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2024.03.01

SENT VIA EMAIL

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VIA

RONALD DAVIDSON LAND USE PLANNING CONSULTANT
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Re. Saugeen Ojibway Nation conditions for SUNDANCE ESTATES at PART LOTS 65 AND 66, CONCESSION A (INCLUDING LOT 16, REGISTERED PLAN 392) GEOGRAPHIC TOWNSHIP OF KINCARDINE, MUNICIPALITY OF KINCARDINE,COUNTY OF BRUCE

The Saugeen Ojibway Nation ("SON") Environment Office and **MONKAT HOLDINGS LTD., KINCARDINE ENERGY LANDS INC. AND 1519201 ONTARIO INC.** entered into a Letter of Agreement ("LOA") on **October 16, 2023** with respect to our mutual goal to set out a consultation and accommodation framework regarding the proposed **SUNDANCE ESTATES** development in the SON Territory. As the **MONKAT HOLDINGS LTD., KINCARDINE ENERGY LANDS INC. AND 1519201 ONTARIO INC.** is already aware, SON's Territory has been significantly altered through ongoing development pressure. Over the past few decades, the SON has seen a decline in biodiversity and an erosion of healthy ecosystems, resulting in the undermining of SON's rights, culture and way of life. The individual and cumulative impacts from projects on the SON's Territory are ongoing concerns for us, as we strive to maintain our relationships with the land and waters, which we have used and protected for time immemorial.

The LOA supported SON's participation in and input into the technical assessments undertaken as part of the **SUNDANCE ESTATES** application process. More specifically, the LOA allowed SON and the **MONKAT HOLDINGS LTD., KINCARDINE ENERGY LANDS INC. AND 1519201 ONTARIO INC.** to identify a plan for addressing any potential impacts the development of the **SUNDANCE ESTATES** may have on SON's lands and constitutionally protected Aboriginal and Treaty rights, proven and asserted, including SON's land claims. This enabled a process that ensured appropriate and meaningful consultation and accommodation of SON's rights and interests throughout the life of the Proponent's proposed operation.

MONKAT HOLDINGS LTD., KINCARDINE ENERGY LANDS INC. AND 1519201 ONTARIO INC.- SUNDANCE ESTATES have proposed the development of 62 large dwelling lots on 29.872 hectares of land. The subject lands are located along the east side of victoria street, south of the inverhuron settlement area. This holiding at its closest point, is located approximately 110 metres east of the lake huron shoreline. The property comprises 29.872 hectares or land, which are forested. a wetland exists in the southeast section of this holding, within proposed block 67.

As per the LOA, SON Environment Office has conducted a peer review of the following documents to measure the impact of the development on SON's Indigenous rights and interests:

SUNDANCE ESTATES - ENVIRONMENTAL IMPACT STUDY UPDATE: 143 Victoria Street, Concession A, Plan 392, Lot 16 and Concession A, Part Lot 65, Geographic Township of Kincardine, Municipality of Kincardine, Bruce County. Prepared by WSP. February 14, 2023. vii + 48pp. + appendices (including correspondence and peer review).

PLANNING REPORT "SUNDANCE ESTATES" RESIDENTIAL SUBDIVISION, Part Lots 65 and 66, Concession A (including Lot 16, Registered Plan 392), Geographic Township of Kincardine, Municipality of Kincardine, County of Bruce. Owners: Monkat Holdings Ltd., Kincardine Energy Lands Inc. and 1519201 Ontario Inc. Prepared by Ron Davidson, Land Use Planning Consultant Inc. ii + 38pp. + appendices.

SUNDANCE ESTATES WETLAND EVALUATION - PART LOTS 65 & 66, CONCESSION A, Municipality of Kincardine. Prepared for: 1519201 Ontario Inc. May 2022. Prepared by GAMAN Consultants Inc. File 22008.00. iv + 10pp. + figures + appendices.

DRAFT PLAN OF SUBDIVISION, Lot 16, Registered Plan No. 392 and Part of Lots 65 & 66, Concession A, Geographic Township of Kincardine, County of Bruce. Prepared by Cobide Engineering. February 23, 2023.

SUNDANCE ESTATES OUTFALL COASTAL REPORT. Monkat Holdings Ltd., Kincardine Energy Lands Inc., 1519201 Ontario Inc. Prepared by WSP. PROJECT NO.: 181-16375-01. April 10, 2023. vii + 23 pp. + appendices.

GEOTECHNICAL EXPLORATION *SUNDANCE ESTATES SUBDIVISION*: *Municipality of Kincardine, Ontario. Prepared by Golder Associates Ltd., February 4, 2022.*

FUNCTIONAL SERVICING REPORT, SUNDANCE ESTATES SUBDIVISION: *Part Lots 65 & 66, Concession A, Former Township of Kincardine, Municipality of Kincardine prepared by COBIDE Engineering Inc., April 2023.*

PRELIMINARY STORMWATER MANAGEMENT REPORT, SUNDANCE ESTATES SUBDIVISION: *Part Lots 65 & 66, Concession A, Former Township of Kincardine, Municipality of Kincardine prepared by COBIDE Engineering Inc., April 2023.*

STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT PROPOSED SUNDANCE ESTATES, INVERHURON: *Part of Lots 65 and 66, Concession A, Geographic Township of Kincardine, now Municipality of Kincardine, County of Bruce, Ontario. Prepared by Detritus Consulting Ltd., July 27, 2021.*

STAGE 1-2 ARCHAEOLOGICAL PROPERTY ASSESSMENT: *143 Victoria Street, Part of Lots 65-66, Concession A (Geographic Township of Kincardine), Municipality of Kincardine, County of Bruce. Prepared by AMICK Consultants Ltd., April 11, 2023*.

It is the Saugeen Ojibway Nation (SON) position that we have a shared responsibility throughout Traditional Territory of the Saugeen Ojibway Nation ("SON"), or *Saukiing Anishinaabekiing*, to honour, preserve and protect the ecological integrity and cultural practices that reflect SON's ancestral connection to this land and SON's way of life. With respect to the technical information discussed here, it is important to understand that even though some specific priorities and considerations are identified below, it is the SON position that it is our duty and responsibility to protect and care for *all* the lands, waters and species in SON Territory for future generations, as well as for our ongoing spiritual, cultural and economic

wellbeing. The lands and waters are integrally connected and cannot be thought of separately. Mammals, fish, birds, insects and plants live and move across the lands and waters to meet their needs irrespective of the parcel fabric and other human-made boundaries.

These technical reviews are undertaken in the spirit of ensuring that, across the Territory, the lands, waters, wildlife and Aboriginal and treaty rights of SON are protected from any potential negative impacts of land and in-water development. SON must be consulted on any project that has the potential to negatively impact SON Aboriginal and treaty rights or the environment of SON Territory.

Summarized below are the findings of these reviews:

Natural Heritage Review Summary

In this reviewer's opinion, based on the information provided in the EIS as well as additional research, publicly-accessible verified natural heritage data, and this reviewer's experience in and knowledge of the area, it would not be possible to construct a 62-unit subdivision of detached homes at this location within forest interior habitat within a Significant Woodland in southern Bruce County without having significant, unmitigable negative impacts on many key significant ecological features and functions, including features and functions of particular importance to SON.

The full detailed review is enclosed as Appendix 1, which outlines specific findings from the review and discusses these findings, evaluating how the proposed development may impact SON's expressed priorities and considerations.

1. Description of Proposed Development	**Size and Location**: The Site is 29.872 ha in size, in the Inverhuron area in the Municipality of Kincardine (Figure 1), of which ~14 ha is proposed for development. **Current Use**: The Site is almost entirely forested, including some (mostly treed) wetland. Evidence of selective logging, trail development (suitable for ATV use) and hunting were observed during the SON site visit. **To be Developed:** Residential subdivision consisting of: single detached homes on 62 large lots (14 ha); municipal streets (1.3 ha); a utility corridor (0.2 ha), with a connection to Victoria Street (Figure 2), as well as a stormwater corridor and a pedestrian walkway. The proposed subdivision is to be serviced with municipal water. A new 200 mm diameter PVC watermain to connect to an existing 300 mm watermain located on Victoria Street at the proposed new intersection. Fire hydrants will be placed along the new subdivision street at a spacing of no greater than 150 metres. The 62 detached dwellings are to be serviced with individual, private septic systems. **Adjacent land uses:** Lands to immediately the north, east and south are undeveloped forest; to the west, along Victoria Street, there are residential homes on fairly large, mostly treed lots. Further east (about 250 m beyond the property boundary) farmland (mostly cash crops) predominates. Within the forest on a rural lot

		to the south, Google Earth shows a cleared area with what appears to be a farm/estate property that includes a long linear clearing.
2. Landscape Context	**Connected Natural Area / Corridor Functions**	The Site is situated within the core of one of the five largest tracts of forest in southern Bruce County and is part of a ~37.5 km long naturally-vegetated corridor (fragmented by roads) extending along or near the Lake Huron coast from Saugeen Shores to just north of Kincardine. It is part of the Huron Fringe biophysical region, an area widely recognized as an important movement corridor for migratory birds. This corridor includes protected areas like MacGregor Point Provincial Park (P.P.), Inverhuron P.P., Stoney Island Conservation Area (C.A.), Brucedale C.A., private nature reserves, and some relatively undisturbed natural areas associated with the Bruce nuclear site. This corridor provides diverse, connected habitat and even supports wide-ranging mammals like Black Bear, many species at risk (SAR), and provincially and locally significant flora and fauna. With respect to the Site, the EIS states: "The woodland likely acts as a movement corridor for wildlife through the landscape, providing access to Lake Huron (though separated from the Lake by Victoria Street and lakeshore residential properties), and other natural heritage features north, east and south of the Site."
	Coastal Habitat	The Lake Huron coastline is about 165 m from the main part of the Site. The "Sundance Estates Outfall" at the shoreline is where a stormwater pipe and a headwall are proposed as part of the stormwater management plan for the proposed development.

	Headwaters	No headwaters have been identified within the Site or Study Area. However, a watercourse in the eastern part of the Site (see next section) presents evidence of groundwater contributions.
	Watercourses / Drainage Features	A permanent coldwater tributary (Figure 4, below) of Tiverton Creek crosses the eastern portion of the Site. According to the EIS, it "originates as drainage from a swampy area located ~160 m southeast of the development lot. It flows as a defined channel for 300 m through woodlands and wetlands before outletting into a series of two online ponds. The aquatic habitat consists of flat sections (100%), with a mean wetted depth of 0.2 m, a mean wetted width of 2.8 m, a mean bankfull depth of 0.5 m and a mean bankfull width of 5.0 m. The substrate consists of detritus (50%), silt (40%) and sand (10%). Banks were natural, stable and had a gradual slope. Bank height was 0.6 m on both sides, and had little to no erosion evident. Instream cover consists of dense instream vegetation (Common Reed [*Phragmites* sp.] and floating filamentous algae), dense woody / organic debris and moderate overhanging vegetation. Riparian vegetation consists of Common Reed, Field Horsetail and grasses and shrubs. There is moderate canopy cover over the watercourse (40% cover). There is evidence of groundwater contributions (iron staining, oily sheen and seepage) to the creek. Just downstream of the swamp, underground flow under tree roots, woody debris and soil are permanent barriers to fish passage. The tributary outlets into Tiverton Creek approximately 500 m downstream of the Site."
	Wetlands	A permanent wetland, associated with the watercourse discussed above, covers most of the eastern third of the Site, with the predominant community being White Cedar Hardwood Organic Mixed Swamp. Connected to the mixed swamp is a 0.5 ha Organic Deciduous Thicket Swamp dominated by Red-osier Dogwood and Speckled Alder. A small patch of thicket swamp (Figure 5) was noted within the deciduous forest community during the SON site visit, but was not discussed or mapped by the EIS, presumably because it falls below the minimum ELC community size threshold of 0.5 ha.

	Forest Interior / Older Growth	Among the most significant features and functions of the Site is that it consists largely of forest interior habitat. The EIS states: "The woodland on the Site is part of a 390 ha woodland, that contains approximately 233 ha of interior woodland habitat (based on a 100 m buffer recommended in Natural Heritage Reference Manual)…It is home to a variety of wildlife and plant species, including some that are considered area-sensitive species" (Figure 3). The EIS describes the deciduous forest as "mature," with occasional >50 cm dbh DBH trees observed. The forest at the Site appeared to be intermediate-aged to semi-mature (but not older-growth) (Figure 6), with scattered older trees, during the SON site visit. Many snags (Figure 7) and some downed trees were noted, indicating some advancement into older growth conditions. 1954 air photos appear to show a closed-canopy deciduous forest across most of the site (Figure 8), suggesting a forest age of at least 100 years. Current Google Earth imagery suggests a more open canopy (Figure 9) as observed during the SON site visit, suggesting that some selective logging has occurred over the years.
	Alvar / Cliff Habitat	Not present.
	Grassland / Open	Aside from a small cleared area at the Victoria Street access point, there is no grassland or open habitat at the Site.
	Site Condition	The EIS describes the deciduous forest community within the Site (which includes the area to be impacted by the proposed subdivision) as generally being "of relatively high botanical quality with predominately native species recorded." A few deer-hunting platforms, ATV trails and informal footpaths were noted by the EIS and during the SON site visit. Serious invasion of habitat by aggressive garden cultivars was noted in the vicinity of existing residences along Victoria Street (Figure 10).

	Fish habitat	Based on the EIS, the fish community in Tiverton Creek "is generally assumed to be representative of the potential fish species likely present within the Site. The fish community documented…consists of coldwater, coolwater and warmwater forage fish species, as well as more sensitive coldwater salmonid species such as Brown Trout and Rainbow Trout. However, the habitat documented within the reach of the tributary on the Site is likely not suitable for trout species, as it is heavily vegetated with fine substrates." Mottled Sculpin was the only species documented in the tributary by the EIS. The fish community in Lake Huron near the location of the proposed stormwater outlet, according to the EIS, "consists of coldwater, coolwater and warmwater forage fish species, as well as more sensitive coldwater salmonid species such as Brown Trout and Rainbow Trout."
3. Culturally Important Natural Features (known or potential)	**M'kwa (Black Bear) habitat**	The Site is situated near the southern limit of Black Bear habitat in SON Territory, with evidence of Black Bear within 3.5 km of the Site observed by the SON reviewer in 2023. Also there are recent records of Black Bear at Inverhuron Provincial Park less than 1.5 km from the Site. The site's forest community provides abundant cover, a relatively undisturbed movement corridor, and good foraging opportunities for Black Bear, including a population of American Beech, an important autumn food source for the species.
	Deer habitat	White-tailed Deer were observed on site by the EIS, and the Site provides cover and natural foraging habitat for deer. Deer-hunting platforms were also observed. Deer wintering habitat is reported >1 km to the north of the Site according to the EIS.
	Other Furbearers	Coyote, Eastern Chipmunk, Eastern Cottontail, Eastern Gray Squirrel, Porcupine, Raccoon, Red Squirrel and Striped Skunk were noted for the Site by the EIS. Many other mammals are likely, including Virginia Opossum, Red Fox, Striped Skunk, Woodchuck, Mink, weasels, as well as smaller mammals (mice, voles, moles and shrews).

	Turtles / Herpetofauna	Four species of amphibians were recorded on the Site: American Toad, Gray Treefrog, Green Frog and Spring Peeper. The only reptile noted by the EIS was Eastern Gartersnake. Two reliable observers have reported (to the SON reviewer) seeing a highly-sensitive Endangered semi-terrestrial turtle species "a few years ago" crossing County Road 15 just east of Victoria Street, into the natural area that is continuous with the Site. There is an extant, well-studied population of this turtle species within 5 km of the Site. Potential presence of this species at the Site is not discussed by the EIS).
	Medicines	A number of medicines (e.g., Balsam Fir, Canada Yew, Wood Betony, Common Boneset, Ironwood, Marsh Marigold, American Elm, Common Elderberry, Red Osier Dogwood, Alternate-leaved Dogwood, Sensitive Fern, Speckled Alder, Spotted Jewelweed, Spotted Joe Pye-weed, Staghorn Sumac, Wild Ginger, Wild Sarsaparilla, White Snakeroot, White Baneberry) grow on the subject lands.
	Other Culturally-important Plants	Common food plants (e.g., Wild Strawberry, Dwarf Raspberry, Common Cattail, Choke Cherry, Black Cherry, Jack-in-the-Pulpit, Red Elderberry, Prickly Gooseberry, Riverbank Grape, Wild Red Raspberry, Wild Leek) are found on the Site. Other culturally-important plants found at the Site include American Beech, Common Juniper, White Birch, White Ash and Alternate-leaved Dogwood.

4. Other Key Natural Features	A key natural heritage feature noted for the Site by SON, and also considered at length by the NRSI peer review, and by the EIS update, is the Significant Woodland, which is ~390 ha in size and presently contains at least 229 ha of forest interior, a very rare habitat feature in southern Bruce County. The near-coastal location of this forest tract within the Huron Fringe, and its connectivity to natural areas to the north and south, adds to its significance, as it provides corridor functions to migratory birds and wide-ranging species, including Black Bear (known to occur within 2 km at Inverhuron Provincial Park and documented in 2023 by SON reviewer within 3.5 km in habitat continuous with the Site). The Significant Woodland at the Site provides breeding habitat for at least eight area-sensitive forest-interior bird species: Yellow-bellied Sapsucker, Red-breasted Nuthatch, Veery, Blue-headed Vireo, Black-throated Green Warbler, Ovenbird, Scarlet Tanager and Canada Warbler. The Site meets PPS criteria for two confirmed Significant Wildlife Habitat (SWH) types: Woodland Area-Sensitive Bird Breeding Habitat; and Habitat for Special Concern and Rare Wildlife Species (Eastern Wood-Pewee and Wood Thrush) and candidate SWH for Woodland Raptor Nesting Areas. As well, the Site provides potential maternity roost (meets PPS “candidate” SWH criteria), day roost, and wetland foraging habitats for up to four Endangered bat species. The Site provides habitat for Species At Risk (SAR), notably (federal SARA status / provincial ESA status): **Butternut** (Endangered / high cultural importance to SON), documented by EIS. **Black Ash** (Endangered / high cultural importance to SON), documented by EIS. **Whip-poor-will** (Threatened / Threatened), extant population during breeding season in continuous habitat (eBird, OBBA 2023), not found by EIS. **Red-headed Woodpecker** (Endangered / Endangered), extant population during breeding season (eBird, OBBA 2023), not found by EIS. **Wood Thrush** (Threatened / Special Concern), breeds at Site, documented by EIS. **Eastern Wood-Pewee** (Special Concern / Special Concern), breeds at Site, documented by EIS **Canada Warbler** (Threatened / Special Concern), probable breeder at or near Site, documented by EIS. **Snapping Turtle** (Special Concern / Special Concern) An Endangered turtle species has been reported to SON as being seen entering the natural area within which the Site is situated, <900 m from the property boundary.

