

Aug 24, 2022

To:

Honourable Tim Houston, Premier of Nova Scotia
Honourable John Lohr, Nova Scotia Minister of Municipal Affairs and Housing,
Honourable Timothy Halman, Nova Scotia Minister of Environment and Climate Change.
Mayor Mike Savage and Halifax Councillors,
Kevin Neatt, Vice President of Planning and Development, Clayton Developments Ltd.

From:

David Patriquin, Professor of Biology, Dalhousie University (retired)
on behalf of the Nova Scotia Wild Flora Society and the Halifax Field Naturalists

An Open Letter in support of William Zebedee's Appeal of Wetland Alteration Approval No 2021-2886385-00 (22-07-29): Can we all take a sober second look at the Southdale Future Growth Node?

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1. Introduction & Summary

Assessment of the environmental implications of the development proposed by Shaw group/Clayton Developments Ltd for the Southdale site appears to have been limited to a LSA (Landscape Suitability Analysis) submitted to HRM by the company. The LSA, now publicly available, [1] is dated "October 2021" yet the wording in the Dec 6, 2021 Staff Report for the Jan 11, 2022 meeting (when the Mayor and Regional Councillors voted unanimously to move ahead with the project) indicates a LSA is required but not that it had been completed and it was not an attachment to the Staff Report or cited otherwise.

On Slide 15 of the HRM presentation on Feb 7, 2022 (Public Information meeting for Case 23830) – We are Here: Planning process Part 1, it is stated that Master Planning process includes a "Detailed review of environmental features, site context". On Slide 26 (section on Presentation by the Landowner) without specific reference to the LSA but presumably based on the LSA, it is stated "Limited environmental constraints were identified, including no species at risk • The large wetland on site is not a wetland of special significance by NSECC". This seems to the entirety of the environmental implications specifically considered by Council, and councillors apparently were never directed to review the LSA; I have confirmed that at least one councillor was not even aware of its existence. Given some significant errors or confusion in wording in the LSA, lack of detail on methods and results of field observations and what one would think are obvious significant omissions (as detailed in this document), one has to wonder if HRM staff reviewed the LSA.

Subsequently this project has moved ahead quickly. Tree clearance began in early August of 2022 without any further discourse concerning the environmental implications of the project. Local resident Bill Zebedee submitted an Appeal of Wetland Alteration Approval No 2021-2886385-00 [2] related to the causeway on 22-07-29; subsequently, direct wetland alteration but not clearing of adjacent woodland was halted pending a review of the appeal.

Protests over the environmental and social impacts of the development have been growing in frequency and participation. Some participants have recently begun to take 'direct action' (non-violent passive resistance), frustrated that sustained, intensive efforts to have the environmental concerns duly considered have been dismissed while at the same time evidence in support of those concerns is growing. Recently, tree-cutting was also halted because of a site incident involving confrontation between tree-cutting machinery operators and protestors, i.e. the situation has become quite heated.

I suggest there are three fundamental questions that need to be addressed, as cited below together with a summary of my related observations and comments detailed in ensuing sections of this document.

(i) Have environmental impacts been given due attention to date? As outlined above, as well as I can determine, they have not procedure-wise, but please review the process. Was the LSA critically reviewed by staff and by NSE? Did HRM Councillors review it?

(ii) Does the Southdale site possess significant 'Ecological Value' (i.e. significant biodiversity features & important Ecological Services). In regard to the woodland (forest), the only pertinent comment in the LSA is that "there are no mapped old forests". I point out that there are government maps indicating presence of Old Forests, I offer informal observations

1. View the Staff Report, the LSA and related HRM documents on the webpage **Case 23820: Southdale Future Growth Node Planning Process** at <https://www.shapeyourcityhalifax.ca/southdale-planning>

2. The Appeal can be viewed at <http://nswildflora.ca/wp-content/uploads/2022/01/Appeal-of-Wetland-Alteration-Approval-NO-2021-2886385-00.pdf>

of old forest features and the presence of certain species, notably old forest birds documented this past spring and summer attests to the biodiversity value of the woodland. The LSA does not consider Ecosystem Services of the woodland, notably water and carbon storage; I offer informal observations suggesting that both are substantial.

In regard to the wetland, the LSA describes it only as a “wetland” and gives the area of the wetland lying within the PIDs of Interest (9.3 ha), but does classify the wetland as to type. My informal observations and a 2020 WESP Report (not cited in the LSA) indicate it is a fen which is a highly valued type of wetland. (Elsewhere, Efforts are being made to restore degraded fens). Fens are peatlands and store a lot of carbon (an “Ecosystem Service”). The WESP report highlights several significant attributes of the wetland not mentioned in the LSA. It is commented in the LSA that no rare flora or fauna were observed during their field reconnaissance, but details of the methodology and detailed results are lacking so it's hard to assess the veracity of the field observations, including the wetland delineation.

No comments are made in the LSA about the possible value of woodland and wetland as wildlife corridors. My informal observation indicate that both the woodland and wetland host very few exotic plant species or individuals, i.e. they are made up almost exclusively of native species. Thus, as well as providing habitat for native species in a highly urbanized landscape, both the wetland and the woodland could be important in providing connectivity across the urban landscape. Viewed on Google Maps, the Southdale site stands out as greenspace in an urban landscape, and must be viewed or sensed by insects and birds, small mammals etc somewhat like a pilot views an airport ...a place to land, feed and take a rest if not stay!

As well, there is set of wetlands along the WAM watercourse (identified on the NS Landscape Map Viewer) extending, with interruptions, from the Southdale site down to Eisner Cove on the coast (the “real Eisner Cove”). It seems likely that the locally applied name 'Eisner Cove Wetland' harks back to a time when that area was part of a larger, more continuous complex of wetlands extending to Eisner Cove. Thus we should really be considering the habitat and connectivity values of the Southdale site in conjunction what is left of that complex (including the adjacent uplands that influence the wetlands) and making efforts to protect as much as possible of what remains.

(iii) Will the destruction of the woodland have any significant impacts on the ecological values of the Southdale site?

Obviously cutting the trees and removal/alteration of the upland soil will completely eliminate the associated ecological values related to biodiversity and carbon storage in the woodland itself. The wetland is not recognized as a fen in the LSA and so the dependence of the fen on the hydrological regime of the steeply sloped (Fig. 1, next page), forested, water-storing upland is simply not addressed. It is inconceivable that removal of the forest and disturbance of the soil, even with the construction of swales etc., would not cause more erratic flows of water into the wetland, with more flooding and more and longer periods of drought. Changes in the hydrological regime, as well as the addition of more roadsalt and nutrients from the developed landscape, will likely have significant effects on whole wetland biodiversity-wise, on carbon storage, on water levels and on microbial activities. Indeed the wetland could well be transformed from a carbon sink to a carbon source. Clearly the possibility of such impacts must be considered.

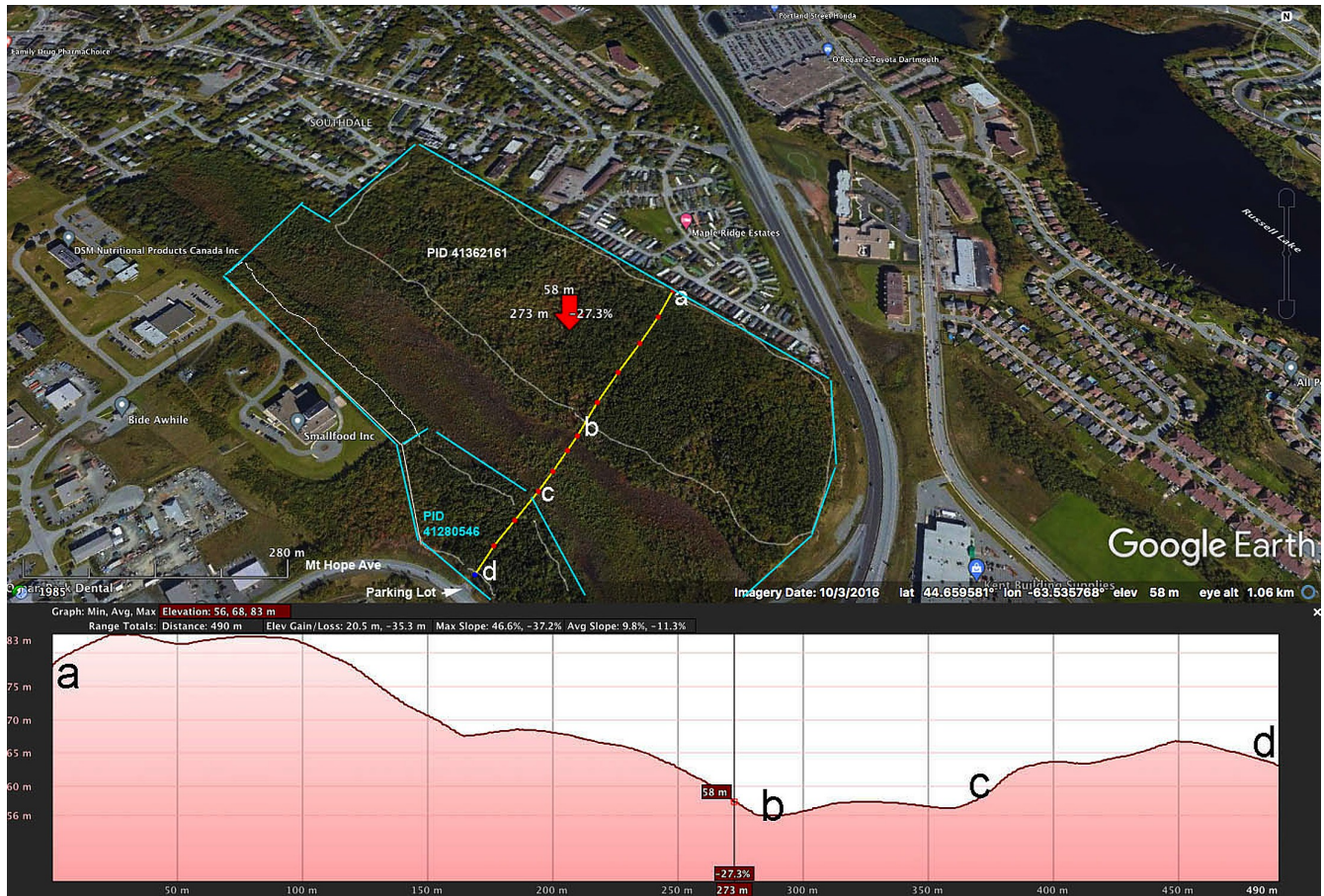


Fig. 1 Elevation profile across Southdale site/Current PIDs of Interest from Google Earth. The profile crosses the wetland approximately where the causeway is planned. The white-enclosed areas are upland forest; the boundaries towards the wetland include a zone, approximately, of closed canopy forest that may qualify as wetland. The blue lines enclose the area of the combined PIDs of Interest including both wetland and woodland, excluding a piece at the southeast extremity. (View a larger version of this figure in the Appendix document).

