70 m to the southeast (Figure 2).

During this time the following species were observed: Domestic Cat (*Felis catus*), Blue Jay (*Cyanocitta cristata*), Northern Cardinal (*Cardinalis cardinalis*), American Mink (*Neovision vison*), Rat (*Rattus* sp.), and Northern Raccoon. The small mammals were observed using the culvert to pass under Spring Garden Road, while the birds were roosting on small shrubs or foraging along the bank. Photos of the wildlife are included in Appendix D.

Todd Lane at the Turkey Creek Bridge Crossing

The trail camera was placed in this location from January 31, 2023 to February 21, 2023. Todd Lane crosses over Turkey Creek roughly 125 m south of Spring Garden Natural Area. The surrounding area is residential, with a large, mowed field bordering Todd Lane and Elmdale Avenue to the southeast. The creek has steep slopes, and the bank is stabilized with rip-rap rock walls held in place with metal mesh wiring. There is a narrow riparian area with trees and shrubs bordering the creek. The trail camera was placed under the bridge to capture wildlife that use Turkey Creek as a potential movement corridor (Figure 2).

During this time, the following species were captured by the camera: Great-blue Heron (*Ardea herodias*), Mallard (*Anas platyrhynchos*), Northern Raccoon, Eastern Grey Squirrel, and Canada Goose (*Branta canadensis*). Turkey Creek holds water throughout the year which allows for aquatic species, waterfowl, and shorebirds to use the habitat. Mallard ducks were observed using the creek as a movement corridor and were foraging in the slow-moving water. Northern Raccoons and Eastern Grey Squirrels were also observed traveling along the gravel edges under the bridge. Great-blue Herons were observed mostly at night, flying under the bridge, or foraging in the shallow water for fish. Photos of wildlife using the Turkey Creek corridor are included in Appendix D.

West Side of Malden Road at the Basin Drain Culvert

The trail camera was placed in this location from February 21, 2023 to March 2, 2023. Basin Drain has steep slopes and flows through a large culvert under Malden Road, providing a potential connection between habitat on the east side (Spring Garden Natural Area) and west side (Ojibway Prairie Provincial Nature Reserve) of the road. The drain slopes are

comprised of small trees and shrubs with residential properties above the top of bank (Figure 2).

This culvert location had very little wildlife activity. Only one species, Mallard ducks, were seen using the culvert to move from one side of Malden Road to the other while foraging in the shallow water. One potential reason for this may be the adjacent utility corridor which provides a relatively wide swath of undeveloped land for wildlife movement between Spring Garden Natural Area, Ojibway Prairie Provincial Nature Reserve, and natural areas in the Town of LaSalle (Town Centre Woodlot and LaSalle Woodlot/Brunet Park). Based on wildlife track/trail data, wildlife appear to use the utility corridor and cross over Malden Road rather than enter the culvert and cross under Malden Road. Photos of wildlife using the Basin Drain culvert are included in Appendix D.

Spring Garden Natural Area at Tunnel Top 5 (T5 ecopassage)

The trail camera was placed in this location from March 9 to 19, 2023. It was first placed at the boundary of the T5 ecopassage and Spring Garden Natural Area, in front of a small 1 m gap in the fence. It was then moved approximately 30 m to the north to monitor wildlife movement from the adjacent open prairie habitat towards the ecopassage (Figure 2). The T5 ecopassage provides habitat connectivity between Spring Garden Natural Area and Oakwood Natural Area, over Highway 401. The ecopassage is dominated by native warm season grasses and forbs. Both Spring Garden Natural Area and Oakwood Natural Area are characterized as tallgrass prairie and meadow on either side of the crossing. Monitoring data collected as part of the Rt. Hon. Herb Gray Parkway construction and operations has confirmed T5 ecopassage use by Eastern Foxsnake (*Pantherophis vulpinus*), Butler's Gartersnake (*Thamnophis butleri*), White-tailed Deer, Wild Turkey and Coyote.

During this time, two species were recorded using the area. Many White-tailed Deer were captured using the gap in the fence to access the ecopassage and to forage in the surrounding area. Similarly, a few Coyote were also observed using this gap to access the ecopassage. Photos for each location are included in Appendix D.

Black Oak Heritage Park and Proposed Ojibway Parkway Ecopassage Landing Location

The trail camera was placed in this location from March 20, 2023 to May 1, 2023. The camera was placed on City-owned property at the border with Essex Terminal Railway. The camera was positioned to capture breaks in an existing fence, as well as gaps underneath the fence that wildlife can use to move from one property to the other. Habitat in this location is characterized as a deciduous swamp and has been identified as a Provincially Significant Wetland.