Natural Heritage Review Recommendations

The following recommendations are made to address concerns with the proposed project based on the available information:

Key Recommendation

- **The subdivision development as proposed should not be approved.**

Secondary Recommendations

- Proponent to respond to terrestrial ecology concerns discussed in this technical review, above.
- Proponent to respond to the comments and questions in the **Detailed Comments Table** (please see the enclosed full Terrestrial Ecology Technical Review) .
- Proponent may wish to consider designing a much smaller development (e.g., of one to three homes) adjacent to or within 100 m of Victoria Street. If a much smaller development along the western edge the property is considered:
    - Proponent to conduct nightjar surveys according to standard survey protocols to determine the status of Eastern Whip-poor-will in the study area during breeding season. If it is determined that this Threatened species is or may be present, proponent to assess potential impacts and propose appropriate mitigations.
    - Proponent to assess the status of Red-headed Woodpecker in the study area during the breeding season. If it is determined that this Endangered species is or may be present, proponent to assess potential impacts and propose appropriate mitigations.
    - Proponent to conduct thorough assessment and surveys according to standard protocols to determine whether highly-sensitive Endangered turtle species are present in the 390 ha natural area within which the Site is situated. If it is determined that this Endangered species may be present, proponent to assess potential impacts and propose appropriate mitigations.
    - Proponent to undertake surveys to determine the status of Black Bear within natural area within which the Site is situated, assess potential impacts to Black Bear, and propose appropriate mitigations.
- Any new development proposed in the area would require ongoing consultation with SON.

Hydrogeological Technical Review Summary

Based on my assessment of the available hydrogeologic information I would interpret the site to be hydrogeologically sensitive particularly as it relates to the thin overburden and fractured bedrock and potentially karstic nature of the bedrock. Although it can be presented that enhanced tertiary treatment would further meet the MECP nitrate dilution guidelines as well as reduce overall nutrient loading there would be no additional, significant subsurface treatment at this site.

The recommended tertiary septic treatment and the proposed groundwater monitoring program are “generally” appropriate measures for mitigation, and to assess the potential groundwater quality impacts within the thin overburden and fractured nature of the shallow groundwater flow system however the potential karstic nature of the site raises the level of risk for groundwater quality impacts particularly given the extent of development. The potential water quality impacts related to stormwater infiltration and septic effluent must be assessed as they relate to the hydrogeologic sensitivity.

An understanding and quantification of the temporal groundwater levels within the lot development area would be necessary for the assessment of septic system design related to the tile bed as well as the potential interception of groundwater flow within the installed subsurface infrastructure.

On balance, when the current hydrogeological sensitivity, including the potential karstic nature of site is combined with the ecological impacts as presented in the terrestrial review then this level of development on this specific site would not be appropriate.

The hydrogeological review, which presents more detail and context, is provided in Appendix 2.

Hydrogeological Technical Review Recommendations

Key Recommendations

- The proposed 62 unit subdivision proposed on individual private sewage systems should not be developed without a more detailed hydrogeological assessment particularly focused on a karst characterization and related groundwater quality impact assessment.

Secondary Recommendations

- Conduct additional site-specific groundwater level monitoring to confirm the temporal shallow groundwater level trends.

Archaeological Review Summary

The reviews of the Stage 1-2 Archaeological assessments have been completed. There are concerns with the technical reports and the absence of SON consultation or engagement in the conducting of this fieldwork in SON Territory, and in areas of high archaeological potential.

Amick's Stage 1 report notes two sites within 1 km of the subject property. The position of BbHj-25, a pre-contact scatter, burial; camp / campsite to the north, corresponds well with the property, which also has some indication of sand and dune environment. Bruce County's AMP shows as large clustering of archaeological sites at Inverhuron Provincial Park, within 2 km of the Monkat development.

SON Archaeology finds the Stage 2 report concerning. The report includes some pictures taken of the property, one poorly executed test pit, but is lacking pictures of the crew in-action or their "high intensity test pit methodology". Although portions of this study area are very likely disturbed, photographic evidence of the test pits that would have confirmed the soil composition of these areas / the degree of variable disturbance, are not included – nor are they described in any detail in the text. Based on the described methodology dozens of test pits would have had to be dug, even given some disturbance (normally ~441 test pits per hectare in a testable area). It is our opinion that it is unlikely the area was tested systematically or thoroughly as the report does not document this.

We find the report inconclusive in demonstrating that a full assessment was conducted. As a result, SON Archaeology does not accept the report.

Archaeological Review Recommendations

- The property assessed by Amick must undergo reassessment with SON presence.
- A Stage 1 report must be produced in consultation with SON, identifying areas of high concern and high archaeological potential.

- A Stage 2 archaeological assessment must then be conducted with SON Archaeology monitors present throughout. This would provide for the generation of a new report that is acceptable. If you require assistance in following these recommendations, please contact our office.

Upon completion of the technical review, SON Environment Office has determined that the proposed SUNDANCE ESTATES project as presented will have significant impacts on the Saugeen Ojibway Nation's natural heritage interests and should not be approved as proposed. Additionally, SON Archaeology has identified concerns regarding the archaeological assessment completed on the property and requires a reassessment of the property to be able to evaluate potential impact on SON's cultural heritage.

Miigwetch,

Manager, Resources and Infrastructure,
Environment Office of the Saugeen Ojibway Nation

Cc' Monica Walker Bolton, Manager of Planning, Bruce County MWalkerBolton@brucecounty.on.ca

Terrestrial Ecology Technical Review

Prepared for:

Saugeen Ojibway Nation Environment Office

Prepared by:

Jarmo Jalava

Advisor, Terrestrial Ecology, SON Environment Office

Project Name: Sundance Estates (Monkat) Subdivision

Location: 143 VICTORIA STREET, CONCESSION A, PLAN 392, LOT 16 AND CONCESSION A, PART LOT 65, GEOGRAPHIC TOWNSHIP OF KINCARDINE, MUNICIPALITY OF KINCARDINE, BRUCE COUNTY

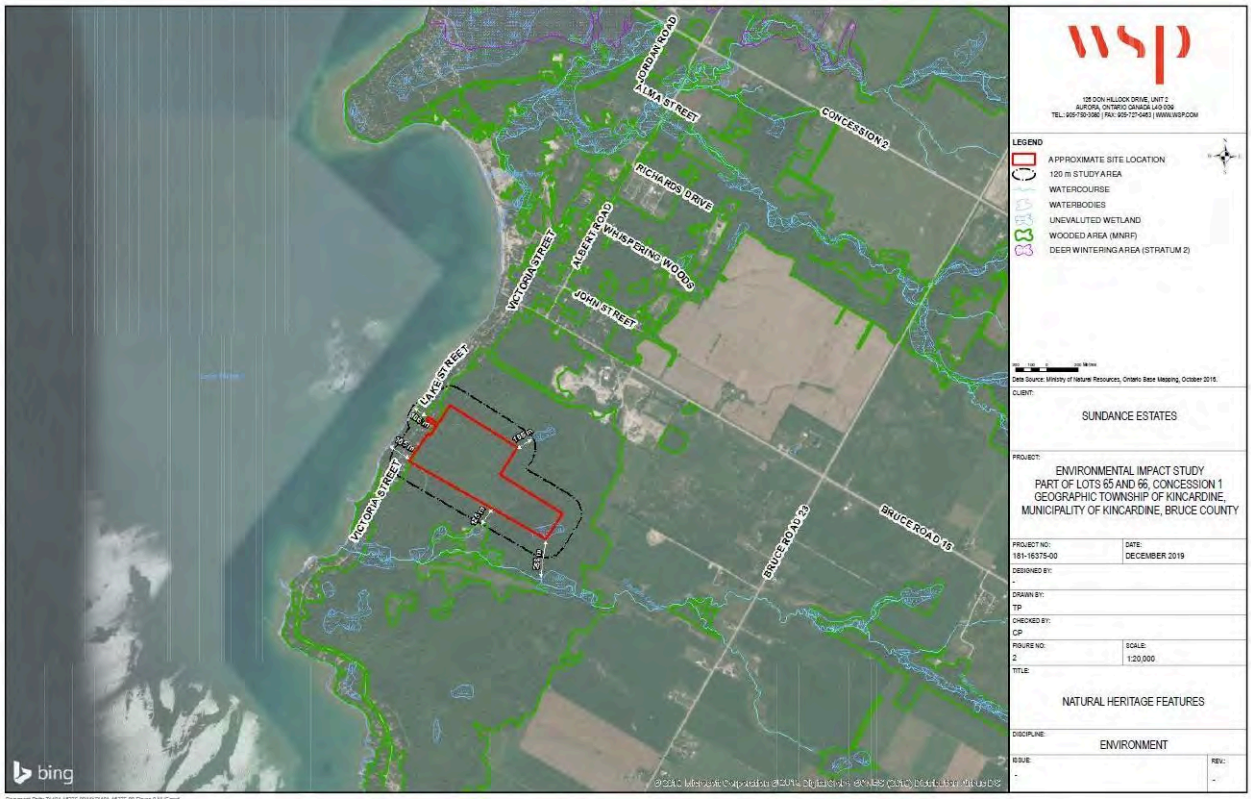

Figure 1. Location of Site

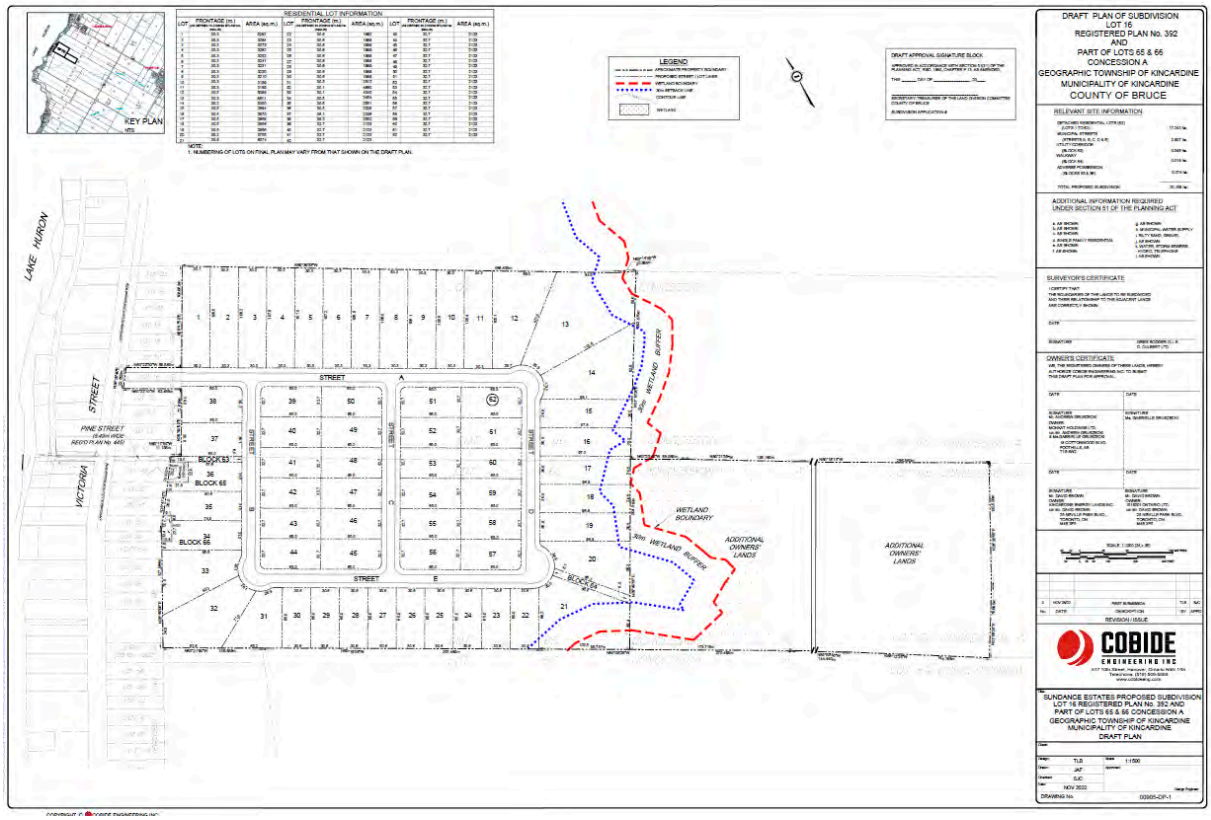

Figure 2. Draft Plan of Subdivision

Figure 3. Forest interior impacts under proposed Draft Plan of Subdivision ("Site plan")

Proponent: Monkat Holdings Ltd., Kincardine Energy Lands Inc. and 1519201 Ontario Inc.

Development Type: 62-lot residential subdivision and associated streets and water/stormwater servicing.

Environmental Study/Studies Conducted by: WSP (2019, 2023). There also is reference in the WSP environmental impact study (EIS) to an earlier EIS conducted by Aquatic and Wildlife Services (AWS) in 2009.

Reviewed Documents:

SUNDANCE ESTATES - ENVIRONMENTAL IMPACT STUDY UPDATE: 143 Victoria Street, Concession A, Plan 392, Lot 16 and Concession A, Part Lot 65, Geographic Township of Kincardine, Municipality of Kincardine, Bruce County. Prepared by WSP. February 14, 2023. vii + 48pp. + appendices (including correspondence and peer review).

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SUNDANCE ESTATES WETLAND EVALUATION - PART LOTS 65 & 66, CONCESSION A, Municipality of Kincardine. Prepared for: 1519201 Ontario Inc. May 2022. Prepared by GAMAN Consultants Inc. File 22008.00. iv + 10pp. + figures + appendices.

DRAFT PLAN OF SUBDIVISION, Lot 16, Registered Plan No. 392 and Part of Lots 65 & 66, Concession A, Geographic Township of Kincardine, County of Bruce. Prepared by Cobide Engineering. February 23, 2023.

SUNDANCE ESTATES OUTFALL COASTAL REPORT. Monkat Holdings Ltd., Kincardine Energy Lands Inc., 1519201 Ontario Inc. Prepared by WSP. PROJECT NO.: 181-16375-01. April 10, 2023. vii + 23 pp. + appendices.

Additional Background Research:

eBird. 2024. ebird.org

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ORAA (Ontario Reptile and Amphibian Atlas). 2021. Database provided to SON by Ontario Nature, May 19, 2021.

OSFN (Owen Sound Field Naturalists). 2023. Vascular plant list, Bruce & Grey: compendium / Owen Sound Field Naturalists; compiled by Tyler Miller, field ecologist. Owen Sound Field Naturalists. 85 pp.

University of Toronto Map and Data Library. 1954 Air Photos of Southern Ontario. Available: https://mdl.library.utoronto.ca/collections/air-photos/1954-air-photos-southern-ontario/index

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Environment and Climate Change Canada. 2021. Recovery Strategy for the Red-headed Woodpecker (*Melanerpes erythrocephalus*) in Canada. Species at Risk Act Recovery Strategy Series. Environment and Climate Change Canada, Ottawa. viii + 118 pp.

Howe, E. J., M. E. Obbard, and J. A. Schaefer. 2007. Extirpation risk of an isolated black bear population under different management scenarios. Journal of Wildlife Management 71:603–612.

Jalava, J.V., C. Harpur, M. Obbard, D. Ritchie, M. Solomon, J. Howard and J. Chegahno. 2022. M'kwa: Black Bear Conservation Strategy for the Saugeen Peninsula. DRAFT – March 31, 2022. Parks Canada and Saugeen Ojibway Nation. ii + 43 pp.

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Obbard, M. E., E. J. Howe, C. J. Kyle, J. Haselmayer, and J. Scheifley. 2016. Estimating the abundance of American black bears (*Ursus americanus*) on the Bruce Peninsula. Science and Research Technical Report TR-13. Peterborough, Ontario.

In addition to consulting the above documents and databases, I conducted a site visit on December 8, 2023. I also discussed the proposed development and associated studies with SON Hydrology / Hydrogeology Advisor, Bill Blackport and SON Environmental Office staff, as well as a Registered Professional Planner. I also had electronic correspondence in January 2024 with local resident and respected birder/naturalist, Robert Taylor, regarding Eastern Whip-poor-will and other Species At Risk observations by him and his wife in the vicinity of the Site.

Technical Review completed by: Jarmo Jalava, Advisor, Terrestrial Ecology, SON EO

Date: January 30, 2024

A) CONTEXT

It is the Saugeen Ojibway Nation (SON) position that we have a shared responsibility throughout Traditional Territory of the Saugeen Ojibway Nation ("SON"), or *Saukiing Anishinaabekiing*, to honour, preserve and protect the ecological integrity and cultural practices that reflect SON's ancestral connection to this land and SON's way of life. With respect to the technical information discussed here, it is important to understand that even though some specific priorities and considerations are identified below, it is the SON position that it is our duty and responsibility to protect and care for *all* the lands, waters and species in SON Territory for future generations, as well as for our ongoing spiritual, cultural and economic wellbeing. The lands and waters are integrally connected and cannot be thought of separately. Mammals, fish, birds, insects and plants live and move across the lands and waters to meet their needs irrespective of the parcel fabric and other human-made boundaries. This technical review is undertaken in the spirit of ensuring that, across the Territory, the lands, waters, wildlife and Aboriginal and treaty rights of SON are protected from any potential negative impacts of land and in-water development. SON must be consulted on any project that has the potential to negatively impact SON Aboriginal and treaty rights or the environment of SON Territory.

1. Description of Proposed Development	**Size and Location**: The Site is 29.872 ha in size, in the Inverhuron area in the Municipality of Kincardine (Figure 1), of which ~14 ha is proposed for development. **Current Use**: The Site is almost entirely forested, including some (mostly treed) wetland. Evidence of selective logging, trail development (suitable for ATV use) and hunting were observed during the SON site visit. **To be Developed:** Residential subdivision consisting of: single detached homes on 62 large lots (14 ha); municipal streets (1.3 ha); a utility corridor (0.2 ha), with a connection to Victoria Street (Figure 2), as well as a stormwater corridor and a pedestrian walkway. The proposed subdivision is to be serviced with municipal water. A new 200 mm diameter PVC watermain to connect to an existing 300 mm watermain located on Victoria Street at the proposed new intersection. Fire hydrants will be placed along the new subdivision street at a spacing of no greater than 150 metres. The 62 detached dwellings are to be serviced with individual, private septic systems. **Adjacent land uses:** Lands to immediately the north, east and south are undeveloped forest; to the west, along Victoria Street, there are residential homes on fairly large, mostly treed lots. Further east (about 250 m beyond the property boundary) farmland (mostly cash crops) predominates. Within the forest on a rural lot to the south, Google Earth shows a cleared area with what appears to be a farm/estate property that includes a long linear clearing.