I think most Nova Scotians want to address both the linked-global-and-local-climate-and-biodiversity crises, and our own housing crisis. The loss of biodiversity and release of carbon from development of the Southdale site might be seen as very small and insignificant in the big picture. However it is through such incremental change that we got to where we, more so in regard to biodiversity than climate change; energy technology has had a lot to do with climate change, but so also has loss of carbon storage and sequestration which has occurred and continues incrementally.

The same could be said about housing; if we simply didn't go ahead with this development, we would be losing circa 800 units, an incremental loss compared to what we need. Currently the Halifax population is increasing by approximately 20000/year; over 10 years, that's equivalent to approximately 50,000 housing units at 4 people per unit.

"Upland development increases stormwater to wetlands, and downstream crossings create flow constrictions. Together these changes lead to **increased ponding, greater water level fluctuation and/or hydrologic drought** in urban wetlands. In addition, urban wetlands receive **greater inputs of sediment, nutrients, chlorides, and other pollutants**; **concentrations in urban stormwater are typically one to two orders of magnitude greater than predevelopment conditions.**"



"Numerous studies describe how urban wetlands respond to these stressors. Although the precise response depends on the sensitivity and landscape position of the wetland, **the general trend is a sharp decline in the diversity of the native plant and animal community and an increase in invasive plant species that can tolerate stressed conditions.** Research has shown that **degraded urban wetlands lose many of their important watershed functions.** The indirect impact of upland development on wetlands is currently not regulated by state or federal agencies."

- T. Wright et al., 2006. **Direct and Indirect Impacts of Urbanization on Wetland Quality Wetlands & Watersheds** Article #1 Prepared for: Office of Wetlands, Oceans and Watersheds U.S. Environmental Protection Agency Washington, DC
<https://www.nrc.gov/docs/ML0915/ML091520194.pdf>

The reality is that we need to address both crises and that we have options to do so. If a sober second look reveals that the environmental impacts are significant and not acceptable and are not compatible with the development as proposed, we are not too late and we will lose the least time-wise at this point by changing course, e.g. by significantly scaling back the development and moving part of it to another site, or by moving the entire development to another site of much lesser ecological value. [3]

If the environmental concerns are misplaced and not justified by a more rigorous examination, at least they will have been properly considered and evidence provided in plain view for all to see.

2. On why the Southdale site was not recognized as an ecologically significant site earlier on

I first became acquainted with the area now identified as the Southdale Future Growth Node in the spring of 2017 when a resident of the area attended a meeting of NS Wild Flora Society and invited members visit the “Eisner Cove Wetlands”. We were not familiar with the area and the first question we asked was “Where is Eisner Cove”? It turns out that the wetland is not very close to the Eisner Cove, although there is likely a good reason historically for this name. To reduce confusion, I refer to the combined undeveloped woodland and the wetland simply as the 'Southdale site'.

We made a field trip to the Southdale site on May 22, 2017 and were astounded by its near pristine state and the exceptional biodiversity and ecological qualities of this patch of green in our urban landscape. We somewhat bewildered that we had not known about the area.[4] I subsequently talked to others in the NS Wild Flora Society, the Halifax Field Naturalists and the NS Bird Society and they also had not been aware of the site.

I recount this because I think it explains in part why the Southdale site was not flagged as ecologically significant early on, particularly in relation to the HGNP (Halifax Green Network Plan). Developed over the period 2014-2018, the HGNP was in its final stages when we made our 'discovery'. As well, because a major block of the Southdale site was owned by a Crown corporation, we and I think local residents did not feel that it was urgent to seek some kind of formal protection for the area. (The land was sold, apparently without public notice, in 2020). Also, It is a relatively small area, not now lying within a complex of wetlands although it did historically. The locally applied name - Eisner (or Eisner's) Cove Wetland - likely harks back to a time when there were substantive, connected wetlands extending both northwest and southeast, the latter to Eisner Cove; some significant patches of wetland still remain in the latter area (see Appendix Figs 7 & 8).

3. It is a widely accepted principle that to minimize the tradeoff between the amount of land required to provide basic human needs (settlement, food production etc) and the amount of land required to maintain critical “ecosystem services” that wherever possible, we conserve lands of high ecological value, develop on lands of low ecological value and restore lands of high ecological that have been degraded. This statement applies well to HRM:

The Northwestern United States is rapidly becoming more human dominated. The population growth and land use intensification is partially due to the high quality natural amenities in the region ... Perhaps counterintuitively, some of the communities that most highly value natural amenities are losing NVC most rapidly. Thus, there is an urgent need to better protect the highest priority remaining natural habitats on private lands. Source: AJ Hansen et al., 2022 **Informing conservation decisions to target private lands of highest ecological value and risk of loss.** In *Ecological Applications* <https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/eap.2612>

Accordingly, both NS Nature Trust and the Nature Conservancy of Canada, the major organizations involved in conservation of private lands, require that lands they protect have high ecological value.

4. View Field Trip Report at <http://nswildflora.ca/comment/eisners-cove-wetland/field-trip-22may2017-notes/>. View related documents related to the Southdale Land compiled by NSWFS at <http://nswildflora.ca/comment/eisners-cove-wetland/>

Many naturalists contributed to the development of the HGNP and I am convinced that if the naturalist community had been familiar with this area early on, we would have recognized its significance and it would have found its way into the HGNP as a significant habitat and as a wildlife connectivity “stepping stone” [5]. In turn, I think that it was tacitly assumed by Regional Councillors and others including The Press that when concern about the loss of ecological and social values of the area were raised by nearby residents in relation to changes in zoning and possible development, they were regarded largely as NIMBY arguments.

I am only one professional raising these concerns [6]; my observations are based on a dozen or so visits to the area since 2017 as a participant in NS Wild Flora Society field trips or individually; I did not conduct any formal surveys. The area has been visited by other members of the NS Wild Flora Society and by members of the Halifax Field Naturalists and those societies have endorsed my comments (I am a board member of NSWFS, past President of the Halifax Field Naturalists). We simply ask that these comments be considered; do they appear to be sufficiently credible that decision-makers should indeed put a pause the whole process and give the concerns detailed consideration?



5. Stepping Stones, definition in HGNP: “Small natural vegetation patches distributed through altered landscapes. They support habitat, animal movement and natural processes.” View Saura et al., 2013. **Stepping stones are crucial for species' long-distance dispersal and range expansion through habitat networks in** *Journal of Applied Ecology* <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.12179>

6. I retired from Dalhousie University as Professor of Biology in 2008. I conducted research on plant and microbial ecology in marine and terrestrial systems. Since retirement I have been active in several natural history and trail groups in HRM. As a volunteer, I conducted surveys and prepared reports on the ecological values of four areas on the Chebucto Peninsula that were subsequently protected: Five Bridge Lakes Wilderness Area, two adjacent Nature Trust properties, and the Shaw Wilderness Park; I am currently conducting similar surveys of two other areas in HRM.

3. Brief Background to the Zebedee Appeal

On January 11, 2022, the Halifax Regional Council voted unanimously to “Initiate a process to amend the Regional Centre Secondary Planning Strategy and Land Use-By-law to develop site-specific Comprehensive Development District (CDD) policies and an associated development agreement to enable development on the Southdale Future Growth Node site...” [1]

This development, proposed by Clayton Developments (a division of the Shaw group Ltd), would replace most (circa 27 ha) of the forested uplands (circa 30 ha in total) bordering a circa 12 ha near-pristine wetland (9.3 ha within the current “PIDs of interest”) by a high density residential development, while retaining the wetland itself and a minimal buffer zone.

On Feb 7, 2022, a public consultation occurred in which citizens of the area and others expressed significant concerns about the ecological and social impacts of such a development.

On March 22, 2022 Nova Scotia Housing Minister John Lohr designated nine “special planning areas” in the Halifax Regional Municipality, one of which is the Southdale site. The designation allows the Minister to assume authority for development approvals in those areas.

Subsequently, this project has moved rapidly. On Aug 10, 2022, contractors began to remove forest cover down to the wetland in an area where a causeway across the wetland is planned.

On July 29, 2022, Bill Zebedee, a local resident and member of the Protect Eisner Cove Wetland group had submitted a formal Appeal of Wetland Alteration Approval No 2021-2886385-00 to Nova Scotia Environment. It is my understanding that work on the causeway has been halted pending consideration of the appeal but that clearing of forest continued.

Zebedee's appeal is a well written, comprehensive document which can be viewed online [7]

The appeal details grounds for appeal under 5 headings:

3.1 It was unreasonable for the Administrator to approve the wetland alteration when the Administrator was aware that further monitoring will be required to identify indirect alterations that may occur to the wetland.

3.2 It was unreasonable for the Administrator to issue the Approval when it is likely that the area of disruption to the wetland will be equal to or greater than 2 ha.

3.3 It was unreasonable for the Administrator to approve the application as it likely failed to accurately disclose the risk that the proposed undertaking poses to threatened Wood turtles (*Glyptemys insculpta*) and endangered bats known to occur in the area.

3.4 It was unreasonable for the Administrator to approve the application when the applicant and their agents failed to accurately identify the Eisner Cove Wetland as a Wetland of Special Significance.

3.5. It was unreasonable for the Administrator to approve the application on the grounds that the application was incomplete.

My comments in support of Bill Zebedee's appeal pertain to items 3.1, 3.2 & 3.4.

7. Zebedee Appeal: <http://nswildflora.ca/wp-content/uploads/2022/01/Appeal-of-Wetland-Alteration-Approval-NO-2021-2886385-00.pdf>

4. Consideration of Environmental Implications in the LSA (Landscape Suitability Analysis)

Under **Environmental Implications** in the Regional Council Report of Jan 11, 2022 [1] it was written (underlining mine):

Development envisioned by the Regional Centre SMPS Future Growth Node policies is compact and mixed use with access to transit and active transportation facilities. This form of development has the potential to reduce private automobile dependency and encourage walking and cycling to services and amenities thereby reducing greenhouse gas emissions.

There is a large wetland on the subject lands. Policy F-3 requires that a land suitability assessment be undertaken to identify sensitive ecological elements, including wetlands. Wetland protection is a shared responsibility between the Province and the Municipality. Wetland alteration is the jurisdiction of the Province and the municipality regulates development adjacent to watercourses and wetlands. The Regional Plan requires minimum setbacks from wetlands and watercourses. The master neighbourhood planning process will consider additional protections for the on-site wetland.

My understanding is that the Environmental Implications were addressed solely by the LSA (Landscape Suitability Analysis) prepared by Englobe for Clayton Properties in October, 2021 [1, 8] and that the unanimous acceptance of the project by the Mayor and Regional Councillors as not having serious environmental implications was based directly or indirectly on that document.