During this time, the following wildlife species were captured by the camera: White-tailed Deer, Eastern Grey Squirrel, Eastern Cottontail, Northern Raccoon and Wild Turkey. White-tailed Deer were observed moving in and out of multiple fence breaks, confirming that wildlife will use fence breaks to their advantage in accessing neighbouring lands.

4 CONCLUSIONS

Results of this wildlife crossing study indicate that many wildlife species common in urban landscapes frequently cross the roads in the Ojibway Prairie Complex, including White-Tailed Deer, Northern Raccoon, Virginia Opossum, Striped Skunk and Eastern Gray Squirrel. Other less common wildlife and species at risk, such as turtles, snakes, and amphibians are also known to cross these same roads (Choquette and Valliant 2016); however, the timing of surveys in this study precluded capturing such movements (e.g. spring migrations).

It appears that wildlife in the Ojibway Prairie Complex use undeveloped right-of-ways, such as naturalized road easements and utility corridors, to move between the natural areas (Figure 4). Connection points where wildlife naturally approach roadways also include openings in existing fences and where drainage features meet the roads. Geospatial connectivity analysis supports the findings of field surveys, where primary, secondary, and tertiary connectivity corridors tend to overlap with wildlife tracks and trails (Wood 2021). This is particularly true at the primary connectively corridor along the Titcombe Road Drain/Titcombe Trail that connects four of the City's significant natural areas. The general area around the parking lot at Ojibway Nature Centre (Matchett Road) and parking lot/trail head for Ojibway Prairie Provincial Nature Reserve (Malden Road) appear to be important locations to consider wildlife crossing mitigation. It is also notable that at the secondary connectivity corridor location north of Chappus Street on Matchett Road, an ACO Wildlife KT500 Slotted Tunnel was installed as part of Rt. Hon. Herb Gray Parkway construction to facilitate movement of snakes and other wildlife under Matchett Road.

Further, the preliminary results herein indicate there may be several additional suitable locations for the placement or use of one or more mitigation measures, such as wildlife signage, speed reduction/traffic calming measures, roadside reflectors, fencing, vegetation management, and wildlife underpasses (i.e., new or retrofitted culverts). The results of trail camera imagery show that wildlife, especially small mammals, will use existing infrastructure such as culverts to facilitate their movements.

In the future, it is recommended that when feasible, additional records of both road mortality and wildlife movement be collected and added to the existing data that has been compiled herein. Surveys conducted during the reptile and amphibian active season will create a more robust species list for each road and potential crossing points. Further, surveys done over a longer period of time may be used to identify trends associated with specific times of the year like emergence, nesting and breeding, and hibernation. Continuing to combine these field-based assessments with results of a geospatial analysis will better support the understanding of wildlife movement across the Ojibway Prairie Complex. The results can then be used to inform the design and placement location of mitigation measures to help reduce the risk of wildlife-vehicle collisions along the roadways.

5 REFERENCES

- Choquette, Jonathan D. and Lindsey Valliant. 2016. Road mortality of reptiles and other wildlife at the Ojibway Prairie Complex and Greater Park ecosystem in southern Ontario. *Canadian Field-naturalist* 130(1): 64–75.
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- Wood PLC, 2021. Matchette Road and Malden Road Ecopassage Location and Solution Study, Preliminary Study of Siting Alternatives and Structure Design. Prepared for the City of Windsor.
- Wood PLC. 2022. Natural Environment Report, Ojibway Parkway Wildlife Crossing, Rev B. City of Windsor, ON.

Appendix A

Road Mortality Survey Conditions



APPENDIX A: Road Mortality Survey Conditions

Road Mortality Survey Dates and Times 2022

Date	Location	Surveyor(s)	Start Time	End Time	Temp (°C)	Wind (Beaufort)	Precipitation	Cloud Cover (%)
10/18/22	Malden Road Matchett Road Armanda Road	WSP staff	18:58	20:10	5	Var. 1-3	0	100
10/21/22	Todd Lane Spring Garden Road	WSP staff	19:00	20:30	16	2	0	50
10/24/22	Malden Road Matchett Road Armanda Road	WSP staff	19:00	20:08	19	2	0	10
10/26/22	Todd Lane Spring Garden Road	WSP staff	19:00	20:30	13	2	0	50
11/1/22	Malden Road Matchett Road Armanda Road	WSP staff	19:00	20:10	15	2	0	30
11/7/22	Todd Lane Spring Garden Road	WSP staff	17:45	19:00	11	2	0	10

