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"*GNOOZHEKAANING*" PLACE OF THE PIKE

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Submitted via email to EGLE-Enbridge-Public-Comments@Michigan.gov and via the MiEnviro Portal

RE: **Comments of the Bay Mills Indian Community on the Enbridge Line 5 Joint Permit Application, Submission No. HQ3-8BYB-N9DT1**

Gnoozhekaaning, "Place of the Pike," or Bay Mills Indian Community ("Bay Mills" or "BMIC") provides these comments on the Joint Permit Application ("JPA") submission ID HQ3-8BYB-N9DT1 for inland lakes and streams, Great Lakes, wetlands, floodplains, dams, environmental areas, high-risk erosion areas, and critical dune areas. These comments are being submitted in response to the public notice issued July 16, 2025, on submission number HQ3-8BYB-N9DT1.

Bay Mills also supports and incorporates by reference here the joint comments of the Environmental Law and Policy Center and Michigan Climate Action Network and those sections of the Grand Traverse Band of Ottawa and Chippewa Indians that focus on the Great Lakes Submerged Lands Act.

I. INTRODUCTION

Enbridge Energy, Limited Partnership ("Enbridge") seeks to construct a massive new infrastructure project ("Line 5 Tunnel Project" or "Project") beneath the Straits of Mackinac

("Straits") so that it may continue to transport fossil fuels through the Straits, a place that is sacred to Tribal Nations, including Bay Mills. The Project will have undeniable and unavoidable impacts on the Straits of Mackinac, a cultural and treaty-protected landscape.[1] The Straits and the Great Lakes watershed play a fundamental role in the economic, cultural, traditional, and spiritual identity of Bay Mills. The Straits area is replete with sites that are eligible for listing on the National Register of Historic Places or are contributing resources to larger eligible properties. As discussed in Section IV, subsistence and commercial fishermen rely on the area and would be devastated by the Project's impacts on the fisheries. Considering the religious and cultural significance of Bay Mills' relationship to the broader ecosystem and the potential adverse impacts that the approval of this permit would have on these critical, treaty-protected resources, EGLE should give special consideration to Bay Mills' knowledge and input on this permit.

In order to construct the Project, Enbridge has applied for a permit under Part 303, Wetlands Protection and Part 325, Great Lakes Submerged Lands under the Natural Resources and Environmental Protection Act ("NREPA"); Section 401 Water Quality Certification under the Clean Water Act; and concurrence with the Consistency Certification under Section 307 of the Coastal Zone Management Act. As an initial matter, various environmental, historical, and cultural developments, regarding the Line 5 Tunnel Project, since the 2020 JPA, require the Michigan Department of Environment, Great Lakes, & Energy's ("EGLE") close consideration. One significant development is the increase in the number of wetlands the Project will impact. The 2020 JPA estimated temporary impacts to .03 acres of wetlands and permanent impacts to .10 acres of wetlands, with Enbridge requesting a waiver for wetland mitigation.[2] The 2025 JPA now estimates permanent impacts on 1.53 acres of wetlands.[3] This substantial increase in wetland acreage came after Bay Mills and the U.S. Army Corps of Engineers ("USACE" or "Corps") called for additional study of areas previously described as upland that contained clear wetland indicators. Bay Mills scientists and their expert consultant, Alice Thompson,[4] advocated for these additional studies and were present on site for their completion. Field delineations in 2023 indeed confirmed that the Project will impact far more wetland acreage than Enbridge and EGLE had previously assumed. These additional surveys occurred after the BMIC raised concerns that additional wetlands could be impacted by the Project. The JD identified 17.696 acres of wetlands that "may be" subject to the USACE's regulatory jurisdiction.[5] These findings and conclusions

[1] Bay Mills is the modern-day successor in interest to the bands of Ojibwe people who were identified by the negotiators for the United States as living near Sault Ste. Marie in the Treaty of Washington of March 28, 1836. 7 Stat. 491.

[2] Enbridge Energy, Limited Partnership, Digital EGLE/USACE Joint Permit Application ("JPA") for Inland Lakes and Streams, Great Lakes, Wetlands, Floodplains, Dams, Environmental Areas, High Risk Erosion Areas and Critical Dune Areas. Revision 5, 11-12 (July 21, 2020).

[3] Enbridge, JPA for Inland Lakes and Streams, Great Lakes, Wetlands, Floodplains, Dams, Environmental Areas, High Risk Erosion Areas and Critical Dune Areas. Revision 7, 14 (August 11, 2025).

[4] Ms. Alice Thompson is a certified Senior Professional Wetland Scientist with the society of Wetland Scientists. Ms. Thompson has been an environmental consultant for more than 26 years. She has deep knowledge and diverse experience working on projects related to wetlands in the Great Lakes region and the upper Midwest.

[5] U.S. Army Corps of Engineers ("USACE"), Preliminary Jurisdictional Determination ("PJD"), 1-2 (Dec. 20, 2024).

only reinforces that the Tunnel Project will have a significant impact on the environment, and a greater impact on wetlands specifically, than originally presented in the 2020 JPA.

This significant impact is also reflected in the USACE's decision to prepare a full Environmental Impact Statement ("EIS") for the Project. Since the 2020 JPA, the Corps, after receiving approximately 15,000 public comments across two public comment periods throughout 2020, determined that the Tunnel Project will significantly impact the environment. After reviewing these comments, the Corps made this determination based on the "unique characteristics of the geographic region; the critical importance of the Straits of Mackinac to the economy, to navigation, to the maintenance of biological diversity, to cultural resources, and to treaty-protected fishery resources; and the uncertain nature of impacts to the Straits of Mackinac Traditional Cultural Landscape."[6] This determination and change of course by the Corps demonstrates the significance of the Project's environmental impact, and EGLE should recognize this significance as well.

Furthermore, the historical and cultural significance of the Straits of Mackinac has gained more recognition since 2020. This year, Michigan's State Historic Preservation Office ("SHPO") determined that the Straits is eligible for listing in the National Register of Historic Places as a Traditional Cultural Place (or Traditional Cultural Property/Landscape) ("TCP" or "TCL"). SHPO determined the Straits is "significant for its important connections to, and place of creation for, the Ojibwe people and by extension, the Bay Mills Indian Community." This determination came after Bay Mills put forth an ethnographic study titled *The Heart of the Turtle: A Traditional Cultural Property Study of the Straits of Mackinac, Michigan, with Recommendations as to its Eligibility for Listing in the National Register of Historic Places*.[7] SHPO noted several specific reasons why the Straits is eligible for listing, including its "important associations with prehistoric and historic Native American Anishnabeg culture," associations with several important figures "central to many oral traditions and narratives" significant to the Tribe, and the landscape's "historic, symbolic, and sacred importance."[8] The USACE has also recognized the TCP within the Straits. Meanwhile, this year the U.S. Department of Interior ("DOI") determined that the Line 5 Dual Pipelines are not eligible for listing in the National Register of Historic Places.[9] Both of these developments have significantly shifted Michigan's understanding and recognition of the historical and cultural significance of the Straits since the 2020 JPA.

As discussed more fully below, EGLE must deny the JPA because the application is administratively incomplete, feasible and prudent alternatives exist to the Project, the activity is not in the public interest, an unacceptable disruption to aquatic resources will occur, the detrimental effects are significant, the Great Lakes Submerged Lands Act requires a permit for the entire tunnel, and analysis under the Michigan Environmental Protection Act dictates denial.

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[6] USACE, Enbridge Line 5 Tunnel Project Draft Environmental Impact Statement, Volume I – Chapters 1 through 7, 1-3 (May 2025).
[7] Letter to President Whitney Gravelle, Bay Mills Indian Cmty, from Ryan M. Schumaker, State Historic Pres. Officer, Mich. State Historic Pres. Off., 1 (Apr. 17, 2025).
[8] *Id.* at 1-2.
[9] Letter and Determination of Eligibility Notification to Shane M. McCoy, Chief, Regul. Branch, USACE, Detroit Dist., from Nat'l Park Serv., U.S. Dep't of the Interior (May 15, 2025).

II. THE JPA IS NOT ADMINISTRATIVELY COMPLETE

In order to determine whether a JPA is administratively complete, EGLE has developed an administrative completeness checklist.[10] The JPA is not administratively complete in a number of areas, including failing to provide a summary of all proposed activities; failing to provide an adequate description of alternatives; failing to provide proposed site plans that describe existing conditions; and failing to provide adequate wetlands compensatory mitigation information. Since the JPA is not administratively complete, it should be denied or, at a minimum, returned to Enbridge for further documentation.[11]

III. FEASIBLE AND PRUDENT ALTERNATIVES EXIST

The existence of a feasible and prudent alternative figures prominently in Part 303, Part 325[12] and Michigan Environmental Protection Act ("MEPA").[13] In fact, Part 303 requires EGLE to consider whether there is a feasible and prudent alternative in two different subsections.[14] EGLE must carefully consider under each of these laws whether a feasible and prudent alternative exists for the JPA. Since the Project will impair Michigan's natural resources and a feasible and prudent alternative exists here, the JPA must be denied.

Michigan courts have explained that "an examination of alternatives that avoid or limit the impact to a resource is a hallmark of Michigan environmental law."[15] The Michigan Supreme Court has held that the State of Michigan has an independent obligation to consider "feasible and prudent alternatives" under MEPA,[16] and this obligation applies to EGLE and other administrative agencies.[17] Enbridge's alternatives analysis is deficient for many reasons. The problem starts

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[10] EGLE, JOINT PERMIT APPLICATION ADMINISTRATIVE REVIEW CHECKLIST, *available at* https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/WRD/Wetlands/administrative-completeness-checklist.pdf?rev=ea13ea996c364a018fef693416c2fb1f.

[11] Enbridge has had five years to complete documentation for this JPA, yet despite substantial impacts, significant data and documentation continue to be absent.

[12] Mich. Admin. Code R 322.1015(b); Subject: Part 325, Great Lakes Submerged Lands, of the Natural Resources and Environmental Protection Act, 1994 Pa 451, As Amended Petition of Joseph Milauckas, 2003 WL 22767293, at *8 (defining "feasible" as "capable of being put into effect or accomplished" and "prudent" as "exercising sound judgment." (citing *Friends of Crystal River v. Kuras Props.*, 218 Mich. App. 457, 554 NW2d 328 (1996)).

[13] MCL 324.1705(2). As discussed below in Sections III and V, there is no question that the Project will impair Michigan's natural resources, necessitating the consideration of alternatives.

[14] MCL 324.30311(2) and(4)(b).

[15] In the Matter of Petitions On the Permit Issued To Laurent J. Torno, Jr. Part 303, Wetlands Protection Agency Department of Environmental Quality Case Type Water Resources Division, 2017 WL 3480831, at *5 (quoting *Petition of Dune Harbor Estates, LLC*, 2005 WL 3451406, at *5 n 8 (Mich, Dept Nat Res.)).

[16] *Petition of Hwy US-24, in Bloomfield Tp, Oakland Cnty.*, 392 Mich. 159, 185-186; 220 NW2d 416, 428 (1974) ("*Vanderkloot*").

[17] *Buggs v. Mich. Pub. Serv. Comm'n*, No. 315058, 2015 WL 159795, at *7 (Mich. Ct. App. Jan. 13, 2015) (confirming that the holding of *Vanderkloot* applies to agency decisions), *aff'd sub*

with Enbridge's purpose and use statement, which focuses only on the continued transportation of oil products through the Straits.[18] That problem continues through Enbridge's alternatives analysis. Rather than preparing a robust alternatives analysis based on current information, it relies heavily on an outdated report and points to the flawed DEIS alternatives analysis. The alternatives analysis fails to consider no action alternatives that involve no fossil fuel transport through the Straits, which is inconsistent with EGLE's obligations under MEPA. Enbridge has failed to provide a robust alternatives analysis—even after EGLE asked Enbridge to develop a more complete alternative analysis.[19]

A. The USACE's DEIS alternatives analysis is flawed

Enbridge's JPA alternatives analysis references the alternatives analysis in the Corps' DEIS, but the DEIS itself is flawed for a number of reasons laid out in Bay Mills' June 30, 2025 comments on the DEIS.[20] For instance, the DEIS's two non-tunnel options—an engineered gravel/rock as a protective cover for the existing Dual Pipelines and the No Action Alternative in which the Dual Pipelines continue operating—do not pass the straight-face test as viable considerations. The Corps' list was constrained by an inappropriate statement of purpose and need; an unreasonably narrow scope of review; and the improper sequencing of the National Historic Preservation Act process and the NEPA process (such that the alternative development did not reflect key information about impacts to treaty-protected rights). Pursuant to the substantive obligations of MEPA, and the new studies and information available, EGLE should insist on a robust alternatives analysis that reflects the significant impairments that the Project will cause.

B. Reliance on the 2017 Dynamic Risk Report is erroneous

To date, Enbridge has not seriously evaluated a non-wetland location or alternatives that sit outside the Straits; instead, it simply regurgitated the obsolete and flawed 2017 Dynamic Risk Report[21] and Enbridge's Alternatives Report to the State of Michigan, completed in 2018.[22] Both

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nom. *In re Application of Encana Oil & Gas re Garfield 36 Pipeline*, No. 329781, 2017 WL 2130276 (Mich. Ct. App. May 16, 2017).

[18] JPA, *supra* note 3, at 12.

[19] Letter to Gina Lee, Enbridge, from Jonathan Walt, EGLE (May 21, 2025) (Corrections Request). Recently, the Army Corps submitted multiple data requests to Enbridge regarding the feasibility of a horizontal directional drilling ("HDD") alternative to the tunnel. Enbridge's response was also provided to EGLE. The addition of an HDD alternative in either the federal or state process would not cure the fact that Enbridge has not evaluated seriously any alternatives that would not involve fossil fuels crossing the Straits.

[20] Letter to Katie L. Otanez, Regul. Project Manager, Detroit Dist., USACE, from Whitney Gravelle, President, Bay Mills Indian Cmty. (June 30, 2025), https://earthjustice.org/wp-content/uploads/2025/07/2025.06.30-bmic-comments-on-draft-eis-final.pdf (Comments on Draft EIS).

[21] DYNAMIC RISK, FINAL REPORT: ALTERNATIVES ANALYSIS FOR THE STRAITS PIPELINES (Oct. 26, 2017) ("2017 Dynamic Risk Report")

[22] ENBRIDGE, REPORT TO THE STATE OF MICHIGAN – ALTERNATIVES FOR REPLACING ENBRIDGE'S DUAL LINE 5 PIPELINES CROSSING THE STRAITS OF MACKINAC (June 15, 2018) (examining a tun-

reports are incomplete and outdated, and neither report does nor could function as a substitute for the required alternatives analysis under MEPA.

First, as the Michigan Attorney General explained in her amicus brief in the appeal of the Michigan Public Service Commission permit, seven years after the preparation of the Dynamic Risk report, significant new information exists that should have informed the MPSC's alternatives analysis. That information must be considered in EGLE's alternatives analysis:

> • A 2019 Statewide Energy Assessment that evaluated the resilience of Michigan's electric, natural gas, and propane delivery systems.[23]
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> • A 2020 report prepared by Michigan's Upper Peninsula Energy Task Force, which conducted a broad analysis of the energy needs of Michigan's Upper Peninsula, including its reliance on propane for heat and alternative solutions for meeting those needs in the event that Line 5 ceases operation.[24]
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> • The 2021 Michigan Propane Security Plan, which details measures Michigan has taken to ensure that it will have a secure energy supply if Line 5 shuts down.[25]

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nel, an open-cut pipeline installation, and horizontal directional drilling), https://www.michigan.gov/psab/-/media/Project/Websites/psab/archive/media/1-Line5_AlternativesEvaluationReport-June18.pdf

[23] MICH. PUBLIC SERV. COMM'N, MICHIGAN STATEWIDE ENERGY ASSESSMENT FINAL REPORT (Sept. 11, 2019), https://www.michigan.gov/-/media/Project/Websites/mpsc/regulatory/reports/2019-09-11_SEA_Final_Report_with_Appendices.pdf?rev=77a6a88282384718aa09360f714f177f

[24] EGLE, UPPER PENINSULA ENERGY TASK FORCE COMMITTEE RECOMMENDATIONS, PART 1 – PROPANE SUPPLY (April 17, 2020), https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Groups/UPETF/Report-UPETF-Part-1.pdf?rev=fcf2b8dfc8e64838b1195fd193405566. The Upper Peninsula Energy Task Force's commissioned economic analysis of propane supply alternatives to Line 5 concluded that any shortfall in propane supply from a disruption to Line 5 could be overcome through a combination of readily available alternatives that include delivery of propane by rail, truck, and pipeline from Edmonton, Alberta, and Conway, Kansas; s*ee also*, PUBLIC SECTOR CONSULTANTS*,* ANALYSIS OF PROPANE SUPPLY ALTERNATIVES FOR MICHIGAN, 67 (March 2020) https://www.michigan.gov/documents/egle/egle-psc-upetf-Report_Analysis_of_Propane_Supply_Alternatives_for_Michigan_683751_7.pdf. Studies have also documented that practical and economic alternatives to propane, including electric heat pumps and electric hot water heaters, *see* Direct Testimony of Dr. Elizabeth A. Stanton, 14-17 (Sept. 14, 2021) (MPSC No. U-20763), https://mipsc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TV1i1AAD.

[25] MICHIGAN PUBLIC SERV. COMM'N, ET AL., MICHIGAN PROPANE SECURITY PLAN (2021), https://www.michigan.gov/-/media/Project/Websites/mpsc/consumer/propane/MI_Propane_Security_Plan_Overview.pdf.

• Evidence presented at a 2022 trial, which a federal court relied upon in ordering Enbridge to reroute Line 5 or else permanently close it within three years.[26]

• A 2023 report prepared by economic and industrial logistics experts PLG Consulting, which analyzed how energy markets would adapt in the event of a complete shutdown of Line 5, and which determined that "energy markets will adapt—as they have always done and continue to do—in the event that Line 5 is shut down. With advance notice, the markets can be expected to do so without supply shortages or price spikes."[27]

In January 2025, after the Michigan Attorney General's amicus brief was filed,[28] the Institute for Energy Economics and Financial Analysis published a report that explains that a no-pipeline alternative merits consideration in light of the rising costs of the Project and the uncertainty in the market for the petroleum products.[29]

Second, even if Dynamic Risk Report's alternatives analysis was not outdated, Enbridge's proposed Tunnel Project has changed so significantly that the Report's 2017 analysis of the tunnel is inapplicable to Enbridge's 2025 JPA. The Dynamic Risk Report did not analyze the current proposed tunnel design, including the economics or feasibility of the current design, but instead considered a tunnel design that was substantially smaller.[30] As such, the Report's discussions of the tunnel's feasibility are irrelevant, as is any conclusion based on a comparison of the original tunnel design's impacts to the alternatives in that report. A new thorough review of alternatives that compares the current tunnel design to an updated set of alternatives is needed.