Technical Studies and Analysis

- Land Suitability Analysis**
 - A desktop evaluation to assess for potential environmental constraints, with field verification for wetlands, watercourses and species at risk.
 - Limited environmental constraints were identified, including no species at risk
 - The large wetland on site is not a wetland of special significance by NSECC
- Archeological Analysis**
 - Assessment included a historic background study and reconnaissance for archaeological resources
 - South of the wetland, the presence of a probable house foundation and outbuilding was discovered.
 - Shovel testing determined that these findings are not cultural in nature. As such, no further archaeological mitigation is recommended.
- Traffic Analysis**
 - Intersection sight distance analysis
 - Trip generation analysis. 199 – 246 trips during peak hours
 - Recommends a crosswalk at Mount Hope Ave. connecting to the existing multi-use path
 - Site generated trips are not expected to have any significant impact to levels of performance on adjacent streets and intersections or to the regional street system.
- Servicing Analysis**
 - Development will be serviced by municipal water & sanitary
 - Proposed water connections at Mount Hope Ave., Baker Drive and Lynn Drive
 - Looping of water systems
 - Sanitary connections at Mount Hope Ave. and Highway 111
 - Study confirmed adequate service capacity

<https://www.youtube.com/watch?v=7QSMmVduEI4>

DARTMOUTH
Southdale Future Growth Node Planning Process - Public Meeting Presentation

85 views Feb 18, 2022 The Southdale Future Growth Node is located at the south-eastern edge of the Regional Centre, in Dartmouth, immediately adjacent to Highway 111 ("Circumferential" ...more

0 Dislike Share Download Save ...

8. The LSA is posted under 'Clayton Developments Proposal' on HRM's Engagement Hub website page Case 23820: Southdale Future Growth Node Planning Process (<https://www.shapeyourcityhalifax.ca/southdale-planning>). The specific URL for the document: https://ehq-production-canada.s3.ca-central-1.amazonaws.com/2b17df49bed523c599bea4b95b85f4068aea3819/original/1651172828/3238848b823955b1d88a372cdee2a748_Clayton_-_Land_Suitability_Analysis_Report_compressed.pdf

The evaluation of the environmental implications of the development focussed on VECs (Valued Ecological Components), the “environmental components of greatest concern”, which is a fairly standard approach in Canadian EAs [10]

The LSA was mostly a desktop evaluation that did not involve new site observations to confirm, refute or refine available information.

Under LSA section 1.2, a “field investigation” is cited, evidently primarily for the purpose of ground-truthing the wetland boundaries – cited under 3.1 - but no details of that process are given, making difficult to judge the veracity of conclusions citing field observations.[11]

The LSA was restricted to the “current area of interest [which] is comprised of two parcels identified as PID Nos. 41362161 and 41280546. The combined parcels cover an area of approximately 36.01 hectares (88.98 acres).”

Comment: The LSA does not refer to or provide estimates of the area of the larger undeveloped forested + wetland area; based on measurements I made on Google Earth, that area is approximately 42 ha including approximately 30 ha of forest and 12 ha of wetland. See Letter Appendix Figs 3&4.

I believe it is anticipated that the entire currently undeveloped forested area will be developed except for perhaps 8 ha that would be retained as parkland (and modified as such). If so, surely some reference to and consideration of the larger undeveloped woodland+wetland area would have been appropriate. What happens in the majority of the area (i.e. in the PIDS of Current Interest, 36 ha) will clearly impact the larger area (42 ha).

10. The VECs cited are Wetlands; Watercourses; Watersheds; Steep Slopes; Forest Cover; Contaminated Sites; Wildlife Habitats and Corridors; Soil and Bedrock; Flood Prone Areas; and Cultural and Heritage Resources. For a discussion of the use, history, limitations of VECs, See Olagunju. 2012. Selecting valued ecosystem components for cumulative effects in federally assessed road infrastructure projects in Canada. Masters thesis University of Saskatchewan <https://harvest.usask.ca/bitstream/handle/10388/ETD-2012-08-673/OLAGUNJU-THESIS.pdf>

11. Field procedures mentioned in the LSA

“The SAR identified by the ACCDC as potentially being present were evaluated during Englobe’s field reconnaissance and no rare flora or fauna were observed.” The fauna species may occasionally visit the site, although based on the field reconnaissance and review of their habitat preferences, none would be expected to depend upon the site exclusively for survival.”

“The boundaries of the wetland (as ground-truthed by Englobe) are presented on Figure 2 (Appendix A).”

“Englobe has conducted a desktop evaluation to assess for potential environmental constraints, with field verification for wetlands, watercourses, and species at risk.”

4.1 Some extracts from LSA Section 3 (“Findings”)

- **Under 3.1 Wetlands:** “the NSE mapped wetland covers approximately 9.3 hectares”

Comment: Wetland boundaries cited as 'Ground-truthed' are not shown, rather the boundary of the wetland as shown in the 2nd figure* in the Appendix Maps was obtained from a “review of the Nova Scotia Wetland Inventory mapping” (see LSA page 5). *Figures are not specifically labelled as Fig 1,2, etc., in the LSA but are referred to as such in the text.

It's not entirely clear whether the “9.2 ha” shown in the 2nd figure in the Appendix Maps refers only to the area of the wetland within the PIDs of Interest or refers to the whole of the “NSE mapped wetland”. (The area of the larger wetland is given on the NS Landscape Map Viewer as 12 ha - see Letter Appendix Fig 7.)

In the 2nd figure in the Appendix Maps, the “High Water Mark” contour (the elevation contour corresponding to the top of the Water Control structure) encloses a sizable piece of land (circa 3 ha) outside of the identified wetland boundaries. One wonders if that should be considered “wetland”; what are its vegetation and soil characteristics? Would it be infilled? If so what are the implications for flood control/water levels in the wetland?

- **Under 3.2 Watercourse:** “A water channel was observed discharging from Fenwick Street (west boundary of the site), into the mapped wetland at the site, flowing west to east (see Figure 2). Based on the topographic mapping, this water feature is mapped as a watercourse. In our opinion this water feature satisfies NSE’s evaluation criteria and should be considered a watercourse. From our understanding of the site conditions and mapping from Halifax Water, this “watercourse” originates at a stormwater outfall at the end of Fenwick Street, and terminates at a Halifax Water control structure at Neptune Crescent. There are no other water channels present in the study area...Since this feature is controlled at the inlet and outlet by Halifax Water, additional municipal permits may be required for any instream work. HRM also requires buffers to watercourses.”

- **Under 3.3 Flood prone Areas** “As noted above, the “watercourse” at the site is controlled through municipal infrastructure. The only flooding that may occur is from stormwater that could impound up to the limit of the Halifax Water control structure. The high water mark for this potential at the site is presented in Figure 2. Permitting Considerations: None.

Comment: I do not understand the description under 3.2 in relation to what I have seen on the ground, and it seems to be in contradiction with their own map (LSA Fig 2). The map identifies a watercourse extending from just NW of the NW boundary of the PIDs of Interest but still within the larger woodland/wetland area to the NW boundary of the larger woodland/wetland area between Fenwick Street and Lynn Drive. Viewed on the ground, the flow in that watercourse is from east to west (or more precisely southeast to northwest) not “west to east “ and after discharging from the wetland, it flows below Fenwick street, surfaces again by Clement Street Park and goes into a forested riparian area as it moves west (or northwest); it then, apparently goes underground again and eventually discharges into Halifax Harbour. View Appendix Figs 5,9 & 10. In the LSA it is contended, apparently, that water flows *into* the wetland from the Fenwick Street-Lynn Drive area and at some point is pumped uphill to Neptune Crescent. So the related statements about the inlet and outlet are, to me at least, highly confusing.

In the LSA it is commented that any watercourse issues are the domain of Halifax Water, but states also that “HRM also requires buffers to watercourses”; there is no further discussion of the required buffers. It's all a bit hazy, of who is responsible for what.

Re under 3.3 “The only flooding that may occur is from stormwater that could impound up to the limit of the Halifax Water Control Structure”. I understand there are recurrent flooding issues downstream from the Water Control Structure, in the vicinity of Clement Street Park.

Surely there should have been some discussion in the LSA of possible impacts of development on downstream flooding, e.g. impacts associated with more prolonged peak flows due to removal of the forest canopy and large reductions in water holding capacity of the soils due to excavation and removal of water-storing organic duff (I measured it as approx 30cm thickness at one woodland site) and alteration of soil texture.

Surely it is important to determine how much (to what elevation) of the land lying within the High Water Contour but outside of the currently delineated wetland shows evidence of past flooding. Does Halifax Water maintain records of water level at the Water Control Structure? The issue of downstream flooding seems to be simply dismissed as the domain of Halifax Water and by the comment in LSA section 3.4 that “The locations of stormwater, sewer and water infrastructure coincide with road layout, all of which have been considered during the development planning process”.

Re: “There are no other water channels present in the study area”. Perhaps this is a matter of semantics or of definitions but one can view other areas of surface water movement, much of it seasonal, and it appears to proceed alternately above and below ground. The overall movement is likely that given by the WAM Predicted flows which includes large portions within the PIDs of Interest. See Letter Appendix Figs 9, 10.

Drone footage taken by the Protect Eisner Wetland group [12] illustrates many areas of actual or possible surface water movement; the general orientation, along a NW/SE axis suggest they are areas of surface water flow, not just ponding.

There is a culvert at the SE boundary of the wetland which takes water below the Mt. Hope Exit off the Circumferential and discharges it into another wetland...and there is a set of residual wetlands right down to Eisner Cove. See Letter Appendix Figs 5-8. None of this is mentioned in the LSA.

12. View [Eisner Cove Wetland Channel](https://www.youtube.com/channel/UCDdMb0JVcJl2MdNvWVl9ZQ): (<https://www.youtube.com/channel/UCDdMb0JVcJl2MdNvWVl9ZQ>)
Videos: <https://www.youtube.com/watch?v=h1iLW2-n3pY> (“Northbrook”); <https://www.youtube.com/watch?v=VVvqybRigj4> (Logging Road Bridge)

- Under 3.4 Steep Slopes: “Slope gradient is a key factor influencing the relative stability of a landscape. It determines the degree to which gravity acts upon a soil mass. Slopes are often irregular and complex, with gradients varying greatly over large areas. Slopes are an important LSA factor when considering what lands are most suitable for development, as well as when considering where to locate roads and other infrastructure. The locations of stormwater, sewer and water infrastructure coincide with road layout, all of which have been considered during the development planning process...Permitting Considerations: None.

Comment: The slopes are significant and together with the loss of water interception and water storage capacity [13] associated with the woodland vegetation and soils will amplify (in comparison to wetland/upland systems with lesser slopes) peak water flows into the wetland and any downstream flooding issues (which already exist); that will likely in turn create more extended droughty conditions between the times of peak water flows. Both the increased flooding and increased droughtiness could be expected to have significant impacts on the integrity of the larger wetland (discussed further below).