Appendix B

Winter Wildlife Track Photos



APPENDIX B: Winter Wildlife Track Photos



1. White-tailed Deer crossing between homes, northwest Malden Road near Turkey Creek bridge. February 2, 2023.



2. Fence break along Matchett Road (near OPPNR), White-tailed Deer using as crossing. January 27, 2023.



3. Northern Raccoon tracks, west Matchett Road (near Ojibway Park). January 27, 2023.



4. White-tailed Deer track, Matchett Road south (near OPPNR). January 27, 2023.



5. Eastern Gray Squirrel tracks, north Matchett Road (near Ojibway Park). January 27, 2023.



6. Hole in fence along Matchett Road, wildlife using as a crossing point. January 27, 2023.

Appendix C

Trail Camera Log



APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-01-09	3:07	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	
2023-01-09	23:10	Basin Drain-N Spring Garden	Domestic Cat	<i>Felis catus</i>	
2023-01-10	21:16	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	Came out of culvert
2023-01-11	1:36	Basin Drain-N Spring Garden	Domestic Cat	<i>Felis catus</i>	
2023-01-12	1:04	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	Going in culvert
2023-01-12	1:09	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	Going in culvert
2023-01-12	1:06	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	Going in culvert
2023-01-12	5:47	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	Came out of culvert
2023-01-13	5:55	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	
2023-01-13	6:36	Basin Drain-N Spring Garden	Northern Raccoon	<i>Procyon lotor</i>	
2023-01-15	9:18	Basin Drain-N Spring Garden	Blue Jay	<i>Cyanocitta cristata</i>	
2023-01-16	1:27	Basin Drain-N Spring Garden	Domestic Cat	<i>Felis catus</i>	
2023-01-19	4:41	Basin Drain-N Spring Garden	American Mink	<i>Neovison vison</i>	
2023-01-20	0:32	Basin Drain-N Spring Garden	Rat	<i>Rattus</i>	
2023-01-21	9:13	Basin Drain-N Spring Garden	Northern Cardinal	<i>Cardinalis cardinalis</i>	Female
2023-01-31	14:27	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Five males, three females
2023-01-31	14:54	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males, two females
2023-01-31	15:12	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males, three females
2023-01-31	19:40	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	Foraging
2023-02-01	7:54	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males, two females
2023-02-01	11:53	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male
2023-02-01	12:01	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males
2023-02-01	12:20	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two females, one male
2023-02-01	14:03	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two females, two males
2023-02-01	18:17	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-01	23:07	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	
2023-02-02	3:24	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	
2023-02-03	6:49	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	
2023-02-03	7:57	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-02-03	13:54	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Female
2023-02-03	14:36	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males, one female
2023-02-03	15:51	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male
2023-02-03	16:46	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male
2023-02-03	19:07	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	Flying past camera
2023-02-03	21:37	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	Foraging in shallow water
2023-02-04	4:56	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-04	8:05	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-04	20:14	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-04	21:18	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-04	21:54	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	
2023-02-05	3:14	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	Foraging along edged of creek
2023-02-05	3:37	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	Two individuals foraging
2023-02-05	4:42	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	Two individuals foraging
2023-02-05	5:25	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-05	7:16	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	
2023-02-05	10:17	Turkey Creek-Todd Lane SW corner	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-02-05	11:30	Turkey Creek-Todd Lane SW corner	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-02-05	15:04	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-05	16:06	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males, two females
2023-02-05	17:14	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-05	19:06	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	Foraging
2023-02-05	23:26	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	Flying past camera
2023-02-06	23:16	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-07	3:49	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-07	9:44	Turkey Creek-Todd Lane SW corner	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-02-07	9:52	Turkey Creek-Todd Lane SW corner	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-02-07	10:17	Turkey Creek-Todd Lane SW corner	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-02-07	10:32	Turkey Creek-Todd Lane SW corner	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-02-07	11:36	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-07	12:37	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-07	19:11	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-08	18:30	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-08	14:08	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-08	14:21	Turkey Creek-Todd Lane SW corner	Mallard	<i>Anas platyrhynchos</i>	Two males
2023-02-08	23:13	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-09	4:10	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-09	4:21	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-10	5:28	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-10	8:44	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-10	9:06	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-10	11:45	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Group of seven swam by camera
2023-02-10	12:29	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-10	14:55	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-10	15:35	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-10	16:09	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Six individuals
2023-02-10	17:11	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	
2023-02-10	19:48	Turkey Creek-Todd Lane SW corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-10	20:53	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-10	21:06	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-11	0:22	Turkey Creek-Todd Lane SW corner	Great Blue Heron	<i>Ardea herodias</i>	Flying past camera
2023-02-11	10:54	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals
2023-02-11	10:59	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Two individuals