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[26] *See Bad River Band of Lake Superior Tribe of Chippewa Indians of Bad River Rsrv. v. Enbridge Energy Co., Inc.*, No. 19-CV-602-WMC, 2023 WL 4043961 (W.D. Wis. June 16, 2023) *(appeal pending).*

[27] PLG CONSULTING, LIKELY MARKET RESPONSES TO A SHUTDOWN OF LINE 5, 8 (Oct. 2023), https://plgconsulting.com/white-paper-likely-market-responses-to-a-line-5-shutdown/; *see also* Press Release, Mich. Dep't of Att'y Gen., Attorney General Nessel Lauds "Game-changing" Line 5 Report (Nov. 17, 2023), https://www.michigan.gov/ag/news/press-releases/2023/11/17/attorney-general-nessel-lauds-game-changing-line-5-report.

[28] Brief of Amicus Curiae Michigan Attorney General Dana Nessel in Support of Appellants, In re Application of Enbridge Energy to Replace & Relocate Line 5, Nos. 369156, 369159, 369161, 369162 (consolidated), No. 369157 (Mich. Ct. App. Sept. 19, 2024).

[29] *See generally* Institute for Energy Economics and Financial Analysis, Enbridge Should Consider Closing Its Old, Troubled Line 5 Pipeline (January 2025), https://ieefa.org/sites/default/files/2025-01/Updated%20Authors-Enbridge%20Should%20Consider%20Closing%20Line%205_Report_January%202025_Final.pdf.

[30] The 2017 Dynamic Risk Report considered a 10- to 12-foot-wide tunnel. The Corps is considering a permit application for an 18- to 21-foot-wide tunnel. Obviously, distinct environmental impacts follow the larger tunnel size. For example, increasing the tunnel size would increase the amount of soil and rock materials extracted from beneath the Straits and necessarily impacts the disposal sites.

The 2017 Dynamic Risk Report's alternatives analysis was also limited because the Scope of Work established in the contract with the State of Michigan included a limitation preventing consideration of "mixed alternatives," meaning that it did not consider combinations of multiple lower-capacity alternatives that the State identified for its review.[31] This omission further undermines the Report's usefulness. Enbridge has the capacity to increase supplies using its existing Line 78.[32] Truck, barge, or rail could supplement the use of existing Lines in the short-term. To that end, EGLE should consider ways that a combination of alternatives might both meet an assumed need for Line 5 product and reduce climate impacts.

A closer look reveals that nearly all of the 400,000-450,000 barrels per day supplied to refineries by Line 5 would be replaced by market forces almost immediately:

- 100,000 barrels per day in existing excess capacity in another Michigan pipeline owned by Enbridge, Line 78, that does not transit the Straits;
- 60,000 barrels or more per day via existing rail terminals.
- 200,000 barrels per day by waterborne transport to refineries in Quebec;
- Within 18 months, another 110,000 barrels per day could be added to Line 78 simply by adding pumping capacity (without laying new pipe), and expansion of rail facilities could enable the delivery of even more oil.[33]

Third, as the 2017 Tribal Comments on the Draft Dynamic Risk Report explained in detail, the analysis was flawed because it did not compare the impact of each alternative on treaty rights, which is a necessary consideration.[34] The Tribal Comments on the Draft Report also pointed out a flaw that persists today: the analysis rested on the faulty premise that the Proposed Project, and any alternative, should maintain undiminished Enbridge's existing Line 5 product flow between Superior, Wisconsin and Sarnia, Ontario.[35] That premise promotes Enbridge's profits over the protection of the Great Lakes and Michiganders. Finally, as detailed in the Tribal Comments, the Dynamic Risk Report's underestimation of the cost of an oil spill in the Great Lakes, noted as in the $103-128 million range, is completely out of touch with the true costs, as evidenced by the Kalamazoo spill (which has cost more than one billion dollars to date, and a spill in the Great Lakes would be even costlier) and "does not provide a separate valuation estimate for subsistence, commercial or cultural values associated with the use of resources by tribes."[36]

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[31] 2017 Dynamic Risk Report, *supra* note 21, at ES-2.
[32] *See* Direct Testimony of Dr. Elizabeth Stanton, *supra* note 24, at 21.
[33] PLG CONSULTING, LIKELY MARKET RESPONSES TO A SHUTDOWN OF LINE 5, *supra* note 27, at 11.
[34] Letter to Hon. Rick Snyder, Governor for the State of Michigan, from Whitney Gravelle, President, Bay Mills Indian Cmty. (Aug. 1, 2017), https://perma.cc/284W-S57Q (Comments on Dynamic Risk Draft Alternatives Analysis).
[35] *Id.* at 5.
[36] *Id.* at 6 (quoting Dynamic Risk Draft Alternatives Analysis at 1-9).

IV. PART 303 DICTATES DENIAL OF THE JPA

A. Legal Framework

It is unlawful to dredge from or fill a wetland, or construct any development on a wetland, without a permit pursuant to Part 303 of NREPA.[37] Part 303 recognizes that a loss of wetland may deprive the people of the state of some or all of the benefits to be derived from a wetland.[38] Accordingly, before EGLE issues a Part 303 permit to Enbridge, EGLE must make several determinations about the Project and the permit including:

1. The permit "is in the public interest."[39]

2. The permit "is necessary to realize the benefits derived from that activity."[40]

3. The "activity is otherwise lawful."[41]

4. "[A]n unacceptable disruption will not result to the aquatic resources."[42]

5. "An applicant has used all practical means to minimize impacts to wetlands."[43]

A determination that a permit is in the public interest requires a comparison of the reasonably foreseeable benefits of the Project, weighed against the reasonably foreseeable detriments of the Project.[44] In determining whether an unacceptable disruption to aquatic resources will result, EGLE must first analyze the permit under Section 30302 and assess whether the permit is in the public interest. Then, the permit applicant must show either that "the proposed activity is primarily dependent upon being located in the wetland" or "a feasible and prudent alternative does not exist."[45]

1. This Project is not in the public interest

In determining whether an activity is in the public interest, the following criteria are considered:

(a) "The relative extent of the public and private need for the proposed activity.

(b) The availability of feasible and prudent alternative locations and methods to accomplish the expected benefits from the activity.

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[37] MCL 324.30304.
[38] MCL 324.30302(b).
[39] MCL 324.30311(1).
[40] *Id.*
[41] *Id.*
[42] MCL 324.30311(4).
[43] Mich. Admin. Code R 281.925.
[44] MCL 324.30311(2).
[45] MCL 324.30311(4)(a)-(b).

(c) The extent and permanence of the beneficial or detrimental effects that the proposed activity may have on the public and private uses to which the area is suited, including the benefits the wetland provides.

(d) The probable effects of each proposal in relation to the cumulative effects created by other existing and anticipated activities in the watershed.

(e) The probable effects on recognized historic, cultural, scenic, ecological, or recreational values on the public health or fish or wildlife.

(f) The size of the wetland being considered.

(g) The amount of remaining wetland in the general area.

(h) Proximity to any waterway.

(i) Economic value, both public and private, of the proposed land change to the general area."[46]

EGLE's decision on the activity "shall reflect the national and state concern for the protection of natural resources from pollution, impairment, and destruction."[47] The purpose of enacting Part 303 was to prevent loss of wetlands, which are important for storm control, wildlife habitat, groundwater recharge, pollution treatment, and erosion control.[48]

Here, any benefit from the Line 5 Tunnel Project is far outweighed by the "reasonably foreseeable detriments of the activity" as set out below.[49]

a. This Project will cause significant negative impacts to water resources in Michigan.

i. Wetlands

Enbridge proposes to destroy a broad swath of coastal wetlands in the process of constructing its fossil fuel tunnel. The wetlands at issue are ecologically rare, provide a habitat for threatened and endangered species, and contain culturally significant plants. Wetlands identified as W8, W10, W13, W19, W22,[50] W29, and W30 have coastal fen species, including Northern white cedar, Kalm's St. John's wort, *Juncus balticus*, little bluestem, Houghton's goldenrod,

[46] MCL 324.30311(2)(a)-(i).
[47] MCL 324.30311(2).
[48] MCL 324.30302(1)(b); *People v. Schumacher,* 276 Mich.App. 165, 171, 740 N.W.2d 534 (2007) (NREPA is intended to protect the environment and natural resources of this state.)
[49] MCL 324.30311(2).
[50] Enbridge provides no reasoning or justification for filling W22 in its description of the North Side Preferred LOD Alternative. *See* 2025 JPA, Attachment 7, Alternative Analysis and Minimization of Impacts Report (Rev. 3) (July 8, 2025), https://mienviro.michigan.gov/nsite/map/results/detail/2746869251480183093/documents.

false asphodel, shrubby cinquefoil, and dwarf lake iris.[51] Coastal fen is a rare natural community that generally is (or should be) afforded more protections in permitting processes. Houghton's goldenrod and dwarf lake iris, listed as threatened species, are abundant in the wetlands the Project will permanently impair, and they will be destroyed.

Plants in these wetlands, such as wiingashk, also known as sweetgrass, have cultural significance and importance to Bay Mills and other Tribal Nations. Ms. Alice Thompson and Bay Mills' scientists observed and documented sweetgrass blooming in W8 and W18 during the May 2023 delineation.

Thus far, Enbridge and EGLE have failed to properly acknowledge the quality and vulnerability of wetlands on the site. The Michigan Rapid Assessment Method (MiRAM) is a state-specific tool to determine the "functional value" of a particular wetland and assign a rating level to that wetland as compared to others.[52] Bay Mills incorporates the June 30, 2025 Expert Report of Alice Thompson that Bay Mills Indian Community submitted to the Army Corps of Engineers, included here as Attachment A. Functional assessments are helpful to evaluate wetland functions and wetland mitigation. All wetlands set to be destroyed by the Project are ranked as having "exceptional ecological value" using MiRAM because they are within 1,000 feet of the ordinary high water mark of Lake Michigan. Most of the wetlands also meet other criteria that make a wetland exceptional in Michigan, such as providing habitat for threatened and endangered species.[53] The Project will destroy wetlands of exceptional value. This matters, and it should be avoided.

In addition to the 1.53 acres of direct, Project footprint wetland impacts that are explicitly contemplated in Enbridge's materials, the activities set forth in the application materials describe a range of activities that will cause additional impacts to wetlands that, up to this point, EGLE appears to be ignoring.

First, wetlands are sensitive to groundwater drawdown, which will occur here during the construction of the massive exit shaft for the tunnel boring machine,[54] the boring of the tunnel, and throughout the duration of its operation. Groundwater drawdown that causes the loss of wetlands or the draining of surface water from a wetland requires a permit under Part 303.[55] The shallow, limestone bedrock underlying the wetlands at the Project site is known for being highly fractured and permeable, meaning that groundwater will easily flow through it. The result is that groundwater drawdown from construction will likely impact wetlands adjacent to the limits of disturbance. The extent of drawdown and the permanency of drawdown would be factors in how

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[51] Comments on Draft EIS, *supra* note 20, at 36.
[52] *Michigan Rapid Assessment Method*, EGLE, https://www.michigan.gov/egle/about/organization/water-resources/wetlands/michigan-rapid-assessment-method (last visited August 27, 2025).
[53] Thompson Report, Attachment A, at 23-24.
[54] According to Enbridge, the exit shaft will be a vertical shaft approximately 80-feet deep with a 65-foot diameter. *See* 2025 JPA, Attachment 6, Construction Sequence, Methods, Timing and Equipment (v2), 4 (April 17, 2025), https://mienviro.michigan.gov/nsite/map/results/detail/2746869251480183093/documents.
[55] MCL 324.30304.

the wetlands remaining in the Project area and surrounding areas will respond to ongoing dewatering of the shaft and tunnel. Wetlands with sustained drawdown, especially if concurrent with low lake levels or drought, could be susceptible to permanent and irreversible shifts in the plant communities.

Second, there will likely be additional impacts to wetlands due to the transformation of this relatively quiet, rural area into an industrial site overwhelmed with heavy construction and truck traffic. There will be an extremely high volume of traffic on Boulevard Drive. Truck hauling and construction will affect the wetlands, in particular W8, W12, W13, and W18. The North Side of the Project will see 240 truck trips along a gravel road (which is currently rarely used) each day over a six-year construction period.[56] These truck trips will cause dust and sedimentation that pollutes wetland habitats, destroying coastal, threatened, and culturally significant plant species.[57] Heavy truck traffic also introduces the risk of oil, brake line, transmission, and hydraulic fluid leakage impacting wetlands.

ii. Groundwater

In addition to the groundwater drawdown impacts leading to dewatering of wetlands, the Project will also impair groundwater resources. These impacts and risks are more fully described in the June 30, 2025 Expert Report of Limnotech that Bay Mills Indian Community submitted to the Army Corps of Engineers, included here as Attachment B. The construction of the tunnel will link together previously disconnected pockets and zones of groundwater in aquifers, disrupting normal conditions and increasing groundwater flow into the tunnel and access shaft during and after construction. The operation of the tunnel boring machine, the construction of the access shaft (including blasting), and the installation of the water intake pipe via horizontal directional drilling (HDD) all pose the risk of drilling fluids and other chemicals being released into groundwater, wetlands, and surface water.

There is also a risk of upward movement (upconing) of higher-density, saline, and sulfidic groundwater into extraction wells and tunnel infrastructure. Besides creating disposal challenges and potentially impacting nearby water supply wells, this water will accelerate corrosion of tunnel linings, bolts, brackets, supports, railings, ladders, walkways, wiring, sensors, pumps, fittings, and potentially the pipeline itself. The upconing of higher-density, saline, and sulfidic groundwater may also cause the dissolution of the bedrock, particularly where the bedrock is limestone. Dissolution of the bedrock (i.e., creating new voids and cavities underground) may subsequently lead to damage to the pipeline infrastructure and structural integrity of the tunnel. Additionally, if these cavities become large enough or connect with other voids/cavities, the ground overlying and underlying ground may collapse leading to pipeline failure, spills, and other damage to infrastructure, buildings, and roadways, along with other safety risks.

[56] Comments on Draft EIS, *supra* note 20, at 37.
[57] Thompson Report, Attachment A, at 29-30.

Groundwater at the Straits also contains dangerous dissolved gases, such as methane and hydrogen sulfide. Dewatering activities, including those associated with the discharge of contaminated groundwater and the venting of explosive or toxic gases, may create environmental and human health risks in and around the tunnel and tunnel support infrastructure.

Finally, EGLE must reckon with Enbridge's history of impacting aquifers and failing to report or remedy those impacts. In 2021, while working on another pipeline project styled as a "replacement" or "reroute" in Minnesota, Enbridge breached an aquifer, leading to the uncontrolled flow of groundwater.[58] This exemplifies the dangers that can occur from geological condition changes during large-scale construction projects. Even more troubling is Enbridge's record in responding to this aquifer breach: it admitted that it delayed notifying the relevant agency.[59]

b. The Project will have significant adverse impact on recognized cultural and historic values.

The proposed Tunnel Project will sit in a place that is sacred to Bay Mills and other Tribal Nations and is protected by treaty. Anishinaabe oral histories tell us that a great flood covered all of Earth. The animals that survived the flood were instructed by the Creator to swim deep beneath the water and collect soil to be used to recreate the world. All of the animals failed, until the lifeless body of the muskrat, the last animal that tried, resurfaced carrying a small handful of wet soil in its paws. The Creator took that soil and rubbed it on the Great Turtle's back, forming the land that became known as Turtle Island. Thus began the creation of North America. The Great Turtle emerged from the flood in the Straits of Mackinac, and the Great Lakes are considered the heart of Turtle Island and North America. The word "Mackinac" is derived from the original name of the Great Turtle in the Anishinaabe creation story. The Straits are more than a waterway; they are a place of ongoing and present-day spiritual significance. Since time immemorial, the Great Lakes have been an integral part of the BMIC's way of life, and they will continue to be an integral part of our culture and traditions for many generations to come.

The Straits of Mackinac has been the center for cultural contact, interaction, and commerce for thousands of years. The area is sensitive due to the presence of terrestrial and bottomland archaeological sites (including historic aircraft and shipwrecks), submerged paleo landscapes, and cemeteries or isolated human burials (many of which are Native American occupation sites that collectively contain a record of thousands of years of tribal history).[60] These sites and resources are non-renewable, so once they are damaged or destroyed, there are no alternative archaeological means of learning about the lives of the native people who first settled and developed unique adaptations to the natural environment in what is today northern Michigan.

The Anishinaabe maintain special ceremonies and traditions associated explicitly with the Straits, and they demonstrate a deep and enduring commitment to preserving this landscape for

[58] Press Release, Office of Minn. Attorney General, Enbridge Admits It Breached Aquifer in Line 3 Construction, Will Pay Fine and Perform Environmental Restoration (Oct. 17, 2022), https://www.ag.state.mn.us/Office/Communications/2022/10/17_Enbridge.asp.
[59] *Id.*
[60] Letter from Stacy Tchorzynski, Senior Archaeologist, Mich. State Historic Pres. Off., to Joseph Haas, Gaylord Dist. Supervisor, EGLE (Nov. 10, 2020).

the next seven generations. The Anishinaabe maintain a continuous association with and use of the Straits for economic and ceremonial purposes, including fishing, hunting, gathering, and as a central focus of their traditional cultural practices and beliefs.

The robust ecosystem of the Great Lakes has allowed for the trading and harvesting of many different traditional medicines and food sources. Maple sugar, berries, mushrooms, and manoomin are staples of the traditional diets of BMIC citizens.[61] In addition, along the Enbridge Line 5 pipeline, many other important plants are found: Northern white cedar (giizhik) and black ash (aagimaak), both of which are used for medicine, canoes, clothing, baskets, and ricing sticks.[62]

The Straits of Mackinac is of such cultural and religious significance to the BMIC and other Tribal Nations, that it is a Traditional Cultural Landscape ("TCL") eligible for listing in the National Register of Historic Places.[63] This special status derives from the historic and continuing relationships of BMIC and other Tribal Nations with the landscape, its ecosystems, and the species and features within them.

Within the Straits of Mackinac are numerous spawning grounds for different fish species—including Lake Whitefish—which our people hold in sacred regard. Oral histories recount that during a time of famine and desolation, the eight traditional clans—Bear, Turtle, Deer, Loon, Crane, Marten, Bird, and Whitefish—came together to discuss how to save the Anishinaabe throughout the Great Lakes Region. After much debate and discussion, the Whitefish clan chose to sacrifice itself to provide for the well-being of the people. The Whitefish clan submerged itself in the Great Lakes and became the Lake Whitefish that BMIC and other Tribal Nations fish and eat today, as a sole source and means to provide for the prosperity of the Anishinaabe.