- Under 3.5 Forest Cover: “There are no mapped Old Forests...”Permitting Considerations: All work is to be conducted in accordance with the Migratory Birds Convention Act (MBCA), which outlines that no migratory bird nests or eggs will be moved or obstructed during the construction or operational phase of the project. To ensure project activities are in compliance with the MBCA, tree clearing will take place outside of the migratory/nesting bird season or a qualified person be onsite to confirm the absence of nesting or migratory birds prior to and during clearing.”

Comment: Based on (i) the presence of wide diameter trees (15-20” dbh), (ii) even wider old stumps left from selective tree-harvesting in the past, (iii) a well developed ground flora characteristic of undisturbed sites, (iv) abundance of snags, fallen dead wood in various stages, some areas of these forests should certainly be considered “Old Forest”. The Forest Development Class layer on the NS Landscape Map Viewer indicates that of the order of 40-50% (eyeballed estimate) of the larger forest area is “Multi-Aged Old Forest” (See Letter Appendix Fig 11). This is important in regard to biodiversity - Old Forests are critical habitats for many Species At Risk and other species that have been declining in the NS, [14] , also in regard to function of the area as a “stepping stone” across the urban landscape, and in regard to carbon storage – old forests store a lot more carbon than young forests.

- Under 3.6 Contaminated Sites:...Permitting Considerations: None. [No Comment]

13. Water storage in the fine textured drumlin soil of the woodlands could be quite high. Along one route from the wetland to the edge of the upland forest that I examined in some detail, plants characteristic of high moisture sites (Rhodora, cinnamon fern, snowberry) were observed along the whole profile, and soil “duff” measured at one site was 30 cm in thickness, a very high value. View details at <http://nswildflora.ca/comment/eisners-cove-wetland/wet-forest/>

14. See MG Betts et al., 2022. **Forest degradation drives widespread avian habitat and population declines.** In *Nature Ecology & Evolution*. Study area: The Maritime Provinces. **Abstract** In many regions of the world, forest management has reduced old forest and simplified forest structure and composition. We hypothesized that such forest degradation has resulted in long-term habitat loss for forest-associated bird species of eastern Canada (130,017 km²) which, in turn, has caused bird-population declines. Despite little change in overall forest cover, we found substantial reductions in old forest as a result of frequent clear-cutting and a broad-scale transformation to intensified forestry. Back-cast species distribution models revealed that breeding habitat loss occurred for 66% of the 54 most common species from 1985 to 2020 and was strongly associated with reduction in old age classes. Using a long-term, independent dataset, we found that habitat amount predicted population size for 94% of species, and habitat loss was associated with population declines for old-forest species. Forest degradation may therefore be a primary cause of biodiversity decline in managed forest landscapes.

- **Under 3.7 Wildlife Habitats and Corridors:** “The SAR identified by the ACCDC as potentially being present were evaluated during Englobe’s field reconnaissance and no rare flora or fauna were observed. The fauna species may occasionally visit the site, although based on the field reconnaissance and review of their habitat preferences, none would be expected to depend upon the site exclusively for survival.”

Comment: A lot depends on the veracity of this statement. As commented above we are given no information on “Englobe’s field reconnaissance”. It is likely, given the near-pristine state of the much of the forests and all of the wetland, that some rare fauna or flora would be revealed by comprehensive multi-season field surveys. For example, there are informal reports of wood turtles being present in the area.

The Protect Eisner Cove Wetland group has recently conducted field surveys of birds, on 5 dates between May 6 and Aug 5 2022, recording 46 species [15] including species cited by Betts et al., 2022 [14]. e.g. as declining in the Maritime provinces which they relate to loss of Old Forest habitat due to extensive clearcutting.

Two of the four Old Forest species cited by Betts et al. , 2022 [14] as “declining at rates >30% over the past ten years which is a rate consistent with the ‘threatened’ COSEWIC status” are included in the List of Birds observed at the Southdale site: Black Throated Green Warbler and Blackburnian Warbler. Clearly, the LSA has not represented well the significance of the woodland habitat.

There is no comment in section 3.7 about the possible significance of the PIDs of Interest and of the Larger Forest+Wetland area in regard to landscape connectivity. Viewed on Google Maps, the Larger Forest+Wetland area stands out as a green oasis on the urban landscape, and must be an important wildlife connectivity “stepping stone” across the urban environment for both plants and animals, especially as the site is close to the coast. The residual wetlands lying between the Southdale site and Eisner Cove (Letter Appendix Figs 7 & 8) may further enhance connectivity. I suggest that experts in this area be consulted for comment (e.g., Professors Karen Beazley and Alana Westwood at the School of Resource and Environmental Studies at Dalhousie University) on this aspect.

15. Eisner’s Cove Wetland Bird Study Prepared by Richard Hatch with assistance from Fulton Lavender. View document at <http://nswildflora.ca/wp-content/uploads/2022/01/Eisner's-Cove-Wetland-Bird-Study.pdf> The searches were conducted on May 6th, May 23rd, July 7th, July 22nd, and August 5th, approximate hours spent searching being 21 in total, and findings were as follows:

| Total Species Observed (46) | |
|--|--|
| Blue Headed Vireo (<i>Vireo solitarius</i>) | White Throated Sparrow (<i>Zonotrichia albicollis</i>) |
| Blackburnian Warbler (<i>Setophaga fusca</i>) | American Robin (<i>Turdus migratorius</i>) |
| Red Winged Blackbird (<i>Agelaius phoeniceus</i>) | Gray Catbird (<i>Dumetella carolinensis</i>) |
| Common Grackle (<i>Quiscalus quiscla</i>) | Bay Breasted Warbler (<i>Setophaga castanea</i>) |
| Tree Swallows (<i>Tachycineta bicolor</i>) | Red Breasted Nuthatch (<i>Sitta canadensis</i>) |
| Yellow Warbler (<i>Setophaga petechia</i>) | Downey Woodpecker (<i>Dryobates pubescens</i>) |
| Black-and-White Warbler (<i>Mniotilta varia</i>) | Hairy Woodpecker (<i>Leuconotopicus villosus</i>) |
| Northern Parula Warbler (<i>Setophaga americana</i>) | Dark Eyed Junco (<i>Junco hyemalis</i>) |
| Philadelphia Vireo (<i>Vireo philadelphicus</i>) | Alder Flycatcher (<i>Empidonax alnorum</i>) |
| Common Yellow Throat Warbler (<i>Geothlypis trichas</i>) | Northern Cardinal (<i>Cardinalis cardinalis</i>) |
| Northern Flicker (<i>Colaptes auratus</i>) | Song Sparrow (<i>Melospiza medodia</i>) |
| Red Eyed Vireo (<i>Vireo olivaceus</i>) | European Starling (<i>Sturnus vulgaris</i>) |
| Rose Breasted Grosbeak (<i>Pheucticus ludovicianus</i>) | Blue Jay (<i>Cyanocitta cristata</i>) |
| Magnolia Warbler (<i>Setophaga magnolia</i>) | Rock Pigeon (<i>Columbia livia</i>) |
| Purple Finch (<i>Haemorhous purpureus</i>) | American Crow (<i>Corvus brachyrhynchos</i>) |
| Nashville Warbler (<i>Leiothlypis ruficapilla</i>) | American Goldfinch (<i>Spinus tristis</i>) |
| Yellow-Rumped Warbler (<i>Setophaga coronata</i>) | Black-Capped Chickadee (<i>Parus atricapillus</i>) |
| Black Throated Green Warbler (<i>Setophaga virens</i>) | Herring Gull (<i>Larus smithsonianus</i>) |
| Tennessee Warbler (<i>Leiothlypis peregrina</i>) | Ring Neck Pheasant (<i>Phasianus colchicus</i>) |
| Swamp Sparrow (<i>Melospiza georgiana</i>) | Mourning Dove (<i>Zenaida macroura</i>) |
| Osprey (<i>Pandion haliaetus</i>) | Red Crossbill (<i>Loxia curvirostra</i>) |
| Chipping Sparrow (<i>Spizella passerina</i>) | Common Raven (<i>Corvus corax</i>) |
| Ruby Throated Hummingbird (<i>Archilochus colubris</i>) | Golden Crowned Kinglet (<i>Regulus satrapa</i>) |

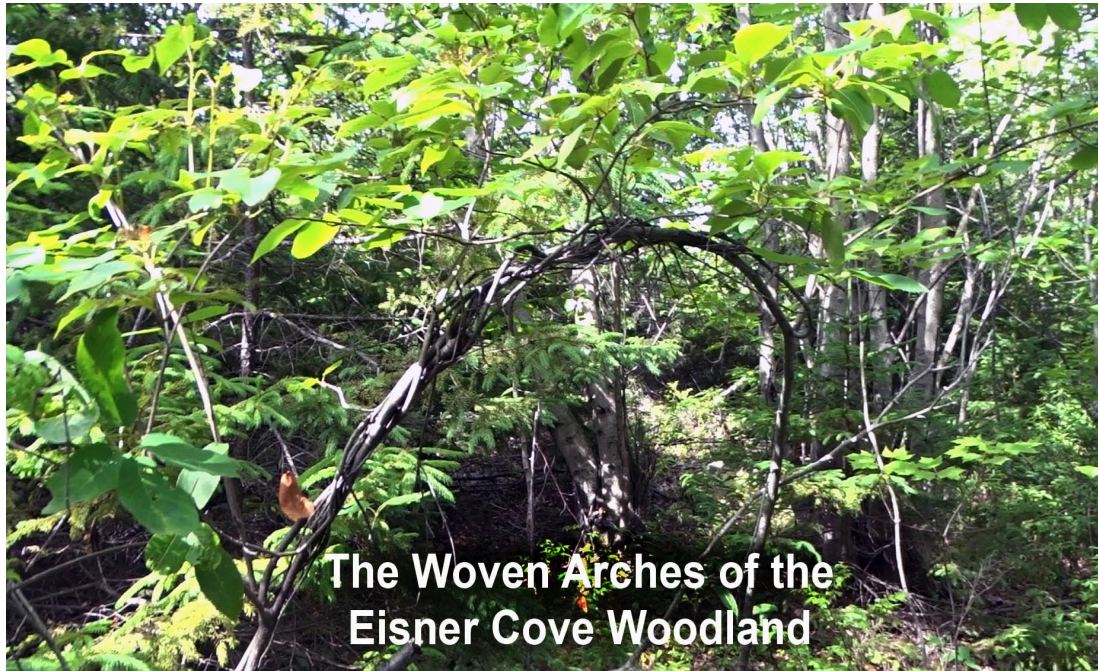
- Under 3.8 Soil and Bedrock: “... Permitting Considerations: None”

Comment: There is no comment of how the water-holding capacity of the soils will be impacted by deforestation and development. These effects are likely to be very significant; this is discussed further in Section 5.3 Linkages... of this letter.

- Under 3.9 Heritage and Cultural: “...Permitting Considerations: To be determined following shovel testing at the site.”