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-02-11	11:01	Turkey Creek-Todd Lane SW corner	Canada Goose	<i>Branta canadensis</i>	Four individuals
2023-02-18	12:24	Turkey Creek-Todd Lane NE corner	Canada Goose	<i>Branta canadensis</i>	Flying past camera, two individuals
2023-02-18	19:03	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-18	19:13	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-18	19:14	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-18	19:32	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-18	20:22	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Foraging
2023-02-18	20:57	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-18	21:41	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Flying past camera
2023-02-18	21:48	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	entering culvert of the NW side of creek
2023-02-18	22:25	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	
2023-02-18	22:39	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Flying past camera
2023-02-19	1:13	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	Foraging along edges of creek
2023-02-19	3:49	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Flying past camera
2023-02-19	19:05	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-19	20:19	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-19	23:08	Turkey Creek-Todd Lane NE corner	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-19	23:08	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Foraging
2023-02-20	0:20	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Foraging
2023-02-20	5:22	Turkey Creek-Todd Lane NE corner	Great Blue Heron	<i>Ardea herodias</i>	Foraging
2023-02-20	11:07	Turkey Creek-Todd Lane NE corner	Canada Goose	<i>Branta canadensis</i>	Flying past camera
2023-02-21	8:48	Turkey Creek-Todd Lane NE corner	Canada Goose	<i>Branta canadensis</i>	Three individuals
2023-02-21	9:54	Turkey Creek-Todd Lane NE corner	Canada Goose	<i>Branta canadensis</i>	Five individuals
2023-02-21	21:08	Basin Drain-NW Malden Road	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-21	22:15	Basin Drain-NW Malden Road	Northern Raccoon	<i>Procyon lotor</i>	
2023-02-22	9:43	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-22	10:06	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-23	22:50	Basin Drain-NW Malden Road	Northern Raccoon	<i>Procyon lotor</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-02-26	12:19	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-27	6:52	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Two males, one female
2023-02-27	7:02	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-02-28	17:56	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Female
2023-03-02	17:12	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-03-02	7:38	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Female
2023-03-02	9:21	Basin Drain-NW Malden Road	Mallard	<i>Anas platyrhynchos</i>	Male and female
2023-03-09	18:13	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-09	18:15	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-09	18:28	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Four individuals
2023-03-09	20:45	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-10	0:22	T5 Ecopassage-West	Coyote	<i>Canis latrans</i>	
2023-03-10	0:32	T5 Ecopassage-West	Coyote	<i>Canis latrans</i>	
2023-03-10	0:43	T5 Ecopassage-West	Coyote	<i>Canis latrans</i>	
2023-03-11	5:20	T5 Ecopassage-West	Coyote	<i>Canis latrans</i>	
2023-03-11	17:12	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-12	17:47	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-13	7:11	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-14	11:55	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-14	12:03	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-14	12:05	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-14	18:21	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Five individuals
2023-03-14	22:05	T5 Ecopassage-West	Coyote	<i>Canis latrans</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-03-15	17:41	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-15	17:45	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-16	7:38	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-16	7:41	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-16	7:50	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Twelve individuals slowly walking by from 7:50-7:52
2023-03-18	7:56	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-18	18:36	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-18	18:39	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-18	18:43	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Five individuals foraging
2023-03-18	18:53	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-18	23:46	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-19	18:32	T5 Ecopassage-West	White-tailed Deer	<i>Odocoileus virginianus</i>	Four individuals, two on T5
2023-03-20	21:21	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-20	23:30	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	Climbing tree in front of camera
2023-03-21	0:33	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-21	6:30	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-21	6:32	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-21	18:14	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-21	19:05	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-03-22	1:51	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-22	1:59	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-22	7:53	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-22	11:00	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-23	17:19	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	Foraging
2023-03-23	17:20	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	Foraging
2023-03-23	21:14	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-23	21:15	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-23	22:26	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-23	22:44	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	Two individuals
2023-03-24	20:09	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	Two individuals
2023-03-24	20:40	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-24	23:15	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-24	5:39	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-24	5:41	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-25	2:15	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-25	2:17	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	Three individuals