Lake Whitefish remains an essential cultural and subsistence resource, playing a part in cultural traditions for naming and for feasting in celebration of children, ghost suppers, burial ceremonies, and other traditions. Lake Whitefish also continues to serve important functions in Anishinaabe governance and decision-making processes as a clan leader. These Anishinaabe teachings remind our peoples of the sacrifices of our brethren and the resulting solemn duty we have to protect and preserve these resources and these sacred places.

Fish and fishing are an integral part of the subsistence and livelihood of Bay Mills' citizens. Over half of Bay Mills' citizen households rely on fishing for some or all of their income. Any impact on waters and fisheries that reduces access to fish will disproportionately burden Bay Mills' citizens by drastically reducing household incomes. Reduced incomes, in turn, lead to

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[61] M. NIEVES ZEDEÑO, ET AL., BUREAU OF APPLIED RSCH. IN ANTHROPOLOGY, UNIV. OF ARIZ. TUCSON, TRADITIONAL OJIBWAY RESOURCES IN THE WESTERN GREAT LAKES: AN ETHNOGRAPHIC INVENTORY IN THE STATES OF MICHIGAN, MINNESOTA, AND WISCONSIN 50 (May 1, 2001), http://hdl.handle.net/10150/292680.

[62] *Id.* at 50-51.

[63] The Michigan State Historic Preservation Office concurs in the Tribal Nations' identification of the Straits of Mackinac as a TCL. *See* Letter from Ryan M. Schumaker, SHPO, to Katie Otanez, Regul. Project Manager, Detroit Dist., USACE, at 1 (May 15, 2024).

food insecurity and health disparities, among other economic and health-related effects. In addition, any substantial shutdown of the fishery would damage the transfer of traditional fishing knowledge to future generations.

BMIC has deep and inextricable relationships with their traditional homelands, landscapes, and the species within them. These relationships are what gave rise to the treaty terms securing the Tribal Nations' use rights for these lands and resources, and they remain as vital cultural context for the Tribal Nations' sovereign interests in economic and cultural self-governance and survival.

The Straits of Mackinac is a cultural and treaty-protected landscape that is not valued on the basis of individual treaty rights and resources alone, but on the interconnectedness of the land, water, and people. If EGLE fails to consider the significance of the Straits, the Great Lakes, and the dangers the Project poses to the treaty resources, culture, and traditions of BMIC, then EGLE risks destroying our way of life.

BMIC and other Tribal Nations' interpretation of our own ancestral sacred places must be primary and authoritative. Anishinabek knowledge bearers who possess sensitive and critical information about the Straits as a sacred place and its connection to the modern-day Tribal Nations must control it. If the archaeology consultants opine that we are not connected to the prehistoric site, then there is no reason to involve the Tribal Nations in this historicization. The result of this improper reliance on consultants instead of Tribal Nations' own interpretations is the erasure of Anishinabek history. Erasing Anishinabek connection to our historic and sacred places is fatal. A recent article in Smithsonian Magazine provides an example of how Indigenous peoples' connections to our sacred places are ignored.[64] As you can see, there is no mention of the Anishinabek and the author failed to include any mention of the local Indigenous peoples' perspectives or teachings, effectively disregarding ties to any modern-day Tribal Nation. Bay Mills is aware of additional research developed in this field that has resulted in conclusory statements that lack an essential grounding informed by Indigenous knowledge bearers. The archeology studies associated with the Project should have followed a two-step process. The first step should be limited to archaeologists' identification of whether an ancient, historic, or pre-historic site exists. That identification of a site should not be the final word on what a site might mean and how it connects to modern day Tribal Nations. The second step must be left to the Tribal Nations, who can properly explain the connection between the site and Tribal Nations. That expertise must be deferred to. Since that process has not been implemented here, any findings regarding cultural resources are inherently flawed.

Direct and indirect effects from Project construction, including ground disturbance, work activity, and excavation necessary to create the tunnel boring machine ("TBM") retrieval shaft on Point La Barbe, would negatively impact the cultural and historic values associated with not only this site, but also a tribal burial mound, and the Straits as a sacred and cohesive cultural landscape. Moreover, as described above, cultural resources are not exclusively archaeological sites. The fish in the lake are cultural resources. Plants—including those at burial sites, those that

[64] Sean Kingsley, *Clues to the Lives of North America's First Inhabitants Are Hidden Underwater*, SMITHSONIAN MAGAZINE (March 29, 2023), https://www.smithsonianmag.com/history/biggest-clues-lives-early-americans-hidden-underwater-submerged-prehistory-180981891/.

are used for medicines and those that are part of the ecosystem as a whole—are cultural resources. To Bay Mills, the natural resources that support the Tribe's treaty-protected activities are cultural resources, and the probable effects of the Project on these resources must be considered in a public interest analysis.

As discussed infra, the Project puts vulnerable and irreplaceable ecosystems and cultural resources, including spawning grounds for fish and species essential to BMIC's treaty use-rights and way of life, at great risk, including from irreparable damage to populations which may not be observable for years.

c. This Project will have an adverse impact on fishes and aquatic species.

Under both the public interest analysis and Part 303(4), EGLE must closely examine the impact of this Project on fishes and aquatic species. This Project will cause an unacceptable disruption and have an adverse impact on fishes and aquatic resources. For this reason alone, the permit cannot be issued.

The potential vibrations from the tunnel boring machine (TBM) and other construction activities are significant and long-lasting.[65] Although Enbridge argues that the level of vibration will not be significant and that the vibrations are not likely to impact anything but spawning areas, no data is provided to support this conclusion. In fact, no data is provided to indicate the actual levels of vibration that will be produced, the distance over which that vibration will travel, or the level of sound energy, particularly particle motion, that will reach the water as a result of these vibrations. Finally, no data is provided to support Enbridge's position that the vibrations produced by the TBM and other construction activities will not impact spawning or other activities and behaviors of fishes and aquatic resources.

Enbridge indicates that drilling will occur for periods of 30 to 60 minutes at a time with frequencies below 100 Hz. Enbridge also argues that these signals attenuate significantly at distances from the source, reaching 0.6 mm/s at 25 m. It is likely that signals far lower than 0.6mm/s are detectable by fishes. Therefore, once the signal gets to the water/substrate interface, they may be detectable by both the ear and lateral line of many fish species and potentially lead to temporary hearing loss or other alterations in fish behavior.

Numerous fishes and aquatic invertebrates communicate using sounds for finding mates, protecting territories, mating, and many other activities.[66] In many species of fish, males produce sounds to call females to mating sites and use an array of sounds during courtship. All species of fish can hear and use environmental sounds to learn about their surroundings.

Any sounds in the environment that prevent a fish (or invertebrate) from hearing sounds of biological relevance can significantly alter the animal's behavior and potentially lead to harm

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[65] *See* Technical Memorandum from Sam Swartz, McMillen, Jacobs & Assocs., to James Clift, EGLE, and Ryan Mitchell, Mich. Dep't of Transportation (Jan. 12, 2021).

[66] A.D. Hawkins, and A.A. Myrberg, *Hearing and sound communication under water*, *in* BIOACOUSTICS: A COMPARATIVE APPROACH 347 (B. Lewis ed., 1983).

for individual animals or populations. Changes in behavior can include leaving a breeding site or feeding site temporarily or permanently.

While Enbridge indicates that there will be no impact on fish at frequencies below 100 Hz, data suggests that behavior alterations occur in some fish species at frequencies as low as 10 Hz[67] and that nearly all species of fish hear well sounds that are well below 100 Hz. BMIC is concerned about behavioral impacts on fishes that may result in animals leaving feeding sites, abandoning nests of eggs or larvae, being forced to change migration paths, and not hearing potential mates or predators. These changes have long-term implications for animal survival and fitness that could hurt not only individual animals but also populations.[68] As discussed *supra*, fish are important to BMIC culturally and economically. Treaty rights to hunt, gather, and fish are "worthless without harvestable [resources]."[69] Any change to the fish population as a result of noise and vibrations from this Project would be a significant adverse effect.

EGLE has not properly examined the in-water sounds produced by either the land or underwater construction, nor has there been any attempt to measure the actual vibrations at the substrate-water interface or in the water just above the bottom. The one measure that Enbridge proposes, a hydrophone, only measures sound pressure. There has been no analysis and no planned analysis to measure particle motion, substrate vibration, or the sounds that come into the water from the substrate, the very signals that are most likely to impact fishes, eggs, and larvae.[70]

There is no data that provide real insight into the potential impacts of construction of Enbridge Line 5 on aquatic life, or on the impacts on aquatic life of any project that takes many years to construct, with continuous production of high levels of sound. Without any data to support Enbridge's claims and with available data suggesting that behavioral impacts in fishes are likely to occur, EGLE must conclude that the issuance of this permit is not in the public interest, that the Project will cause an unacceptable disruption to aquatic resources, and that the permit must be denied.

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[67] F.R. Knudsen, et al., *Avoidance responses to low frequency sound in downstream migrating Atlantic salmon smolt, Salmo salar*, 45 J. OF FISH BIOLOGY 227 (Aug. 1994).

[68] S. Lokkeborg and A.V. Soldal, *The influence of seismic exploration with airguns on cod (Gadus morhua) behavior and catch rates*, 196 ICES MARINE SCI. 62 (1993 Arne Hassel et al., *Influence of seismic shooting on the lesser sandeel (Ammodytes marinus)*, 61 ICES J. OF MARINE SCI. 1165 (2004).

[69] *United States v. Washington*, 853 F.3d 946, 965 (9th Cir. 2017) ("Just as the land on the Belknap Reservation would have been worthless without water to irrigate the arid land, and just as the right to hunt and fish on the Klamath Marsh would have been worthless without water to provide habitat for game and fish, the Tribes' right of access to their usual and accustomed fishing places would be worthless without
harvestable fish.").

[70] Note, it is possible to extrapolate particle motion levels from measures of sound pressure, but *only* in water that is significantly deeper than the wavelength of the lowest frequency sound of interest and never near the surface or bottom of the water column.

d. EGLE must consider the risk of an oil spill

The potential environmental impacts posed by allowing the existing pipeline to continue transporting oil for the next six+ years, during the preparation for and construction of the tunnel,[71] as well as after the tunnel is built, must be considered. Throughout tunnel construction and until the Project is complete, Enbridge expects to continue the operation of the dual pipelines in the Straits.[72] The risk of an oil spill from the deteriorating, 72-year-old pipeline is significant.[73]

Enbridge has a very troubling record of oil spills and an unimpressive record of pipeline maintenance. In addition to being responsible for the largest terrestrial spill of crude oil in the U.S., the catastrophic Kalamazoo spill on Line 6B, Enbridge's Line 5 has had more than 33 oil spills releasing at least 1.3 million gallons of oil into the environment.[74] Many of these spills have occurred in close proximity to waterways, including Lake Superior, Lake Michigan, and Lake Huron. Further, Enbridge's inadequate maintenance of the pipeline in Lake Michigan and problematic events related to that inadequate maintenance have been well-documented. These include, in part:

- Anchor supports have been damaged and caused the shutdown of the pipeline.[75]
- Anchor strike or strikes have damaged the pipeline,[76]
- The pipeline coating has worn off leaving the pipeline less protected.[77]

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[71] Gantt Chart (May 2, 2025), 2025 JPA, https://mienviro.michigan.gov/nsite/map/results/detail/2746869251480183093/documents.

[72] The December 2018 Third Tunnel Agreement between Governor Snyder, state agencies, and Enbridge provides that Enbridge may continue its use and operation of the existing Line 5 pipelines until the new tunnel pipeline is operational. Third Agreement Between the State of Michigan, Michigan Department of Environmental Quality, and Michigan Department of Natural Resources and Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P., Sec. 4.1, 4.2d.

[73] Before granting a section 401 certification, EGLE must consider both planned and potential discharges, including stormwater pond overflows and oil spills. *Compare* 33 U.S.C. § 1341(a)(1) (reflecting that Section 401 expressly governs activities and facilities that "may" cause discharges with *Waterkeeper Alliance v. EPA*, 399 F.3d 486, 505 (2d Cir. 2005) (noting that other sections of the CWA govern "actual" discharges"

[74] Using Pipeline Hazardous Materials Safety Administration data, National Wildlife Federation compiled a map of the spill locations along Line 5, *see Protect Our Global Freshwater Resources*, NAT'L WILDLIFE FED'N: LINE 5, https://www.nwf.org/Great-Lakes/Our-Work/Line-5 (last visited Aug. 27, 2025).

[75] Temporary Restraining Order, *Nessel v. Enbridge Energy, Ltd., et al*, No. 19-474-CE (Ingham County Cir. Ct. Michigan, June 25, 2020).

[76] Attorney General Nessel's Brief in Support of Motion for Preliminary Injunction, *Nessel v. Enbridge*, *Ltd*., *et al*, No. 19-474-CE (Ingham County Cir. Ct. Michigan), p.2.

[77] *Id.*

- Abandoned bore rods pose uncertain risks.[78]
- Numerous instances of unsupported spans of pipeline, posing a safety risk.[79]

A spill in the Straits could damage an enormous area. Researchers at the University of Michigan conducted a quantitative analysis of computer modeling of 840 oil spill cases in the Straits using a "worst-case discharge" from Line 5.[80] The analysis found that more than 1,000 kilometers of Lake Huron and Lake Michigan shorelines and specific islands are vulnerable to an oil release.[81] In three-quarters of cases, the models predicted an open water oil patch of at least 200 km2 within five days.[82]

Any analysis of an oil spill is incomplete without consideration of the impacts on Tribal Nations and their Treaty-reserved fishing, hunting, and gathering rights. Northern Lake Michigan and Northern Lake Huron are productive areas for several species of fish that BMIC and other Tribal Nations continue to harvest and that would be impacted by an oil spill.

e. EGLE must consider air quality and climate concerns

Air quality impacts from Project construction and operation must be analyzed by EGLE as a part of its Part 303 public interest test. Air quality effects from the Project include emissions of greenhouse gases ("GHG") associated with construction, including electricity used by the TBM and water in-take structure, and GHG emissions from materials such as cement and steel used to construct the tunnel; the release of gases or other pollutants in the event of a leak or explosion; construction-related dust; and air emissions associated with internal combustion engines used during construction and operation.

EGLE must also consider how climate the Project will contribute to climate change. Climate change disproportionately impacts Bay Mills and other Tribal Nations. The Project will emit GHG emissions during both the construction of the Project and throughout the Project's operational life, all of which lead to climate impacts. These climate impacts include the synergistic effects of further entrenching reliance on the fuels that are transported through Line 5.

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[78] *Enbridge won't clean up debris left in Straits of Mackinac until spring*, MLIVE (December 6, 2019), https://www.mlive.com/news/grand-rapids/2019/12/enbridge-wont-clean-up-debris-left-in-straits-until-spring.html

[79] 2016 Consent Decree, *U.S. v. Enbridge Energy, et al.*, Case No. 1:16-cv-914, 68b (requiring installation of anchor supports to reduce the unsupported spans to a maximum of 75 feet); *see* Letter to Hon. Bill Schuette, Att'y Gen. State of Mich. and Hon. Dan Wyant, Dir. EGLE, from Bradley F. Shamla, VP, US Operations, Enbridge (Nov. 2014) (documenting unsupported spans of the dual pipelines).

[80] DAVID J. SCHWAB, STATISTICAL ANALYSIS OF STRAITS OF MACKINAC LINE 5: WORST CASE SPILL SCENARIOS (March 2016), https://ippsr.msu.edu/sites/default/files/MAPPR/Mackinac-Line-5-Worst-Case-Spill-Scenarios.pdf.

[81] *Id.* at 10.

[82] *Id.*

According to expert Peter A. Erickson,[83] construction will cause 87,000 metric tons of CO2e emissions.[84] Operation-related impacts exacerbating climate change will also occur due to the operation of the Project's ventilation fans, sump pump, tunnel service vehicle, and lighting.[85] Operational impacts are calculated to consist of at least 520 metric tons of CO2e emissions annually.[86] Additionally, the products transported by the Project will release GHG emissions when produced, processed, and combusted.[87] Based on the amount of crude oil and natural gas liquids that the Proposed Project will transport, the Project will be associated with an additional 87,000,000 metric tons of CO2e emissions annually.[88]

These numbers translate to real-world impacts—none of which will cease when the last piece of construction equipment leaves the Straits. Northern Michigan is already experiencing climate-related impacts such as increased flooding, wildfires and poor air quality, droughts, heat waves, and expanding impacts of pests and pathogens.[89] Ice cover on the Great Lakes is forming later and melting sooner, which alters fish habitats.[90] Climate change is already impacting treaty-protected resources that are vitally important, such as:

- **Lake Whitefish**—or adikameg—is held in sacred regard and is part of Tribal Nations' oral histories. This fish is one of the primary commercial and subsistence fish for tribal fishers. But Lake Whitefish is a cold-water species, and it is widely recognized that climate change leads to the warming of their habitat. With climate change, fish habitats are impacted by warming waters, and a weakened natural ecosystem creates opportunities for invasive species.[91]

- **Walleye**—or ogaa—supports tribal commercial and subsistence fisheries. As the climate warms, walleye populations will become less sustainable. As the warming climate has increased the water temperatures of inland lakes, walleye

[83] Mr. Erickson is a Senior Scientist and the Climate Policy Program Director at Stockholm Environmental Institute. A leading expert on GHG emissions, he has authored numerous peer-reviewed studies and conducted research projects on behalf of numerous partners and clients, including the United Nations Framework Convention on Climate Change, the World Bank, the U.S. Environmental Protection Agency, and multiple state governments.
[84] Direct Testimony of Peter A. Erickson, 11 (Sept. 14, 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TV111AAD.
[85] *Id.* at 19.
[86] *Id.* at 11.
[87] *Id*.
[88] *Id.* at 20.
[89] Direct Testimony of Dr. Jonathan T. Overpeck, 6 (Sept. 14, 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TV1H4AAL.
[90] *See Climate Change Indicators: Great Lakes Ice Cover*, EPA, https://www.epa.gov/climate-indicators/climate-change-indicators-great-lakes-ice-cover (last visited August 27, 2025).
[91] *See* Direct Testimony of President Whitney Gravelle, 15-16 (Sept. 14, 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TUxgKAAT; Direct Testimony of D. Jonathan T. Overpeck, *supra* note 89, at 26.

populations are already declining, and additional population losses are expected under projected climate scenarios.[92]

- **Harvesting maple syrup**—or zhiiwaagamizigan—is a traditional practice, and maple syrup is considered a medicine, a traditional food, and a gift that brings about a new season of life. Sugar maple is also an important part of the health of Michigan forests, providing ecosystem benefits such as healthy soil that can support other species, water filtration and purification, and landslide protection. Climate change will cause changes in temperature and precipitation in the region that will threaten the tree species. Increasing aridity due to climate change will hurt the sugar maple, and it will compound other forest stressors such as invasive species, insect pests and plant disease, and the likelihood of severe wildfire.[93]

- **Loons**—or maang—are culturally significant as one of the seven primary clans of the Anishinaabe. Loons also are ecologically important as top trophic-level predators in lake habitats. Already, climate change has caused or contributed to loon population loss, and it is projected to have further negative effects on loons by reducing breeding habitats in Michigan and increasing the frequency and intensity of botulism outbreaks. As a result, climate change will drastically reduce the loon population in Michigan.[94]

- **Wild rice**—or manoomin—is an irreplaceable cultural, spiritual, nutritional, and commercial resource and sacred to Bay Mills. Warmer temperatures are likely to harm wild rice and contribute to population reductions. Climate change-induced alterations in precipitation regimes will likely lead to flooding and high water levels in the spring when wild rice is vulnerable to flooding, and drought conditions later in the season that can impede harvesting. Climate change will also indirectly impair wild rice by improving habitat conditions for species that damage wild rice waters and worsening pathogen and pest infestations.[95]

GHG emissions wreak havoc on the climate, changing temperature and precipitation patterns, and devastating natural resources that are culturally, spiritually, and economically important to Bay Mills and other Tribal Nations. For this Project, then, EGLE must address how

[92] Direct Testimony of Dr. Karen M. Alofs, 3-12 (Sept 14. 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TUxwhAAD.
[93] Direct Testimony of Dr. Ines Ibanez, 7-9 (Sept. 14, 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TUy3gAAD; Direct Testimony of Dr. Jonathan T. Overpeck, *supra* note 89, at 25-26.
[94] Direct Testimony of Dr. Alec R. Lindsay, 7-12 (Sept. 14, 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TUy7PAAT.
[95] Direct Testimony of Dr. Daniel Larkin, 4-16 (Sept. 14, 2021) (MPSC No. U-20763), https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068t000000TUxo5AAD.

climate change impacts such as increased and flash floods, much more variable Great Lakes water levels, and corresponding erosion will affect pipeline safety, the future of this proposed Project, and the environmental effects of this Project.

f. EGLE must consider the geology and risks of explosion on public health and the environment.