Comment: Perhaps it is not usual to include current use of the undeveloped area in this type of report, but clearly the impending development has touched a raw nerve amongst residents of the adjacent communities, many of whom who have used the area currently and historically for outdoor recreation, nature experiences etc. In addition, homeless people use the area, and others who we are not likely to hear from. [16]

16 An example: view The Woven Arches of the Eisner Cove Woodland, YouTube Video at <https://www.youtube.com/watch?v=umGT2KHqoPc>



“We encounter an arch woven from stems of living wild raisin and shadbush. I had seen natural arches of this type but composed of other species elsewhere, and assumed it was natural. However, Bill tells me that there are many to be found through this area, and that they were made by a man for whom walks in the woods and creating these arches is essential mental therapy. We encountered two more. They simply are beautiful creations, celebrating in a quiet, unobtrusive way, the serenity of this place.

There were many more signs of use of the area in the form of trails and old encampments. It is peaceful place, important in the lives of many but especially of "quiet people" who are probably not aware of the impending development.

- Under 4. Conclusions: (underlining mine):

Englobe has conducted a desktop evaluation to assess for potential environmental constraints, with field verification for wetlands, watercourses, and species at risk. Based on the results of the assessment, generally there were limited environmental constraints identified. Most areas of the site consist of forested lands. There are some steep slopes and the predominate soil type is fine-grained, although these considerations can be managed through routine construction practices.

There is a very large wetland present at the site, although there were no species at risk identified. This wetland is not considered a wetland of special significance by NSECC. From our review of the development concept, we understand that some minor alteration of this wetland will be required to access the developable lands. Given the characteristics of the wetland, the proposed wetland alteration location, and provided that any wetland alteration followed routine construction practices, approval by NSE to alter the wetland for this purpose would not be considered an environmental constraint.

5. Additional Observations & Comments

5.1 The Wetland

A baseline survey of the entire wetland has not been conducted, but from what I have seen most of it would be classified as fen. (The LSA describes it only as a “wetland”). A portion of the wetland (4.2 ha) was classified by Bocking & Millett in a WESP report as fen (document dated 06/29/2020; details below). It is identified as a 12.2 ha Swamp on the NS Landscape Map Viewer (see Letter Appendix Fig 7). Whether it is Fen or Swamp is important because fens are peatlands which store immense amounts of carbon, and significant disturbance could result in massive release of GHGs.

Moving surface water is clearly evident at several sites and drone footage taken by the Protect Eisner Wetland group shows many areas of surface water movement; the water exits via culverts at the southwest and northeast borders, with the division in water flow located approximately where the causeway is sighted for construction.

Much of the wetland is dominated by leatherleaf, other common species include Rhodora, bog kalmia, sheep laurel, Labrador tea, bog rosemary, cotton grasses, various sedges and rushes, pitcher plant, sundew, several orchids. There are fairly dense stands of mountain holly shrubs in some areas and of trees (tamarack, red maple, black spruce (mostly stunted) - in others.

Except in a few very limited areas, there are no exotic species, indicating a high degree of ecological integrity.[17]

I observed an exposure of a thick peat deposit towards the southeast end, probably turned up during construction of the circumferential.

There are a few, quite limited patches of cattail located close the margins, some where there has likely been some nutrient enrichment associated with runoff from anthropogenic landscape.

17. R. Lapaix et al., 2009. **Ground vegetation as an indicator of ecological integrity.** In *Environmental Reviews*.

<https://cdnsiencepub.com/doi/10.1139/A09-012><https://cdnsiencepub.com/doi/10.1139/A09-012>

From the Abstract: “Alien species are considered to be especially valuable indicators of changes in ecological integrity due to their established relationships with anthropogenic stressors, known historical state, relevance to all floristic communities, and ability to cause undesirable changes to biodiversity and ecological processes.”

The LSA offers no comment on possible impacts of development of the uplands on nutrient and salt inputs to the wetland.

I made some on-site measurements on *flowing water* in the wetland on June 25, 2017 using portable instruments:

Temperature: 18.7

ph: 5.98

Electrical Conductivity: 182 uS/cm

The pH value was just above the commonly cited upper limit (circa pH 5.5-5.8) of *Rhodora* (Nova Scotia's native azalea) which is common in the wetland. pH of aquatic systems generally increases with increasing urbanization.[18] Electrical Conductivity, a measure of salt content, was well above values for pristine waters in this area (circa 30-50 uS/cm). The CCME Guideline for chloride ion for the protection of aquatic life is 120 mg/L for long term exposure, and 640 mg/l for short term exposure [19] corresponding approximately to EC values of 470 and 2410 uS/cm respectively. It's pretty likely the electrical conductivity would rise well above 470 uS/cm, if not the higher value, once the landscape begins to be developed.

Remarkably, the LSA makes no reference to a Ducks Unlimited WESP report on a portion of this wetland dated June 8, 2021 [20]:

WESP_SummaryReport_HRM_26_Final.pdf

Site Name: Eisner Cove Wetland **Site Code:** HRM_26

Date of Field Assessment: 06/29/2020

Assessors: Emma Bocking & Lee Millett

PIDs: 41362161; 40003600

GPS Coordinates: 44.659510, -63.536596

Wetland Type: Fen **Size:** 4.25 ha

Landowner(s): A.J. Legrow Holdings Ltd.

That report applies to 4.25 ha within these two PIDs, one of which is one (44.659510) of the PIDs of Interest cited in the LSA. It gives a "Higher" benefits rating to 14 of 19 "Wetland Functions or Other Attributes", a "Moderate" to 3, and a "Lower" to only 2; some of the Higher ratings were applied to Water Storage and Delay, Streamflow Support, Amphibian and Turtle Habitat, Waterbird Feeding Habitat, Waterbird Nesting Habitat, Songbird, Mammal and Raptor Habitat, native Plant Habitat, Wetland Sensitivity. Carbon Sequestration does not have a benefits rating, but is cited as "Moderate" under the Function Rating.

Surely this information is highly pertinent to the LSA. It provides independent support of my contention that there is more Ecological Value to the wetland than suggested by the LSA..

18. e.g., see S, Kaushal et al., 2017, Human-accelerated weathering increases salinization, major ions, and alkalinization in fresh water across land use, in Applied Geochemistry. <https://www.sciencedirect.com/science/article/pii/S0883292717301282>

19. View CCME Document Scientific Criteria Document for the Development of the Canadian Water Quality Guidelines for the Protection of Aquatic Life CHLORIDE ION at <https://www.ccme.ca/fr/res/2011-chloride-cegg-scd-1460-en.pdf>

20. The WESP document does not seem to be posted anywhere; presumably it is available from Ducks Unlimited or from A.J. Legrow Holdings Ltd.

Also pertinent is the relationship of this wetland to other wetlands in the area, notably to the southeast (See Letter Appendix Figures 7&8) where they extend in a sequence towards Eisner Cove. Presumably the commonly applied name 'Eisner Cove Wetland' derives from a time when there was much more wetland cover along this whole route and it extended to Eisner Cove.

I wonder as well whether the topographic 'high point' across the wetland where the causeway is proposed was created at some time during the settler era, perhaps within the last 100 years. On the ground, a longitudinal ditch/embankment that begins at the forest margin by Mt Hope Avenue goes down to the wetland entering it at or close to where the causeway is sighted; on Google Map a linear feature can be seen that extends from Mt Hope Avenue, across the wetland and up the other side (See Appendix Fig. 12). What is the origin of this structure? Could the flow of water in the wetland have been entirely NW to SE earlier on (as opposed to two direction now with the separation approximately where the causeway is sighted)?

I suggest that the Southdale wetland should be considered in relation to its geographic context historically and presently, i.e. we should really be looking at the whole set of wetlands from the "Eisner Cove Wetland" down to Eisner Cove proper and assess their collective significance as habitat and wildlife corridor, and take steps to conserve as much of it as possible.

5.2 The Forested Uplands (Woodlands)

Most of the moderate to steeply sloping uplands in the watershed are forested, and except in limited areas close the margins, or on more heavily used trails, there are no exotic species, indicating a high degree of ecological integrity overall.[17] The forest varies from mostly hardwood (dominated by red maple, yellow birch, ash), through mixed wood to coniferous spruce/pine forest. While individual trees have been harvested in the past, there is no evidence of recent clearcutting or stand-leveling fires. Gap scale wind disturbance is common, and there is a general abundance of standing and fallen dead wood. Much of the woodland is mature and easy to walk through. The larger trees on the southwest side are circa 15-20 inches dbh, and there are larger old stumps. These larger, still extant trees (some were cut down in August) are likely over 100 years of age; the age of a stump of a recently cut black spruce of the Mt. Hope forest side I examined was 72 years, diameter 11.3 inches.

The mature state of circa 50% of the forested area, the diversity of trees, and the abundance of dead wood make the forests exceptional natural habitat in an urban landscape. Signs of bear and bobcat have been noted, and an abundance of bird life and species as documented by the Protect Eisner Cove Wetland group (cited above) attesting to its relatively undisturbed state. (Regrettably some of the birds were still nesting when cutting began, the assurances in the LSA that nesting birds would not be disturbed (cited above) notwithstanding.)

5.3 Linkages and significance of the combined wetland and upland forest

The wetland and much of the forested area are near pristine habitat. Their diversity and location close to the coast adds to its overall value as habitat for migratory birds; undoubtedly the biodiversity of the forest + wetland is higher than the sum of the two if they existed independently. Together, the wetland and forest must function as a significant "stepping stone" for movement of native plants and animal across this now predominantly urban landscape.

I walked the area between the parking lot on Mt Hope avenue down to the wetland – i.e. the area now mostly cleared that leads to the planned causeway in July of this year and observed cinnamon fern, Rhodora, and snowberry in pockets from the wetland to the uppermost edge all indicating that the soil holds a lot of moisture. The ground is very spongy to walk on. At one location about midway downslope, I dug by hand though approximately 30 cm of duff (organic matter), an exceptionally thick duff layer; the lower 20 cm were wet - this in droughty late July. [View Photos below] Thus it's clear that this forest holds a lot of water, in the soil, also organic carbon. On the opposite, northeast side of the wetland, the forested slope is longer and steeper (view Letter Appendix Fig. 1).



Photos illustrating moisture-requiring plant species and soil duff (organic matter) on forested slope down to wetland, Mt. Hope Avenue area on July 23, 2022. A: locations of plants, B: Rhodora, C: snowberry. D: cinnamon fern, E. surface litter parted to expose top of duff layer, approximately 30 cm depth at this one site; F: the lower 20 cm were very wet. The forest in this area fits the description for [NS Forest Vegetation Type SP5](http://nswildflora.ca/comment/eisners-cove-wetland/wet-forest/) According to the description of SP5, the presence of Cinnamon Fern and Creeping Snowberry (also fairly common at this site) indicate “elevated moisture levels”. Rhodora is not cited as a common species for SP5 but clearly is [was] common at the Mt. Hope site. Trees were removed from this particular area in early August. View more details of the observations at <http://nswildflora.ca/comment/eisners-cove-wetland/wet-forest/>

Given that fens are dependent on inflows of water and develop in relation to those flows, also in relation to the mineral and nutrient content of incoming water, it is clear that removal of most of the forest cover, direct alteration of the forest floor by development activities and the introduction of nutrients from gardens etc will fundamentally alter the hydrologic and nutrient regimes. It can be expected that there will be much more erratic stream flows, and water entry into the wetland will be much less dispersed resulting in more flooding than currently, and in turn greater droughtiness. Such conditions are known to accelerate breakdown of the peat and release of carbon [21]; added nutrients also accelerate such breakdown.

