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From: [Jeffrey Waller](#)

Sent: Sunday, May 29, 2022 10:20:17 PM

To: [Georgina Island-Ile Georgina \(IAAC/AEIC\)](#); [Du, Sherry \(IAAC/AEIC\)](#)

Subject: edits for readability for my comment "Is the Fixed Link An Environmental Disaster and Engineering Failure Waiting to Happen? "

Sensitivity: Normal

Hello,

I submitted my comment entitled "Is the Fixed Link An Environmental Disaster and Engineering Failure Waiting to Happen?", Reference #57, at <https://iaac-aeic.gc.ca/050/evaluations/proj/83539/contributions/id/58510> today and realize it could be made more readable. Could you please accept this revised text below?

Is the Fixed Link An Environmental Disaster and Engineering Failure Waiting to Happen?

My perspective comes from that of a multigenerational family who has enjoyed Lake Simcoe for four generations, for fishing, swimming, boating, skating, and simply the enjoyment of its natural beauty. Over the past thirty years, we have watched with considerable dismay at the environmental degradation due to invasive species, runoff-fueled algal blooms, and increasing temperatures that weaken ice and warm waters. I grew up on Lake Simcoe next to the Bayvista Lane property, where my parents have lived for 49 years. My parents' property shares the lakeshore and has a deeded right-of-way through the wetlands, over the creek, and through the forests of the Bayvista Lane property, the favoured Fixed Link mainland landing point. Although I left the area after living there for 19.5 years plus 2 summers, I regularly visit. I am therefore very familiar with the Bayvista Property area, the surrounding shoreline, and the Lake in the study area having regularly explored it, canoed it, and swam/waded in it for years. I even ventured out on the Nolan's Point (aka Nolan's Landing) shoal a few hundred feet once, where the crossing to the Island evidently once was.

We've been present for some of the tragic drownings which have probably claimed ~80 Georgina Islanders over the past ~80 years, not to mention near-escapes necessitating rescues (Reference #1=Ref#1). Far too often we have seen the rescue aircraft or scoots and the saddening stories that follow. We are very familiar with the weather conditions and how fast they can change, and the potential danger of crossing the lake or ice in severe weather, especially when the ice is weak.

However, for the reasons that will be described, I believe the proposed Fixed Link will be an environmental disaster, an engineering failure, and an especially costly one that is unneeded when environmentally friendly new solutions are now available. The concerns I raise will likely be shared by the ~260 households that line the shoreline between Sibbald's Point Provincial Park and the northern tip of Duclos Point. Since the proposed Fixed Link will be the most drastic alteration to Lake Simcoe since the Trent-Severn canal system flooded the lake, the Fixed Link proposal must be examined fearlessly and critically.

An Environmental Disaster Waiting to Happen?

Lake Simcoe is an invaluable natural resource that has seen extensive degradation of the Lake's ecological health with many existing pressures reviewed in Palmer et al, 2011 (Ref#2). Therefore, any alterations to the natural northwest-to-southeast water currents and sedimentation patterns should be avoided since environmental damage is sure to result.

Firstly, the Bayvista Lane is right in the middle of the Virginia Beach Wetland complex, recognized as a floodplain ~190m back from lake (Ref#3). The creek can sometimes flood quite a bit in the spring – I recall the creek's water washing out the culvert in the early 1980s, stranding our car on one side. The previous owners of my parents' property told my parents that during the 1958 Hurricane Hazel flooding, the original house had to be sandbagged for protection. With climate change expected to cause more extreme weather events, building here would be hazardous. The lakeside lawn of the former 3 Bayvista Lane cottage site is underwater each spring and I have pictures of ducks swimming in the underwater lawn and also in the nearby swamp from years ago. Furthermore, minnows and fish swim into the swamp during the high water in the spring too. This wetland is also recognized as an ecologically significant groundwater recharge area in a Highly Vulnerable Aquifer region (Ref#4). This wetland is also recognized as a Greenland system with recognized Woodland and Wetland in a River Valley Connection (Refs#5,6). Furthermore, the Bayvista Lane property lies in an officially recognized Environmental Protection Area which according to the Town of Georgina's Official Plan may not be developed in a way that negatively affects them (ie Section 5.1.1.1, section 5.3.1.1 and since reasonable alternatives exist, section 5.3.1.1 e doesn't apply, Refs#7,8). If you examine the satellite photos of the southern shore of Lake Simcoe, it is easy to see that Bayvista bay, the Virginia Wetland Complex is the last undeveloped wetland on the shoreline between the Holland Marsh and far side of Duclos Point, with a small exception of a stretch between Water Fringe Drive and McRae Beach South Drive. Therefore, destroying this wetland with a fixed link cutting through it would harm both an irreplaceable wetland forest that is a refuge for many land and aquatic forms of life.