EGLE must consider the geology along the tunnel configuration in the Straits to properly analyze the effects on public health and the environment. There are significant data gaps regarding the geologic formations that will be bored through to create the tunnel. More than half of the geotechnical borings that were advanced as part of the tunnel design did not penetrate to the full depth of the tunnel, particularly in the deepest tunnel sections. Without adequate geotechnical data, the TBM will be flying blind in the areas of the greatest pressures and depths. Pressurized boring and probing ahead of the tunnel boring machine are not adequate replacements for actual geotechnical survey information. Further, the overall integrity of the rock through which the tunnel will be bored, and into which access approaches and shafts will be blasted, is highly problematic. The limited geotechnical data that is present shows consistent low core recovery and common voids, fractures, and brecciated zones encountered during drilling. Voids present construction and operational risks related to sealing the tunnel from groundwater and dangerous gas infiltration, as well as threats to the structural integrity of the tunnel due to adjacent voids that go undetected or that may expand or collapse following construction.

EGLE's analysis should also include the possible consequences of encountering methane and other toxic gases. Only 24 groundwater samples were collected in the location where Enbridge proposes to construct the tunnel, and dissolved methane was detected in four of the samples. Significantly, none of the 24 samples were collected from the deepest parts of the proposed tunnel alignment. Because of the lack of geotechnical data, as explained above, it is possible that elevated concentrations of methane will be encountered during construction along the proposed path of the tunnel. Encountering methane during tunneling could lead to an explosion during the construction phase of the Project, risking both environmental consequences and human life.

B. The Permit will cause an unacceptable disruption to aquatic resources

1. Legal Framework

Part 303 provides that:

> A permit shall not be issued unless it is shown that an unacceptable disruption will not result to the aquatic resources. In determining whether a disruption to the aquatic resources is unacceptable, the criteria set forth in section 30302 and subsection (2) shall be considered. A permit shall not be issued unless the applicant also shows either of the following:
>
> > (a) The proposed activity is primarily dependent upon being located in the wetland.

(b) A feasible alternative does not exist.[96]

Section 30302 focuses on the important role that wetlands play both in the environment and for human health and safety.[97] The criteria in subsection (2) are covered *supra* in Section IV(a)(1). Both of these sets of criteria demonstrate that the JPA should be denied. In addition, the applicant has failed to make the required showings under Part 303—the Project is not wetland dependent, and a feasible and prudent alternative exists.

2. The Project is not wetland dependent

The Tunnel Project is not wetland dependent. In order to determine whether the Project is "primarily dependent" upon being located in a wetland and to evaluate the feasible and prudent alternatives to the Tunnel Project, the purpose of the project must be established.[98] Rule 2(a)(4) states, "[a] permit applicant shall completely define the purpose for which the permit is sought, including all associated activities."[99] Once the permit applicant defines the purpose, EGLE "shall independently evaluate and determine if the project purpose has been appropriately and adequately defined by the applicant, and shall process the application based on that determination."[100] If the Project applicant's definition of the purpose is "too narrow, thereby precluding a comprehensive examination of alternatives," then EGLE must evaluate the purpose "to ensure it is not so narrow that it precludes a complete analysis of alternatives."[101]

Enbridge has failed to state the purpose of the Project, leaving the application incomplete. Making matters worse, this omission may be strategic, considering that in the past, Enbridge has restated its purpose depending on the audience.[102] The lack of, or changed descriptions of, Enbridge's statement of purpose is significant because it hampers EGLE and other agencies from

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[96] MCL 324.30311(4).
[97] MCL 324.30302.
[98] Mich Admin Code R 281.922a(4).
[99] *Id*.
[100] *Id.;* Subject: Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 Pa 451, As Amended Petition of Carol Dubuc, 2004 WL 2371410 at *10.
[101] Subject: Part 301, Inland Lakes and Streams, and Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 Pa 451, As Amended (NREPA) Petition of Narrows Land Development Company, 2007 WL 2142648, at *28; Subject: Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 Pa 451, As Amended Petition of Charles Miller, 2010 WL 1259345, at *9 (rejecting an applicant's stated purpose when it accommodated personal preference and "precluded a complete analysis of feasible and prudent alternatives on an objective basis considering the particular features of this parcel of land.")
[102] Past descriptions of the Project's purpose are notably distinct from each other. For instance, in its 2020 Part 303 permit, Enbridge simply states, "[t]he project's purpose is to accommodate the replacement of the portion of Line 5 twin pipelines that cross the straits." Yet, in its MPSC permit application, Enbridge offered: "The purpose of the Project is to alleviate an environmental concern to the Great Lakes raised by the State of Michigan relating to the approximately four miles of Enbridge's Line 5 that currently crosses the Straits of Mackinac." The referenced "environmental concern" is the risk of an oil spill in the Great Lakes.

evaluating the actual purpose. EGLE must require Enbridge to provide a statement of the Project's purpose before proceeding; then EGLE must undertake its own analysis of the purpose. If EGLE defers to a subjective statement of purpose, it will enable all permit seekers to manipulate the purpose of their projects and avoid the wetland protection goals of Part 303. Rule 2(a)(5) requires EGLE to "consider a proposed activity as primarily dependent upon being located in the wetland *only* if the activity is the type that requires a location within the wetland and *wetland conditions* to fulfill its basic purpose."[103] Even without a statement of purpose, it is obvious that nothing about transporting petroleum products in a pipeline requires the location to cross wetlands. Accordingly, Enbridge and EGLE must presume that a non-wetland location will have less adverse impact.

3. A feasible and prudent alternative exists

If the purpose is not wetland dependent, "it is presumed that a feasible and prudent alternative involving a non-wetland location will have less adverse impact on aquatic resources than an alternative involving a wetland location."[104] An alternative is feasible and prudent if the alternative is available and capable of being done after taking into consideration cost, existing technology, and logistics, and if the alternative would have less adverse impact on aquatic resources.[105] "[F]easible and prudent alternatives" include alternative locations, configurations, sizes, construction technologies, layouts and designs.[106]

As discussed above in Section III, feasible and prudent alternatives exist. Because Enbridge cannot make a showing on either Part 303(4)(a) or (b), the JPA must be denied.

4. The detrimental effects that the proposed activity will have are significant.

As discussed throughout these comments, the numerous detrimental effects that will result from this Project will significantly impact public and private uses, including fishing, rare plant viewing, and impacts to Tribal cultural resources.[107] In addition to these impacts, EGLE must consider the impacts of vibrations and noise on surrounding structures. Bay Mills incorporates herein the Expert Report of Gennaro G. Marino, Attachment C. First, the sound report[108] is missing key information, including any information about the potential maximum charge of the blasts. Instead, the report indicates that there will be a week of blast tests to assess the acceptable level of blasting, but provides no details about how the testing will determine whether the total simultaneous charge is acceptable Missing test information includes: blasting sequence, locations of blasting sites, locations of seismograph monitors, and ground vibration threshold for both terrestrial and marine locations. Second, there is no consideration of the fact that the Peak Particle Velocity threshold for surrounding structures will differ based on the nature of the structure:

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[103] Mich. Admin. Code. R. 281.922a(5) (emphasis added).
[104] *Id*. at 281.922a(8).
[105] *Id*. at 281.922a(6)(a) & (b).
[106] *Id*. at 281.922a(6).
[107] MCL 324.30311(c).
[108] Stantec, *Ambient Sound Survey and Area of Potential Impact Assessment*, at 1 (Oct. 18, 2023).

modern industrial facilities will have a different threshold than historic buildings or cultural resources.

The Project will also have significant impacts on the tourism industry. The Great Lakes host millions of tourists annually, who come to enjoy nature, boating, and other water sports, as well as fishing. These local tourism dollars generate revenue for local economies, support businesses and services, create local jobs, and bring the state revenue. Enbridge proposes to disrupt that tourism for six+ years, with endless noise, dust, light pollution,[109] and construction traffic.[110]

V. A MICHIGAN ENVIRONMENTAL PROTECTION ACT ("MEPA") ANALYSIS SUPPORTS THE DENIAL OF THE PROJECT PERMIT APPLICATION.

EGLE must fulfill its obligation under MEPA to consider the environmental impacts of permitting Enbridge's Tunnel Project. For each permitting decision—including the submerged lands, wetlands, as well as the 401 certification—EGLE must satisfy its obligations under MEPA.

The Michigan Constitution expressly directed the Legislature to provide for the protection of the environment. The Constitution provides:

> The conservation and development of the natural resources of the state are hereby declared to be of paramount public concern in the interest of the health, safety and general welfare of the people. The legislature shall provide for the protection of the air, water and other natural resources of the state from pollution, impairment and destruction.[111]

The Michigan Supreme Court has held that this constitutional declaration imposes a "mandatory legislative duty to act to protect Michigan's natural resources."[112] Section 1705(2) of MEPA sets forth the requirements for agencies and reviewing courts in connection with administrative proceedings:

> In administrative, licensing, or other proceedings, *and in any judicial review of such a proceeding*, the alleged pollution, impairment, or destruction of the air, water, or other natural resources, or the public trust in these resources, *shall be determined*, and conduct *shall not be authorized or approved* that has or is likely to have such

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[109] Round-the-clock construction activities and lighting, including steady-state lighting and flashing lights, will dramatically impact conditions at nearby Headlands International Dark Sky Park. This dark sky park recognizes and promotes excellent stewardship of the night sky and depends upon night sky brightness of a certain caliber.

[110] Gantt Chart, *supra* note 71.

[111] Const. 1963, art. 4, § 52.; *Nat'l Wildlife Fed'n v. Cleveland Cliffs Iron Co.*, 471 Mich. 608, 656, 684 N.W.2d 800, 829 (2004), overruled by *Lansing Sch. Educ. Ass'n v. Lansing Bd. of Educ.*, 487 Mich. 349, 792 N.W.2d 686 (2010).

[112] *Vanderkloot*, 392 Mich. 159, *supra* note 16, at 178-79; *see also Buggs v. MPSC*, 2015 WL 159795, *supra*, note 16, at *6-7.

an effect if there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare.[113]

MEPA provides that administrative agencies (and reviewing courts) must determine "the alleged pollution, impairment, or destruction of the air, water, or other natural resources, or the public trust in these resources," and forbids the approval of a project "that has or is likely to have such an effect if there is a feasible and prudent alternative."[114] Soon after MEPA's enactment, the Michigan Supreme Court recognized that it "represents a comprehensive effort on the part of the legislature to preserve, protect and enhance the natural resources so vital to the well-being of this State."[115]

Courts have recognized that this language imposes on state agencies a "substantive" requirement to consider the impact proposed projects will have on the environment.[116] The Michigan Supreme Court has held, in *Vanderkloot*, that MEPA proscribes "pollution, impairment, or destruction" of natural resources" "unless it is demonstrated that there is no feasible and prudent alternative" to the conduct and "such conduct is consistent with the promotion of the public health, safety and welfare in light of the state's paramount concern for the protection of its natural resources."[117] The term "impairment" of natural resources "encompasses probable damage to the environment.[118]

MEPA requires that EGLE examine the impact the operation of the tunnel and the tunnel construction will have on the aquatic environment and the surrounding air, land, water, and wildlife, as well as on Bay Mills' and other Tribal Nations' federally protected treaty fishing rights and resources. MEPA applies to each of the permitting and certification determinations that EGLE must make here, including the review of applications for a wetlands permit, GLSLA permit, NPDES permit, and Clean Water Act 401 certification, as well as the Coastal Zone Management Act review. It is not hard to imagine that drilling a massive tunnel into the lakebed of the Straits of Mackinac will have significant consequences on the environment. As noted above, the USACE recognized the significant impact that the Project will have on the environment and decided to compile an EIS.

To date, Enbridge has failed to adequately detail or study all the environmental impacts that will result from the Tunnel Project. These comments highlight some of the massive impacts of this Project including construction impacts that include destruction of wetlands; groundwater drawdown and groundwater and surface water pollution and harm to the fisheries and endangered plant populations; increased air pollution including greenhouse gas emissions; perpetuation of the risk of oil spills along the length of Line 5; and the disruption and destruction of a TCL for

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[113] MCL 324.1705(2) (emphasis added).
[114] *Id.*
[115] *Vanderkloot*, *supra* note 16, 392 Mich. at 183.
[116] *See, e.g., Buggs, supra* note 17, at *6-7; *Vanderkloot*, *supra* note 16, 392 Mich. at 220.
[117] *Vanderkloot*, *supra* note 16, 392 Mich. at 220 (citing MCL 391.1203, replaced by MCL 324.1703).
[118] See *Ray v Mason County Drain Comm'r*, 393 Mich 294, 224 NW2d 883 (1975).

Tribal Nations and impacts to cultural and historic resources, and disruption of the tourist industry. A review of the effects makes it clear that significant pollution and impairment of natural resources will occur.

VI. THE GREAT LAKES SUBMERGED LAND ACT REQUIRES A PERMIT FOR THE TUNNEL, AND ENBRIDGE CANNOT MEET THE PERMIT STANDARD.

The Great Lakes Submerged Lands Act ("GLSLA") governs the conveyance and private use of "all of the unpatented lake bottomlands and unpatented made lands in the Great Lakes, including the bays and harbors of the Great Lakes, belonging to the state or held in trust by it, including those lands that have been artificially filled in,"[119] and "all of the waters of the Great Lakes within the boundaries of the state."[120] Although the term bottomlands is not expressly defined in the statute, the statute's use of the term makes evident that it extends to the subsurface estate.[121] Further, EGLE's own regulations define "bottomlands" to mean all "lands in the Great Lakes . . . lying below and lakeward of the ordinary high water mark."[122]

Section 12 of the GLSLA prohibits earth-moving activities with respect to lands covered under the Act unless a permit from EGLE is obtained.[123] Without such a permit, "a person shall not … [d]redge *or* place spoil or other material on bottomland[.]"[124] These provisions apply broadly and subject any person who "*excavates or fills or in any manner alters or modifies*" any lands covered under the GLSA without EGLE authorization to criminal penalties.[125] EGLE's longstanding implementing rules define "dredging" to encompass "*removal of any* mineral, organic, or *other material* from or within the bottomland or waters of the Great Lakes by any means."[126]

To date, Enbridge has failed to submit a permit application for the tunnel itself—and has only sought a permit for the installation of intake structures on the bottomlands. Based on the language of the statute and regulations, the tunnel Project's removal of more than 2 billion[127]

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[119] MCL 324.32502.
[120] *Id.*
[121] For instance, it addresses subsurface that the state should "reserve mineral rights, including coal, oil, gas, sand, gravel, stone, and other materials or products found in these lands." MCL 324.32503(1).
[122] Mich. Admin. Code R 322.1001(e).
[123] MCL 324.32512. *See* MCL 324.32502 ("The word 'land' or 'lands' as used in this part refers to the aforesaid described unpatented lake bottomlands and unpatented made lands and patented lands in the Great Lakes and the bays and harbors of the Great Lakes lying below and lakeward of the natural ordinary high-water mark[.]"). Although the statute does not define bottomlands.
[124] *Id.*
[125] MCL 324.22510(1) ("[A] person who excavates or fills or in any manner alters or modifies any of the
land or waters subject to this part without the approval of the department is guilty of a misdemeanor[.]").
[126] Mich. Admin. Code R322.1001(h) (emphasis added).
[127]

pounds of material from the bottomlands necessitates a GLSA permit. It similarly defies common sense to conclude that a four-mile tunnel and fossil fuel pipeline occupying those lands for 99+ years does not require authorization under the GLSLA. EGLE should not allow this Project to proceed without receipt of, and evaluation of, the permit application.

Even if EGLE receives a permit application for the boring of a tunnel in the bottomlands, EGLE could permit the private use of public trust lands *only* if it determines that "the private or public use of those lands and waters will not substantially affect the public use of those lands for [public trust purposes]."[128] EGLE's rules mandate an environmental assessment prior to the issuance of a permit for a covered activity, requiring that "existing and potential adverse environmental effects shall be determined" and that approval shall not be granted unless EGLE has determined both of the following:

> (a) That the adverse effects to the environment, public trust, and riparian interests of adjacent owners are minimal and will be mitigated to the extent possible.
>
> (b) That there is no feasible and prudent alternative to the applicant's proposed activity that is consistent with the reasonable requirements of the public health, safety, and welfare.[129]

As our comments point out, and as further detailed in the comments of the Grand Traverse Band, the Project will result in massive impacts on environmental and tribal interests and may not be feasible on its own. Moreover, feasible and prudent alternatives exist.