2. Landscape Context	**Connected Natural Area / Corridor Functions**	The Site is situated within the core of one of the five largest tracts of forest in southern Bruce County and is part of a ~37.5 km long naturally-vegetated corridor (fragmented by roads) extending along or near the Lake Huron coast from Saugeen Shores to just north of Kincardine. It is part of the Huron Fringe biophysical region, an area widely recognized as an important movement corridor for migratory birds. This corridor includes protected areas like MacGregor Point Provincial Park (P.P.), Inverhuron P.P., Stoney Island Conservation Area (C.A.), Brucedale C.A., private nature reserves, and some relatively undisturbed natural areas associated with the Bruce nuclear site. This corridor provides diverse, connected habitat and even supports wide-ranging mammals like Black Bear, many species at risk (SAR), and provincially and locally significant flora and fauna. With respect to the Site, the EIS states: "The woodland likely acts as a movement corridor for wildlife through the landscape, providing access to Lake Huron (though separated from the Lake by Victoria Street and lakeshore residential properties), and other natural heritage features north, east and south of the Site."
	Coastal Habitat	The Lake Huron coastline is about 165 m from the main part of the Site. The "Sundance Estates Outfall" at the shoreline is where a stormwater pipe and a headwall are proposed as part of the stormwater management plan for the proposed development.
	Headwaters	No headwaters have been identified within the Site or Study Area. However, a watercourse in the eastern part of the Site (see next section) presents evidence of groundwater contributions.
	Watercourses / Drainage Features	A permanent coldwater tributary (Figure 4, below) of Tiverton Creek crosses the eastern portion of the Site. According to the EIS, it "originates as drainage from a swampy area located ~160 m southeast of the development lot. It flows as a defined channel for 300 m through woodlands and wetlands before outletting into a series of two online ponds. The aquatic habitat consists of flat sections (100%), with a mean wetted depth of 0.2 m, a mean wetted width of 2.8 m, a mean bankfull depth of 0.5 m and a mean bankfull width of 5.0 m. The substrate consists of detritus (50%), silt (40%) and sand (10%). Banks were natural, stable and had a gradual slope. Bank height was 0.6 m on both sides, and had little to no erosion evident. Instream cover consists of dense instream vegetation (Common Reed [*Phragmites* sp.] and floating filamentous algae), dense woody / organic debris and moderate overhanging vegetation. Riparian vegetation consists of Common Reed, Field Horsetail and grasses and shrubs. There is moderate canopy cover over the watercourse (40% cover). There is evidence of groundwater contributions (iron staining, oily sheen and seepage) to the creek. Just downstream of the swamp, underground flow under tree roots, woody debris and soil are permanent barriers to fish passage. The tributary outlets into Tiverton Creek approximately 500 m downstream of the Site."

	Wetlands	A permanent wetland, associated with the watercourse discussed above, covers most of the eastern third of the Site, with the predominant community being White Cedar Hardwood Organic Mixed Swamp. Connected to the mixed swamp is a 0.5 ha Organic Deciduous Thicket Swamp dominated by Red-osier Dogwood and Speckled Alder. A small patch of thicket swamp (Figure 5) was noted within the deciduous forest community during the SON site visit, but was not discussed or mapped by the EIS, presumably because it falls below the minimum ELC community size threshold of 0.5 ha.
	Forest Interior / Older Growth	Among the most significant features and functions of the Site is that it consists largely of forest interior habitat. The EIS states: "The woodland on the Site is part of a 390 ha woodland, that contains approximately 233 ha of interior woodland habitat (based on a 100 m buffer recommended in Natural Heritage Reference Manual)…It is home to a variety of wildlife and plant species, including some that are considered area-sensitive species" (Figure 3). The EIS describes the deciduous forest as "mature," with occasional >50 cm dbh DBH trees observed. The forest at the Site appeared to be intermediate-aged to semi-mature (but not older-growth) (Figure 6), with scattered older trees, during the SON site visit. Many snags (Figure 7) and some downed trees were noted, indicating some advancement into older growth conditions. 1954 air photos appear to show a closed-canopy deciduous forest across most of the site (Figure 8), suggesting a forest age of at least 100 years. Current Google Earth imagery suggests a more open canopy (Figure 9) as observed during the SON site visit, suggesting that some selective logging has occurred over the years.
	Alvar / Cliff Habitat	Not present.
	Grassland / Open	Aside from a small cleared area at the Victoria Street access point, there is no grassland or open habitat at the Site.
	Site Condition	The EIS describes the deciduous forest community within the Site (which includes the area to be impacted by the proposed subdivision) as generally being "of relatively high botanical quality with predominately native species recorded." A few deer-hunting platforms, ATV trails and informal footpaths were noted by the EIS and during the SON site visit. Serious invasion of habitat by

		aggressive garden cultivars was noted in the vicinity of existing residences along Victoria Street (Figure 10).
	Fish habitat	Based on the EIS, the fish community in Tiverton Creek "is generally assumed to be representative of the potential fish species likely present within the Site. The fish community documented…consists of coldwater, coolwater and warmwater forage fish species, as well as more sensitive coldwater salmonid species such as Brown Trout and Rainbow Trout. However, the habitat documented within the reach of the tributary on the Site is likely not suitable for trout species, as it is heavily vegetated with fine substrates." Mottled Sculpin was the only species documented in the tributary by the EIS. The fish community in Lake Huron near the location of the proposed stormwater outlet, according to the EIS, "consists of coldwater, coolwater and warmwater forage fish species, as well as more sensitive coldwater salmonid species such as Brown Trout and Rainbow Trout."
3. Culturally Important Natural Features (known or potential)	**M'kwa (Black Bear) habitat**	The Site is situated near the southern limit of Black Bear habitat in SON Territory, with evidence of Black Bear within 3.5 km of the Site observed by the SON reviewer in 2023. Also there are recent records of Black Bear at Inverhuron Provincial Park less than 1.5 km from the Site. The site's forest community provides abundant cover, a relatively undisturbed movement corridor, and good foraging opportunities for Black Bear, including a population of American Beech, an important autumn food source for the species.
	Deer habitat	White-tailed Deer were observed on site by the EIS, and the Site provides cover and natural foraging habitat for deer. Deer-hunting platforms were also observed. Deer wintering habitat is reported >1 km to the north of the Site according to the EIS.
	Other Furbearers	Coyote, Eastern Chipmunk, Eastern Cottontail, Eastern Gray Squirrel, Porcupine, Raccoon, Red Squirrel and Striped Skunk were noted for the Site by the EIS. Many other mammals are likely, including Virginia Opossum, Red Fox, Striped Skunk, Woodchuck, Mink, weasels, as well as smaller mammals (mice, voles, moles and shrews).
	Turtles / Herpetofauna	Four species of amphibians were recorded on the Site: American Toad, Gray Treefrog, Green Frog and Spring Peeper. The only reptile noted by the EIS was Eastern Gartersnake. Two reliable observers have reported (to the SON reviewer) seeing a highly-sensitive Endangered semi-terrestrial turtle species "a few years ago" crossing County Road 15 just east of Victoria Street, into the natural area that is continuous with the Site. There is an extant, well-studied population of this turtle species within 5 km of the Site. Potential presence of this species at the Site is not discussed by the EIS).

	Medicines	A number of medicines (e.g., Balsam Fir, Canada Yew, Wood Betony, Common Boneset, Ironwood, Marsh Marigold, American Elm, Common Elderberry, Red Osier Dogwood, Alternate-leaved Dogwood, Sensitive Fern, Speckled Alder, Spotted Jewelweed, Spotted Joe Pye-weed, Staghorn Sumac, Wild Ginger, Wild Sarsaparilla, White Snakeroot, White Baneberry) grow on the subject lands.
	Other Culturally-important Plants	Common food plants (e.g., Wild Strawberry, Dwarf Raspberry, Common Cattail, Choke Cherry, Black Cherry, Jack-in-the-Pulpit, Red Elderberry, Prickly Gooseberry, Riverbank Grape, Wild Red Raspberry, Wild Leek) are found on the Site. Other culturally-important plants found at the Site include American Beech, Common Juniper, White Birch, White Ash and Alternate-leaved Dogwood.
4. Other Key Natural Features	A key natural heritage feature noted for the Site by SON, and also considered at length by the NRSI peer review, and by the EIS update, is the Significant Woodland, which is ~390 ha in size and presently contains at least 229 ha of forest interior, a very rare habitat feature in southern Bruce County. The near-coastal location of this forest tract within the Huron Fringe, and its connectivity to natural areas to the north and south, adds to its significance, as it provides corridor functions to migratory birds and wide-ranging species, including Black Bear (known to occur within 2 km at Inverhuron Provincial Park and documented in 2023 by SON reviewer within 3.5 km in habitat continuous with the Site). The Significant Woodland at the Site provides breeding habitat for at least eight area-sensitive forest-interior bird species: Yellow-bellied Sapsucker, Red-breasted Nuthatch, Veery, Blue-headed Vireo, Black-throated Green Warbler, Ovenbird, Scarlet Tanager and Canada Warbler. The Site meets PPS criteria for two confirmed Significant Wildlife Habitat (SWH) types: Woodland Area-Sensitive Bird Breeding Habitat; and Habitat for Special Concern and Rare Wildlife Species (Eastern Wood-Pewee and Wood Thrush) and candidate SWH for Woodland Raptor Nesting Areas. As well, the Site provides potential maternity roost (meets PPS “candidate” SWH criteria), day roost, and wetland foraging habitats for up to four Endangered bat species. The Site provides habitat for Species At Risk (SAR), notably (federal SARA status / provincial ESA status): **Butternut** (Endangered / high cultural importance to SON), documented by EIS. **Black Ash** (Endangered / high cultural importance to SON), documented by EIS. **Whip-poor-will** (Threatened / Threatened), extant population during breeding season in continuous habitat (eBird, OBBA 2023), not found by EIS.	

	Red-headed Woodpecker (Endangered / Endangered), extant population during breeding season (eBird, OBBA 2023), not found by EIS. **Wood Thrush** (Threatened / Special Concern), breeds at Site, documented by EIS. **Eastern Wood-Pewee** (Special Concern / Special Concern), breeds at Site, documented by EIS **Canada Warbler** (Threatened / Special Concern), probable breeder at or near Site, documented by EIS. **Snapping Turtle** (Special Concern / Special Concern) An Endangered turtle species has been reported to SON as being seen entering the natural area within which the Site is situated, <900 m from the property boundary.

	Environmental Study	**Technical Review Comments**
1. Background Research	The following background information sources were consulted by the EIS: aerial photographs and satellite images; Atlas of the Breeding Birds of Ontario (2nd Ed., to 2006); Natural Heritage Areas Mapping, including Natural Heritage Information Centre (NHIC) data; Ontario Reptile and Amphibian Atlas (ORAA). Also consulted were the relevant federal and provincial environmental legislation, policies, guidelines, technical manuals, and municipal official plans, etc..	The EIS did not review following information sources that should be consulted for EIS studies: eBird, iNaturalist, and the Ontario Mammal Atlas. Also, data from the current Ontario Breeding Bird Atlas (OBBA), which commenced in 2021, would have been available for the EIS update completed in 2023. Both eBird and the current OBBA include recent breeding season observations of SAR (e.g., Eastern Whip-poor-will, Red-headed Woodpecker) in or near the forest tract within which the Site occurs that should have been considered in the EIS update.
2. Field Surveys	EIS field surveys consisted of: bat habitat snag tree density surveys (2019: February 19-22; 2022: August 23); amphibian calling surveys (2019: April 18, May 28, June 19); vegetation and ELC (2019: May 28; June 20; August 14; 2022: August 23); breeding birds (2019: May 28, June 20); wetland delineation (2021: October 27); as well as a site walk with SVCA and land surveyors to confirm wetland boundaries (2021: November 17) and Butternut sapling locations (2021: December 8); aquatic habitat (2022: May	Given the habitat types present, field surveys appear to have been conducted at appropriate times of year and under suitable weather conditions. General breeding bird, bat roost and amphibian surveys were undertaken according to protocols, and ELC and botanical studies appear to have been satisfactory (although the plant list contains a couple of questionable observations). However, no targeted nightjar surveys were undertaken despite the

Appendix 1: Terrestrial Ecology Technical Review

	Environmental Study	Technical Review Comments
	9, August 23); Butternut health assessments (2022: June 16).	documented presence of Eastern Whip-poor-will during breeding season in or near the Significant Woodland within which the Site is situated (OBBA 2023, eBird 2023).
3. Results	The EIS includes descriptions and mapping of vegetation (ELC) communities (7 ELC types) and wetlands, as well as descriptions of results of breeding bird (69 spp.) and amphibian surveys (4 spp.), bat maternity roost habitat assessment (75 cavity trees meeting criteria found across 47 plots), incidental wildlife and aquatic surveys. Appendices list vascular plants (123 spp., 98 native), birds (69 spp. breeding, 11 non-breeding), mammals (9 spp.), amphibians (4 spp.), reptiles (1 species), butterflies (5 spp.) and odonata (4 spp.). Results of Butternut health assessments are also presented (15 live stems/trees, 13 confirmed as non-hybrid, 12 of them being "retainable" Category 2 trees). The EIS results include an assessment of fish habitat, a discussion of species of conservation concern documented at the Site, as well as mapping of documented natural heritage features, cavity tree survey results, interior woodland habitat and Butternut health assessment results. Supplementary reports include a "wetland evaluation" and "coastal report".	The EIS is well-organised, quite detailed and clearly-written (although it contains a number of typographic / spelling errors). However, the natural features and functions of the Site have not been fully documented or characterized. Certain significant species known from the immediate vicinity of the Site (and reported by qualified observers) were not documented. Mammal and herpetofaunal lists are very limited. Also, pockets of wetland observed by SON during the December 8, 2023, site visit (Figure 5) within the upland forest community are not described. Not "classifying" them as ELC types because they are smaller than the ELC minimum is acceptable, but, for impact assessment purposes, these wet patches should nonetheless have been described as inclusions within the forest (as the EIS does for pockets of upland forest found within the wetland community). Many flora and fauna (e.g., breeding salamanders), some of them potentially significant, may be associated with small wetland patches within forest communities. Documentation of wet areas and saturated soils also informs hydrological and hydrogeological understanding of the site. The ELC descriptions should include estimates of percent cover of tree and other strata to facilitate assessment of the suitability of habitat for potential

	Environmental Study	Technical Review Comments
		breeding bird SAR, notably Eastern Whip-poor-will and Red-headed Woodpecker, which were not found by the EIS, but which have been confirmed (eBird, OBBA) as occurring during breeding season in the Significant Woodland within which the Site occurs. In the opinion of the SON technical reviewer, there is suitable potential breeding habitat for both species in the Study Area. The plant list should be linked to ELC types to better inform analysis of habitat quality.
4. Assessment	The EIS states: "As species of Special Concern, Canada Warbler, Eastern Wood-pewee and Wood Thrush are not afforded habitat protection under the ESA. Vegetation removal will reduce the availability of nesting habitat for these species; however, abundant nesting and foraging habitat exists within the immediate area. Mitigation measures include retaining as much forest as possible and utilizing timing windows to prevent direct impacts to these species." The EIS states: "It is expected that all SWH functions of the significant woodland feature will be maintained post-construction; however, there may be some localized reduction in the abundance of area-sensitive species (potentially proportional to loss of interior forest areas or approximately 10-21%)."	The EIS's assessment of impacts of the proposed development on the Significant Woodland, although detailed, are problematic and in some respects self-contradicting. The EIS takes the position that (i.e., a >14 ha subdivision of 62 detached homes, with streets, municipal water and stormwater infrastructure) permanent loss of ~24 ha of forest interior habitat within a Significant Woodland is acceptable and will not negatively impact the significant ecological features and functions. In this reviewer's opinion, such a position is untenable. ***Please refer to Discussion and Detailed Review Comments, below.***
8. Mitigation / Recommendations	A 30 m buffer has been proposed along the western boundary of the SWM4-1 community (Appendix A, Figure 7). This buffer is intended to protect the wetland communities and associated habitat from direct impacts associated with proposed development of the Site.	With the exception of possible compensation "if there is limited room on the Site to accommodate plantings," none of the recommended mitigations substantially address the primary negative impacts of the proposed development, which are:

	Environmental Study	Technical Review Comments
	The EIS recommends the following mitigations with respect to the Significant Woodland habitat: tree protection fencing (with appropriate bracing) to be installed before work on the Site begins and inspected and maintained/repaired regularly; prohibit storage or stockpiling of materials including fill, topsoil, construction equipment and debris, disposal of liquids, and operation of heavy machinery beyond the fencing; tree removal to conform to all relevant by-laws, and should be performed by properly trained and accredited individuals; adherence to Migratory Birds Convention Act with respect to vegetation removal timing; preparing "a forest edge management plan"; potential compensation for woodland removal to be negotiated with the Municipality and/or SVCA if there is limited room on the Site to accommodate plantings. Mitigations related to impacts on Butternut (Endangered) are contingent on approval under the ESA (2007). Proposed options include transplanting or removal based on tree health, logistics and identification of suitable receiving habitat. Removed trees would be compensated for as per the requirements under the ESA (2007), including contribution to the SAR fund "to ensure there is a net benefit to the species." Recommended mitigations for potential impacts to Endangered bats are quite elaborate: vegetation removal during appropriate timing windows (October 1 and March 31); "consideration" of strategies to minimize light pollution; staking of permitted vegetation clearing areas; cavity trees within proximity to the proposed work areas to be flagged and the dripline limits identified in the contract	1) Permanent significant loss of tree cover in the core of the Significant Woodland in a region with already low levels of forest cover; 2) Permanent reduction in extent and fragmentation of forest interior habitat in a region with extremely limited forest interior habitat. 3) Permanent loss of habitat for significant wildlife, including Species At Risk and other declining species that require large tracts of forest and/or forest interior. 4) Impacts on the ecological integrity of a wildlife movement corridor by narrowing it and exposing it to edge effects and a variety of anthropogenic disturbance factors associated with proximity to a major residential development. A number of the recommended tree removal and wildlife protection-related mitigations involve abiding by existing legislation or by-laws and are therefore not actual "mitigations" as they would apply regardless of whether the proposed development occurs or not. Bat habitat mitigations include "consideration" of strategies. "Consideration" is not a mitigation; implementation is a mitigation. The proposed wetland mitigations and setbacks are standard and appear to be acceptable.