With the Ontario Ministry of Natural Resources Lake Simcoe Fisheries Assessment Unit (LSFAU) at Sibbald's Point Provincial Park, the health of the aquatic life populations has been well studied for decades. The Bayvista area bay is the least developed and most natural along the southern shore (Figure 3 in Ref#9) and is noted for its fish species richness (Figures 4 to 6 Ref#9). I recall LSFAU scientists coming often to the beach at Bayvista Lane property in the 1980s when I was a child to seine fish – I was told not to pester the nice scientists since they were busy! Sadly, the southeast areas of L. Simcoe have seen statistically significant declines in fish species richness since 1987 so the Fixed Link cutting through these waters would only further harm the fish spawning grounds and habitat (Ref#10). The proposed Fixed Link would cut through one of the most abundant habitats for lake plants too, prime habitat and food for fish and other aquatic life (Ref#11). When wading offshore, there were always plenty of fish, crayfish, snails, and mussels to be seen. Although not as precise, ornithologists have identified 119 species of birds in the Bayvista area and southwards, (Ref#12, see Ref#13 for map, birds at Ref#14, and for explanation codes see Ref#15). These include 11 provincially rare, 38 regionally rare, and 19 species of interest. I attach pictures of an immature Bald Eagle in the Bayvista bayside tree and common mergansers offshore (both regionally rare, the former a Species of Special Concern in the Ontario Endangered Species Act (OESA)) and Great Blue Herons (Species of Interest). I also attach a picture of the snapping turtle that comes by to lay eggs in the sandy Bayvista bay beaches, a Species of Special Concern in the Ont. Endangered Species Act. Several species of frogs hop of the swamps of the Bayvista property, I attach pictures of Gray Treefrog, Leopard Frog, Wood Frog, and Green Frog – although we can hear Spring Peepers in the Wetland too. There are certainly many types of moths, butterflies, and other insects in these woods too that should be surveyed, as well as other animals. I attach pictures of garter snake, deer, wild turkeys, turkey vultures, trumpeter swans – recently recovered from near-extinction, woodpeckers, and musk rat and although I can't supply pictures, turtles, salamanders, toads, foxes, coyotes, racoons, skunks, mice, voles, porcupines, ducks, geese, chipmunks, songbirds, owls, osprey, ground hog, and many other animals definitely inhabit the area.

Nowhere in the Initial Project Description of a Designated Project is the issue of light pollution from streetlights and navigational lights raised – surely this would have a negative effect on the fish, birds, and insects, not to mention the unsightliness to other lakeshore residents. The issue of significant noise pollution during construction of the cofferdams and bridge piles is not described very well – the reverberations of a massive pile-drive pounding in sheet piles and bridge piles for lengthy periods will no doubt scare away birds, fish, animals, and cause stress to anyone within hearing range.

Lastly, it is been increasingly recognized that building causeways across important bodies of water and interfering with the natural flow of water causes great environmental damage. Eventually, the damage becomes so evident that these causeways are causing that they are even removed to reverse the damage. The Avon River Causeway in Nova Scotia created massive silt accumulation when the causeway blocked the natural flow of river water, negatively affecting fish populations (Ref#16-18). The Bateman Island Causeway over the Yakima and Columbia Rivers in Washington State, although small, blocked river flow, harming fish migration and populations and will be removed (Ref#19). The Little Bouctouche River causeway and bridge in New Brunswick caused massive silt accumulation and filled in the river with sediment, negatively affecting the environment (Ref#20). The best example of negative environmental effects due to a causeway is the Petitcodiac River in New Brunswick where a causeway caused immediate silt buildup, fish habitat degradation and loss, fish population declines, contributed to fish extinction, ice jamming, narrowing of the river channel, and recently required a multi-year, \$121 million partial remediation of the problems by removing the causeway and partially restoring water flow (Ref#21-23). If there are less damaging alternatives, such as the case with the crossing to Georgina Island, causeways must be avoided.

An Engineering Failure Waiting to Happen?