Beyond the significant impacts of tunneling activities through the bottomlands—which EGLE is utterly and unlawfully ignoring—the Project poses a risk of pollution and impairment to the bottomlands, groundwater, and surface water due to the construction of the water intake pipe via HDD. The Draft EIS recognizes that "during the HDD installation of the water intake pipe, approximately 20,000 gallons of drilling fluid (primarily consisting of water and bentonite with additives such as lubricants and greases) could be released at the interface of the HDD and the lakebed."[130] The basis for this estimate is unclear, and the actual amount of drilling fluid release could be substantially higher. At this juncture, EGLE does not have a full understanding of the chemical constituents that will be used in the drilling fluid, but HDD drilling fluid may contain PFAS chemicals, which can wreak havoc on water quality and aquatic life in very low concentrations.[131] The threat of such a release is a major concern due to its potential impact on the Great Lakes and the spawning habitat on the lakebed.

Finally, EGLE should require Enbridge to use Type III turbidity barriers surrounding the HDD exit point. Type II barriers are susceptible to tide and wave damage and are thus inappro-

[128] MCL 324.32502.
[129] Mich. Admin. Code R 322.1015.
[130] DEIS Vol. 1, at 4-76.
[131] LimnoTech Report, Attachment B, at 19.

priate for use in the Great Lakes. Even with the utilization of a Type III turbidity barrier, construction activities that generate turbidity must be avoided or halted in the late fall, when lake trout and whitefish spawn near the Project area.

VII. CONCLUSION

The JPA underscores the numerous data gaps and detrimental impacts that the Project will have on Tribal communities, northern Michigan, and the Great Lakes. EGLE is charged with "protect[ing] Michigan's environment and public health" and "mak[ing] reasoned decisions … informed by science…that reflect [its] mission."[132] EGLE must fulfill its mission, and the only way to protect Michigan from the impacts described in these comments is to deny the JPA.

Should you have any questions, please do not hesitate to contact the Bay Mills Legal Department at rliebing@baymills.org.

Chi miigwetch (thank you),

Whitney Gravelle, President
Bay Mills Indian Community

[132] *Mission, Vision, and Values*, EGLE, https://www.michigan.gov/egle/about/mission (last visited Aug. 27, 2025).

EXHIBIT INDEX

Attachment A. Expert Comments of Alice Thompson on Draft Environmental Impact Statement (June 27, 2025)

Attachment B. Expert Report of LimnoTech on Draft Environmental Impact Statement (June 30, 2025)

Attachment C. Expert Report of Marino Engineering Associates on Draft Environmental Impact Statement (June 30, 2025)

Attachment A

Expert Comments of Alice Thompson

Thompson & Associates Wetland Services, LLC

South Milwaukee, WI

Enbridge Line 5 Tunnel Project

ACOE Draft Environmental Impact Statement dated May, 2025

June 27, 2025

Contents

Introduction

I, Alice Thompson of Thompson and Associates Wetland Services, LLC, was retained by the Bay Mills Indian Community ("Bay Mills") to provide expert review of impacts to wetlands from the Enbridge Line 5 Tunnel Project ("Project"). Throughout my review, I have collaborated with scientists in the Bay Mills Biological Services Department.

I have reviewed permit materials and potentially impacted wetlands since 2023. Field Reviews of the project area near the Straits of Mackinac (the "Straits") with and on behalf of Bay Mills were done in 2023 and 2024.

This review is complementary to reviews by the scientists in the Bay Mills Biological Services Department, the Great Lakes Indian Fish and Wildlife Commission ("GLIFWC") and other experts retained by Bay Mills.

Qualifications

Education and Work Background

I am the owner and Senior Scientist at Thompson & Associates Wetland Services, LLC, based in South Milwaukee, WI, and have been since 1998. I received a Master of Science Degree in Biology from the University of Wisconsin-Milwaukee in 1995. My research focus was reed canary grass (*Phalaris arundinacea*), a wetland invasive species. I maintain professional certification as a Senior Professional Wetland Scientist (SPWS) with the Society of Wetland Scientists. I have been a Wisconsin Department of Natural Resources (WDNR) Assured Delineator since 2006. Thompson and Associates is a Woman-Owned Business Enterprise (Wisconsin Department of Commerce) and a W-DBE with Unified Certification.

I have experience in wetland delineation, wetland restoration, stewardship planning, invasive species control, permitting and mitigation. I was the principal author of the award-winning Wetland Restoration Handbook for Wisconsin Landowners, printed by the WDNR. I teach field workshops at the University of Wisconsin-Milwaukee Field Station in Saukville, WI. My field class in "Wetland Delineation for Beginners" is routinely offered (2017, 2019, 2023, 2024 and scheduled for August 2025).

I have attended annual Wisconsin Wetlands Association Science Conferences for over 30 years, and attended the Michigan Wetlands Conference in 2023. My company is contracted to provide oversight to utility projects in UP Michigan, and I assisted in a large linear wetland delineation near Watersmeet, MI in 2023.

Thompson and Associates' diverse clients include municipalities and counties, landowners, engineering companies, utilities, religious organizations, non-profits and tribes. I have provided expert reports and been an expert witness for a variety of wetland issues in the Midwest in addition to this project including the Guardian Pipeline, SE Wisconsin (Pro Bono for Neighbors Standing United, Attorney Dennis M. Grzezinski, 2003); Gtac Mine, Iron County, Wisconsin (Bad River Band of Lake Superior Chippewa, 2013-2014); Polymet Mine, Northern Minnesota (Friends of Boundary Waters Wilderness, Earthjustice, 2017); Back 40 Mine, UP Michigan (Menominee Indian Tribe, Earthjustice, 2018-2019); and Enbridge Line 5 Wisconsin Segment Relocation Project in northern Wisconsin (Bad River Band of Lake Superior Chippewa, Earthjustice, 2020-2025).

Observation of Wetland Delineations for the Line 5 Tunnel Project

Bay Mills provided the U.S. Army Corps of Engineers (USACE) with notice that I was engaged on this Project on April 27, 2023, consistent with Bay Mills' role as a Cooperating Agency and a consulting tribal nation. I attended and observed the field studies related to the Project. I was present as a Bay Mills representative and monitor of the field work on May 22-26, 2023, June 13-14, 2023 (for the USACE visit) and May 20-23, 2024. I was not present for August 15-17, 2023 delineation field work. In collaboration with GLIFWC and Bay Mills, I contributed to Bay Mills' comments related to the Project dated December 29, 2023, and August 22, 2024.

Descriptions of Wetlands

The Straits' wetlands were recently delineated by Stantec through field work in 2023 and 2024. I was present as a Bay Mills representative and monitor of the field work on May 22-26, 2023, June 13-14, 2023 (for the USACE visit) and May 20-23, 2024. My observations and comments are incorporated in the comments that Bay Mills submitted to USACE on December 29, 2023, and August 22, 2024.

The Draft Environmental Impact Statement (DEIS) offers minimal information about the wetlands impacted on this project beyond Table 3.4-4 Delineated Wetlands near Main Project Locations (DEIS at 3-42). The following descriptions are drawn for the most part from the Stantec Delineation Report and data sheets (Stantec. 2024). In some wetland descriptions I have augmented the Stantec data with my observations in the field during the delineation field work. All plants are from the Stantec data sheets unless otherwise indicated. Common names are generally used below. I have included photos that I took during the delineation field work.

There are nine wetlands located all or partly in the construction footprint of the Applicant's Preferred alternative (DEIS at 4-50, Figure 4.4-1). Permanent wetland fill is proposed for W 22, W 29, W 30 and W 28. The following wetlands are partially filled by the project – the % of

the acreage shown on Figure 4.4-1 (DEIS at 4-50) – W 21 (72% of total), W 19 (84% of total), W 10 (23% of total), W 8 (3% of total) and W 3 (less than 1% of total). Additional wetlands will be affected in other ways than construction fill as described below.

Wetlands Inside the Construction Footprint

The following wetlands are all or partially within the construction footprint, and the DEIS recognizes that the "entire acreage within footprint will be permanently impacted" (DEIS at 4-50, Figure 4.4-1). Collectively, the following nine wetlands are mapped as 15.1 acres, 1.53 acres of which are in the directly impacted construction footprint.

Wetland 22

W 22 is adjacent the existing Enbridge yard (State Jurisdiction). Stantec DP 26 describes the wetland as having coastal fen species, including northern white cedar in the shrub layer, Kalm's St. John's wort, *Juncus balticus* and little bluestem in the herbaceous layer. Marl was found on the soil surface. Despite the obvious disturbances adjacent the yard and fence maintained area, the wetland retains not only native species, but coastal fen indicator species.

Figure 1. W 22 showing active hydrology. May 20, 2024, Photo 0095

Figure 2. W 22 with Enbridge yard and fence to upper left. May 24 2023, Photo 378

Wetland 30

W 30 is a small basin within a maintained utility corridor (State Jurisdiction). The wetland had coastal fen indicator species including northern white cedar and Kalm's St. John's wort in the shrub and herbaceous layer, and *Juncus balticus*, Houghton's goldenrod, and false asphodel in the herbaceous layer. There were minor levels of non-native species, and soils met hydric indicator depleted below dark surface (A11). Despite the evident occasional disturbance from the overhead utility, native coastal fen indicator species predominate.

Figure 3. W 30 taken on 5/23/2024. Photo 355

Wetland 29

W 29 is a narrow basin surrounded by limestone bedrock glade (State Jurisdiction). The plant community recorded by Stantec at DP 231 is entirely native. It also contained coastal fen indicator species including Kalm's St. John's wort, Houghton's goldenrod, and little bluestem with creeping juniper as well.

Figure 4. W 29 on May 23, 2024, Photo 351

Wetland 28

W 28 is a small, wooded wetland (Northern hardwood forest) (State Jurisdiction). It is dominated by balsam poplar and quaking aspen in the overstory, red osier dogwood and round leaved dogwood in the shrub layer and starry false Solomon's seal and big leaved aster in the herbaceous layer. No non-natives are noted at DP 111 however there was 4% common buckthorn noted on DP 217.

Figure 5. W 28 May 21, 2024, Photo 212

Wetland 10

W 10 is a basin on the bend of Boulevard Dr. on the southeast side of the site (Federal Jurisdiction). It has coastal fen indicator species including northern white cedar in the tree, shrub and herbaceous layers and shrubby cinquefoil in shrub and herbaceous layers. The herbaceous layer included Kalm's St. John's wort, Ohio goldenrod, *Carex eburnea*, *Carex capillaris*, little bluestem and false asphodel. (DP 24, 109, 118). The soils were a coarse sandy loam with marl on the surface. Hydrologic connections to the Straits include under the porous roadbed and in high water events.

Figure 6. W 10 facing north from Boulevard Dr. on May 24, 2023. Photo 360

Figure 7. W 10 on June 13, 2023 - close up of light green shrubby cinquefoil. Photo 631

Wetland 21

W 21 (State Jurisdiction) is a long linear wetland basin adjacent a 2-track within the surrounding limestone bedrock glade community. Coastal fen indicator species (DP 32 & 211) include northern white cedar in the tree (stunted) and shrub layer and the herbaceous layer including shrubby cinquefoil, Kalm's St. John's wort, *Eleocharis elliptica*, silverweed, Houghton's goldenrod, false asphodel, little bluestem and creeping juniper. Some disturbance tracks were seen in the wetland indicating soft soils.

Figure 8. W 21 facing south - southeast- Lake Michigan in far background. May 24, 2023. Photo 435

Wetland 19

W 19 is the largest basin in the project area (0.89 acres) under Federal Jurisdiction. It is adjacent Boulevard Dr. and a 2-track. Hydrologic connections to the Straits include under Boulevard Dr. through the porous rock and in high water events. It is represented by four data points: DP 29, 30, 104 and 105. It contains both threatened species Houghton's goldenrod and dwarf lake iris. Coastal fen indicator species include northern white cedar in the tree (stunted), shrub and herbaceous layer. Shrubby cinquefoil was found in the shrub and herbaceous layer. The herbaceous layer included *Carex crawei*, *Eleocharis elliptica*, *Symphyotrichum boreale*, Ohio goldenrod, limestone catmint, Kalm's lobelia, balsam ragwort, silverweed, bird's eye primrose, Houghton's goldenrod, false asphodel and the federally threatened dwarf lake iris.

Figure 9. W 19 facing south from 2-track. Ruts in soils visible. Northern white cedar is stunted. In the vicinity of DP 30 on May 24, 2023. Photo 427.

Figure 10. W 29 facing south east- Lake Michigan & Mackinac Bridge in upper left of photo. May 24, 2023. Photo 429. The person in the upper right is hidden in this photo to preserve anonymity.

Wetland 8

W 8 is the wetland extending along the shoreline south of the Enbridge yard and then turning to the northeast of Boulevard Dr (Federal Jurisdiction). This wetland appears to be dramatically affected by lake levels due to its proximity to the lake as drowned trees testified. The vegetation near Outfall 003 (DP 220) included northern white cedar in the tree layer (sparse), tamarack, northern white cedar and bayberry or blueleaf willow in the shrub layer. The herbaceous layer had *Carex crawei*, silverweed, Indian paintbrush, bird's eye primrose, Houghton's goldenrod, Ohio goldenrod, bastard-toadflax, and limestone calamint- all coastal fen indicators. Other species included starry false Solomon's seal, black eyed Susan, and grass-leaved goldenrod.

Figure 11. Closeup of W 8- orange are Indian paintbrush, light silver green are silverweed. May 22, 2024, Photo 253.

Figure 12. W 8 in the vicinity of DP 220 facing the cobble shore and lake. May 22, 2024, Photo 255.

Wetland 3

W 3 is primarily outside the project footprint (fill of 0.0003 acres within the construction footprint). It is the largest wetland delineated by Stantec (11.13 acres) and extends to the north outside the delineation boundary. It is a wetland complex with a range of wetland types. The closest wetland area to the project area is the south end of W 3 described by Stantec data sheets 33 and 208 as “early successional hardwood swamp” (Stantec. 2024, page 19 of 87). This area was graded in the 50’s. Data point 33 contains northern white cedar, and quaking aspen in the overstory, red osier dogwood and Bebb’s willow in the shrub layer, and starry false Solomon’s seal and dwarf red raspberry. Data point 208 on the northwest side of the project area also had quaking aspen in the overstory and green ash, prickly gooseberry and common buckthorn in the shrub layer. The herbaceous layer had starry false Solomon’s seal, Canada anemone and early goldenrod. Dwarf lake iris is found within and around this wetland.

Figure 13. Dwarf lake iris within W 3 north of project area. May 25, 2023. Photo 454

Figure 14. W 3 north of project boundary, SW of Enbridge yard edge. May 25, 2023, Photo 451

Wetlands adjacent to Boulevard Dr.

Wetlands were delineated on the east (lakeward) and west side of Boulevard Dr. All three wetlands – W 18, W 12 and W 13 – are hydrologically connected to the Great Lakes.

These wetlands were not evaluated for construction impacts. However, the narrow gravel road has no shoulders, and the heavy use for construction vehicles will degrade the wetlands immediately adjacent to the road.

The road had recently been resurfaced with gravel and new culverts were installed prior to the May 22-25, 2023 delineation.

The ~0.88 mile gravel drive from the Enbridge yard becomes paved at Desmore Ave. On the days that I was observing the wetland delineation work in 2023 and 2024 the traffic was very light and appeared to be local residents or bird watchers that stopped at the shore with binoculars.

The west side of Boulevard Dr. is represented by W 12 to the south, a brief upland break, and then W 13 extending to Desmore Ave. The east- lakeward side is an extension of W 18 to Desmore Ave.

Wetland 18

Figure 15. Sweetgrass in bloom in W 18 on the side of the road. Photo 120. May 23, 2023

Figure 16. Sweetgrass in bloom on the edge of the pavement of Boulevard Dr in W 18. Photo 167. May 23, 2023

W 18, lakeward on the east side to Boulevard Dr., had significant patches of sweetgrass *(Hierochloe odorata*) in multiple locations. This plant has significant cultural importance to the Bay Mills Indian Community (and other Ojibwe tribes), and its presence was not noted on the data sheets or in the final wetland report. The grass grows up to the edge of the gravel pavement.

Dwarf lake iris (federally threatened) was found on the roadside in multiple locations on the east edge of Boulevard Dr.

Figure 17. Dwarf lake iris in W 18 on side of pavement. ~200 feet north of entrance to Enbridge yard. May 23, 2023, Photo 112

Figure 18. Dwarf lake iris on roadside at W 18. ~ 0.57 miles north of entrance to Enbridge yard. Photo 165. May 23, 2023

Figure 19. W 18 on Boulevard Dr. facing lake ~ 200 feet north of entrance to Enbridge yard. Photo 123. May 23, 2023.

This wetland has been sampled in multiple years by the Coastal Wetland Monitoring Program (CWMP) – Pointe St. Ignace Marsh Data since 2011.

Wetland 18 includes a Great Lakes Marsh Natural Community (S3).

Figure 20. Example of culverts under Boulevard Dr. emptying to W 18 and lake ~ 0.46 miles north of entrance to Enbridge yard. Photo 156. May 23, 2023

Figure 21. Same culvert as previous figure- note gravel already spilling into wetland 18. Photo 157. May 23, 2023

Wetland 12

W 12 begins just north of the entrance to the Enbridge yard on the west side of Boulevard Dr. Rich Conifer swamps from west of the drive drain towards W 12 and culverts that flow under the road into W 18 and the lake. Many areas had groundwater signatures seeping from the wetlands off the project area.

Dwarf lake iris were found in multiple locations both in W 12 and upland adjacent Boulevard Dr.

Figure 22. Marsh marigold (yellow) in W 12 is a groundwater indicator plant. May 23, 2023. Photo 283

Figure 23. Dwarf lake iris adjacent Boulevard Dr. in the vicinity of the north edge of W 12. May 23, 2023. Photo 282.

Wetland 13

W 13 extends north on the west side of Boulevard Dr. to the junction of Desmore Ave. where the project area ended. There was dwarf lake iris adjacent Boulevard Dr. in multiple locations. W 13 is fed in part by Rich Conifer swamp to the west of the project area that flows to W 13, and under the road to W 18 and the lake. Groundwater sheen, coastal fen species and marsh marigolds (a groundwater indicator species) were evident in multiple locations. It is possible that there are threatened Houghton's goldenrod as well, however they were not developed enough to be able to identify easily in May.