2023-03-26	1:02	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-26	7:45	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-03-26	7:58	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-26	9:03	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-03-26	10:15	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-27	3:14	Black Oak Heritage Park- East Fence Line	Eastern Cottontail	<i>Sylvilagus floridanus</i>	
2023-03-27	8:23	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-27	14:33	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-27	14:55	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-27	18:24	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-27	18:44	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-27	22:18	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	Two individuals
2023-03-27	22:19	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-28	18:36	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	Two individuals
2023-03-29	15:29	Black Oak Heritage Park- East Fence Line	Wild Turkey	<i>Meleagris gallopavo</i>	Two males
2023-03-29	21:06	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-29	22:49	Black Oak Heritage Park- East Fence Line	Eastern Cottontail	<i>Sylvilagus floridanus</i>	
2023-03-30	0:11	Black Oak Heritage Park- East Fence Line	Eastern Cottontail	<i>Sylvilagus floridanus</i>	
2023-03-30	1:12	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-30	17:49	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-30	18:04	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-03-30	18:39	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-30	18:56	Black Oak Heritage Park- East Fence Line	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-03-30	20:09	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-31	0:09	Black Oak Heritage Park- East Fence Line	Northern Raccoon	<i>Procyon lotor</i>	
2023-03-31	7:46	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-03-31	8:00	Black Oak Heritage Park- East Fence Line	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-06	1:00	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Three individuals
2023-04-07	11:00	Black Oak Heritage Park- East Fence Line (Fence Break)	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-04-08	5:00	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals foraging
2023-04-12	18:34	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-12	6:25	Black Oak Heritage Park- East Fence Line (Fence Break)	Wild Turkey	<i>Meleagris gallopavo</i>	
2023-04-13	2:47	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals
2023-04-13	14:34	Black Oak Heritage Park- East Fence Line (Fence Break)	Wild Turkey	<i>Meleagris gallopavo</i>	
2023-04-13	19:14	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-13	19:17	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Three individuals
2023-04-15	8:22	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-15	17:11	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-17	17:26	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-17	19:00	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-04-18	12:07	Black Oak Heritage Park- East Fence Line (Fence Break)	Wild Turkey	<i>Meleagris gallopavo</i>	Two individuals
2023-04-18	14:21	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-19	1:30	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-18	4:29	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Browsing vegetation
2023-04-18	8:22	Black Oak Heritage Park- East Fence Line (Fence Break)	Wild Turkey	<i>Meleagris gallopavo</i>	Came out of fence break
2023-04-20	3:19	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-20	6:13	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Browsing vegetation
2023-04-20	6:37	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	
2023-04-21	11:59	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Browsing on vegetation, using fence break
2023-04-21	14:06	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Browsing on vegetation
2023-04-21	14:54	Black Oak Heritage Park- East Fence Line (Fence Break)	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-04-22	11:33	Black Oak Heritage Park- East Fence Line (Fence Break)	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-04-22	21:29	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-23	5:52	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Two individuals, browsing on vegetation
2023-04-23	6:54	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, browsing on vegetation
2023-04-23	7:00	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Two Bucks, browsing on vegetation
2023-04-23	7:04	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck jumped through the fence break
2023-04-23	13:22	Black Oak Heritage Park- East Fence Line (Fence Break)	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	
2023-04-24	0:34	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-04-24	13:09	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Doe, browsing vegetation
2023-04-24	16:22	Black Oak Heritage Park- East Fence Line (Fence Break)	Wild Turkey	<i>Meleagris gallopavo</i>	Female
2023-04-25	0:33	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-25	2:23	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-25	20:06	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-25	20:51	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-26	19:32	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Two bucks browsing on vegetation. One buck jumped through the fence break
2023-04-26	22:03	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-26	2:51	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-27	2:01	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Three deer came through the fence break
2023-04-27	5:58	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Doe jumped through the fence break
2023-04-27	12:25	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Doe browsing on vegetation, jumped through the fence break heading west
2023-04-27	19:24	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, went through fence break heading west
2023-04-27	19:25	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, went through fence break heading west
2023-04-27	19:26	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, went through fence break heading west
2023-04-28	3:58	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	