In other words, far more than the limited area directly affected by construction of a causeway will be impacted by this development, even with a 20 or 30 m buffer zone and especially given the slopes. It is widely acknowledged that buffer zones of 20-30 meters are inadequate to protect wetlands and stream courses, for example this NS-based research:

Modeling Reforestation's Role in Climate-Proofing Watersheds from Flooding and Soil Erosion

Robert L. France et al., 2019 in *American Journal of Climate Change*
<https://www.scirp.org/journal/paperinformation.aspx?paperid=95101>

Abstract (highlighting inserted)

The mitigation potential of reforestation for offsetting the deleterious effects of increased flooding and soil erosion projected to occur in Atlantic Canada through future climate change was investigated. Modelling determined a strong but non-linear relationship between extent of vegetative cover and runoff volume and discharge rate for a Nova Scotian watershed, suggesting that reforestation will reduce, but not completely prevent, flooding. Predicted erosion rates were found to be progressively reduced in relation to the extent of upland reforestation. Of three scenarios examined in which 60%, 65%, and 85% of the entire watershed are randomly reforested, only the latter would reduce the elevated erosion expected to occur through climate change back to present-day existing levels. Additional modelling revealed that comparable mitigation of soil erosion can ensue through implementation of 70 m streamside buffer strips, which would only take up 19% of the total surface area. Prioritizing riparian zones for reforestation will therefore subsume less of the overall productive land area and therefore enact a less severe socio-economic impact on agriculture and forestry.

The LSA makes no mention of these linkages, of the possible impacts of deforestation and development on carbon release from both the forested land and the wetlands, of the possible effects of nutrients and salt on the wetland.

These are critical deficiencies in the LSA.

21 .See for example L. Lamers et al., 2014. **Ecological restoration of rich fens in Europe and North America: from trial and error to an evidence-based approach.** In *Biological Reviews* <https://onlinelibrary.wiley.com/doi/full/10.1111/bry.12102>

5. Conclusion

Evidently, the LSA was the major source of information about possible environmental impacts of the Clayton Developments proposal. However the LSA clearly failed to identify some key characteristics of the site and some very significant potential environmental impacts, and downplayed the ecological significance of the site, its role as habitat, in landscape connectivity and in carbon sequestration and storage.

The LSA was mostly a desktop study and relied on existing information about the wetland which is mostly coarse scale information; there have been few published ground observations. Some highly pertinent observations. e.g., the bird study and the drone footage obtained by the Protect Eisner Cove Wetland group, and some of my observations were made subsequent to LSA. For whatever reason, reference to a WESP report on the site dated June 8, 2021 is entirely lacking in the LSA.

I have suggested, based on my informal visits to the site, that had local naturalists known about and visited the Southdale site prior to development of the Halifax Green Network Plan, it probably would have been recognized in the HGPN as ecologically significant site. The independently conducted WESP study lends support to that contention.

It appears in turn that the LSA was not critically reviewed by staff and few if any councillors read document critically or at all.

So in a sense 'we collectively I messed up' with the exception of the Protect Eisner Cove Wetland group who have struggled to have their concerns given serious consideration.

It is still early on in the development process. Surely now, the right thing to do is to take a sober second look at the Southdale Future Growth Node.

- *David Patriquin*

Postscript

This letter is open letter to Premier Houston and other key decision-makers in relation to the Southdale Growth Node. It will be posted on the Nova Scotia Wild Flora Society Website at <http://nswildflora.ca/comment/eisners-cove-wetland/letter-24aug2022/>

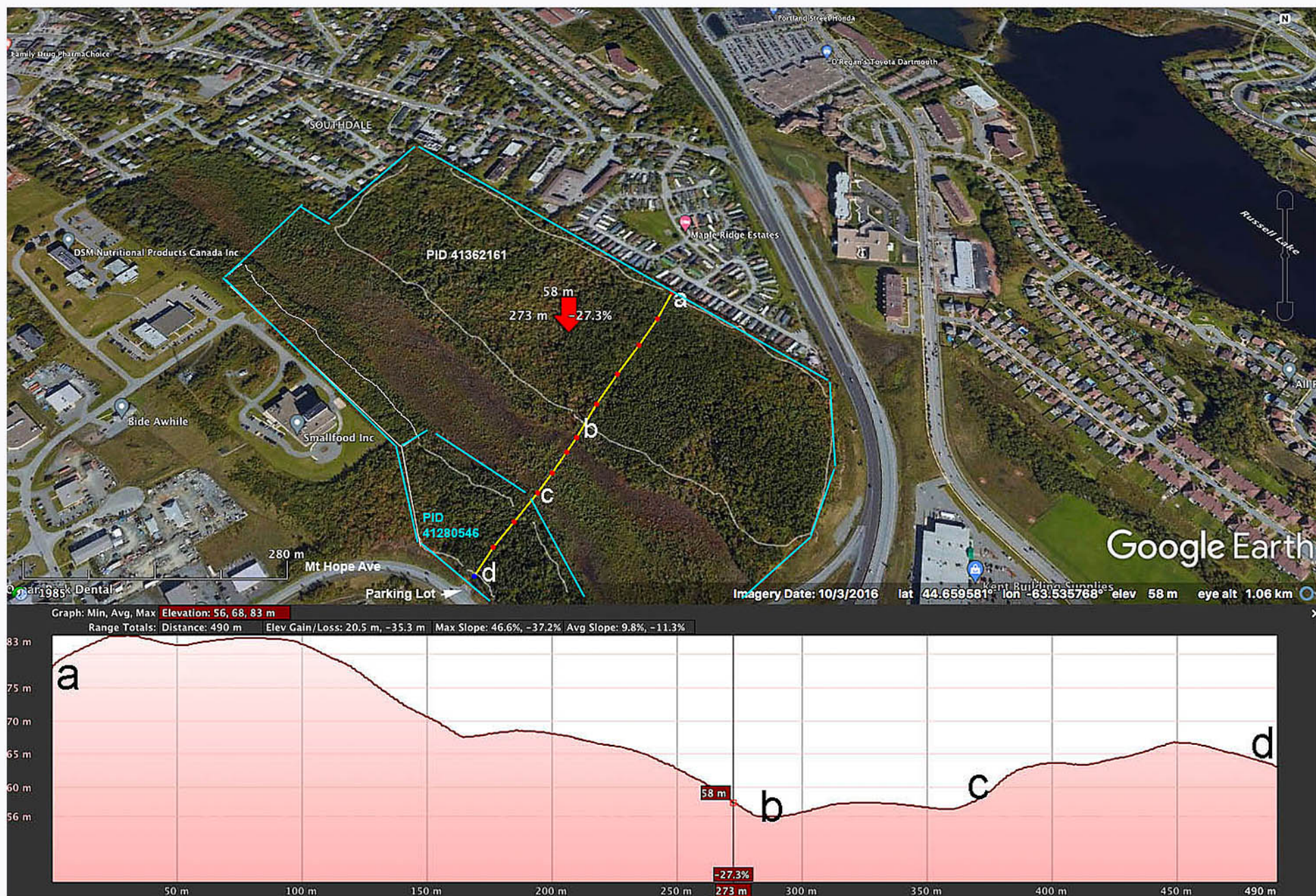
I expect to post replies to the letter on the same page.

August 24, 2022.

Appendix to An Open Letter in support of William Zebedee's Appeal of Wetland Alteration Approval No 2021-2886385-00 (22-07-29): Can we all take a sober second look at the Southdale Future Growth Node?

by David Patriquin, Professor of Biology, Dalhousie University (retired)
on behalf of the Nova Scotia Wild Flora Society and the Halifax Field Naturalists

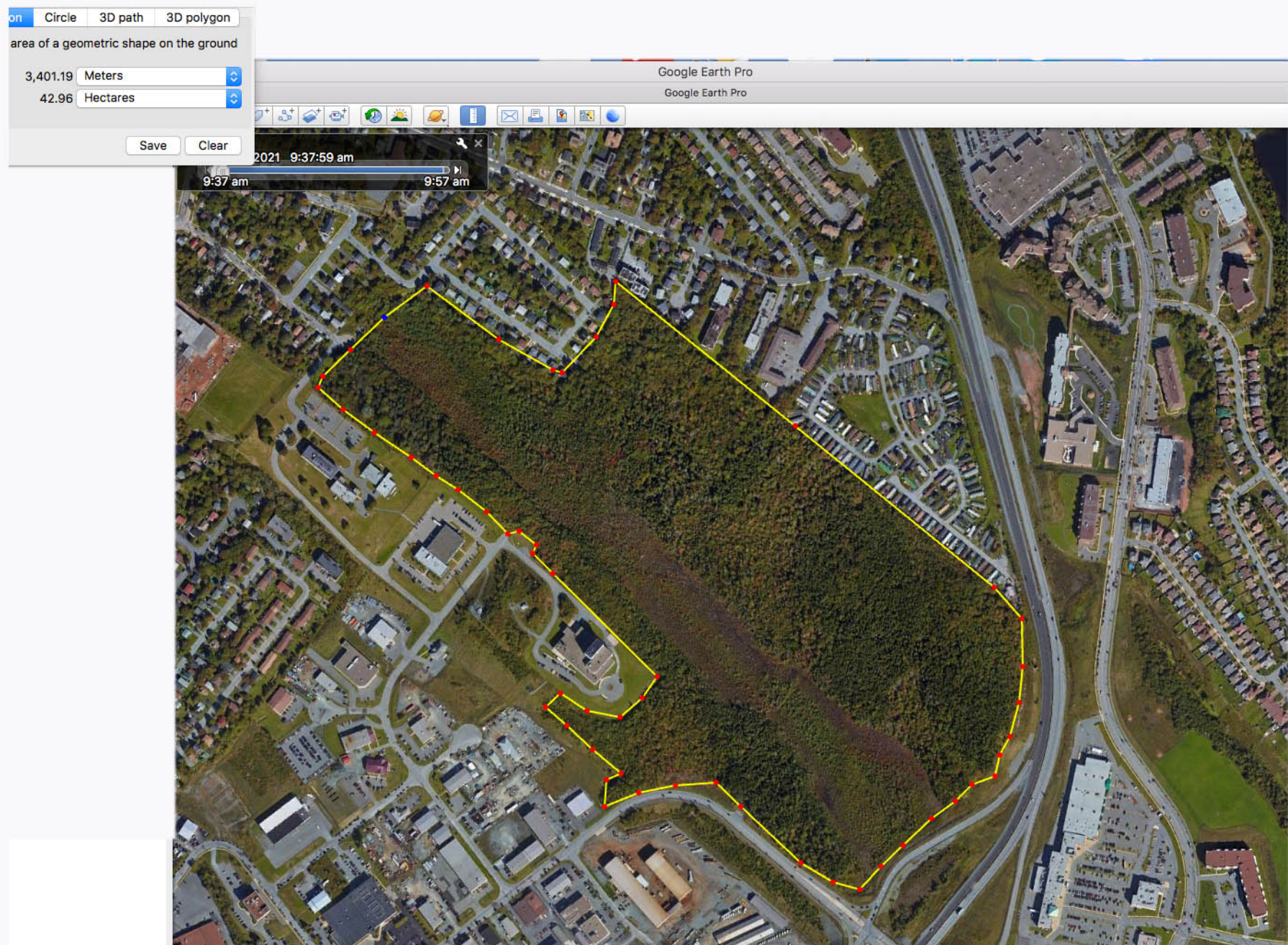
This document contains 12 figures (Maps & Photos)



Appendix Fig. 1: Elevation profile across Southdale site/current PIDs of Interest from Google Earth. The profile crosses the wetland approximately where the causeway is planned. The white-enclosed areas are upland forest; the boundaries towards the wetland include a zone, approximately, of closed canopy forest that may qualify as wetland. The blue lines enclose the area of the combined PIDs of Interest including both wetland and woodland, excluding a piece at the southeast extremity.