Figure 24. Close up of Dwarf lake iris close to the wetland/upland south boundary of W 13 adjacent the road. Photo 275. May 23,2023

Figure 25. W 13 ditch with strong groundwater sheen on surface. May 23, 2023. Photo 253.

Figure 26. Rich conifer swamp with marsh marigolds in understory west of W 13 project area and road. May 23, 2023. Photo 229.

Figure 27. W 13 as ditch however the wetland extends off the project area as Rich Conifer swamp to the west- here is a tamarack overhanging the ditch portion. Photo 228. May 23, 2023

Figure 28. West of the ditch line is Rich conifer swamp with Northern white cedar and marsh marigolds blooming below. Photo 215. May 23, 2023.

Figure 29. Dwarf lake iris south of Trans Canada. May 23, 2023. Photo 213.

Figure 30. North end of W 13 north of Trans Canada. Dwarf lake iris adjacent Boulevard Dr. May 23, 2023. Photo 202.

Rare and High Functional Value Wetlands

The wetlands that will be affected by the project include rare community types and are of high functional value.

Rare Natural Communities and Coastal Fen Indicators

During the delineation, Stantec biologists determined that Wetlands W 10, W 21 and W 19 are a coastal fen natural community. Enbridge and EGLE have since backed off of the determination (DEIS at 3-45). These wetlands remain rare on the landscape, retain many coastal fen indicator plants, are biodiverse and have high ecological value.

In an introduction to "A Field Guide to the Natural Features of Michigan" (2015) is this sentence (page xii):

> "This book is meant to serve as a tool for those seeking to understand, describe, document, and restore the diversity of natural communities native to Michigan."

The intent to preserve biodiversity is foundational to our understanding of native communities. It is evident that although the wetlands on this site have had human disturbance – most notably grading topsoils in the 1950s, and 1960s – the vegetation that returned to the site in the intervening ~fifty five years is predominantly native. The wetlands also contain many coastal fen indicator species and rare species including the state and federally threatened *Iris lacustris* (dwarf lake iris) and *Solidago houghtonii* (Houghton's goldenrod). Dwarf lake iris is also Michigan's state wildflower (as found at https://www.michigan.gov/som/about-michigan/state-facts-and-symbols).

The delineation data points in wetlands W 22, W 30, W 29, W 10, W 21 and W 19 contain coastal fen indicator species. In an inventory of Michigan's coastal fens, six of the top ten most important vascular plant species were found in project area wetlands (Slaughter et al. 2011, Table 8). These are *Dasiphora fruticosa* < .5m (shrubby cinquefoil), *Solidago ohioensis* (Ohio goldenrod), *Juncus balticus* (Baltic rush), *Thuja occidentalis* < .5m (northern white cedar), *Hypericum kalmianum* <.5m (Kalm's St. John's wort), and *Schizachyrium scoparium* (little bluestem).

The wetlands, although disturbed by historic anthropogenic grading, are also facing harsh natural environmental factors including high pH from the limestone bedrock, storms from nearby Lake Michigan which can affect and slow soil accumulation, and areas with sparse vegetation leading to slow organic matter accumulation, thus leading to slow topsoil accumulation. However, marl, a natural material and hydric soil indicator that is formed by algae that precipitate calcium carbonate, was found in W 10 when the USACE visited the site in June, 2023 and is suspected in others.

In the survey of coastal fens the authors characterized abiotic variables of the coastal fen sites as "diverse, patch substrates of lacustrine sand, clay, limestone gravel and cobble, peat and marl" (Slaughter et al. 2011, page 7 of 151). In Table 9 (page 16 of 151) the soil surface was summarized as, "Nearly half the plots contained moss cover. Bare mineral soil and marl were encountered in approximately 25% of plots; unvegetated peat, cobble and wood were less frequently encountered. Approximately 50% of plots were at least partially inundated, although water depths were typically shallow." This study illustrates a variety of substrates, hydrology and conditions in coastal fen communities.

The groundwater feeding these La Pointe basins would be dramatically affected by the highs and lows of Lake Michigan water levels, complicating our ability to observe groundwater in these wetlands.

Three sides of the project area remain relatively undisturbed with natural wetland communities. North of the project area and Enbridge facility is Rich Conifer Swamp – a

groundwater fed wetland with northern white cedar, marsh marigolds and groundwater signatures.

The Stream-01 (state jurisdiction) that flows west of the existing facility also had coastal fen indicators including pitcher-plants (*Sarracenia purpurea*) on the bank (Figure 34, below).

The wetland outside the delineated boundary south of the stream and east of Boulevard Dr. was designated as a coastal fen wetland on a Figure 4 map of Natural Communities North Shore (DEIS Appendix F, page 34 of 79).

The natural shoreline - Wetland 8, also has many of the coastal fen native species that are also found in Limestone Cobble Shore (S3), described above.

The wetlands to the northeast on private land (as viewed from Boulevard Dr.) appear to be Rich Conifer Swamp on the west side of the road. Wetlands on the east side of Boulevard Dr. were sedge meadow and marsh (Great Lakes Marsh Natural Community, S3).

Functional Assessments

The Michigan Rapid Assessment Method (MiRAM) is a state-specific tool to determine the "functional value" of a particular wetland and to assign a rating level to that wetland as compared to other wetlands. (MiRAM Version 2.1 User's Manual. 2010). Functional assessments are helpful to evaluate wetland functions and also evaluate the appropriateness of the wetland mitigation. According to Page 11 of the MiRAM User's Manual, the Narrative Rating is a rapid method to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. It states: "If any of the metrics are answered affirmatively, the Wetland has exceptional ecological value and is automatically rated as having high functional value and completion of the Quantitative Rating is not necessary."

There are no MiRAM Functional Assessments in the DEIS for the wetlands at issue here. Using Stantec (2024) vegetation data and measuring distances on Google Earth, I completed a functional assessment of these wetlands using the MiRAM factors. My assessment is included as Attachment 1 to this report.

All twelve wetlands in the project area or adjacent Boulevard Dr. ranked as *Exceptional Ecological Value* based on being within 1000 feet of the ordinary high water mark (OHWM) of Lake Michigan. The analysis for this designation by MiRAM (page 16) is that "Great Lakes coastal wetlands are unique, relatively rare systems that provide immensely valuable functions to the entire region, regardless of a long history of anthropogenic degradation (Mitsch and Grosselink 2000a, Albert 2003)". Nine of twelve ranked Exceptional as a coastal wetland *and* as habitat for threatened and endangered species. One of twelve (W 8) ranked

as Exceptional as a coastal wetland, habitat for threatened and endangered species, *and* suitable habitat for Piping Plover. In the context of the landscape surrounding the project area that has natural wetland communities, and because Pointe La Barbe has not only historic cultural features but current biodiversity in a coastal environment, the wetlands have exceptional ecological value, regardless of whatever name you put to them. The summation of the wetlands in the DEIS is short on detail that underplays their importance and skimps on the data and descriptions that were accumulated in 2023 and 2024 field delineations as well as the time spent in oversight by the tribal representatives and the state and federal agencies.

Effects on Wetlands

Construction Layout and Permanent Wetland Fill

The wetlands that will have permanent impacts, as described above, include threatened and endangered species, culturally significant species, rare natural communities and high functional values. The culturally significant species are found throughout the wetlands but also uplands in and around the project area.

The DEIS is unclear as to whether, with a different construction layout, some wetland impacts could be avoided. The alternatives analysis focuses on high level alternatives; there is no alternatives analysis of the Figure F-3 North Side Construction Layout. The DEIS also does not present a plan with the wetlands and the construction layout combined, which represents a major flaw. I approximated the wetland layout (DEIS at 4-50, Figure 4.4-1) with the plan construction layout (DEIS at App'x F-10, Figure F-3), and many issues pop out with this exercise. It appears that the entire construction area is leveled with no attempt to avoid any wetlands within it. There are many upland areas within the project footprint that appear underutilized to protect wetlands. The access road is not configured to avoid wetlands.

There is no justification for filling W 22 adjacent to the Enbridge yard that I can see. The wetland is outside the construction activities and outside the permanent North Side Operational Layout shown on Figure F-11. W 22 (could easily be avoided saving 0.12 acres of wetland fill. The filling appears to be an unnecessary impact and one wonders if it is for some future need rather than for this project.

W 10, with coastal fen species and on the southeast side of the project, has a total area of 0.25 acres (Figure 4.4-1) and impact of 0.06 acres, showing an avoidance of 0.19 acres. The access road and 200' diameter Lake Tank is shown northeast portion of W10. The map does not appear to scale as the room to avoid the majority of W10, and build the road and tank does not appear possible. This map looks unrealistic.

There is no mention of the mechanics of installing this large temporary lake tank in the DEIS. This is a very tight footprint with less than 10 feet between the tank and the portion of W 10 that is avoided. The access road is also very close to the tank. The construction of this tank would include a perimeter to construct in, erosion control, and fencing. The access road adjacent the tank does not look realistic. There is a strong possibility that a greater area of W 10 will be impacted by the construction.

W 19 – with coastal fen species – is the largest basin in the construction footprint and 0.89 acres of a total 1.06 acres is filled and graded. The ability of the remainder of the wetland west of the footprint to persist is unknown depending on hydrology changes, surface water and groundwater changes, and sedimentation or other impact from the proximity to the construction. An alternative to limit fill of W 19 is not explored in the DEIS.

W 8 has Outflow 003 located on the west side for the project, south of Boulevard Dr. The reported wetland impact is 0.06 (Figure 4.4-1). The volume of the outflow of water will impact the wetland that extends south to the shoreline, as it is basically a culvert delivering water into a coastal wetland. There may be foreign substances from tunnel construction mixed in this stormwater/tunnel water outflow. This is not accounted for as an impact to W 8.

W 3 is a forested wetland extending to the north side of the construction footprint. Figure 4.4-1 states that 0.0003 acres is filled for the construction footprint, but it is unclear on the drawing where this is. The construction footprint is very close if not touching the boundary of W 3. Why the Field Office and Dryhouse with parking cannot be moved south to be adjacent the other parking area is not explained or justified. This could pull the north edge of the construction perimeter south and give an upland buffer to W 3. The lack of an upland buffer and a fence put on the boundary is concerning and will negatively impact the south edge of W 3.

Figure F-3. North Side Construction Phase Layout does not show roads accessing the parking areas. This is a very simplistic drawing of the layout.

There are other issues with the layout that a more thorough alternative analysis of the layout on the North project would determine.

W 12, W 13 and W 18 are in federal jurisdiction adjacent Boulevard Dr. that will be the access route for construction equipment and trucking of spoils and water. These wetlands are not included as permanent impacts in the project in the DEIS, however the road shoulders are non-existent and wetlands and rare species will be negatively impacted by the proposed truck traffic as gravels, sedimentation and other pollutants enter the wetlands from the roadway.

Other Wetland Impacts than direct fill outside construction layout

Water Drawdown

Wetlands are sensitive to groundwater drawdown, unless they are perched or otherwise separated from groundwater influence by an impermeable barrier, like an underlying clay layer or solid bedrock. The shallow, limestone bedrock underlying the wetlands at the project site is noted as being highly fractured, meaning that groundwater will easily flow through it (see wetland delineation datasheets in Stantec 2024). The result is that groundwater drawdown from construction will likely impact wetlands adjacent the limits of disturbance. The extent of drawdown and the permanency of drawdown would be factors in how the wetlands remaining in the project area and surroundings respond. Wetlands with sustained drawdown, especially if concurrent with low lake levels or drought, could be susceptible to shifts in the plant communities. Furthermore, drawdown could also affect Stream-01, that demonstrated suitable larval habitat for the federally endangered Hine's Emerald Dragonfly (DEIS at 3-68, Table 3.5-4).

Figure 3232. Stream-01 facing east towards delineated project area from Boulevard Dr. May 25, 2023. Photo 485

Figure 31. Stream-01 facing west from Boulevard Dr. towards Lake in background. May 25, 2023 Photo 486

Figure 34. Stream-01 within delineated boundary, facing east. June 14, 2023. Photo 728

Figure 33. Pitcher plants (coastal fen indicator species) on banks of Stream- 01 close to Boulevard Dr. May 25, 2023. Photo 484.

The DEIS states under Groundwater Drawdown "Direct, detrimental impacts would occur for the duration of shaft/portal construction (6/8 months, respectively) and during tunnel boring operations. Maximum drawdown during shaft/portal construction would be 2 feet within a 360-foot radius" (DEIS at 4-39, Table 4.4-1). This statement characterizes the impacts to adjacent wetlands as temporary.

Yet under Surface Water/Wetland Disturbance is the statement “Indirect, detrimental impact if loss of hydrology results in unanticipated additional permanent wetland losses” (DEIS at 4-40, Table 4.1.1). This possible permanent wetland loss outside the construction footprint is not addressed or compensated for in the mitigation plan.

The portion of W 19 avoided on the far west is a 0.17 acre area within this 360 foot radius of drawdown. It may be permanently lost due to changes in surface hydrology and possible groundwater drawdown as it is so removed from the larger landscape context of this impacted wetland.

The portion of W 21 (0.08 acres) west of the construction area is similarly challenged by changes in surface hydrology. It is just beyond the 360 foot drawdown radius, but with other climate factors, may be impacted by drawdown. The small remaining wetland may not persist due to hydrologic factors of other disturbances.

W 3 immediately adjacent the construction area is within the radius of possible groundwater drawdown. Because it is on highly fractured limestone bedrock that was graded in the 1950s

and 1960s it may be connected to groundwater and possible impacts of groundwater drawdown cannot be ruled out.

The Rich Conifer Swamp (W 3) north of the Enbridge yard is a Northern cedar swamp with marsh marigolds, active seeps and flow and groundwater discharge that flows towards Stream-01. These areas that include sedge meadow on the north side of the yard could be negatively impacted by groundwater drawdown depending on the scale of the drawdown and the duration. Combined with a low lake level or drought year the effects could be greater than anticipated.

Figure 35. W 3 north of Enbridge yard. Rich conifer swamp with Northern white cedar, marsh marigolds, groundwater sheen, flowing water. May 25, 2023. Photo 563

Dust and sedimentation impacts from truck hauling and construction

Wetlands W 8, W 10, W12, W 13 and W 18 are immediately adjacent Boulevard Dr., and they are going to be directly impacted by the increased truck and construction traffic for six years of construction. This is a low traffic volume road currently.

The DEIS does not disclose the traffic pattern, so it seems possible to assume *either* that the eastern portion of the road would see out-and-back traffic *or* that truck traffic into and out of the site will be one-way, following a loop through the site, and that Boulevard Dr. south of the construction footprint will also have truck traffic. Thus W 8 that borders the coastline and the unimpacted edge of W 10 will also experience road impacts.

In DEIS Section 4.10.3.1.1 there are forecasted to be up to 240 daily single trips per day or 24 single-trips per hour, Monday through Saturday on Boulevard Dr. Considering that the drive is not paved, but gravel and that it is flanked on both sides by wetlands and threatened species up to the gravel edge, this heavy truck traffic will cause sedimentation into the wetlands on either side. There is no room between the wetland and the road to even place silt fencing. Silt fencing is not adequate erosion control for a 6 year construction process in all seasons.

Figure 21 above (photo of W 18 culvert area) shows gravels already slopped over into wetlands in May 2023. Maintenance of the roadway by continuing to add gravel to the roadbed will cause on-going sedimentation and pollution into the coastal wetlands.

Road dust in dry months will also drift to wetlands on either side, ultimately discharging into Great Lakes Coastal Marsh.

Depending on where the trucks have been, invasive species on the truck body or tires can be tracked into the wetlands on either side of the road and invade the Great Lakes Coastal Marsh.

Rare species including the culturally significant sweetgrass and federally threatened *Iris lacustris* or dwarf lake iris will be harmed. Sweetgrass was prominent along the edge of the road and both sides of the road contained patches of dwarf lake iris as I discussed above.

W 8 which borders the coastline is also susceptible to sediment, gravel and road dust from truck traffic. This impact is not discussed.

Other examples of specific impacts

Indirect effects to the portion of W 3 adjacent the construction footprint could include impacts from fence placement, changes in surface water hydrology from the graded

construction footprint, drawdown of groundwater, and sedimentation or other pollution (released substances) from the construction site.

Indirect effects to the remainder of W 10 could include impacts from fence placement, changes in surface water hydrology from the graded construction footprint, sedimentation and deposition from truck traffic on Boulevard Dr. and sedimentation from the construction site. As discussed above, the position of the Lake Tank in the Construction layout does not appear realistic and it appears very possible that more of W 10 will be filled than is stated.

Mitigation

Wetland mitigation is intended to compensate for lost wetland functions once all avoidance and minimization measures are met. As discussed above, it appears that more avoidance and minimization of wetland impacts on the construction footprint could be met. Wetland functional values should be utilized to demonstrate that the mitigation is adequate. Mitigation should replace like wetlands for like, high quality wetlands should merit higher mitigation ratios, and the impacted watershed should be benefit from the mitigation site functions.

It is difficult to fully comment on the mitigation plan as information on it is so sparse. The DEIS states that 3.06 acres of mitigation credit will be purchased from the Carp River Mitigation Bank in the Carp River Watershed (DEIS at 5-20). The ratio of impact to credits appears to be 2:1, based on 1.53 acres of permanent, direct disturbance (DEIS at 4-50, Figure 4.4-1).

The assessment of impacts to the site to mitigate should include other impacts, including to wetlands that border Boulevard Dr. Based on the high quality and functions of the coastal Pointe Le Barbe wetlands, that are ranked as Exceptional Ecological Value by MiRAM (Attachment 1) and the information on the mitigation site that follows, the ratio of 2:1 does not mitigate the loss of wetlands of exceptional ecological value, nor are the acreages of lost wetlands sufficient.

There is no information about the Carp River Mitigation site on the website of the sponsor Crandell Environmental. The Carp River Mitigation Bank 2022 Wetland Mitigation Banking Agreement and a field map are posted on the MI enviro portal, but there are no other reports (WMBA. 2022).

This site is in the far western portion of the Carp River Watershed. The mitigation plan is intended to create forested wetland that flows towards Furlong Creek and thence to Millecoquins Lake. Three tiers of farmland were graded, as is evident on the 2025 Google Earth aerial. The plan specified elevations falling from Tier 1 at 682 feet Above mean sea level

or amsl, to Tier 2 at 680 amsl, and finally Tier 3 at 766.5 amsl . The plan states that each tier graded at different elevations have one foot berms surrounding them with Agri -drain control structures installed in the berms to allow each basin to flow to the next lower elevation.