	Environmental Study	Technical Review Comments
	drawing; standard erosion and sediment control measures for wetland protection; roosting habitat enhancement through installation of a minimum of two "Rocket Box" bat houses prior to proposed works <1 km of the site; should SAR or other roosting bats be found in the work area, activities that could potentially harm the animal to cease immediately and MECP SAR Biologist to be contacted. A list of standard mitigations (re: sediment and erosion control; construction; operation and machinery are recommended that aim to ensure no negative impacts) on the wetland habitat at the site. A number of mitigations are proposed "for protection of general wildlife."	See also separate SON hydrology / hydrogeology technical review (by W. Blackport) re: potential impacts and mitigations regarding hydrological inputs and water balance.
9. Conclusions	The EIS concludes that "the results of this EIS indicate that potential negative impacts to the natural heritage features or their ecological functions adjacent to the Site can be avoided, minimized or mitigated with the implementation of mitigation measures provided..."	The EIS results, existing data and SON research do not support the EIS conclusions. ***Please refer to Discussion and Conclusions sections, below.*** Please refer to separate SON hydrology / hydrogeology technical review with respect to conclusions groundwater and hydrological impacts.
10. Knowledge / Information Gaps	• No nightjar surveys were undertaken despite recent eBird documentation (which would have been available to the EIS update authors) of Eastern Whip-poor-will during breeding season in the forest habitat that is contiguous with the Site. Nightjar surveys need to be completed according to standard Birds Canada protocols. • The possibility of a highly vulnerable Endangered turtle species using habitat within or near the Site needs to be definitively ruled out. • How much of the 390 ha Significant Woodland is relatively mature Sugar Maple Deciduous Forest? Google Earth Pro imagery suggests that much of this forest tract is mixed or coniferous forest. If that is the case, the	

B) ASSESSMENT

Figure 4. Stream associated with wetland at Site

Figure 5. Standing water and small thicket swamp (background) inclusion within Sugar Maple eciduous forest

Figure 6. Intermediate-aged Sugar Maple deciduous forest with scattered more mature trees

Figure 7. Frequent snags and cavity trees in deciduous forest

Figure 8. Composite 1954 aerial photography of forest south of Inverhuron showing closed canopy deciduous forest across much of the Site (faded lower portion of image appears to be a technical anomaly rather than a significant difference in habitat types)

Figure 9. Recent Google Earth imagery for subject lands and vicinity showing contrast between paler green deciduous forest and darker green coniferous/mixed forest, as well as apparent variable canopy cover across much of the deciduous forest

Figure 10. Abundance of invasive garden cultivars (Periwinkle, English Ivy) encroaching from adjacent residential lots at Victoria Street entrance to the Site; this ecologically harmful phenomenon is very common in natural areas next to residential subdivisions

C) DISCUSSION

C.1. SON Ecological Priorities

The following "priorities" and considerations align with information provided by the SON Environment Office in early 2020 to the County of Bruce to support the County's Official Plan update process.

CAPITALIZED ITALICIZED TEXT has been inserted as a high-level assessment of the proposed Sundance (Monkat) development area ("THE STUDY AREA / THE SITE") in the context of the SON priorities and considerations described.

The integrity, extent, connectivity and health of following landscapes, ecological features and habitat types must be given particular attention in land use and development planning, with an emphasis on habitat connectivity and other elements of ecological functionality (e.g., extent, corridor widths, condition, diverse upland/wetland/riparian habitat mosaics, etc.).

1. **Black Bear habitat matrix and movement corridors**.

Over recent decades, the Saugeen (Bruce) Peninsula and surrounding lands have experienced a significant and ongoing decline of the M'kwa or Black Bear population. Black Bears are an important species playing a vital role in the ecosystems of the Saugeen Peninsula and hold high cultural significance for the Saugeen Anishnaabek, who have honoured M'kwa since time immemorial. Because of their wide-ranging habits, the survival of the small, isolated population of Black Bear in SON Territory is dependent on habitat on lands outside of protected areas (Obbard et al. 2010; Jalava et al. 2022). It is essential to maintain habitat quality within all required habitat types for spring foraging, fall foraging and winter denning as well as ensuring that all habitat types are accessible (i.e., connected by suitable habitat corridors) and available in sufficient quantity to provide for the nutritional requirements of Black Bears throughout the year in each of the stages of their life cycle (cub, subadult, adult female, adult male).

Based on the estimates of abundance currently available (Zorn and Quirouette 2003, Obbard et al. 2016, as cited in Jalava et al. 2022), if it is accepted that Black Bears on the Bruce Peninsula (and southern Bruce County) constitute a separate subpopulation of Black Bears in the province, estimates of the number of bears on the entire peninsula north of Highway 21 (almost certainly fewer than 250 mature individuals) suggest the population is Critically Endangered by IUCN standards, and are even rarer south of the Peninsula.

BLACK BEAR ARE KNOWN TO OCCUR IN HABITATS LESS THAN 1.5 KM FROM, AND ECOLOGICALLY CONNECTED TO, THE PROPOSED SUBDIVISION DEVELOPMENT SITE. THE FORESTED LANDSCAPE ALONG AND NEAR THE LAKE HURON COAST IS THE MOST INTACT TRACT OF NATURAL, UNDISTURBED HABITAT FOR BLACK BEAR MOVEMENT AND FORAGING IN SOUTHERN BRUCE COUNTY. HABITAT LOSS DUE TO DEVELOPMENT, INCREASES IN VEHICLE TRAFFIC, AND

HUMAN-BEAR CONFLICTS ARE AMONG THE MOST SERIOUS THREATS TO THE HIGHLY SIGNIFICANT BLACK BEAR POPULATION IN SON TERRITORY (JALAVA ET AL. 2022).

2. Any sites where development would potentially have a negative impact on **fish habitat.**

FISH HABITAT IS PRESENT IN THE PROJECT STUDY AREA BUT WOULD PROBABLY BE ADEQUATELY PROTECTED BY PROPOSED BUFFERS.

3. **Reptile habitat matrices and movement corridors** (i.e., hibernacula, breeding areas, egg-laying sites, gestation sites, summering areas, etc.), which are species-specific and typically require connected mosaics of upland and wetland habitats.

THE STUDY AREA PROVIDES POTENTIAL HABITAT FOR SNAPPING TURTLE. ANOTHER HIGHLY SENSITIVE ENDANGERED TURTLE SPECIES (NOT DISCUSSED IN THE EIS) HAS BEEN REPORTED TO SON WITHIN 900 M OF THE PROPERTY. THERE IS A WELL-STUDIED EXTANT POPULATION OF THIS SPECIES TO THE NORTH OF THE SITE WITHIN THE CONNECTED NATURAL CORRIDOR OF FORESTS AND WETLANDS ALONG THE LAKE HURON COAST.

4. **Sites supporting plants used in ceremony, for medicine, as food and for other products of traditional, cultural or economic importance to SON**, particularly those species that are rare, vulnerable or declining (please see Appendix C).

THE PROPOSED DEVELOPMENT SITE PROVIDES HABITAT FOR A DIVERSITY OF PLANT SPECIES OF IMPORTANCE IN ANISHINAABE CULTURE, INCLUDING PLANTS USED FOR CEREMONY, MEDICINES, FOOD, ARTISANSHIP AND OTHER PRODUCTS. THESE INCLUDE ENDANGERED SPECIES (E.G., BUTTERNUT AND BLACK ASH).

5. **Upland deciduous forests**, particularly mature stands on rich soils, and all upland deciduous forests in areas of the county with low levels of forest cover overall (i.e., much of Bruce County south of the Peninsula and agriculture dominated landscapes in the remainder of SON Traditional Territory), and upland deciduous and mixed forests where Eastern Hemlock, Butternut and/or Beech are components. In addition to importance for maple sugar production, these forests support potentially vulnerable or declining plants of high importance to SON

RELATIVELY MATURE DECIDUOUS FOREST, INCLUDING INTERIOR HABITAT, IS THE KEY NATURAL FEATURE THAT WOULD BE NEGATIVELY IMPACTED BY THE PROPOSED DEVELOPMENT.

6. **Riparian areas, flood plains and shorelines** (including, in some cases, “surrogate” habitat such as ditches, channels and agricultural drains). These habitats support potentially vulnerable or declining plants of high importance to SON (e.g., Sweet Flag, Wild Cucumber, Sweet Grass, Ostrich Fern, Stinging Nettle, willows and Red-osier Dogwood) and are critical to maintaining healthy fish populations, and other species of special importance such as turtles. Riparian areas were and are also typically important

travel routes, camp sites and settlement areas, and often have high archaeological and ongoing cultural importance.

THE PROPOSED SUBDIVISION DEVELOPMENT FOOTPRINT IS ADJACENT TO (BUT PROPOSED TO BE BUFFERED BY 30 M FROM) A WATERCOURSE / WETLAND AREA. ALSO, STORMWATER PIPING IS PROPOSED FOR THE SHORELINE OF LAKE HURON.

7. **All wetlands, including fens, marshes, shallow lakes, treed swamps**. In addition to providing habitat for plants of high importance (such as Sweet Flag, Wild Rice, Black Ash, Labrador Tea, Common Cattail, Broadleaf Arrowhead, willows and dogwoods) wetlands perform essential ecological functions, including recharge functions, which affect water quality and fish populations.

THE PROPOSED DEVELOPMENT FOOTPRINT IS <100 METRES FROM A WETLAND. A 30M WETLAND BUFFER IS PROPOSED.

8. **Alvars and cliffs**. In addition to supporting many plants of traditional importance (e.g., Thimbleweed, Calamint, False Pennyroyal, wormwood/sage), cliffs and alvar openings are often sites of spiritual and ceremonial importance.

NO ALVARS OR CLIFFS ARE PRESENT AT THE SITE.

9. **Coniferous and mixed forests**. While coniferous and mixed forests remain quite extensive and widespread on the Saugeen Peninsula and south along the Lake Huron coast, they provide important habitat to many species of importance to SON (including Black Bear, White-tailed Deer, Ruffed Grouse, Snowshoe Hare), many of which need large tracts of connected habitat to maintain healthy populations. Protection of landscape-level functionality of these ecosystems, in diverse habitat mosaics (with wetlands, alvars, dune systems, natural meadows, etc.,) to ensure healthy wildlife populations, medicines and food plants, etc., is of critical important to SON.

THE SITE INCLUDES A WHITE CEDAR DOMINATED MIXED SWAMP, WHICH IS PROPOSED TO BE PROTECTED BY THE 30M WETLAND BUFFER.

10. **Meadows** (including roadsides, road allowances, edges of trails, old fields) **and thickets**. In addition to being critically important to pollinator insects, which are essential to wild berry and nut production (as well as to agriculture), meadows and thickets are important sources of medicinal and food plants.

NO SIGNIFICANT MEADOW HABITAT IS FOUND IN THE STUDY AREA.

11. **Other Important Planning Considerations**

To minimize negative impacts, development should be concentrated around existing developed or disturbed sites, and should be discouraged in more intact landscapes, especially along shorelines and riparian areas, and near ANSIs, wetlands and other sites identified as ecologically significant by municipalities (e.g., Significant Woodlands), conservation authorities, NGOs, etc. Protection of large, diverse tracts of landscape should be prioritized.

New development requires additional services, including utilities and roads. Consider impacts of road upgrades and improvements and the potential impact to wildlife and plant species. Road surface upgrades from gravel to paved roads may impact vehicle speeds as well as traffic volume, and thus have a potential impact on wildlife populations (reptiles, amphibians, mammals, birds and insects). Road avoidance by wide-ranging mammals such as Black Bear, turtles, snakes, rare breeding birds and other sensitive and declining fauna may occur due to increased traffic, associated noise, causing further fragmentation of and stress on the vulnerable local populations.

THE PROPOSED DEVELOPMENT WOULD BE SITUATED ENTIRELY WITHIN A SIGNIFICANT WOODLAND, MOSTLY WITHIN HIGHLY-SIGNIFICANT FOREST INTERIOR HABITAT.

According to the EIS:

“As shown on Schedule ‘B-3’ of the Municipality of Kincardine’s OP (2021), the woodland on the Site is considered significant. Section C2.3.4 states that, “Development and site alteration shall not be permitted in significant woodlands, significant valleylands, significant wildlife habitat and significant areas of natural and scientific interest, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. Further, Section C2.3.6 states:

“The Municipality acknowledges the need to identify the significant woodlands and those portions of the woodlands that need to be protected from negative impacts that may be associated with development. [...] Where development is proposed within 120 metres of a significant woodland, as shown on Schedules ‘A’ and ‘B’, Council shall be satisfied that the proposed development will not have a negative impact on the feature or ecological function of the woodland.”

“The majority of the Site is currently designated as Secondary Urban Community on Schedule A: Plan Designations within the County OP (2017) and the eastern quarter of the southern portion of the Site is designated as Rural. The majority of the Site is designated as Natural Environment within Schedule A-3 of the Municipal Official Plan (2021). The eastern quarter of the southeast portion of the Site is not subject to the policies of the Municipality’s OP (2021); therefore, this portion follows the policies identified by the County. To permit develop of the site as per the

zoning, tree removal will be required. These removals have the potential to impact the form and function of the significant woodland….

“The woodland on the Site is part of a 390 ha woodland, that contains approximately 233 ha of interior woodland habitat (based on a 100 m buffer recommended in Natural Heritage Reference Manual [OMNR, 2010]). It is home to a variety of wildlife and plant species, including some that are considered area-sensitive species (refer to Section 7.3.1). The majority of the Site is within interior woodland habitat, with the exception of the far west portion of the Site. Interior woodland habitat is associated with SWH, including candidate woodland raptor nesting areas and woodland area-sensitive breeding bird habitat. The woodland likely acts as a movement corridor for wildlife through the landscape, providing access to Lake Huron (though separated from the Lake by Victoria Street and lakeshore residential properties), and other natural heritage features north, east and south of the Site.”

A key question in relation to the proposed development is whether permanent loss of 14 ha of woodland, reducing forest interior habitat of the Significant Woodland by ~24 ha (according to EIS measurements, Appendix A, Figure 8), in the core of one of the last remaining large tracts of forest in southern Bruce County should be considered a negative impacts on the ecological features and functions of the Significant Woodland, and/or whether the proposed mitigations are adequate to address those negative impacts?

The habitat that would be lost is:

a) part of a Significant Woodland;

b) ~24 ha of forest interior Significant Wildlife Habitat;

c) habitat for a diversity of forest interior breeding bird species;

i) high-potential habitat for a critically-imperilled doodem (clan animal) of high importance to SON, Black Bear, for which habitat is extremely limited in southern Bruce County;

g) confirmed habitat for Endangered Butternut;

h) confirmed habitat for a number of plant species of importance to SON;

d) candidate roosting habitat for Endangered bat species;

e) potential breeding habitat for Threatened (and locally rapidly declining) Eastern Whip-poor-will;

f) potential breeding habitat for Endangered Red-headed Woodpecker;

f) potential habitat for a highly-sensitive Endangered turtle species;

j) meets multiple other high-concern criteria for SON.

FROM A TERRESTRIAL ECOLOGY PERSPECTIVE, THERE ARE FEW POORER LOCATIONS TO SITUATE A SUBDIVISION DEVELOPMENT IN SOUTHERN BRUCE COUNTY THAN WITHIN THE CORE OF ONE OF THE LAST REMAINING LARGE TRACTS OF FOREST WITHIN THE HURON FRINGE ECOLOGICAL CORRIDOR.

C2. Species of Conservation Concern Not Documented by the EIS but Potentially Impacted

1. Eastern Whip-poor-will

ECCC (2018) describes the nesting habitat of Eastern Whip-poor-will as: "most types of forest at early stages of succession (or edges of forests with a dense tree cover but showing a similar structure at the ground level), rock or sand barrens with scattered trees, savannahs, old burns, as well as sparse conifer plantations (Wilson 1985; Bushman and Therres 1988; Cink, 2002; Mills 2007; Wilson and Watts 2008; Tozer et al. 2014). All these habitats exhibit characteristics such as well-drained soils, moderate tree cover (Godfrey 1986; Roy and Bombardier 1996; 26 to 83% in Garlapow 2007) and moderate to sparse shrub and herbaceous cover (Eastman 1991; Garlapow 2007)…When woodlots are used for nesting (e.g., in agricultural landscapes), smaller isolated woodlots are not occupied by the species (Reese 1996), suggesting that there may be a threshold in forest patch size."

A comparison of breeding records of Eastern Whip-poor-will in Bruce County south of the Saugeen Peninsula between the first OBBA (1981-85) and the second OBBA (2001-2005) reveals a drastic decline (Figure 11). During the first atlas, breeding evidence was documented in sixteen (16) 10X10 km atlas squares vs. only five (5) squares during the second atlas. The only squares in which the species was documented during the second atlas were those overlapping with the extensively forested areas around MacGregor Point Provincial Park and Inverhuron Provincial Park.