Appendix Fig 2: Google Map Satellite View of Eisner Cove Wetland & Vicinity

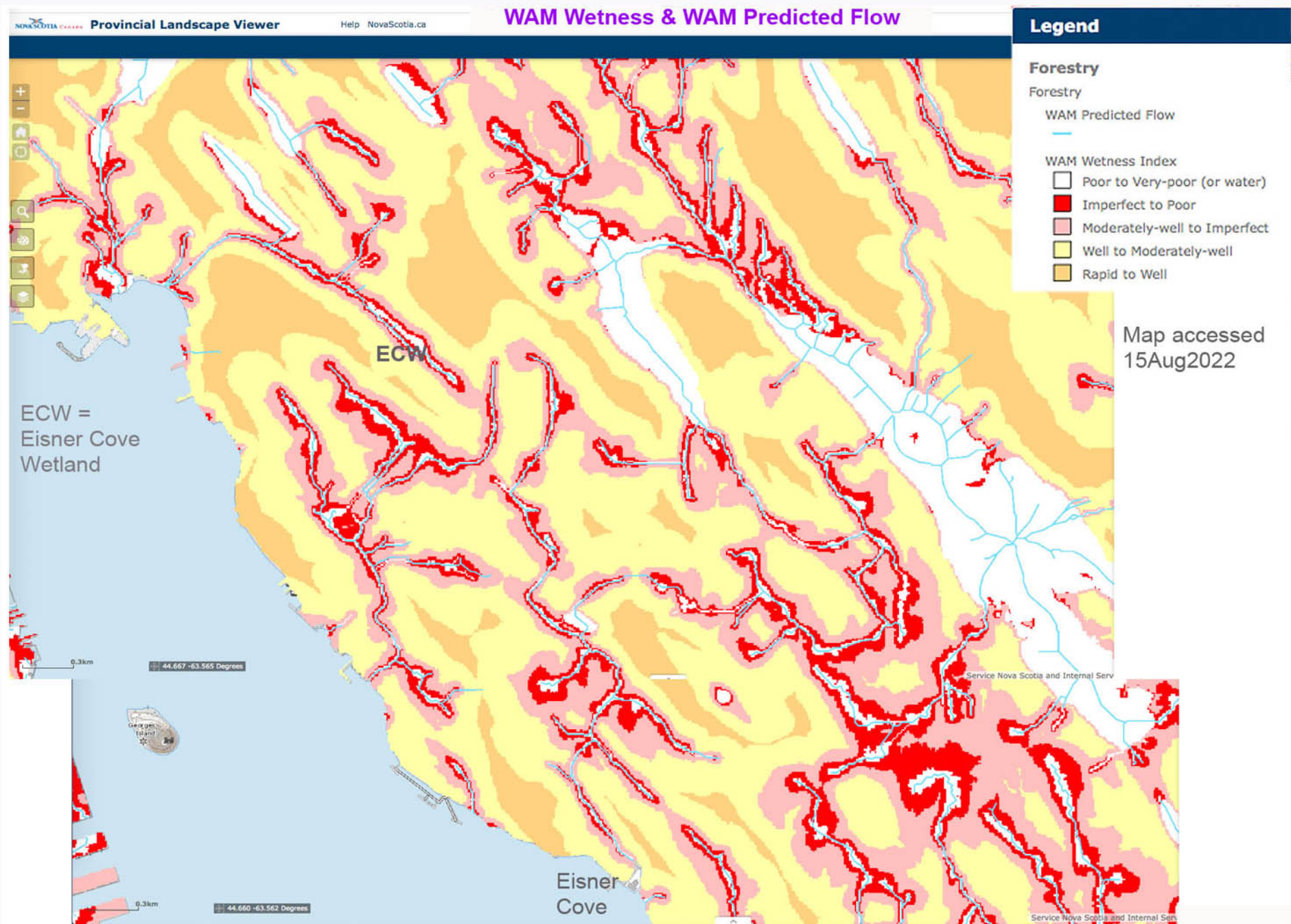


Appendix Fig 3: **Estimation of area of wetland + woodland at South Site**
(Google Earth Measurement)

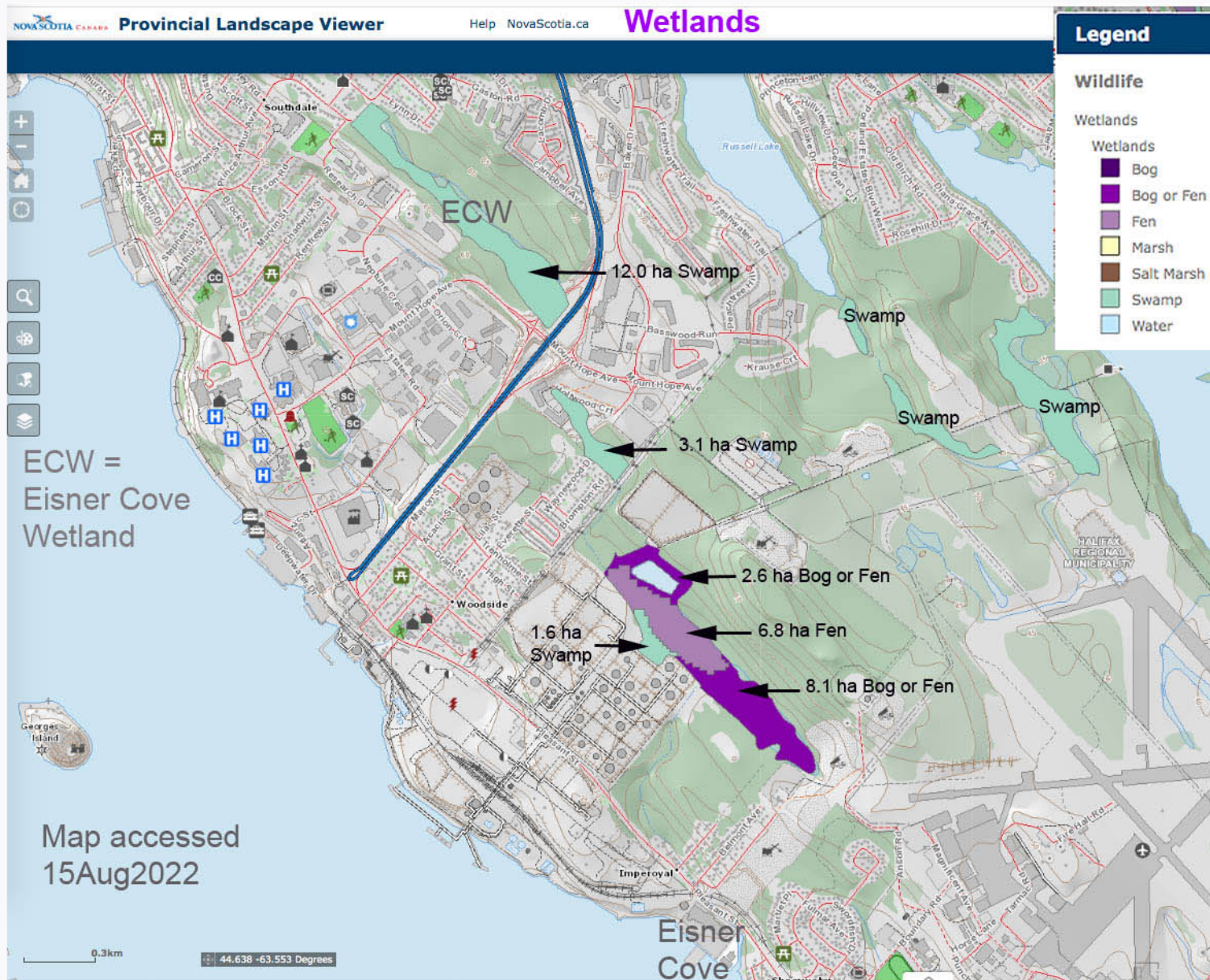
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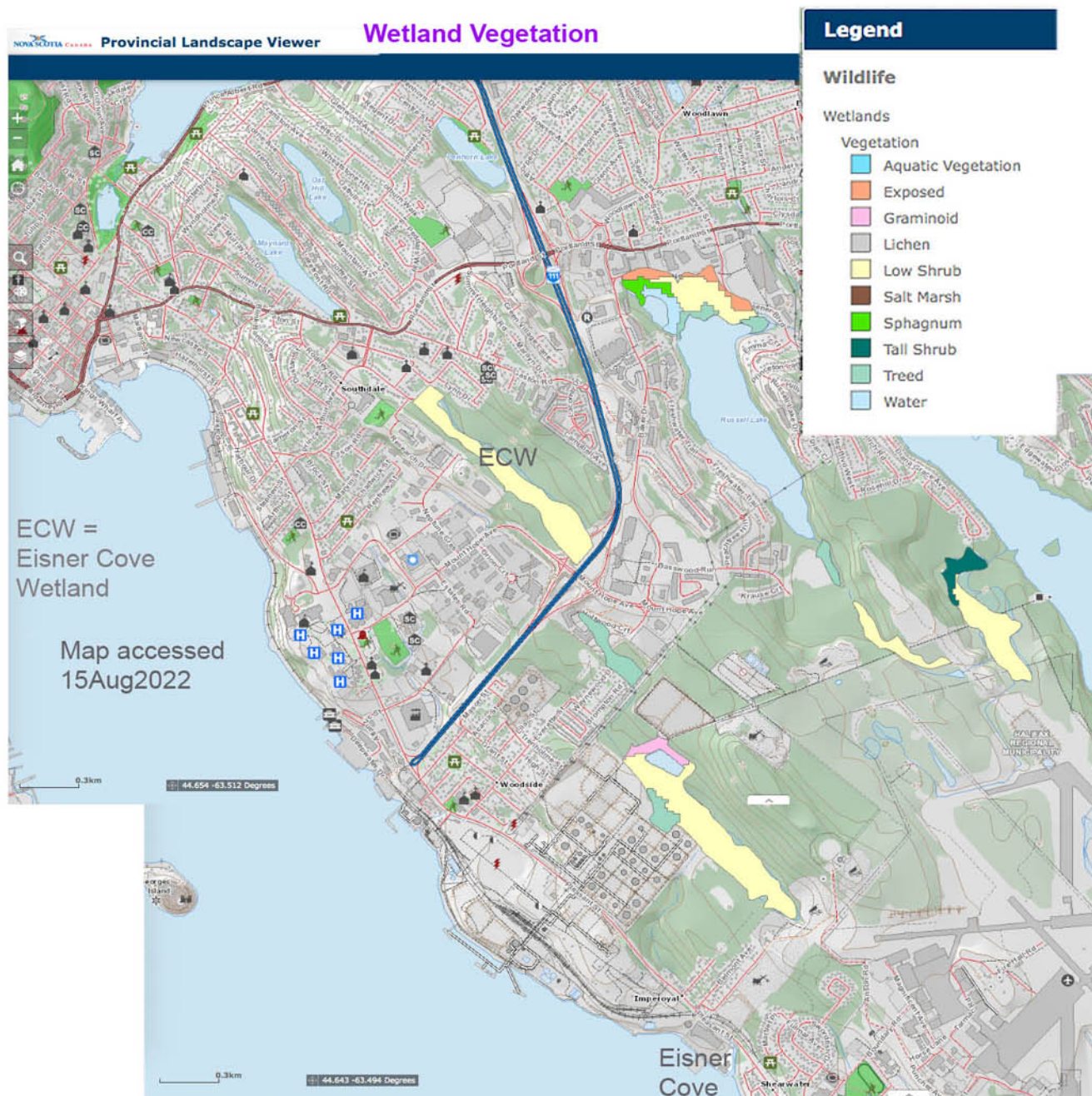
Appendix Fig 4: Estimation of area of wetland at South Site
(Google Earth Measurement)