The soils of this former hay field are predominately Gogomain- Pickford Complex (166) with Rudyard silty clay loam (11A), and Ontonagon – Fluvaquents, frequently flooded complex (169E). Gogomain-Pickford and Rudyard silty clay loam have variations of very fine sandy loam over clay, the Ontonagon unit has silty clay loam over clay.

There are no "As Built" Reports or Annual Monitoring Reports (2023, 2024) found on the Mi Enviro portal. The initial grading was completed as noted on the Google Earth aerial dated 5/21/2025. It is not known if the tree plantings or native seedings were accomplished or what they were comprised of.

The "surface water wetland" (WMBA. 2022, page 19) will require long term annual maintenance of berms and water control structures into perpetuity (WMBA. 2022, page 32). This is not a self-sustaining wetland restoration site. For example, muskrats tunneling into berms and creating leaks, flooding events that overwhelm the 1 foot berms and spillways, and failures of the Agri-drain water control structures (frost heave etc.) can cause on-going problems into perpetuity. Water-control structures are not built for perpetuity and would need to be replaced and repaired. The Agri-drain inline water control structure has a 5 year warranty on the structure (https://www.agridrain.com/shop/c85/manual-water-level-control-structures/p901/inline-water-level-control-structures/).

The MiRAM Narrative rating of the impacted project wetlands in the Straits (Attachment 1) is that they have *exceptional ecological value* due to their being within 1000 feet of the OHWM of Lake Michigan, and that most impacted wetlands contain federal and state threatened species (only one of four possible criteria needed for this designation, most wetlands had two criteria).

The DEIS in Table 3.4-4 Delineated Wetlands near Main Project Locations describes the wetlands W 3, W 6, W 7, W 19, W 21, W 22, W 27, W 28 and W 29 as "Wetland provides habitat, groundwater recharge, and maintenance of water quality/overall transfer of water within the watershed" (DEIS at 3-42, Table 3.4-4). W 8 has a different description "During periods of low water levels, wetland vegetation may establish on the exposed lakebed and provide ecological value. When water levels rise, wave action and sediment erosion will eventually destroy the vegetation that has been established in this area: however, prior to destruction, vegetation may provide spawning and nursing habitat for fish and feed into the aquatic food chain."

The DEIS and the wetland delineation report (Stantec. 2024) provides no further data in terms of the use of MiRAM for this project. The brief functional assessment in Table 3.4-4 does not emphasize the high ecological value of the wetlands that the MiRAM narrative rating does.

The wetlands impacted by the project are coastal wetlands, this mitigation bank is inland. Although it is in the same coastal HUC-8 watershed, it is over 45 miles west. Coastal watersheds at a HUC-8 level are typically comprised of many, smaller sub-catchments, that can be dramatically different from one another depending on underlying geology or landscape position. The mitigation bank soils – sandy clay loams and silty clay loams with clay underneath – are not geologically similar to the limestone bedrock soils impacted by the project. The wetland water quality and groundwater recharge functions that the tunnel project impacts will not be locally mitigated.

The high quality of the wetlands impacted are not mitigated by this restored wetland of unknown floristic and wildlife quality. There is no likelihood that the threatened dwarf lake iris or Houghton's goldenrod that exist on limestone bedrock could be restored on this bank site. The predominantly native species on the Pointe La Barbe site are unlikely to be compensated on the mitigation site.

This mitigation site is flawed by a lack of monitoring reports made public and lack of any relevance to the proposed wetland impacts except that it is in the same watershed. Like wetlands impacted would not be mitigated by like wetlands in the bank. There is no evidence that high quality wetlands on Pointe Le Barbe are being replaced by a high quality site.

The mitigation plan relies on wetland hydrology maintained by berms and water control structures into perpetuity, which is a flawed concept. This mitigation plan is inadequate to replace the lost high values and functions of the project's impacted wetlands.

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Attachment 1

North Straits Enbridge Project Area MiRAM Narrative Rating by Thompson

"If any of the metrics are answered affirmatively, the Wetland has exceptional ecological value and is automatically rated as having high functional value and completion of the Quantitative Rating is not necessary." MiRAM, 2010

	Wetland									Boulevard Dr.		
Narrative Questions:	**W22**	**W30**	**W29**	**W28**	**W10**	**W3**	**W21**	**W19**	**W 8**	**W 12**	**W 13**	**W 18-lakeward**
1. US Fish and Wildlife Service Critical Habitat- is habiat suitable for Piping Plover, Hine's Emerald Dragonfly?									Suitable habitat for Piping Plover at 0.05 acre clearing*			
2. Threatened or Endangered Species?		*Solidago houghtonii*	*Solidago houghtonii*		*Solidago houghtonii*	*Iris lacustris Solidago houghtonii*	*Solidago houghtonii Iris lacustris*	*Solidago houghtonii Iris lacustris*	*Solidago houghtonii*	*Iris lacustris*	*Iris lacustris*	*Iris lacustris*
3. Rare Wetland Natural Community Type (S1 or S2) ?					contested coastal fen S2		contested coastal fen S2	contested coastal fen S2				
4. Great Lakes Coastal Wetland- within 1,000 feet of the OHWM of any Great Lakes?	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exceptional Ecological Value	**yes**	**yes by 2**	**yes by 2**	**yes**	**yes by 2**	**yes by 2**	**yes by 2**	**yes by 2**	**yes by 3**	**yes by 2**	**yes by 2**	**yes by 2**

All T and E species noted on wetland delineation data forms by Stantec (2024), except W 12, 13 and 18 which were identified adjacent the road in multiple locations by Thompson in 2023 (see photos in text). * Piping Plover Federal Special Status Species Impacts found in DEIS Table 4.5-4, Page 287 of PDF

Attachment B

Preliminary Assessment of Groundwater Impacts of the Line 5 Tunnel Project: Expert Report

prepared for:

Earthjustice, on behalf of Bay Mills Indian Community and other Tribal entities

submitted by:

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Date: June 30, 2025

LimnoTech

Table of Contents

1 INTRODUCTION

I was retained by Earthjustice, on behalf of Bay Mills Indian Community and other Tribal entities, to prepare an expert report related to the proposed Enbridge Line 5 Tunnel Project (L5TP). As of May 2025, federal and State of Michigan permits for the L5TP spanning the Straits of Mackinac (Straits) in Michigan are under review, including the release on May 30, 2025, of the *Draft Environmental Impact Statement* (DEIS) by the U.S. Army Corps of Engineers (USACE). This preliminary report summarizes potential groundwater and related ecological impacts associated with the construction and operation of the Line 5 Tunnel. I began my investigation by reviewing documents and information including background scientific studies on the hydrogeology of the L5TP region, permit application materials and associated commentary by agencies and interested parties, and relevant standards. To supplement the information provided in these sources and to further refine my conceptual model of the geological, hydrogeological, and ecological impacts of the proposed project, I also reviewed approximately 10 additional documents including:

- U.S. Geological Survey (USGS) and State of Michigan geological and hydrogeological studies,
- Mackinac Bridge geotechnical documents,
- Peer-reviewed journal articles, and
- A doctoral dissertation on tunnel standards.

The primary issues I identified in my assessment concern the following possible impacts on groundwater and surface water as a result of the project and the site hydrogeology, and deficiencies in project data and analysis:

- Creation or enhancement of vertical and horizontal groundwater migration pathways
- Upconing of saline and sulfidic groundwater due to dewatering
- Breaching of artesian aquifers
- Negative impacts on groundwater-lake water interactions
- Negative impacts on current and future drinking water wells
- Temporary or permanent damage to wetland habitats from dewatering
- Shaft, tunnel, or pipeline failure potential and associated releases of contaminants to groundwater and surface water
- A lack of geotechnical data from borings that did not penetrate to the full tunnel depth
- Inadequate consideration of dewatering impacts during tunnel construction and operation.

I reached these conclusions with a reasonable degree of scientific certainty based on my review of the various documents and datasets, and my prior professional experience.

2 QUALIFICATIONS

My name is John F. Bratton and I am the Senior Science Officer at LimnoTech, an environmental science and engineering consulting firm based in Ann Arbor, Michigan. I earned an Sc.B. degree in Geology-Chemistry from Brown University, and a Ph.D. in Geology from the University of California at Berkeley. I am a former research scientist and laboratory director with the U.S. Geological Survey and the National Oceanic and Atmospheric Administration, respectively. I have served as an adjunct faculty member at six institutions where I have taught undergraduate and graduate courses in earth science, environmental science, and oceanography. I am a licensed Professional Geologist in four states: California, Utah, Alabama, and Florida. I have over 37 years of experience in hydrogeological investigations to support the development of drinking water supplies, assess risks to human and ecological health, and design remedial approaches for groundwater and surface water that has been impacted by harmful or toxic chemical constituents.

As LimnoTech's Senior Science Officer, I lead company-wide initiatives related to innovation and emerging technologies and advise other officers and principals on technical aspects of corporate service areas and related disciplines. I also conduct research and development projects for federal, state, academic, non-profit, and regional government clients. I provide scientific peer review and expert support for litigation and allocation matters for government agencies and industrial, regulatory, and private clients.

I am a recognized expert in hydrogeology and environmental geochemistry, including contaminated soil, groundwater, and sediment characterization and remediation. I have conducted hydrogeological and sediment studies in major river systems, estuaries, and the Great Lakes, and as part of remedial investigations at U.S. EPA Superfund sites and Great Lakes Areas of Concern including the Sylvester/Gilson Road Site (NH), Pease AFB (NH), Olin Chemical (MA), Upper Hudson River, Berry's Creek and Newark Bay (NJ), Witco Chemical (NJ), Chambers Works (NJ), New York area waterways, Ciba-Geigy/McIntosh (AL), Detroit River, Rouge River (MI), St. Louis River Estuary (MN), Lower Duwamish Waterway (WA), Portland Harbor (OR), and Alameda Naval Air Station (CA). I have worked with Potentially Responsible Parties and allocators under U.S. EPA Record of Decision guidance and led a national hydrogeological research project to assess groundwater-surface water interactions in coastal zones for the U.S. Geological Survey.

My recent related publications include the following:

Steinman, Alan, Donald G. Uzarski, David P. Lusch, Carol Miller, Patrick Doran, Tom Zimnicki, Philip Chu, Jon Allan, Jeremiah Asher, John Bratton, et al., 2022, Groundwater in crisis? Addressing groundwater challenges in Michigan as a template for the Great Lakes. Sustainability, 14(5):3008.

Bratton, John, Mary P. Trudeau, René Drolet, Jim Nicholas, Pedro Restrepo, and IJC Workgroup members, 2022, Development of a Great Lakes Groundwater and Surface Water Conceptual Framework, A report prepared for the U.S. Dept. of State, International Joint Commission, 126 p.

LimnoTech (senior author), 2018, Impacts of Unrefined Liquid Hydrocarbons on Water Quality and Aquatic Ecosystems of the Great Lakes Basin, prepared for the U.S. Dept. of State, International Joint Commission, Science Advisory Board, 97 p.

3 PROJECT BACKGROUND AND SETTING

The proposed L5TP is located in parts of Emmet (south) and Mackinac (north) Counties of northern Michigan (**Figure 1**) and is intended to replace two parallel 20-inch-diameter segments of the existing Line 5 pipeline. The existing pipeline segments were placed on the lakebed in 1953 and are currently supported at intervals by steel screw anchors and saddle mounts. The proposed L5TP involves constructing a 21-foot-diameter tunnel, approximately 3.6 miles long, within the bedrock beneath the Straits of Mackinac. This tunnel would house a new 30-inch pipeline, replacing the existing 20-inch twin pipelines that currently lie on the lakebed. The tunnel is designed to be constructed at depths ranging from 60 feet to 370 feet beneath the lakebed. Construction and operation of the tunnel will require dewatering during construction and ongoing pumping to deal with groundwater infiltration into the tunnel and ancillary structures.

The L5TP will primarily use tunnel boring methods during construction where a tunnel boring machine (TBM, **Figure 2**) is advanced at a low angle from the south shore of the lake from a launch portal into bedrock, followed by lining of the tunnel behind the machine with precast concrete panels as it advances (**Figure 3**). The TBM will be recovered in segments from a shaft that will be advanced on the north shore of the Straits (**Figure 4** and **Figure 5**). The shaft will be 80 feet deep and have a diameter of 65 feet. Once the tunnel is complete, a 30-inch steel replacement pipeline will be installed in the tunnel and shaft. The purpose of placing the pipeline in a tunnel beneath the Straits is to protect it from anchor strikes by ships and other unprotected lakebed hazards (e.g., erosional scour, ice keels, shipwrecks), and to provide secondary containment of any leaks or spills of hydrocarbons that might be released from the pipeline in the event of a rupture.

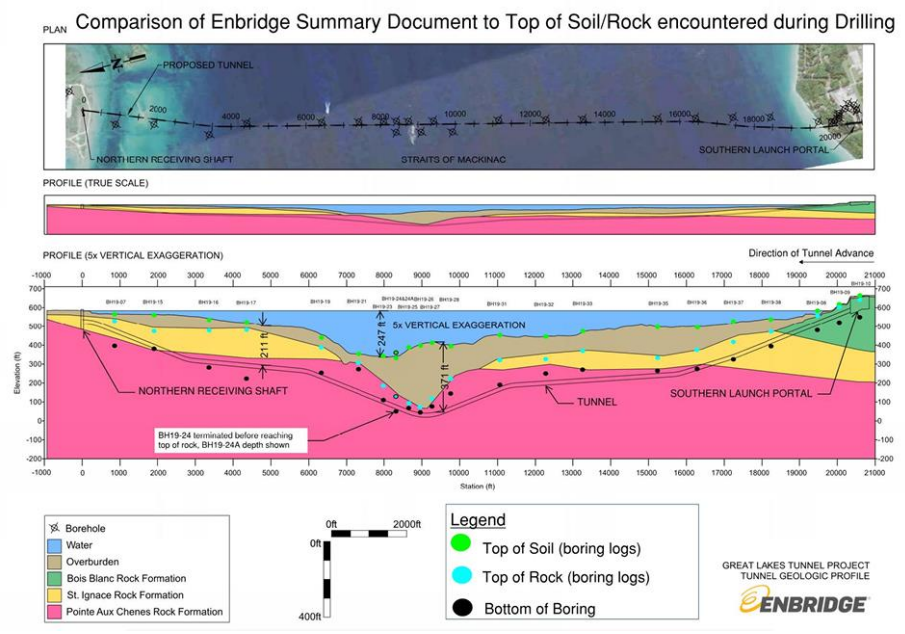


Figure 1. Plan view of proposed tunnel alignment spanning the Straits of Mackinac, as well as geotechnical boring locations and cross-sections at 5x vertical exaggeration (bottom) (Technical Memo from McMillen Jacobs Associates, 2021; DEIS Figure 4.14-1). Note the number of borings that do not penetrate to the full tunnel depth (12 of 21).

Figure 2. A tunnel boring machine similar to the one planned for use in the L5TP. The machine consists of a rotating cutting head and "trailing gear" that extends several hundred feet behind the cutting head (580 feet for the L5TP TBM). The example shown was used for subway tunnel construction in Sydney, Australia (https://www.sydneymetro.info/article/first-mega-borer-its-way-city-tunnelling).

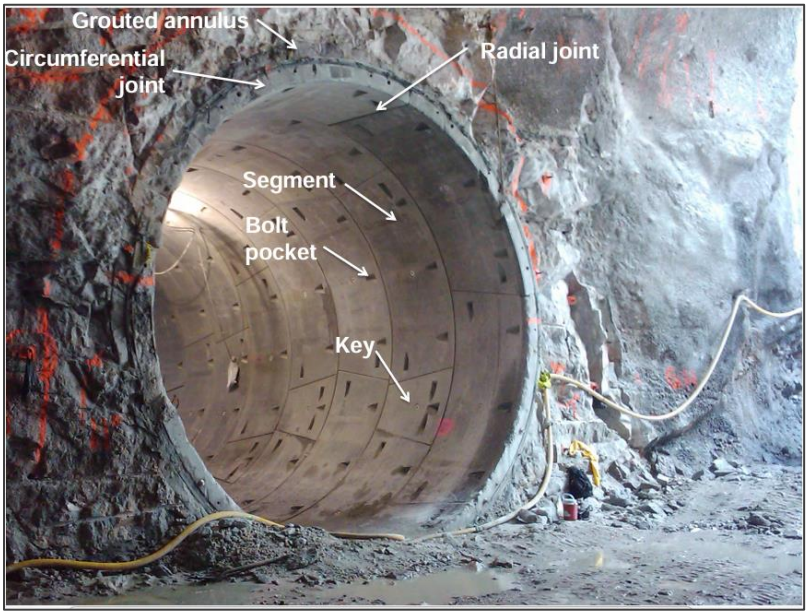


Figure 3. A bored tunnel lined with precast concrete panels, similar to the approach planned for the L5TP (https://www.mines.edu/underground/wp-content/uploads/sites/183/2018/07/Segmental_Concrete_Liners_CSM_2016.pdf).

Figure 4. Use of a crane to lower a TBM section into a permanent shaft in London, England as part of a sewer interceptor boring project. Note that the L5TP shaft would be used for removing rather than deploying the Straits TBM (https://www.ingenia.org.uk/articles/londons-deepest-tunnel-and-shafts/).

Figure 5. Removal of a damaged TBM from a temporary recovery access pit in Seattle in 2015 (https://www.brierleyassociates.com/projects/sr99-bertha-tbm-access-shaft/).

4 HYDROGEOLOGICAL SETTING AND RISKS

Below is a brief description of the general hydrogeological conditions that exist in the project area and nearby areas, presented from shallowest to deepest, that would be impacted by the proposed L5TP (**Figure 1**; Enbridge-WSP, 2019; Enbridge-MJA, 2021; Rosenau, 1956). Included with the descriptions are brief considerations of risks posed by these conditions. The risks are considered in more detail in following sections.