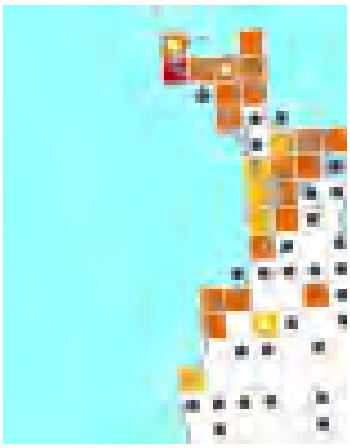
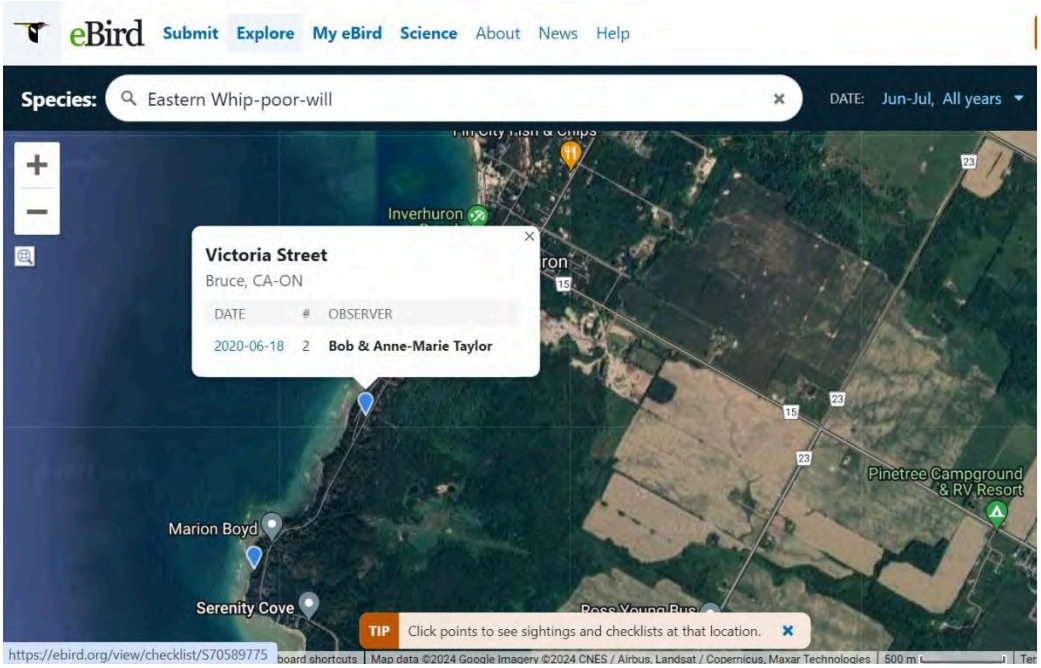
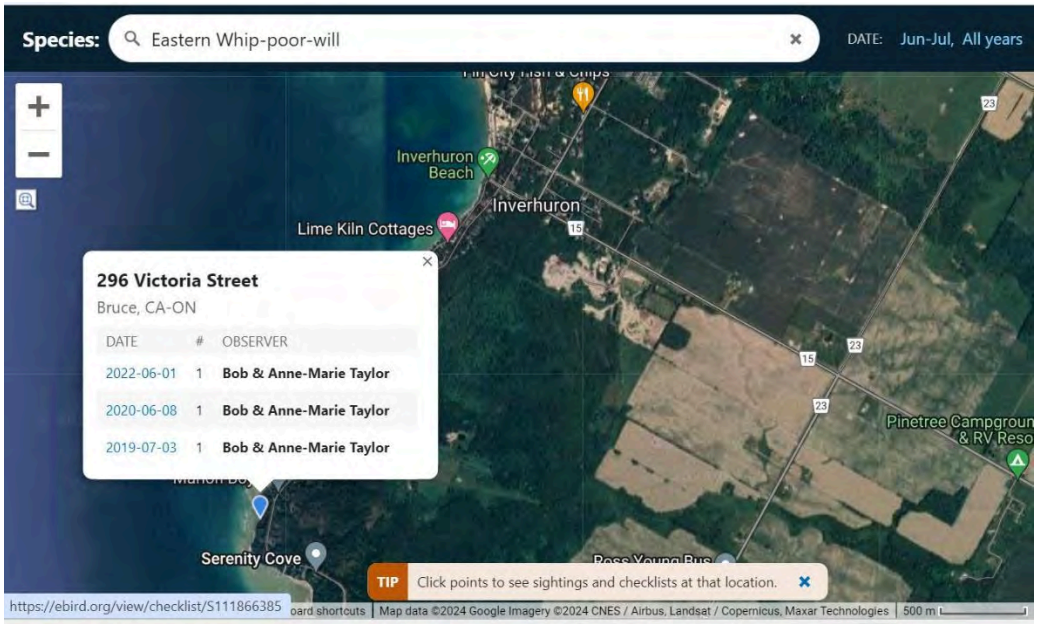


Figure 11. Decline of breeding Whip-poor-will in southern Bruce County (black dots represent atlas squares in which the species showed breeding evidence 1981-1985 but not 2001-2005) Source: Birds Canada (Cadman et al. 1987)

The decline of Eastern Whip-poor-will in southern Bruce County in recent decades, so starkly illustrated by the results of the Ontario Breeding Bird Atlas, is alarming. The species has been documented in the Significant Woodland within which the Site is situated on several occasions in recent years indicates the significant possibility of a breeding pair (or multiple pairs) in the vicinity of the Site (figures 12 and 13). Note that the mapped points are the locations from which the Eastern Whip-poor-wills were heard; the birds were vocalizing from the woodland to the east of the mapped points.





Figures 12 and 13. Breeding season (June-July) observations of Red-headed Woodpecker in vicinity of Site since 2019 (ebird 2024)

The EIS did not conduct nightjar surveys according to standard protocols. No development should occur at the Site or within the Significant Woodland until nightjar surveys have been completed.

2. Red-headed Woodpecker

ECCC (2021) describes the breeding habitat of Red-headed Woodpecker as: "mature lowland and upland deciduous woodlands typically characterised by low canopy cover, open understories, and large, tall trees, especially beech or oak…The species typically occupies woodlots with less canopy cover, more coarse woody debris, and greater dead limb lengths compared to unoccupied woodlots..."

While the EIS does not provide tree canopy cover percentage estimates, observations during the December 8, 2023, SON site visit were that the woodland community within the Site has a relatively open canopy. Given that trees were not in leaf, it was not possible to estimate the percentage cover, however. In this SON reviewer's opinion, the woodland presented no aspects that would preclude the use of habitat at the site by Red-headed Woodpeckers during breeding season or other times of the year, and the species has been documented in the vicinity of the Site (i.e., within or near the Significant Woodland) during breeding season in recent years (Figure 14). In any case, Red-headed Woodpeckers would be less impacted by clearing than forest interior species. If foraging habitat or a nest were present within or near the development site, the species could be negatively impacted by disturbance caused by construction activity.

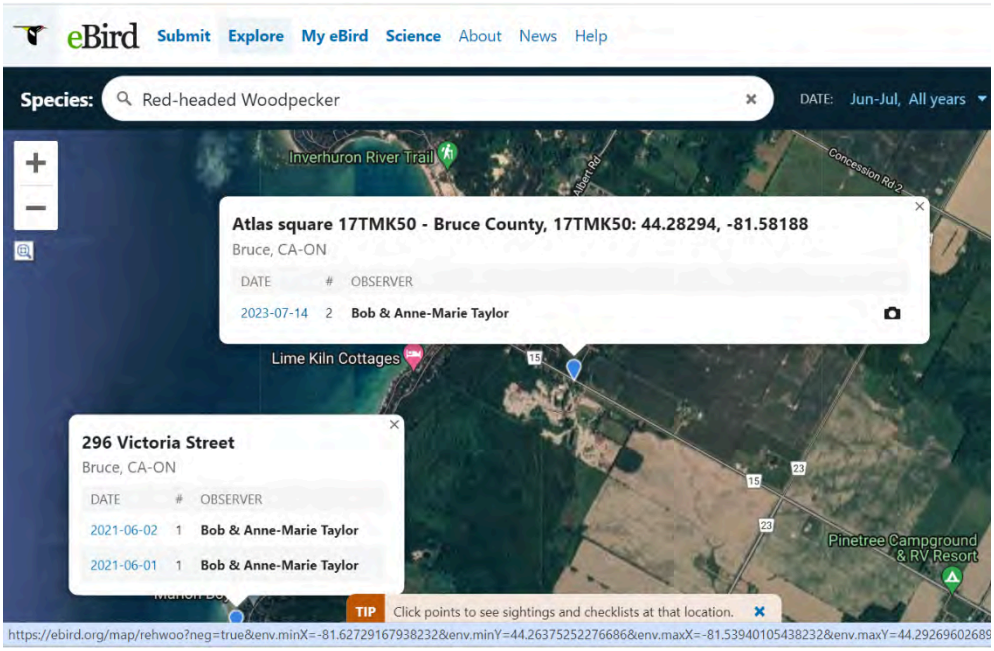


Figure 14. Breeding season (June-July) observations of Red-headed Woodpecker in vicinity of Site since 2020 (ebird 2024)

3. Endangered Turtles

The highly-sensitive Endangered turtle species reported at the north end of the Significant Woodland (crossing Road 15 just east of Victoria Street, heading south) uses several types of habitats at different stages of its annual life cycle. According to Environment and Climate Change Canada, the species is considered primarily aquatic, but individuals spend time on land to meet biological needs such as nesting, thermoregulation, and periods of summer inactivity. In Ontario, home range lengths vary from 140 m to over 1,500 m. Aquatic habitat used by the species is typically shallow wetlands (<1 m deep) rich in organic matter, including swamps, bogs, fens, marshes and meadow marshes. The species also uses ponds, vernal pools, seepage areas, sloughs, creeks, woodland streams, edges of sheltered bays, drainage ditches, stormwater ponds and man-made channels. Terrestrial habitat includes shoreline areas such as beaches, rocky outcrops, as well as upland forests, open fields and meadows.

Although it would be surprising, the presence of this Endangered turtle species at the Site cannot definitively be ruled out, given the aquatic, wetland and upland habitats present combined with the nearby observation and the known population in connected habitat to the north (just north of the Bruce nuclear site).

4. Black Bear

As noted above, Black Bears are known to occur within 1 km of, and ecologically connected to, the Site. Locations with recent Black Bear observations include Inverhuron Provincial Park, as well as the Bruce nuclear site (Figure 15). The natural landscape along the Lake Huron coast ("Huron Fringe") is the most intact habitat corridor for Black Bear movement and foraging in southern Bruce County and SON Territory. Habitat loss due to development, increases in vehicle traffic, and human-bear conflicts are among the most serious threats to the declining Black Bear population in SON Territory. Maintaining and enhancing bear habitat south of the Saugeen (Bruce) Peninsula is a key strategy considered important to recovering the critically- imperilled Saugeen Black Bear population (Jalava et al. 2022).

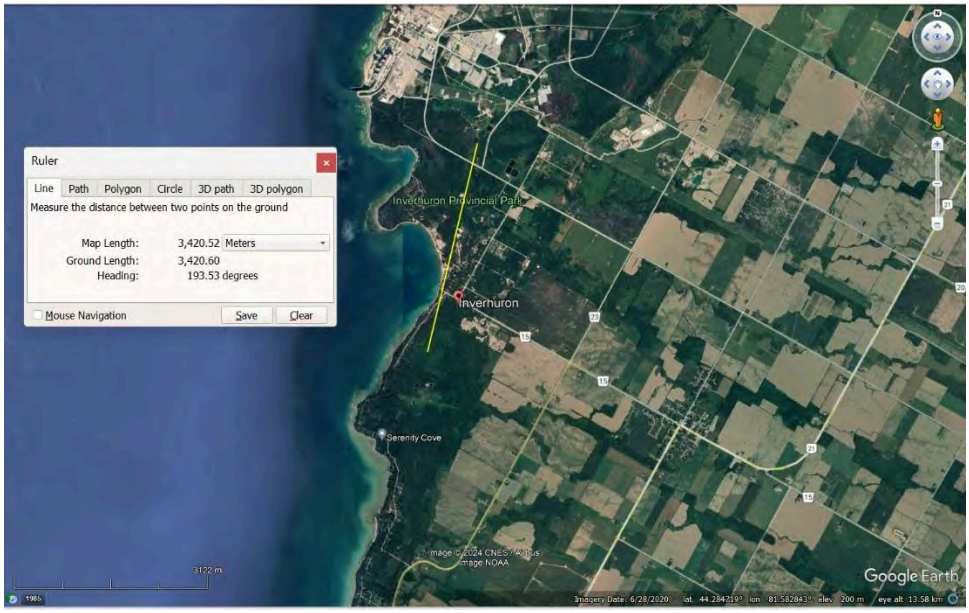


Figure 15. Approximate linear distance from the Site of 2023 Black Bear observation by the SON terrestrial ecology reviewer

High concentrations of mast-producing tree species (e.g., American Beech, present in the Sugar Maple forest at the Site) (Figure 16) would trigger consideration of Significant Wildlife Habitat (SWH) for Black Bear according to provincial criteria if the Site were situated in Ecodistrict 6E-14, which encompasses the Saugeen Bruce Peninsula north of the Ferndale – Lion's Head area. The Peninsula's Black Bears are given special consideration by the Province because the population is genetically isolated from other Black Bear populations, due largely to human-caused habitat fragmentation to the south. Recent analyses of monitoring data indicate that the unique Saugeen Peninsula Bear population is in significant decline (Howe et al. 2019, in, Jalava et al. 2022) and if this trend is not reversed, the Peninsula bear population will probably eventually disappear.

Figure 16. Mature American Beech at the Site, an important autumn food source for Black Bear

The bears that occur south of Ecodistrict 6E-14 in SON Territory (i.e., bears in the Inverhuron area), are almost certainly part of this same population, and there is no scientific basis to suggest that they are less “significant” or less in need of protective measures than those in

northern Bruce County. In fact, if the southern populations are permitted to decline through habitat loss and fragmentation, the northern Peninsula population will become even more genetically isolated, have a smaller gene pool, and be subject to greater inbreeding pressure, further increasing the likelihood of extirpation.

Therefore, *SON does not recognize the Ecodistrict boundary as an acceptable basis upon which to exclude Black Bears and their habitat south of Ferndale from a significance consideration.* The SON position is supported by science.

Obbard et al. (2010) note that because of their wide-ranging habits, the survival of the small, isolated population of Black Bear on the Peninsula appears dependent on habitat on lands outside of protected areas. Their study of habitat use around Bruce Peninsula National Park found that adult females preferred dense mixed forests to establish home ranges within the population range, whereas subadults and yearlings selected dense deciduous forests. Within home ranges, adults selected dense mixed forest in spring and summer and moved into dense deciduous forest in late summer and fall. On the other hand, subadults selected dense deciduous forest, marsh, dense mixed forest, and water during the spring and summer and avoided developed lands and roads. Yearlings selected dense mixed forest stands, dense deciduous forest, and sparse forests in spring and summer and dense deciduous forest and dense mixed forest in late summer and fall. Obbard et al. (2010) concluded that "the selection of dense deciduous and dense mixed forest stands, especially at the broader scale, suggests that strategies to ensure persistence of this isolated population should focus on protecting the integrity of these stands."

It may therefore be inferred that "integrity of these stands" includes maintaining the habitat quality within the stands (i.e., ecological processes remain intact) as well as ensuring that all habitat types are accessible (i.e., connected by suitable habitat corridors) and available in sufficient quality to provide for their nutritional requirements throughout the year for bears in each of the stages of their life cycle (cub, subadult, adult female, adult male). OMNRF (2014) supports such an inference, in that it highlights the extensive annual movements of Black Bear, their large home ranges, and their need to access a wide variety of habitats to meet nutritional requirements at different stages in their life cycle and at different seasons, noting that "Outside of the denning season (mid-October to mid-April), black bears seek areas providing seasonally-abundant foods. They often make extensive movements (40 to 80 km) to get to these unique feeding areas...During spring, bears seek forest openings and field edges where they can eat succulent new shoots of grasses and sedges and poplar catkins... From mid-May until early June, bears feed heavily on trembling aspen leaves. Although highly digestible, these early spring foods may serve as interim fillers until more nutritious foods become available. It is not until bears switch to their summer diet that they begin to gain weight.... During summer, bears seek areas where fruit is abundant. Bears usually seek areas where blueberries are common, but also visit areas offering other berry crops (i.e. strawberries, sarsaparilla, raspberries, pin cherries, service berries, apples, etc)…. During autumn, bears seek forest

stands providing hard mast (oak and beech nuts)…. Access to abundant berry and nut supplies is particularly important as bears must eat enough high-quality food to allow them to build up the large fat reserves that they need to survive the winter."

With respect to housing development, OMNRF 2014 states: "Roads, buildings, and construction of other structures may destroy the function of a unique feeding area. While roads in the development are likely to increase mortality for deer (due to collisions), bears tend to avoid areas within 100 m of major roads (Howe et al. 2007). If significant food resources remain distributed around the structures, bears will continue to come to the site. If the structures are not inhabited when bears are using the unique feeding area, the effects may be minor. Any time humans and bears are brought into contact; bears will be deterred from returning to the site. If this occurs, a significant food source for a local bear population will have been lost resulting in the reduction of the area's carrying capacity for bears (Howe et al. 2007).

"Fragmentation of habitat by development may also reduce carrying capacity for bears and this has the potential to cause local extirpations in small or isolated populations (Howe et al. 2007). A reduced food supply will force bears to seek alternate food sources, which again may result in conflicts with humans. In some cases, bears become habituated to humans and these bears may become destructive or dangerous (OMNR 2007a). Forest clearing and excavation can result in the permanent loss of [and access to] unique feeding areas like forest openings, blueberry patches, and oak and beech stands, or reduce overall carrying capacity (Howe et al. 2007)."

"Site selection is typically an important component of a successful mitigation strategy. Best practices for site selection should also include consideration of cumulative impacts. For example, planners should account for known impacts in neighbouring developments and the cumulative amount of disturbed/converted habitat relative to the amount of undisturbed habitat (OMNR 2000)…"

"Development-related human activities, both during construction and after completion, will likely disturb wildlife using the habitat, thereby reducing the habitat's ecological function. The best mitigation option is to avoid developing in the habitat...."

It is clear from Provincial guidelines as well as the scientific literature (e.g., Obbard et al. 2010) that Black Bears require large, intact, unfragmented natural areas that meet all their life cycle needs (not just mast-producing forest stands) in order for a population to remain viable, and there is strong evidence that the SON Territory bear population is already at the tipping point and likely to disappear without appropriate land management and conservation measures.

D) CONCLUSIONS

In this reviewer's opinion, based on the information provided in the EIS as well as additional research, publicly-accessible verified natural heritage data, and this reviewer's experience in

and knowledge of the area, it would not be possible to construct a 62-unit subdivision of detached homes at this location within forest interior habitat within a Significant Woodland in southern Bruce County without having significant, unmitigable negative impacts on many key significant ecological features and functions, including features and functions of particular importance to SON.

E) RECOMMENDATIONS

The following recommendations are made to address concerns with the proposed project based on the available information:

Key Recommendation

- The subdivision development as proposed should not be approved.