The Fixed Link's causeways are proposing to dump 4.5 million cubic meters of rock into the lake. On page 206 (of 1635 of the IPDDP) in the Initial Project Description of a Designated Project (IPDDP), the 'typical road section' cross-section indicates that the fill will be put directly onto the lake bed – and evidently assumes it will not sink a single inch. This will not happen – and this is hinted at on page 665 of the IPDDP but the implications of this are not fully described. Sediment cores taken from Lake Simcoe appear to be fine-grained mud (Ref#24), other sources describes the southern part of Georgina Island as flat silty-sandy clay (Ref#25), and a map of the Virginia Island Wetland Complex shows the Bayvista Lane property to be "swamp, mainly "muck"" (Ref#26). More recent descriptions describe the lake bed as sand and diamicton, a mixture of mud and sand with rocks in it on the Georgina Island tip of the Fixed Link (Ref#27). Layering of millions of cubic meters of rock onto soft, silty sand will undoubtedly cause the rock to continuously sink deep into the lake bed. It is therefore unwise to attempt to build a causeway and bridge on sand, for the unrelenting pounding of waves and ice on a sinking structure will doom it. As an additional point on the environmental damage, trucking the 4.5 million cubic meters of fill to Lake Simcoe at 35 cubic meters per truck load will mean ~129,000 round-trip truck loads – it is difficult to believe that this many dumpings of fill will not result in 'fugitive' dust clouds or dust-contaminated run-off fouling the lake and fish habitat.

This sort of bridging project has been built before, only to be quickly proven an abject failure. The Coburg and Peterborough Railway built a ~1,120 meter railway bridge across nearby Rice Lake between Harwood and Hiawatha in the 1850s, even with an island bridging point midway. This is less than half the length of the propose Fixed Link. However, between wind and water levels driving the ice against the bridge, difficulties with building into the lake bottom (which is the same as Lake Simcoe's), the bridge was damaged beyond repair and abandoned in less than a decade (Ref#28). Closer to the proposed GIFL, more ominous examples of this exist 1) if you compare the map of Lake Simcoe from 1926 (Figure 1 from Ref#29), an aerial photo from 1954 (Ref#30) with a recent Google Earth satellite photo, it is clear that the Sand Islands have completely changed shape as the awesome unrelenting force of wind-driven ice and waves has broken up the Sand Island into several, erased an island and obliterated most of another one. Two, the two large artificial rock piers at Sibbald's Point Provincial Park beach have noticeably sunk into the lakebed since their installation, with one awash and nearly underwater now. There are likely more examples locally that bear investigating, for example the piers at the outlet of the Pefferlaw

River, Beaverton River, and the Trent-Severn Canal can also be examined for ice damage and subsidence into the lake over time.

On pages 670 and 677 of the IPDDP, there is little said about the problem of ice loadings when wind-driven ice piles up. This is a well-known problem to residents and also to scientist. Residents have seen ice pile up 20 feet high (Ref#31, 32), quickly too (Ref#33), to great destructive effect (Ref#34). They have been quoted as saying “even breakwaters built with boulders were no match for the ice” (Ref#35). Ice piled up several meters high and destroyed boathouses (Ref#36), came on shore and had sufficient force to break through house walls and penetrate inside (Ref#37), and smashed through rebar-reinforced concrete to damage a boathouse further upshore (Ref#38). Rob Baldwin, general manager of planning and development for the LSRC for 17 years was quoted as saying “winter ice will “move whatever is in its way” under prevailing winds, and that includes up onto shorelines. He’s seen ice take out boathouses, docks and other structures. “I’ve seen ice go through a living room window...it can move a boulder the size of an SUV.” Baldwin also noted wind-driven waves can go overtop of a breakwall and tear it from the shore. (Ref#39). Armour stone is proposed to protect the causeway but against the unshielded might of wind-driven lake ice, it seems overly optimistic that armour stone would hold up against this force. On a smaller Ontario lake than Lake Simcoe, scientists recorded ice piling events on Lake St. Clair in March 1978 that resulted in pile-ups with heights of 6 to 12 m high along a 5 km stretch (Ref#40). An ice assault along the length of the Fixed Link like this would not only likely cause massive damage but also cut off the Island. On Lake Simcoe, ice piles 9 meters high were recorded in 1973 – this report explicitly states the sloped shores, like those proposed on page 206 of the IPDDP, favour ice piling (Ref#41).

The Initial Project Description of a Designated Project calls for ice breakers to be built on page 332, 1042, and 1073 (of 1635 of the IPDDP), to avoid additional forces on the piers but on page 488 of the IPDDP in the ‘Estimated Capital Cost’ section, but surprisingly no costs are given for the design, construction, or operation of such a vessel nor is any environmental impact estimated (green house gases, effects on lake and life in and around it, noise pollution, etc.). I imagine this would need to be a formidable diesel-powered vessel to take on all the wind-driven ice along a 2.8 km front. There is also a large and unexplained discrepancy in the Initial Project Description of a Designated Project regarding the amount of fill needed for the causeways. On page 32 (of 1635 of the IPDDP), 4.5 million cubic meters of fill are called for with 2.5 million cubic meters under water. This amount of fill is enough to cover all 3,449 acres of Georgina Island in a foot of rock. However, on page 488 (of 1635 of the IPDDP) in the ‘Estimated Capital Cost’ section, the volume of fill is adjusted downward dramatically to only 0.6 million cubic meters. If the 4.5 million cubic meters are used, then the cost of the fill alone using the provided costs is not ~\$60 million, it is \$199 million. With a bridge cost of \$170 million, this makes the total project cost at least \$377 million, assuming the fill does not sink into the soft, sandy, lake bed and excludes any cost to excavating and filling in the Virginia Beach Wetland Complex. Additional fill costs and icebreaker construction costs could result in a large project price increase.