APPENDIX C: Trail Camera Log

Date	Time	Location	Common Name	Scientific Name	Notes
2023-04-28	19:36	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, walked through fence break heading west
2023-04-28	19:39	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Two Bucks, jumped through fence break heading west
2023-04-29	15:51	Black Oak Heritage Park- East Fence Line (Fence Break)	Wild Turkey	<i>Meleagris gallopavo</i>	Two individuals, one male
2023-04-29	19:09	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-30	3:58	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, jumped through the fence break heading west
2023-04-30	20:30	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-30	21:42	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-04-30	23:28	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-05-01	4:17	Black Oak Heritage Park- East Fence Line (Fence Break)	Northern Raccoon	<i>Procyon lotor</i>	
2023-05-01	6:57	Black Oak Heritage Park- East Fence Line (Fence Break)	White-tailed Deer	<i>Odocoileus virginianus</i>	Buck, jumped through the fence break heading west

Appendix D

Trail Camera Observations: Photo Appendix



APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023

Trail Camera Placement Locations



1. Basin Drain culverts under Spring Garden Road.



2. Todd Lane at the Turkey Creek bridge crossing.



3. Basin Drain culvert under Malden Road (west).



4. T5 Ecopassage west entrance from Spring Garden Natural Area.



5. Forest habitat at Black Oak Heritage Park.



6. Fence opening along property boundary in Black Oak Heritage Park.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023

North Side of Spring Garden Road at the Basin Drain Culvert



1. Northern Raccoon crossing drain.
January 9, 2023.



2. Domestic Cat crossing drain.
January 9, 2023.



3. Domestic Cat entering the culvert.
January 10, 2023.



4. Black Rat moving along the edge of the drain.
January 20, 2023.



5. Northern Raccoon crossing the drain.
January 12, 2023.



6. American Mink moving along the drain edge.
January 19, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023



7. Blue Jay perched on the culvert.
January 15, 2023.



8. Northern Cardinal foraging on the drain slope.
January 21, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023

Todd Lane at the Turkey Creek Bridge Crossing



1. Great Blue Heron foraging in the creek.
February 1, 2023.



2. Two Mallard's that landed under the bridge.
February 3, 2023.



3. Grate Blue Heron foraging.
February 3, 2023.



4. Northern Raccoon crossing to the south side of
the bridge. February 4, 2023.



5. Pair of Northern Raccoons heading south
under the bridge. February 5, 2023.



6. Male and Female Mallards swimming north.
February 5, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023



7. Eastern Grey Squirrel moving south to north under the bridge. February 7, 2023.



8. Canada Geese swimming south. February 8, 2023.



9. Great Blue Heron foraging in shallow water. February 18, 2023. (NE corner)



10. Raccoon entering small culvert on the west wall. February 19, 2023. (NE corner)



11. Group of Canada Geese February 21, 2023. (NW corner)



12. Group of male and female Mallard's swimming and foraging. January 31, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023

West Side of Malden Road at the Basin Drain Culvert



1. Northern Raccoon crossing the drain.
February 21, 2023.



2. Male and Female Mallard ducks.
February 22, 2023.



3. Northern Raccoon crossing the drain.
February 23, 2023.



4. Male and Female Mallards swimming west out of the culvert. February 26, 2023.



5. Group of three Mallards swiftly swimming out of the culvert. February 27, 2023.



6. Female Mallards swimming out of the culvert west. February 27, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023

Rt. Hon. Herb Gray Parkway at Tunnel Top 5 (T5 Ecopassage)



1. Coyote crossing onto T5 Ecopassage.
March 10, 2023.



2. White-tailed Deer crossing onto T5 Ecopassage.
February 9, 2023.



3. Coyote along the Spring Garden Natural Area
fence line. March 11, 2023.



4. White-tailed Deer approaching Spring Garden
Natural Area. March 12, 2023.



5. White-tailed Deer foraging in open prairie.
March 13, 2023.



6. Group of White-tailed Deer walking west.
March 12, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023

Black Oak Heritage Park and Proposed Ojibway Parkway Ecopassage Landing Location



1. Eastern Grey Squirrel in forest habitat.
March 21, 2023.



2. Two Wild Turkey in forest habitat.
March 29, 2023.



3. Eastern Cottontail in forest habitat.
March 27, 2023.



4. Three White-tailed Deer foraging on woody vegetation. April 6, 2023.



5. White-tailed Deer walking through the fence break. April 21, 2023.



6. Northern Raccoon walking along fallen trees.
April 22, 2023.

APPENDIX D: Wildlife Crossing Study Photo Collage, January-May 2023



7. White-tailed Deer jumping through fence break. April 27, 2023.



8. White-tailed Deer jumping through fence break. April 28, 2023.



9. Two Wild Turkeys walking the fence line. April 29, 2023.



10. White-tailed Deer walking through the fence break. April 23, 2023.