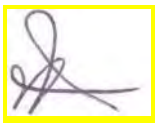
Secondary Recommendations

- Proponent to respond to terrestrial ecology concerns discussed in this technical review, above.
- Proponent to respond to the comments and questions in the Detailed Comments Table.
- Proponent may wish to consider designing a much smaller development (e.g., of one to three homes) adjacent to or within 100 m of Victoria Street. If a much smaller development along the western edge the property is considered:
    - Proponent to conduct nightjar surveys according to standard survey protocols to determine the status of Eastern Whip-poor-will in the study area during breeding season. If it is determined that this Threatened species is or may be present, proponent to assess potential impacts and propose appropriate mitigations.
    - Proponent to assess the status of Red-headed Woodpecker in the study area during the breeding season. If it is determined that this Endangered species is or may be present, proponent to assess potential impacts and propose appropriate mitigations.
    - Proponent to conduct thorough assessment and surveys according to standard protocols to determine whether highly-sensitive Endangered turtle species are present in the 390 ha natural area within which the Site is situated. If it is determined that this Endangered species may be present, proponent to assess potential impacts and propose appropriate mitigations.
    - Proponent to undertake surveys to determine the status of Black Bear within natural area within which the Site is situated, assess potential impacts to Black Bear, and propose appropriate mitigations.
- Any new development proposed in the area would require ongoing consultation with SON.

Appendix 1: Terrestrial Ecology Technical Review

Miigwetch for the opportunity to prepare this technical review on behalf of Saugeen Ojibway Nation.

Sincerely,



Jarmo Jalava

Detailed Review Comments

Page #	EIS Text	SON comment / question	Proponent response
8	Kathy Doge, Biologist at the Owen Sound office of the Midhurst District MNRF. Ms. Doge outlined…	Presumably the EIS is referring to Kathy Dodge.	
31	According to the SVCA's Watershed Report Card, Bruce County has an overall 20.9% forest cover (SVCA, 2018) and the Lake Fringe Watershed Report Card reports 28.8% forest cover for the Lake Fringe Watershed (SVCA, 2008).	The 20.9% figure almost certainly refers to the SVCA portion of Bruce County, not Bruce County overall (as forest cover is much greater on the Saugeen Peninsula). Please confirm that these figures as stated are correct.	

Page #	EIS Text	SON comment / question	Proponent response
32	Within the Municipal OP (2021), Shoreline Residential Uses (subject lands are part of the Lakeshore Plan Area) section D8.5.2.5 it states, "In making their applications, development proponents will be required to retain and protect natural features and as much tree cover as possible. In areas of significant tree cover and not designated Natural Environment, a tree preservation plan shall be required." Therefore, the Municipal OP (2021) implies that development or site alterations can occur within Significant Woodland provided as much tree cover as possible is retained and a supporting Tree Preservation Plan is prepared.	Have the proponent or the authors of the EIS considered that more tree cover could be retained with a smaller project footprint? Or that if development is to occur at all, "retaining as much tree cover as possible" would logically involve the development of only one residential dwelling? How do the proponent and/or the EIS authors define "as much as possible"? Is modification of a site plan to reduce the overall project footprint "impossible"? Is development of only one or two homes at this Site "impossible"?	

Page #	EIS Text	SON comment / question	Proponent response
31-32	"…Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels" (OMMAH, 2020)… The woodland on the Site is part of a 390 ha woodland, that contains approximately 233 ha of interior woodland habitat (based on a 100 m buffer recommended in Natural Heritage Reference Manual [OMNR, 2010]). It is home to a variety of wildlife and plant species, including …area-sensitive species...The majority of the Site is within interior woodland habitat, with the exception of the far west portion of the Site. Interior woodland habitat is associated with SWH, including candidate woodland raptor nesting areas and woodland area-sensitive breeding bird habitat.	The EIS is correct in stating that the Site does not contain (provincially) "rare vegetation communities." However, given that ~75-80% of forest cover has been cleared in southern Bruce County (i.e., south of the Saugeen Peninsula), and the forest at the site is one of five or so remaining larger woodlots in this part of the County, and is one of the very few woodlands with >100 ha of interior forest, would it be reasonable to state that the interior forest habitat at the site is a "very rare" vegetation feature (habitat type) in this geographic area? If so, would it be reasonable to state that the forest interior habitat at the site is therefore highly significant? Is it reasonable to expect planning authorities and regulatory agencies to ensure that there is no further loss of interior forest habitat in southern Bruce County?	

Page #	EIS Text	SON comment / question	Proponent response
37	Lighting: in development of street lighting plans and guidance or conditions for builders, consider strategies to minimize light pollution and 'spillage' of light into the natural areas (i.e., through use of 'Dark-Sky' compliant lighting technologies and minimizing lighting adjacent to buffers / natural areas).	The recommendation of use of 'Dark-Sky' compliant lighting, etc., is laudable, but to "consider strategies to…" do so is not an actual mitigation.	

Page #	EIS Text	SON comment / question	Proponent response
41	The loss of interior habitat will reduce the availability of habitat for area-sensitive species and may decrease local populations in the vicinity of the Site. There is potential for these area-sensitive species to shift their habitats to other locations in the regional landscape; however, the potential for cumulative impacts on a long-term, landscape level must be considered by local municipalities and other planning authorities.	It is important to recognize that prior to European settlement, the vast majority of southern Bruce County was forest, and much of that forest was interior habitat. Forest interior bird species that are locally uncommon to rare were likely common to abundant at the time. With the clearing of 75-80% of the forest for agriculture, and the fragmentation of remaining woodlots by roads, etc., there are now fewer than 10 woodlands containing interior habitat comparable to that of the site, with the woodland within which the Site is situated being one of the five largest remnants (if the MacGregor Point P.P. associated forest tract is considered one unit). While individual forest-interior birds displaced by the proposed development would likely attempt to establish territories and nest at “other locations in the regional landscape,” they would almost certainly be competing for limited resources with birds with established territories at those other sites. The overall loss of interior forest habitat would almost inevitably result in proportional reduction in populations of the displaced species, some of which have likely already greatly declined since the forests were cleared.	

Page #	EIS Text	SON comment / question	Proponent response
42	- Tree protection fencing should be installed between the areas of proposed development and the new treed edge to reduce the potential for physical damage to trees and their root systems. Supports and bracing used to secure the barriers should be installed as close to the tree driplines as possible or beyond, and in a way that minimizes root damage. — Tree protection fencing should be installed before work on the Site begins and inspected regularly to ensure it is performing its intended function. If any section is found to be damaged or non-functional it should be replaced immediately. — The following activities are prohibited beyond the tree protection fencing: storage or stockpiling of materials including fill, topsoil, construction equipment and debris; disposal of liquids; and operation of heavy machinery.	These three mitigations can be stated in one sentence: “Prohibit storage or stockpiling of materials (including fill, topsoil, construction equipment and debris), disposal of liquids, and operation of heavy machinery beyond tree protection fencing (with appropriate bracing) to be installed before work on the Site begins, and to be inspected regularly and repaired as required during construction.” “Tree protection fencing” will not address the primary negative impacts of the proposed development, which are: 1) The significant loss of tree cover in the core of the Significant Woodland; 2) The reduction in extent and the fragmentation of forest interior habitat.	
42	— Tree removal should conform to local, municipal, or regional by-laws, and should be performed by properly trained and accredited individuals.	Conforming to local, municipal and regional by-laws is not a mitigation.	

Page #	EIS Text	SON comment / question	Proponent response
42	— To limit disturbance to the local birds, vegetation removal should be limited during their most vulnerable period, i.e., the breeding bird season also including breeding raptors (March 1 to August 31), unless a survey by a qualified biologist confirms that there are no active nests within the vegetation to be removed.	This is not a mitigation. This is the law. The Migratory Birds Convention Act, established in 1917 and updated in June 1994, contains regulations to protect migratory birds, their eggs, and their nests. Implementation guidance for the Act includes the regional timing windows noted in the EIS.	
42	— To limit stress to trees retained around the perimeter of the development and along the new treed edge, a forest edge management plan is recommended.	This mitigation will not significantly address the primary negative impacts of the proposed development, which are: 1) The significant loss of tree cover in the core of the Significant Woodland; 2) The reduction in extent and the fragmentation of forest interior habitat.	

Page #	EIS Text	SON comment / question	Proponent response
42	— Compensation for woodland removal should be negotiated with the Municipality and/or SVCA if there is limited room on the Site to accommodate plantings.	This mitigation recommendation needs to be clarified. What is meant by “plantings”? Is the EIS referring to Butternut “plantings”, or compensation for woodland removal (which is mostly forest interior habitat)? Compensation for loss of (relatively-mature) interior forest habitat is not realistic given the timeframes that would be involved (>80-100 years for maple, beech forest to re-establish) and the likely limited availability of potential sites immediately adjacent to existing woodland (adjacency would be necessary to expand forest interior extent).	
42	Tree removal should take place at minimum one season prior to construction activities taking place in the vicinity of the new treed edge. This will ensure the new edge has been ‘pre-stressed’ before construction activities begin.	This mitigation will not significantly address the primary negative impacts of the proposed development, which are: 5) The significant loss of tree cover in the core of the Significant Woodland; 6) The reduction in extent and the fragmentation of forest interior habitat.	

Appendix 1: Terrestrial Ecology Technical Review

Page #	EIS Text	SON comment / question	Proponent response
42	Tree protection fencing should be employed between the areas of proposed development and the new forest boundary to reduce the potential physical damage of trees and their root systems within this area. Tree protection fencing should be installed before work on the Site begins, and removed after the threat of damage to trees and roots has ceased.	Why is this mitigation stated twice?	
46	If a SAR bat, possible SAR bat or other roosting bat species is encountered in the work area, all activities that could potentially harm the animal will cease immediately. An MECP SAR Biologist will be contacted for direction.	The EIS has assessed that candidate bat maternity bat roost habitat is present within the Site, including the proposed subdivision footprint. What is the likelihood that construction workers would be on Site when SAR bats that could be harmed are active and detectable (i.e., dusk, dawn and overnight?	
APPENDIX B – Vascular Plants		Black Ash is indicated in the EIS as occurring at the site but is not listed in the Appendix.	

Page #	EIS Text	SON comment / question	Proponent response
APPENDIX B – Vascular Plants	Gray's Sedge *Carex grayi* Long-beaked Sedge *Carex sprengelii*	Gray's Sedge has never been documented in Bruce County (see OSFN 2023). If this identification was correct, this would be a highly significant locally rare species. Similarly, Sedge has never been documented in southern Bruce County (OSFN 2023). Were voucher specimens or photographs taken of these species? If verified as extant, locations of these species occurrences should be mapped and protected.	

Sundance Estates (Monkat) Subdivision Hydrogeological Technical Review

Prepared for:

Saugeen Ojibway Nation Environment Office

Prepared by:

Bill Blackport
Blackport & Associates
Advisor, Hydrogeology, SON Environment Office

Date: February 5, 2024

Re: Proposed Residential Development

This memo assesses the hydrogeology/hydrology factors related to the proposed development.

1. Technical Review Background

Reviewed Documents Provided to the SON Environment Office

- Geotechnical Exploration – Sundance Estates Subdivision, Municipality of Kincardine, Ontario prepared by Golder Associates Ltd. (February 4, 2022).
- Sundance Estates Wetland Evaluation, Part Lots 65 & 66, Concession A, Municipality of Kincardine prepared by GAMAN Consultants Inc. (May 21, 2022).
- Natural Environment Impact Study prepared by AWS Environmental Consulting Ltd. (January 2022).
- Functional Servicing Report, Sundance Estates Subdivision, Part Lots 65 & 66, Concession A, Former Township of Kincardine, Municipality of Kincardine prepared by COBIDE Engineering Inc. (April 2023).
- Preliminary Stormwater Management Report, Sundance Estates Subdivision, Part Lots 65 & 66, Concession A, Former Township of Kincardine, Municipality of Kincardine prepared by COBIDE Engineering Inc. (April 2023).
- Environmental Impact Study Update: 143 Victoria Street, Concession A, Plan 392, Lot 16 and Concession A, Part Lot 65, Geographic Township of Kincardine, Municipality of Kincardine, Bruce County (Sundance Estates) prepared WSP (Feb 14, 2023)
- Planning Report “Sundance Estates” Residential Subdivision, Part Lots 65 and 66, Concession A (including Lot 16, Registered Plan 392), Geographic Township of Kincardine, Municipality of Kincardine, County of Bruce prepared by Ron Davidson Land Use Planning Consultant Inc. (April 10, 2023).

Additional Information Review

In addition to the review of the documents listed above I have reviewed the Terrestrial Ecology Technical Review (January 30, 2024) by Jarmo Jalava, SON terrestrial ecology advisor and reviewed the following information sources:

- MECP Water Well Database Map: Well records | ontario.ca
- Ontario Geological Survey (OGS) Surficial Geology, Karst, Bedrock Topography and Paleozoic Geology Mapping OGSEarth (gov.on.ca)

2. Key Findings

3.

The following are the key findings presented in the above noted reports regarding potential development, site characteristics and water related connections. The site is located on part Lots 65 and 66, Concession A in the former Geographic Township of Kincardine, Municipality of Kincardine, County of Bruce.

The Site is 29.9 ha in size proposed for development will primarily comprise a residential subdivision consisting of 62 detached lots (17.24 ha), Municipal Road Allowances (2.81 ha) and Conservation Lands (9.68 ha) as presented in Figure 1.

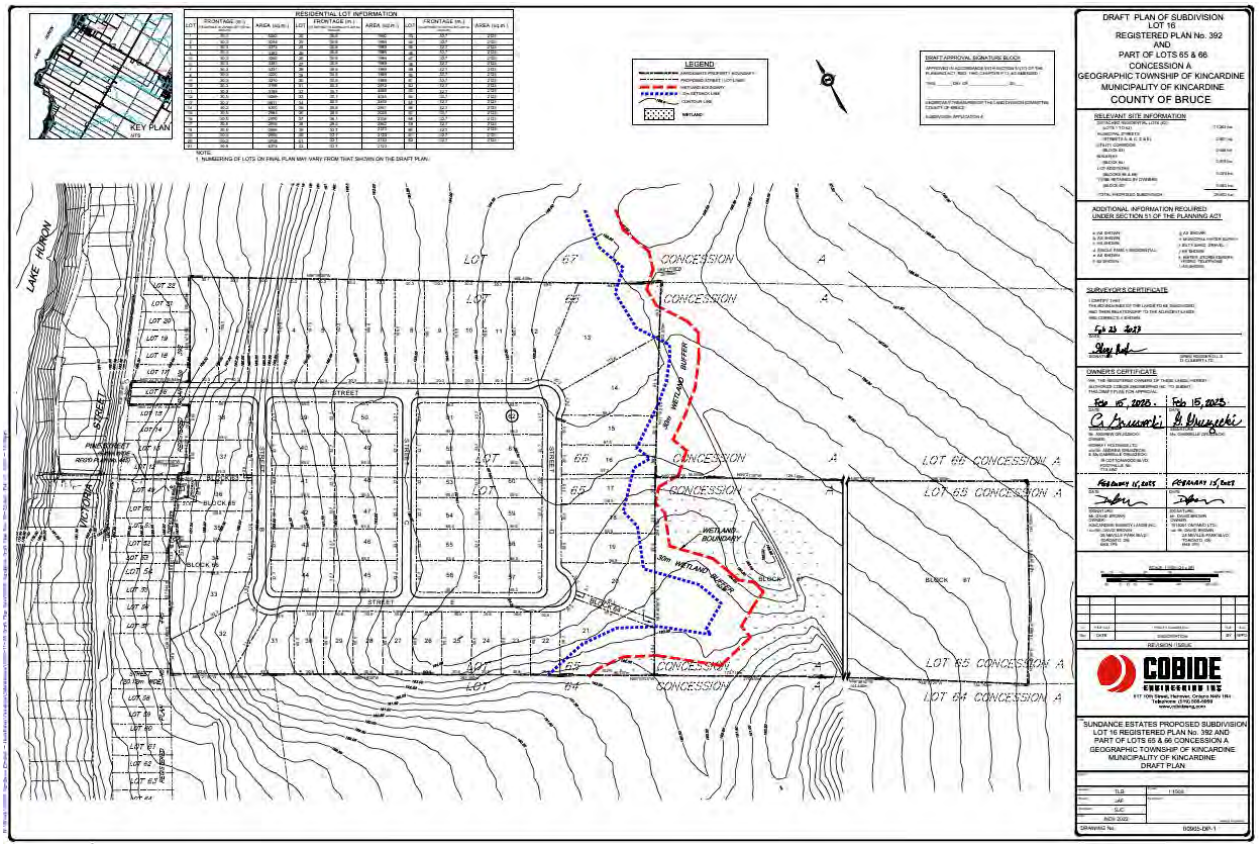


Figure 1 Site Plan

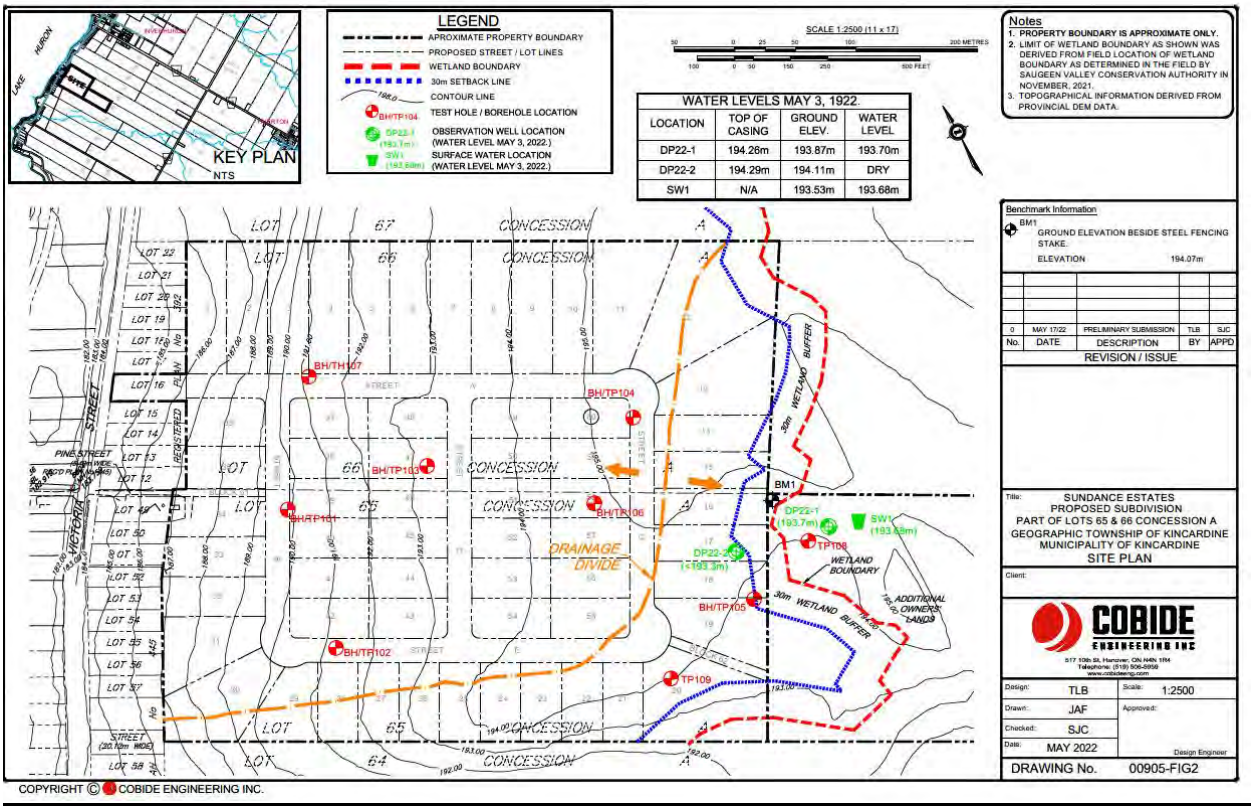


Figure 2 Borehole and Monitoring Well Locations

Geotechnical Report Findings/Documentation

Background Information

It was documented that based on the Ontario Department of Mines (ODM) Preliminary Map P.2314 titled “Quaternary Geology, Chelsea-Tiverton Area, Southern Ontario”, the surficial soils within the development site consist of glacial deposits of sandy silt and clayey silt till with drift thicknesses between 0.6 to 2.4 metres overlying weathered bedrock and that the site is reportedly underlain by Silurian-age dolostone and limestone bedrock of the Guelph Formation.