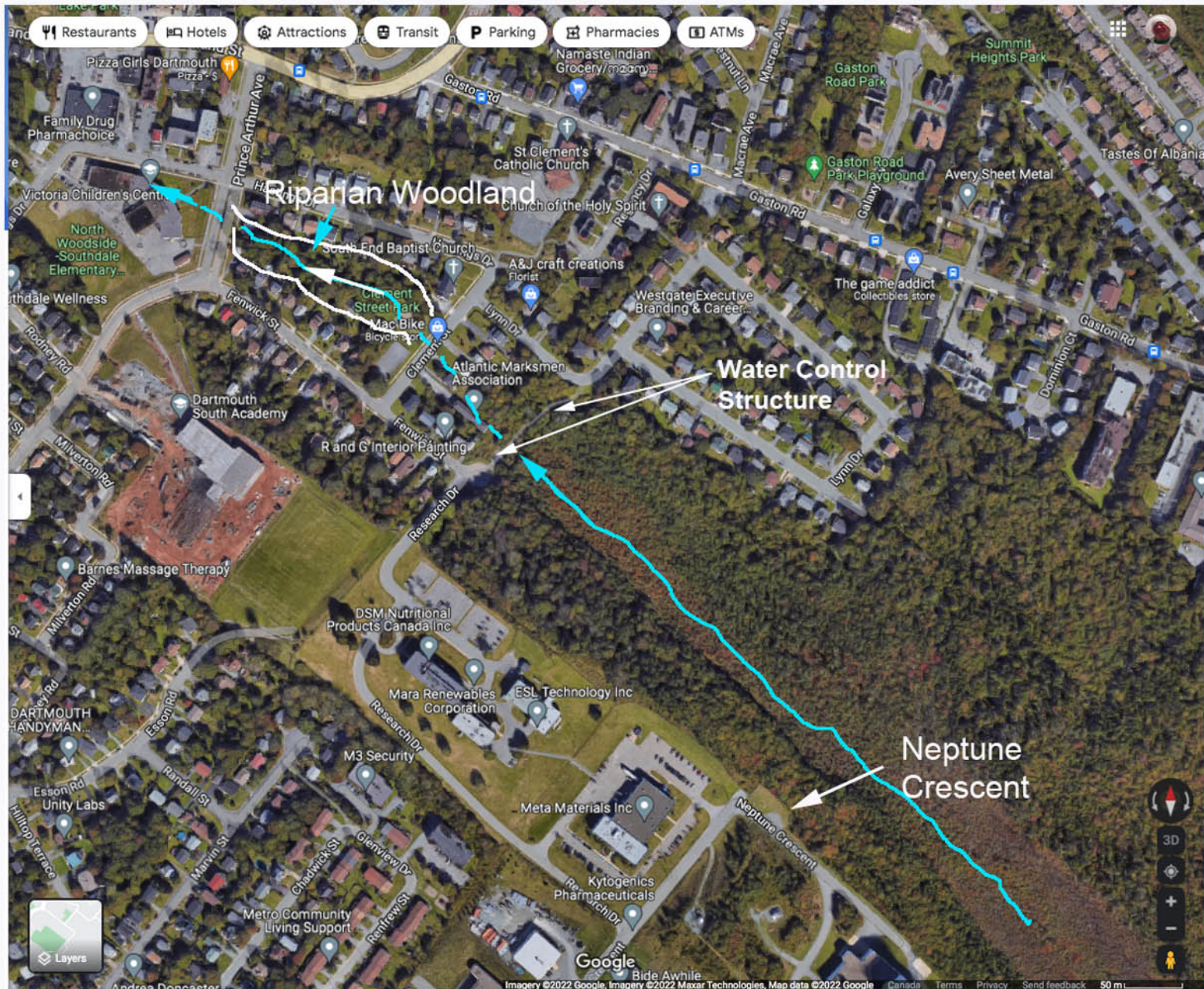
Appendix Fig 6: **WAM Wetness and WAM Predicted Flows through the Southdale site and to the NW and SE into Halifax Harbour.** From NS Landscape Map Viewer



Appendix Fig 7: **Wetlands from the Southdale site southeast to Eisner Cove.**
From NS Landscape Map Viewer



Appendix Fig 8: **Wetlands from the Southdale site southeast to Eisner Cove - Vegetation Types From NS Landscape Map Viewer**

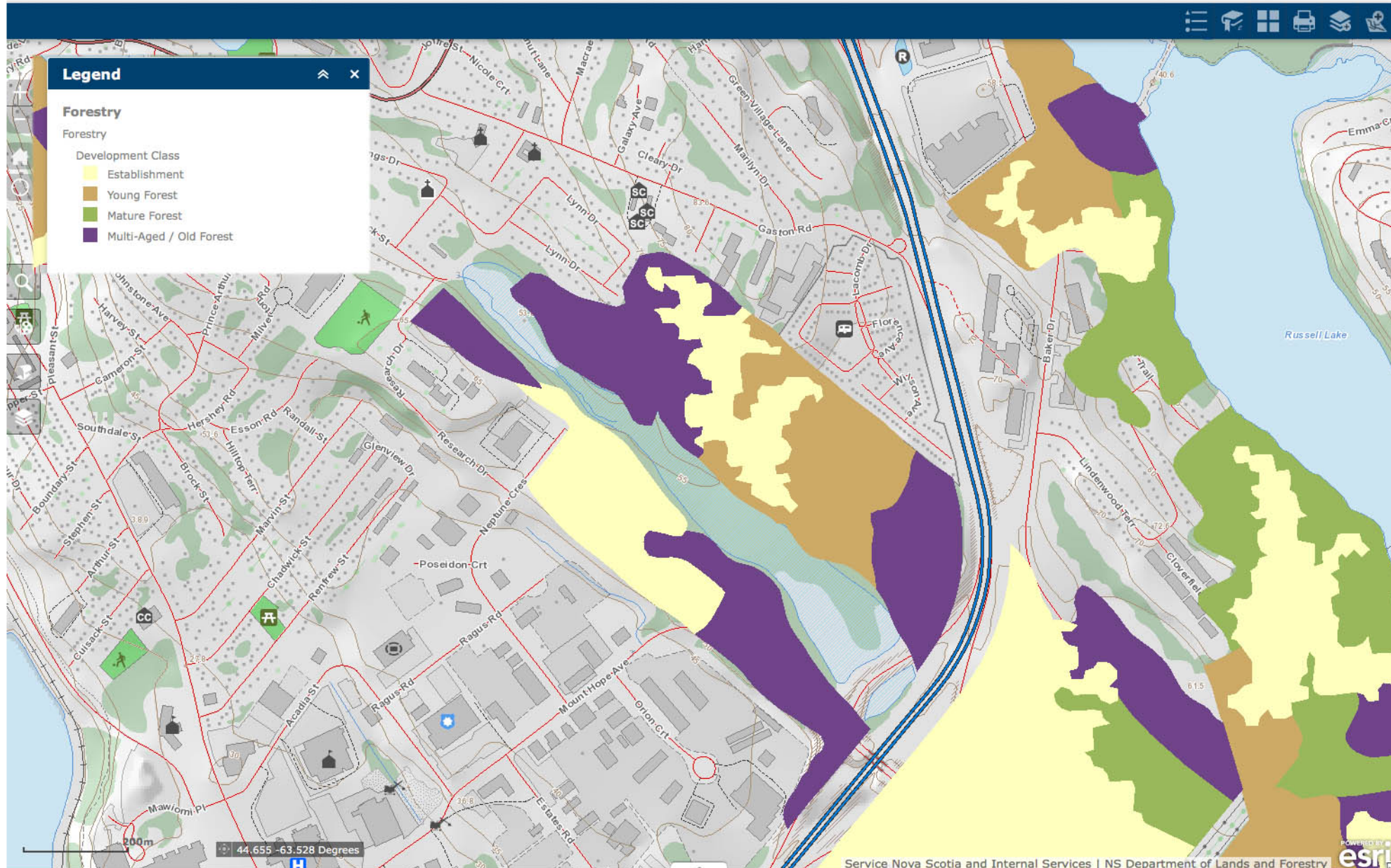


Appendix Fig 9: **Approximate WAM Predicted Flow towards NW end of wetland and beyond, location of Water Control Structure**



Photos on May 30, 2017

Appendix Fig 10. Photos illustrating flowing surface waters and Water Control Structure at the northwest boundary of the wetland.



Appendix Fig 11: **Southdate Site Forest Development Class**
From NS Landscape Map Viewer



Appendix Fig 12: Southdate Site, Linear Feature viewed on Google Earth