On page 32, a bridge 20 m high above the water is called for but later on page 488 (of the IPDDP, it is lowered 10 m, perilously close to how high ice has been previously measured to pile up on Lake Simcoe. Even if it is not lowered, the effect of wind-driven ice pushing ice against piers, perhaps squeezing it through the gap and upward, could damage the bridge, even to the point of collapse as has happened before on rivers (Refs#42-44). There is also the fact that all snowmobile and boat traffic will be concentrated into a far narrower boat channel, raising the risk of collisions – especially when heading west into the sun late in the day with sun in the driver’s eyes. If lake currents are funneled through this narrow channel, the ice will surely be weakened too by faster-flowing water, raising the risk of going through the ice. If the bridge is lowered to 10 m, then taller watercraft may be blocked, blocking transit of mid- to large-sized sailboats who have masts up to 20 meters high.

The claim that the fixed link will be all-weather all-seasons is error since the same whiteout conditions that make the ice road impassable are the same weather conditions that will make the fixed link road impassable, perhaps even more so. The high winds that can pick up on the lake may also prevent the use of the bridge for the same reasons that boating becomes hazardous. This is true for other water body-crossing bridges like the Confederation Bridge in PEI. Furthermore, during freezing weather when the waves are smashing against the bridge and causeway, wind will drive water onto the road, where freezing will make the road hazardous.

Since the proposed Fixed Link would directly impact navigation, Transport Canada has already stated that approval, if granted, would take 1-2 years meaning the proposed construction deadline will be lengthened and inflation-affected costs will only rise. They also state the potential effects described are minimal and very general, so much more work and time will be needed, further delaying any construction – if approved at all.

Better Option

While there is a need for a safer method of crossing the lake in all weather conditions, there is no absolute ‘need’ for a bridge and causeway, but a new ferry and a better access management. Other island communities in Ontario face precisely the same challenges, relying on ferries alone. For example, 1) Wolfe Island off Kingston in Lake Ontario (~1,400 inhabitants), 2) Amherst Island near Gananoque in Lake Ontario (450 inhabitants), Howe Island (600 inhabitants), Christian Island which is home to the Beausoleil First Nation reserve (~600 inhabitants), and Toronto Island (7000 inhabitants + 1.4 million yearly visitors) all rely exclusively on ferries with plans to continue to do so indefinitely. In fact, Wolfe Island is just now introduced all-electric ferries that are far more environmentally friendly to cover the distance between Kingston and Wolfe Island (Ref#45). A bubbler system is employed to disrupt ice formation and winter ice buildup is just as much a concern there so lessons can be learned from the Wolfe Island experience. Toronto Island is now served by a small electric ferry (Ref#46) and they also plan on replacing their larger ferries with an electric ferry fleet (Ref#47). The Christian Island will be introducing a brand-new hybrid electric ferry with ice-breaking capability (Ref#48-50). Since icebreakers are called for on pages 32, 1042, and 1073 (of 1635 of the IPDDP), why not just have a ferry with ice-breaking capability? This should be the replacement for the existing Georgina Island Ferry since such an ice-breaking ferry would operate year-round. In whiteout snowstorm, blinding rainstorm, or extreme wind conditions that would also prevent the use of a Fixed Link, those wanting to cross to the island could perhaps be temporarily bunked at a hotel at a modest cost. In the extremely rare cases where medical evacuation is necessary during any perilous weather conditions, training of an emergency medical technician and outfitting of a medical office on the island should be introduced, as is the case on

Christian and Wolfe Islands. If the current scoot used to cross during ice break up lacks space to carry a stretcher and EMT, then one should be obtained – the 24' one employed by York Regional Police has this capacity (Ref#51). Finally, there are passenger/cargo hovercraft alternatives that could be used in the shoulder seasons when ice conditions prevent use of either ice road or ferry, that would be no noisier than the scoots (Ref#52-54). All of these measures would have a far less of a detrimental environmental effect on the area, a lower price tag than building a fixed link, and a certainty of success unlike proposed Fixed Link.

I therefore submit with all due respect that the more environmentally friendly, far more certain engineering solution of an ice-breaking (hybrid) electric ferry should be chosen as a replacement for the current ferry, ice road, and scoot lake crossing methods.

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