Field Survey

Field work for the geotechnical study was carried out on December 2, 2021, at which time a total of seven boreholes, designated as BH-101 to BH-107, were advanced within the area of the proposed residential development. In addition, nine test pits, designated as TP-101 to TP-109, were excavated adjacent to the corresponding borehole locations on December 14, 2021 to further evaluate the bedrock and overburden materials encountered in the boreholes. TP-108 and TP-109 were advanced at two locations that were previously inaccessible by the drill rig. The locations of the boreholes and test pits are presented on Figure 2.

The subsurface soil conditions encountered in the boreholes and test pits generally consisted of surficial topsoil overlying strata of silty sand and gravel, gravelly sandy silt, and weathered bedrock.

Layers of silty sand and gravel and silty sand were encountered beneath the surficial topsoil in BH-104/TP-104 and TP-108. The silty sand and gravel layers were about 0.3 to 0.6 m thick TP-108 was terminated in a layer of silty sand at a depth of about 3.0 m.

Layers of gravelly sandy silt were encountered beneath the surficial topsoil in BH-102/TP-102, BH-103/TP-103, and TP-109 and ranged from 0.3 to 0.7 m in thickness.

Weathered bedrock was encountered in all of the boreholes and test pits, excluding TP-108. The weathered bedrock was encountered beneath the surficial topsoil in BH-101/TP-101, BH-105/TP-105, BH-106/TP-106, and BH-107/TP-107. The weathered bedrock was overlain by layers of the gravelly sandy silt and silty sand and gravel material in BH-102/TP-102, BH-103/TP-103, BH-104/TP-104, and TP-109.

Groundwater was encountered during drilling of BH-101, BH-102, BH-103, and BH-107 at depths ranging from about 0.6 to 1.5 m below the existing ground surface at the time of the exploration. Groundwater was not encountered in BH-104, BH-105, and BH-106.

All of the test pits remained free of groundwater during, and on completion of, excavation.

Groundwater conditions at the site should be expected to fluctuate seasonally and in response to significant precipitation and snowmelt events as well as changes in surface grades and drainage conditions over time.

Wetland Evaluation Report Findings/Documentation

Background Information

The study area and site are located within the Huron Fringe physiographic region The site is located on bedrock drift with little to no overburden. Till deposits are dominant east of the site.

Ground surface contours at the Site are shown on the Draft Plan, Figure 2. The elevation of the site ranges from about 190 to 196 masl. Within the development area of the site, topography dips to the west at about 2.6% between the stormwater pond and Lot 8. There is a local topographic divide shown on Figure 2 in the vicinity of Lots 8 to 15 west of the wetland. Components of runoff from this local divide drains (i) east towards the wetland, (ii) west towards the lake and (iii) south from about Street “E”. The divide appears to be influenced by bedrock topography

The water well record database and geotechnical boreholes drilled at the site were reviewed. It is interpreted that the bedrock aquifer is the main hydrostratigraphic unit within the study area. Static water levels in drilled wells presented in the water well record database confirm the water table is within the bedrock. This differs with the surrounding area because bedrock is close to or is present at ground surface. The geotechnical borehole logs reviewed consistently showed a veneer of silty sand and gravel to gravelly, sandy silt overlying fractured bedrock.

The site is located adjacent to the shoreline of Lake Huron and it follows that shallow groundwater movement should be from east to west towards the lake at the regional scale.

A water balance was carried out and it was determined that the infiltration factor for this site is estimated at 0.45. The infiltration rate associated for the site is the product of the infiltration factor (0.45) and the water surplus (505 mm/yr.) and results in 227 mm/yr./ha.

Field Survey

Standpipes designated DP22-1 and DP22-2 were installed on the east side of the property. A surface water monitoring location designated SW1 was established within the drainage feature of the wetland where surface flow was present. The locations of the standpipes and SW1 are shown in Figure 2. DP22-1 was installed 0.6 metres below ground surface (mbgs) and DP22-2 was installed 0.81 mbgs.

Groundwater levels were monitored on April 20 and May 3, 2022. Drive point DP22-1 was installed beside SW1. Water levels on two occasions show surface water levels in the small watercourse feature of the wetland are about the same elevation as groundwater levels at DP22-1. Groundwater was not present at DP22-2 and would be below the base of the monitor at 193.3 masl; this is more than 0.4 metres below the surface water levels at SW1. The absence of groundwater at DP22-2 is consistent with the dry boreholes BH104, BH105 and BH106 documented in December 2021 by Golder. This confirms groundwater elevations beneath the proposed development lots are lower than the wetland surface water elevations. Ground surfaces at DP22-1 and DP22-2 are about 0.35 to 0.6 metres higher than surface water levels at SW1.

Interpretation

The measured water levels and ground surface elevations provide evidence showing the wetland is sustained by runoff between DP22-2 and the wetland. There could be groundwater and surface water contributions east of the wetland and this area is outside of the proposed development boundary.

Groundwater and surface water monitoring data confirm water levels in the small water course within the wetland at SW1 are higher than groundwater levels within the proposed development area of the site. Ground surface is higher at DP22-2 than the wetland so there is evidence of a component of runoff draining east towards the wetland as shown in Figure 2. DP22-2 is located at the wetland buffer, east of the local drainage divide. The development lots are situated west of the divide. Groundwater in the development area is present at elevations below the surface water levels in the wetland development. There is unlikely to be an adverse effect to the wetland from this development. The proposed wetland buffer provides sufficient setback for hydrogeological purposes at the site and no mitigation is needed.

Stormwater Management Report Findings/Documentation

The following is a summary of the various stormwater management report findings relevant to my groundwater/surface water functional assessment review.

A majority of the internal subdivision grading design will direct stormwater from the proposed lots to the subdivision streets using side yard swales.

The proposed grading of the development is intended to follow the existing topography of the property. Proposed grades will match the existing grades around the perimeter of the property. Existing drainage patterns onto adjacent properties will be maintained. (See Figures 3 and 4)

The post development peak flow will be greater than the pre-development peak flow at DPs #1 and #2. This increase is not expected to have any negative downstream impact on adjacent properties.

The post development peak flow will be less than the pre-development peak flow at DPs #3, #4 and #5. These discharge points drain directly onto the adjacent properties located to the south and west of the subdivision property. Since the post development peak flow will be less than the pre-development flow, there will no negative impact on the adjacent properties from the proposed subdivision development.

‘Enhanced’ stormwater quality control will be provided by a treatment train approach which will include lot level control, conveyance control and ‘end-of-pipe’ control measures.

Lot level control will be provided by directing most impervious areas not directly connected to the municipal storm sewer system, over vegetated areas and directing all rear yard drainage to grass swales prior to discharging into the proposed storm sewer system.

End-of-pipe control will be provided by an Oil Grit Separator.

Since the subdivision will have a direct connection to the lake, a stormwater management pond will not be required. An oil grit separator will be installed to provide water quality treatment of the stormwater prior to discharging into the lake.

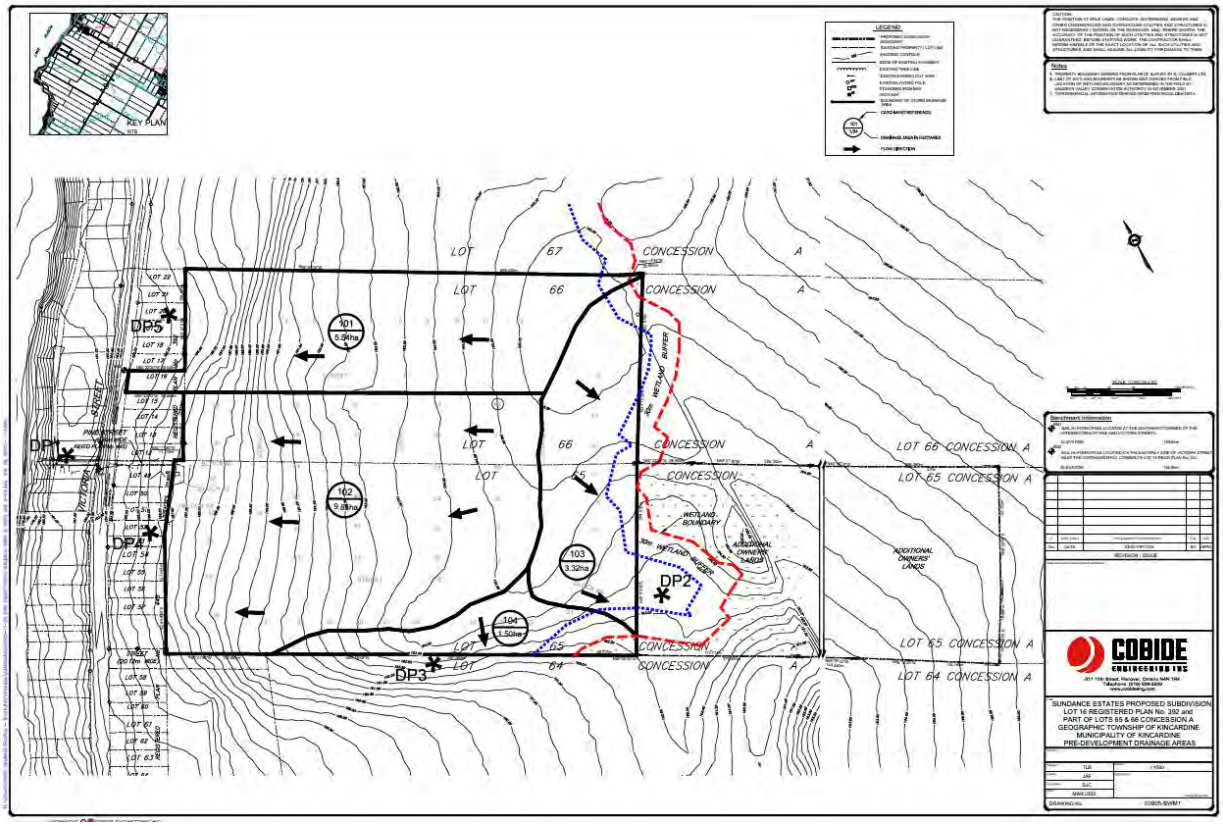


Figure 3 Pre-Development Drainage Areas

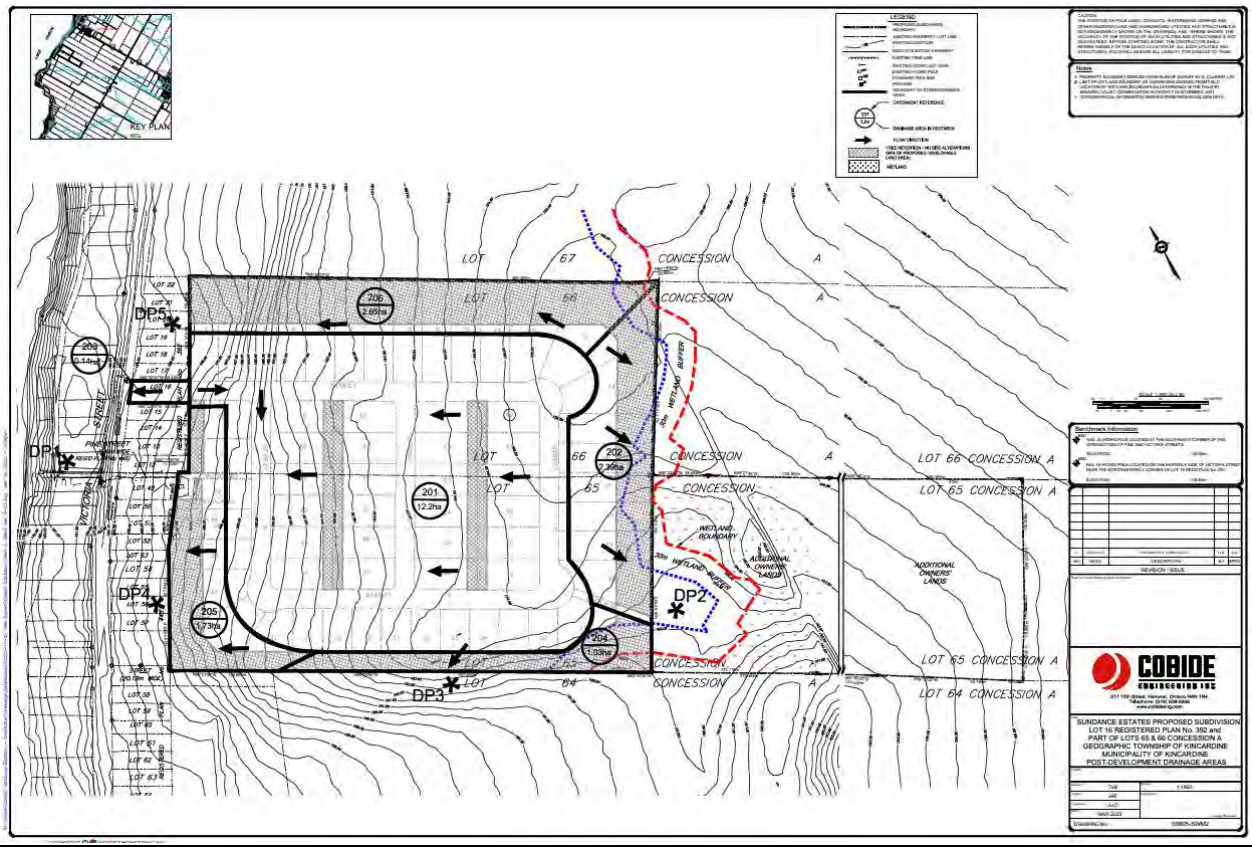


Figure 4 Post Development Drainage Areas

Functional Servicing Report Findings/Documentation

The proposed subdivision will be serviced with municipal water. A new 200 mm diameter PVC watermain will connect to the existing 300 mm watermain located on Victoria Street at the proposed new intersection.

Sanitary servicing considered 4 options:

Option 1 includes constructing a new gravity sanitary sewer system within the subdivision and connecting it by gravity to the closest municipal sewage collection system which is located in Tiverton but topographically was not feasible.

Option 2 is similar to Option 1 in that a new gravity sanitary sewer collection system will be constructed within the subdivision. The only difference is that the collection system will discharge into a sewage pumping station located on the west side of the subdivision near the entrance. Sewage from the new pumping station will then be conveyed approximately 1400 m north along Victoria Street via a new forcemain that will connect to the existing 200 mm dia. forcemain located at the intersection of Albert Street and Bruce County Road 15 in Inverhuron. The estimated cost of Option 2 is $6,749,000. This is equivalent to $108,855 for each lot.

Option 3 would be comprised of a communal on-site sewage system. The construction of this type of system would still require the installation of a gravity sanitary sewage collection system that would direct sewage to the centralized system. The treatment component of the system would be located on the west side of the development. The disposal portion of the system consisting of a subsurface dispersal bed would be located on the east side of the site in order to assist in the system meeting the MECP's Reasonable Use Criteria (ie. Effluent Nitrate Concentration > 2.5

mg/L). This would require the subdivision to be reconfigured to accommodate the construction of the bed. Based on preliminary calculations, the number of lots in the subdivision would have to be reduced to approximately 50 lots in order to accommodate the required dispersal bed. In addition, the MECP will likely require a Groundwater and Surface Water Monitoring Program to be set-up to ensure the system is functioning properly. In discussions with the Municipality of Kincardine, they have confirmed that they would not be in favour of this servicing option due to the need to assume an additional treatment system. The municipality's preferred option would be either individual on-site sewage systems or collection and pumping sewage to one of their existing treatment facilities.

Option 4 involves constructing individual on-site sewage treatment and disposal systems on each lot within the subdivision. For this option to be feasible though, the MECP's D-5-4 Procedure would first need to be completed to confirm if 62 lots are capable of being serviced by an on-site system. Assuming this option is feasible, the following summarizes the average installed costs for a conventional and tertiary treatment sewage system:

- Conventional Class 4 Sewage System $25,000 (Average)
- Tertiary Sewage Treatment System $35,000 (Average)

The estimated cost per lot for Option 4 therefore ranges from $25,000 to $35,000 per lot for servicing 62 lots in the subdivision. Based on a review of the above four options, the preferred sewage servicing option is to install individual on-site sewage treatment and disposal systems on each lot within the proposed development. This option will cost approximately $74,600 to $84,600 less per lot compared to Option 2.

Nitrate Dilution Calculations

Nitrate dilution calculations were carried out for both conventional class 4 sewage systems with an effluent concentration of 40 mg/l nitrate as N, and individual tertiary treatment sewage systems with an effluent concentration 20 mg/l nitrate as N. The calculations in this report utilized an infiltration factor 0.7. The surface area available for infiltration accounted for a 45% impervious factor for the gross area of 29.9 ha.

The respective groundwater down gradient flow boundary calculations for nitrate concentrations are 9.65 mg/l as N and 4.86 mg/l as N

A groundwater monitoring program is proposed specifically related to the existing downgradient water wells along Victoria Street.

EIS Report Water Related Findings/Documentation

The site was visited by the EIS consultants for wetland delineation on October 27, 2021 and aquatic habitat mapping on May 9, 2022.

The White Cedar Hardwood Organic Mixed Swamp (SWM4-1) community is situated to the east of FOD5 and includes the majority of the eastern third of the Site. An unmapped watercourse traversed the Site from north to south within this community and appeared to drain into a pond on the adjacent lot to the south.

An Organic Deciduous Thicket Swamp (SWT3) community was found within the White Cedar Hardwood Organic Mixed Swamp in the southeastern portion of the Site. It is approximately 0.5 ha in size, and is located around the watercourse that cuts through the Site and drains into a pond on the lot located to the south.

The Fresh-Moist White Cedar Coniferous Forest Type (FOC4-1) is in the eastern portion of the Site and is surrounded by SWM4-1 (Unit 4)

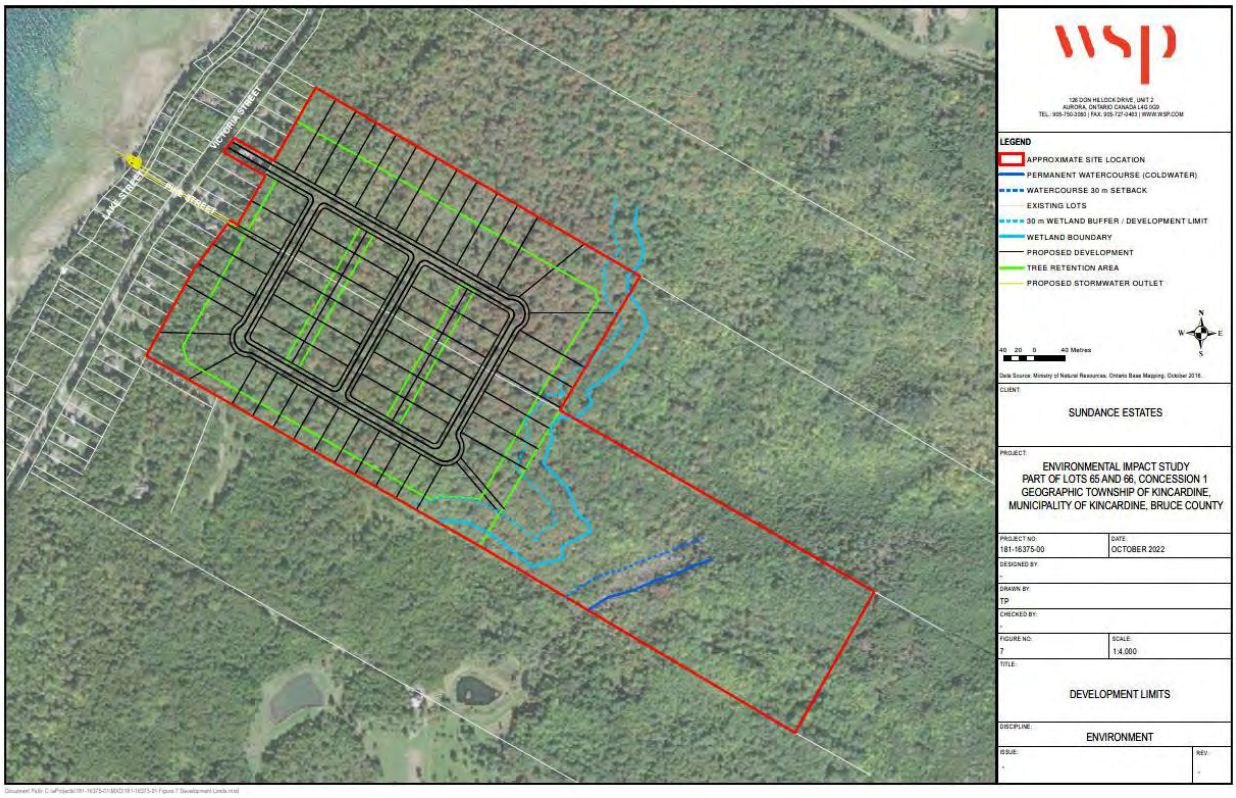


Figure 5 Wetland Limits and Permanent Watercourse

On May 9, 2022, the aquatic habitat in the Tributary of Tiverton Creek was investigated. The tributary is a permanent coldwater watercourse that originates as drainage from a swampy area located approximately 160 m southeast of the development lot. It flows as a defined channel for 300 m through woodlands and wetlands before outletting into a series of two online ponds. The substrate consists of detritus (50%), silt (40%) and sand (10%). There is evidence of groundwater contributions (iron staining, oily sheen and seepage) to the creek. The tributary outlets into Tiverton Creek approximately 500 m downstream of the Site.

4. Assessment and Discussion

Hydrogeologic Setting

The regional and site specific geological and stratigraphic characterization presented in the supporting documents generally confirms the overall characterization presented in the Ontario Geological Survey mapping related to overburden type, thickness and bedrock type. The number of boreholes and test pits is sufficient to provide the site-specific general characteristics. As noted in the geotechnical report site conditions may vary between existing locations.

The significant stratigraphic characteristics, presented in the reporting, as they relate to developing a conceptual hydrogeologic flow model include:

- The thin nature of the overburden in the proposed lot development area which is 0.3 m to 1.2 m thick with 0.6 m being the most common,
- The overburden is thicker, up to 3 m, within the wetland,
- The permeable gravelly, silty sand nature of the overburden,
- The consistent broken or fractured nature of the shallow bedrock.

A major bedrock characteristic which was not noted in the reporting is that the overall development is within a "known karst" area. The boundary of this area (red line Figure 6) encompasses the majority of the larger scale forested area. Characteristics, as documented by the OGS, may include karren, cave types and associated precipitates, sinkholes and disappearing streams. It is recognized that these are general features of karstic areas and may spatially vary. Given the shallow overburden and the limestone/sandy limestone nature of the bedrock, karstic features may be present. It should also be noted that the geotechnical reporting classified the bedrock as the Guelph Formation but is actually the Lucas Formation of the Detroit River Group.

The adjacent stratigraphic setting to the east was not presented in the reporting. Water well records indicate a greater thickness of overburden overlying the bedrock. This overburden can be up to 25 m thick consisting primarily of less permeable clay but appears to have extensive inclusions of permeable gravel layers or lenses.

The geotechnical reporting indicates that groundwater was encountered depths of 0.6 – 1.5 mbgs in a number of boreholes on the west side of the site and that other geotechnical monitoring sites were dry as measured on December 2, 2021. The wetland evaluation report water level measurements indicated that groundwater levels were greater than 0.8 mbgs just outside the wetland boundary and 0.17 mbgs adjacent to the surface water station. In both cases the groundwater level measurements were below the surface level. Measurements were collected on April 20 and May 3, 2022.

Although the existing water level observations were collected in 2 different seasons the number of measurements is limiting when confirming longer term seasonal high-water levels. In addition, aside from the 2 drive point piezometers related to the wetland lot specific development water levels have not been obtained from dedicated monitoring wells. It is noted that the installation of monitoring wells may be challenging due to the stratigraphy.

The reporting presents that the aquifer is within the underlying bedrock and that the water table was within this bedrock aquifer. The water table depth was not interpreted in the reporting. My review of the MECP water well records confirm the bedrock aquifer is the major water supply source with well depths in the range of 20 – 40 m. Given the bedrock wells are open holes with water contributed from various zones one cannot completely rely on the static water levels, as reported on the well records, to represent the actual water table. A review of the well records also indicates shale inclusions within the limestone/dolostone bedrock.

The reporting indicates the general groundwater flow will be from east to west following the topography. My review of the OGS bedrock topography indicates a bedrock ridge to the east of the site which appears to generally coincide with the surficial topography.

I would provide the following hydrogeological interpretation based on a review of the existing observations within the reports and my review of additional information sources:

- A 20 – 40 m thick bedrock aquifer exists within and adjacent to the site and is the major source for the domestic water supply.
- A shallow seasonal groundwater flow zone occurs within the thin overburden and fractured bedrock which "may" include epi-karstic conditions and possible conduit flow. This shallow groundwater flow zone sits on top of a more massive limestone bedrock unit.

- The shallow groundwater flow within the proposed lot development area would likely follow the pre-development drainage area as shown in Figure 3.
- Groundwater flow from the east likely occurs within the shallow bedrock but may include lateral flow within the overburden where there are more permeable gravel layers or lenses.
- Groundwater contributes significantly to the permanent water course with the majority following the east to west groundwater flow system.
- Surface water and groundwater seasonally contribute to the wetland with the majority following both east to west surface water and groundwater flow systems.
- It is expected that relatively significant amounts of infiltration and hence recharge to the shallow groundwater flow system occur onsite.
- Based on the shallow flow system characteristics this hydrogeological setting would be considered sensitive with respect to potential groundwater receptor connections.

Functional Servicing Assessment

Relatively detailed options for both sanitary and water servicing were presented.

Utilizing private lot specific drilled water wells was not presented but the ability to hook up with municipal water is appropriate.

It is noted that **"the municipality's (Kincardine) preferred option would be either individual on-site sewage systems or collection and pumping sewage to one of their existing treatment facilities".** The decision by the proponent to choose individual onsite sewage systems, as reported, appears to be based primarily on cost.

There is no mention of the potential need for raised beds given the thickness of the overburden, and the fractured nature of the bedrock. The removal of a majority of the forested area along with the redistribution of the associated soils may further reduce the overburden thickness in many areas. My assessment that the seasonal high-water table should still be determined adds to the potential need to clarify the potential need for raised beds in the final design. In addition, the use of municipal water may lead to higher levels of water use and the infiltration of stormwater through passive infiltration techniques may add to the groundwater level. Under various circumstances the increase in recharge would be beneficial to maintain the groundwater balance but it may over compensate with respect to lot specific groundwater levels related to septic system design.

To satisfy the MECP requirements a nitrate dilution calculation was carried out as outlined in the D-5-4 Guideline, Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment. It should be noted that the infiltration rates were not consistent between the geotechnical report (0.45) and the wetland evaluation (0.45). In either case, where tertiary treatment has been applied, the dilution calculation at the site boundary would have met the MECP requirements.

Given that the OGS Karst mapping singles out this area (Figure 6) I would bring attention to the following wording in the D-5-4 Guideline:

The groundwater impact assessment will address the ability of the lands, identified by and restricted to the development proposal document, to treat sewage effluent to meet acceptable limits. This assessment, and the assessment described in the "Technical Guideline for Private Wells: Water Supply Assessment", should be completed and submitted together as one document. Approval Authorities (i.e. the Ministry of Municipal Affairs and/or designate) should

only consider support for development applications involving individual on-site sewage systems where the proponent and/or the consultant has:

- *demonstrated that the area is not obviously hydrogeologically sensitive (for example, karstic areas, areas of fractured bedrock exposed at surface, areas of thin soil cover, or areas of highly permeable soils).*

It is not the intent of MOEE to promote the development of areas with high infiltration rates (for example, sandy overburden deposits). Due to lack of effective effluent treatment, proposed development on individual on-site systems should not be approved in soils which have high infiltration rates.

The D-5-4 Guideline focuses primarily on drinking water supplies but can also be considered in the context of groundwater surface water connections.

With respect to the County Bruce Official Plan and the OGS Karst mapping:

Section 4.3.2.11 Karst
The Bruce-Grey Regional Groundwater Study identifies areas of karst topography. This mapping is at a regional scale and therefore all areas may not be adequately shown. Development or site alteration in areas having karst topography shall not proceed in the absence of a detailed evaluation. The evaluation shall investigate the potential threat of the proposed development or site alteration on groundwater resources and shall be completed by an individual who specializes in karst topography. Development shall be prohibited unless it can be shown that these threats can be overcome through mitigation resources.

The proponent has recommended tertiary treatment to improve effluent quality as well as provide for a groundwater monitoring program in various downgradient domestic wells. These measures support mitigation of the greater potential for water quality impacts within the thin overburden and fractured nature of the shallow groundwater flow system. The potential karstic nature of the site raises the level of risk for water quality impacts.

As a minimum, these concerns relating thin cover, fractured rock at ground surface and karst should be addressed in technical detail by the proponent and reviewed by the appropriate regulatory authorities.

Stormwater Management

Aside from the current concerns with respect to the hydrogeological sensitivity noted above the stormwater management presented for the proposed development is found to be generally appropriate related to maintaining the pre development drainage areas. Any removal of forest cover and redistribution of soil cover should be carefully addressed to maintain the eastern topographic divide.

Aside from the current concerns with respect to the hydrogeological sensitivity noted above the stormwater quality management approach presented should provide for an acceptable level of protection.

Given the potential for interception of shallow groundwater flow by subsurface infrastructure appropriate management should be proposed to minimize short circuiting of potentially contaminated groundwater.

5. Outstanding Concerns

None other than those related to the hydrogeological sensitivity and understanding of the shallow groundwater flow system.

6. Information / Knowledge Gaps

An understanding and quantification of the temporal groundwater levels within the lot development area would be necessary for the assessment of septic system design related to the tile bed as well as the potential interception of groundwater flow within the installed subsurface infrastructure.

A detailed understanding of the fractured and potentially karstic nature of the bedrock should be completed.

7. Conclusions

Based on my assessment of the available hydrogeologic information I would interpret the site to be hydrogeologically sensitive particularly as it relates to the thin overburden and fractured bedrock and potentially karstic nature of the bedrock. Although it can be presented that enhanced tertiary treatment would further meet the MECP nitrate dilution guidelines as well as reduce overall nutrient loading there would be no additional, significant subsurface treatment at this site.

The recommended tertiary septic treatment and the proposed groundwater monitoring program are generally appropriate measures for mitigation and to assess the potential groundwater quality impacts within the thin overburden and fractured nature of the shallow groundwater flow system. The potential karstic nature of the site raises the level of risk for groundwater quality impacts particularly given the extent of development.

The potential water quality impacts related to stormwater infiltration and septic effluent must be assessed as they relate to the hydrogeologic sensitivity.

On balance, when the current hydrogeological sensitivity, including the potential karstic nature of site is combined with the ecological impacts as presented in the terrestrial review then this level of development on this specific site would not be appropriate.

8. Recommendations

<u>Key Recommendations</u>

The proposed 62 unit subdivision proposed on individual private sewage systems should not be developed without a more detailed hydrogeological assessment particularly focused on a karst characterization and related groundwater quality impact assessment.

Secondary Recommendations

Conduct additional site-specific groundwater level monitoring to confirm the temporal shallow groundwater level trends.

Regards

Bill Blackport
Advisor, Hydrogeology, Saugeen Ojibway Nation Environment Office

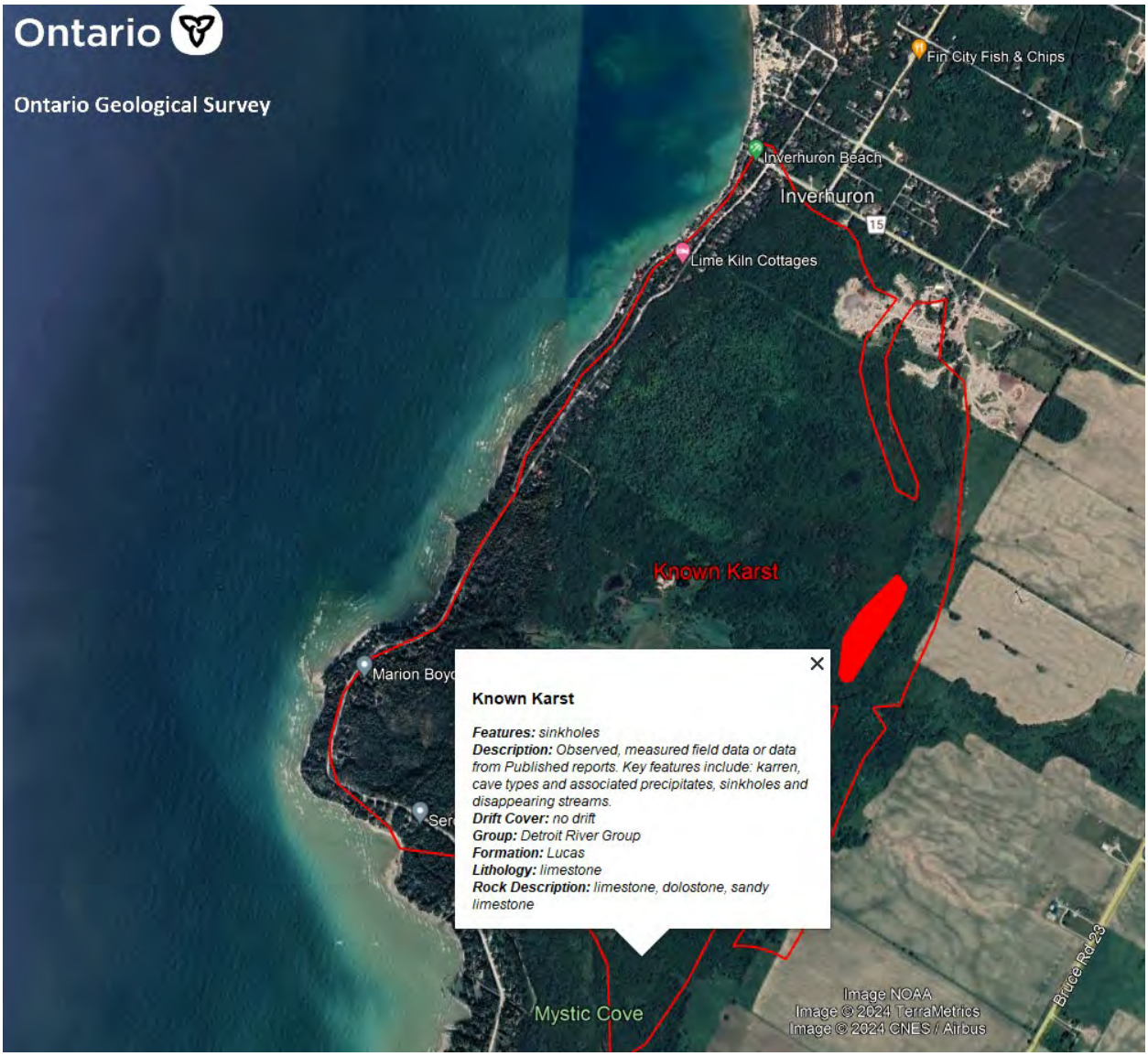


Figure 6 Known Karst