- **Mackinac Channel and Overburden** – The Mackinac Channel is a deeply incised paleovalley that was cut into the exposed lakebed in late glacial times and has been subsequently partially filled by sediments (**Figure 6**). The incised valley increases the likelihood of connections between lake water and groundwater that could be impacted by L5TP dewatering during and after construction, particularly along channel flanks where overburden deposits are thinnest. The crustal depression and rebound associated with glacial ice loading, unloading, and reloading by infilling of the basin after the late-glacial lake lowstands (more than 200 vertical feet of crustal movement; Farrand, 1962) have resulted in relatively recent fracturing and faulting of already brecciated rocks and potential creation of conduits in lake sediment for preferential horizontal and vertical groundwater movement that present risks during and after active tunnel construction.
- **Bois Blanc Formation** – In addition to the fracturing, faulting, and brecciation mentioned below, the cherty limestone and dolomite of the Bois Blanc formation and overlying deposits are known to contain caves, voids, cavities, and pockets that have been produced by dissolution and collapse features within and below the formation, referred to as halokarst (**Figure 7**; Black, 2012). The rock quality of the Bois Blanc formation along the tunnel transect (10% of the tunnel's length, only occurring on the south side) was determined to be >90% very poor based on boring logs (McMillen Jacobs Associates, 2021). In addition to challenges of operating a TBM in such a formation, the ability to prevent tunnel flooding when cavities or voids are encountered, and to properly seal the tunnel annulus with grout after the TBM has passed may be seriously compromised by such cavities and voids. Examples of tunnel flooding, collapse, and explosions resulting from such conditions at other tunneling sites, including sites beneath Lake Huron, are well-documented, including in the USACE DEIS.
- **St. Ignace Formation and Mackinac Breccia** – The rock quality of the St. Ignace dolomite formation was determined to be 95% very poor to fair based on boring logs (McMillen Jacobs Associates, 2021). Approximately 20% of the L5TP will be advanced through this formation, which is described by Vanlier and Deutsch (1958, p. 17) as follows:

  "*Major alteration of the structure of… strata of the Michigan basin has occurred in the Straits of Mackinac region… In this area* [**Figure 7**]*… the dissolution of thick salt beds of the Salina formation created large caverns. Strata of the Salina, St. Ignace, and Bois Blanc formations collapsed into the voids, producing a zone of faulted and brecciated rock. Near St. Ignace and on Mackinac Island these formations are so extensively faulted and brecciated, and fragments of all are so completely intermixed, that boundaries of the individual formations cannot be delineated.*" They further state (p. 33-34), "*Just as there is a complete lack of stratigraphic continuity in the breccia, there is a lack of*

continuity between water-bearing horizons. Much of the permeability of the breccia may be the result of openings along faults and other fractures."

Besides the obvious construction challenges and high failure risks presented by boring through such a formation, there is high potential for creating conduits for horizontal and vertical movement through parts of this formation that connect previously isolated pockets of groundwater that are subject to drainage into constructed features during and after construction (leakage). In addition, the groundwater may contain elevated concentrations of harmful constituents generated from dissolved halite (rock salt) or gypsum, including high chloride, sulphate/sulfide, methane, or toxic hydrogen sulfide gas, which present numerous hazards during and after construction, as well as potential impacts to drinking water wells, groundwater-fed wetlands, and nearshore or offshore benthic habitats.

- **Pointe Aux Chenes Formation** – This formation, which is proposed to contain about 70% of the tunnel's length, is composed of claystone and shale with thin beds of dolomite, limestone, and gypsum. Its rock quality along the tunnel transect based on boring logs was determined to be about 35% very poor to fair (McMillen Jacobs Associates, 2021). Note that only 3 of the 15 borings that penetrate the Pointe Aux Chenes along the alignment where the tunnel will pass through the formation penetrate to the full tunnel depth. The central part of the Mackinac paleochannel is incised directly into the Pointe Aux Chenes, with deposits of cobbles and boulders of mixed lithologies directly above the contact. While generally composed of more competent rock than overlying formations, the Pointe Aux Chenes also contains weak zones and lacks boring data along most of the tunnel alignment within it.

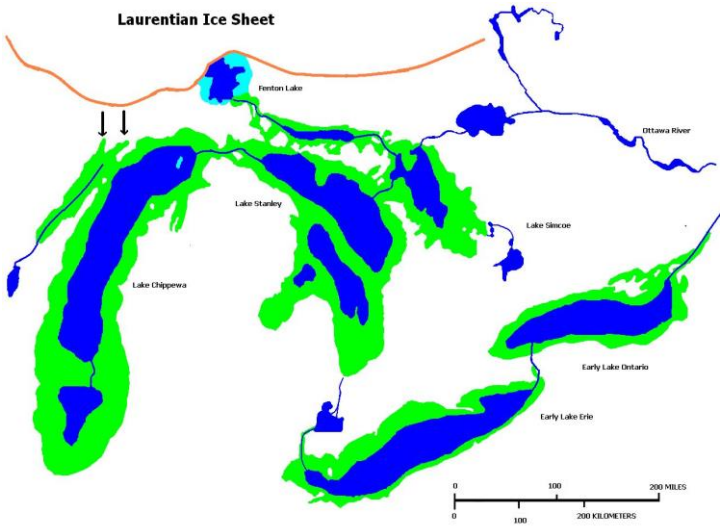


Figure 6. Sketch map of late-glacial lowstand lakes occupying parts of the modern Great Lakes basin before substantial glacial rebound. Lake Chippewa flowed eastward into Lake Stanley and out to the north from 9,500 to 8,000 years before present via an incised river channel that is now submerged beneath the Straits of Mackinac. The base of the channel is approximately 500 feet below the modern water level, with roughly one-half to two-thirds of that depth subsequently filled with unconsolidated sediments. Figure credit: Chris Light, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=33194023, after Larsen (1987).

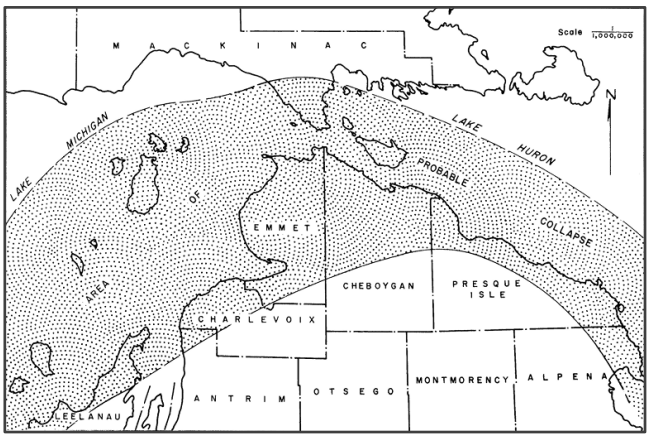


Figure 7. Map of the Straits of Mackinac region showing areas of "probable collapse" of Silurian and Devonian strata into voids created by leaching of salt from the underlying Salina formation (Landes et al., 1945).

Groundwater-Surface Water Interaction – Water present at the land surface interacts with water present below the land surface by downward flow, also known as infiltration, recharge, or stream loss. Likewise, water can flow from aquifers beneath the ground surface onto the surface or into the bed of surface water bodies through seeps, springs, or base flow. Aquifers, surface water bodies, and ecosystems depend on these exchanges to support private drinking water wells, community drinking water wells, stream flows, and habitat functions, especially in wetlands fed by groundwater. Areas where the water table (depth of saturated sediment, porous rock, or rock fractures filled with water) is at or near the land surface, are essential to preserve and protect to support these functions. Construction can alter groundwater-surface water interaction flows by increasing or decreasing groundwater discharge or recharge, and contaminants introduced during or after construction can subsequently impact drinking water wells, streams, lakes, wetlands, and overall ecosystem health. Many types of plants and aquatic organisms, such as freshwater mussels (Rosenberry et al., 2016) and turtles (Ultsch, 2006), are dependent on consistent groundwater seepage during particular seasons or life stages, even though they live in streams, ponds, and wetlands.

Groundwater is a crucial aspect of the ecoregion and wetland characteristics in and around the L5TP tunnel entrance and exit points (**Figure 8**), especially along the north shore of the Straits. Wetlands in these areas occur in shallow bedrock depressions, in hummocky till deposits, and at the bases of steep slopes where seeps are common. These wetlands are fragile and subject to irreversible alteration by construction activities that modify their hydrogeologic settings by changing their interaction with groundwater which can result in:

1. excess groundwater discharge, flooding and drowning the plants that grow in them,
2. excess infiltration into glacial material or fractured rock aquifers that would result in permanently drying out of the wetlands,
3. disturbance of groundwater pathways that feed seeps on which these wetlands rely, or
4. alteration of the pH of groundwater that feeds the high-pH sensitive wetlands in this area.

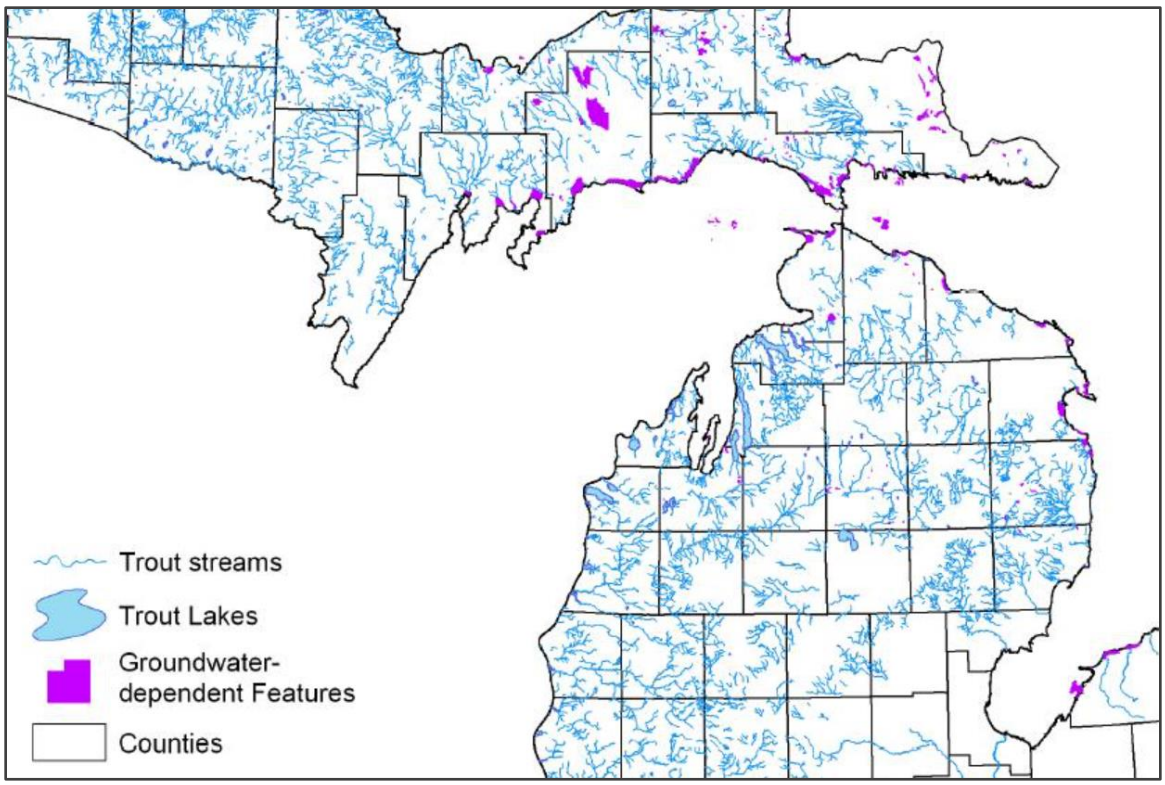


Figure 8. Map showing groundwater-dependent trout streams and wetlands in the Straits area (https://www.egr.msu.edu/igw/GWIM%20Figure%20Webpage/Webpages%20-%20Links/Figure10.html).

5 GENERAL PROJECT COMMENTS

Review comments examining general project-wide effects on groundwater quality are compiled in the following paragraphs. The primary issues addressed by the comments are the impacts of L5TP construction activities and operations on water resources, both during the short-term (construction period), medium-term (post-construction operation), and long-term (decommissioning) periods. These potential impacts fall into five broad categories: groundwater flow and quantity, groundwater quality, groundwater-surface water interactions, groundwater-related habitat impacts, and structural integrity of constructed features.

General Groundwater Concerns

General concerns arising from review of the documents listed previously include the following, each of which is discussed in more detail below:

- Creation or enhancement of vertical and horizontal groundwater migration pathways
- Upconing of saline and sulfidic groundwater due to dewatering
- Breaching of artesian aquifers
- Negative impacts on groundwater-lake water interactions
- Negative impacts on current and future drinking water wells
- Temporary or permanent damage to wetland habitats from dewatering
- Shaft, tunnel, or pipeline failure potential and associated releases of contaminants to groundwater and surface water
- A lack of geotechnical data from borings that did not penetrate to the full tunnel depth
- Inadequate consideration of dewatering impacts during tunnel construction and operation.

Creation or enhancement of vertical and horizontal groundwater migration pathways

The construction of the tunnel involves boring through fractured and brecciated rock layers and blasting during the construction of access features, thereby linking previously disconnected pockets and zones of groundwater in aquifers. In addition to increasing groundwater flow into the tunnel during and after construction, the groundwater is known to contain high concentrations of dissolved solids (salts and sulfates/sulfides), as well as dangerous dissolved gases like methane and hydrogen sulfide. Dewatering during and after construction will be necessary for the project, which may create environmental and human health risks, including those associated with the discharge of contaminated groundwater and the venting of explosive or toxic gases.

Breaching of artesian aquifers

Aquifers that are recharged on land in upland areas adjacent to the Straits and are confined by clays or low-permeability rock layers may be present under artesian pressures (Vanlier and Deutsch, 1958). Breaching of

such confining units could lead to the uncontrolled discharge of groundwater into the tunnel and access features and decrease water availability in nearby wells and wetlands.

Upconing of saline and sulfidic groundwater due to dewatering

Fresh groundwater within subsurface formations that will be removed by dewatering during and after tunnel construction may result in the upward movement (upconing) of higher-density, saline, and sulfidic groundwater into extraction wells and tunnel infrastructure. Besides creating disposal challenges and potentially impacting nearby water supply wells, this water will accelerate corrosion of tunnel linings, bolts, brackets, supports, railings, ladders, walkways, wiring, sensors, pumps, fittings, and potentially the pipeline itself. The sulfidic water may also result in accelerated dissolution of rock surrounding the tunnel, opening additional voids around and beneath the lining of the tunnel over time, potentially increasing the probability of collapse during the operational period.

Negative impacts on groundwater-lake interactions

As demonstrated during pumping tests, connections between fractured bedrock aquifers and surface water may exist in tunnel transition areas (access portal and shaft), as well as along deeper parts of the tunnel itself, including beneath coarse channel fill zones of boulders and cobbles. Drilling fluids and grout can interrupt such connections, while boring and blasting can enhance them. Negative impacts of disturbed or enhanced connections could include impacts on benthos and fish spawning habitats, as well as impacts on groundwater flow rates and aquifer water quality in wells due to movement of lake water into fracture zones.

Negative impacts on current and future drinking water wells

Hydrogeological measurements and simulations conducted as part of the tunnel permit application and design process rely on overly optimistic assumptions about vertical and horizontal extents of tunnel dewatering and other hydrogeological impacts (e.g., grouting of voids). This may result in inadequate characterization of impacts on water yield and water quality in existing private and water supply wells and potentially future aquifer suitability for well construction, especially in the vicinity of the South Shore site.

Temporary or permanent damage to wetland habitats from dewatering

Groundwater-fed wetlands, especially those surrounding the area of the tunnel shaft on the North Shore of the Straits (Figure 9), will be impacted by dewatering for months to years during construction, and for decades after construction. These sensitive wetland resources are likely to suffer permanent damage.

Shaft, tunnel, or pipeline failure potential and associated releases of contaminants to groundwater and surface water

In addition to the safety risks and costs associated with shaft or tunnel failure due to low-integrity conditions of bedrock and overburden in the construction area or explosions from methane infiltration, failure of tunnel elements during operation would also likely release pipeline fluids. Such fluids, while also being a possible source of tunnel failure, could leak into surrounding aquifers and surface waters via the voids, fractures, and brecciated conduits described earlier, contaminating bedrock aquifers, overburden aquifers, and surface

water. Slow leaks could go undetected for long periods. Catastrophic failures could impact aquifers deep beneath the Straits, making cleanup nearly impossible and resulting in slow seepage to surface water that would be carried to both Lake Michigan and Lake Huron based on highly variable currents in the Straits. Hydrocarbons from undetected pipeline leaks could also enter the operational tunnel dewatering system and be pumped into surface waters.

A lack of geotechnical data from borings that did not penetrate to the full tunnel depth

More than half of the geotechnical borings that were advanced as part of tunnel design did not penetrate to the full depth of the planned tunnel, especially in the deepest tunnel sections (**Figure 1**). This means that the TBM will be "flying blind" in the areas of the greatest pressures and depths of the whole project. Proposed solutions involving pressurized boring and probing ahead of the TBM do not replace inadequate geotechnical information at the project approval stage.

Inadequate consideration of dewatering impacts during tunnel construction and operation

Assessments of dewatering impacts on groundwater, surface water, and wetlands during and after tunnel construction rely on overly optimistic assumptions about groundwater leakage and infiltration, and unrealistic extrapolation of pumping test and borehole packer test results that are unlikely to scale to the configuration and dimensions of the actual proposed tunnel elements. Major accidents and fatalities that have occurred in other Michigan tunneling projects in similar geological and hydrogeological conditions should demonstrate the necessity of more comprehensive geotechnical data collection and consideration of hazards and risks during tunnel construction and operation.

6 DOCUMENT-SPECIFIC REVIEW COMMENTS

The primary documents reviewed in this preliminary evaluation of potential groundwater impacts are listed in the table below. Review comments addressing specific project concerns are detailed in the following sections.

Documents Reviewed
Enbridge -- WSP Line 5 Replacement and Tunnel Project, Geotechnical Data Report (Dec. 2019)
Enbridge -- McMillen Jacobs Associates (MJA) Technical Memorandum, FINAL Risk Mitigation for the Line 5 Replacement Tunnel (Jan. 2021)
Enbridge – Stantec Wetland Delineation Report, Great Lakes Tunnel Project (Nov. 2023)
USACE Draft Environmental Impact Statement (DEIS; 30 May 2025)
FHA, 2009.Technical Manual for Design and Construction of Road Tunnels – Civil Elements
Black, T.J., 2012. Deep karst system research, Michigan
Farrand, W.R., 1962. Postglacial uplift in North America
Landes, K.K., Ehlers, G.M. and Stanley, G.M., 1945. Geology of the Mackinac Straits Region and Sub-Surface Geology of Northern Southern Peninsula
Larsen, C.E., 1987. Geological History of Glacial Lake Algonquin and the Upper Great Lakes
Rosenau, J.C., 1956. Mackinac Bridge: Final Geologic Report
Vanlier, K.E., and Deutsch, M., 1958. Reconnaissance of the Ground-Water Resources of Mackinac County, Michigan

Comments on Enbridge Documents

Enbridge – WSP Line 5 Replacement and Tunnel Project, Geotechnical Data Report (Dec. 2019)

The overall competence of the rock through which the tunnel will be bored and into which access approaches and shafts will be blasted is highly problematic. The geotechnical data presented in boring logs shows consistently low core recovery and common voids, fractures, and brecciated zones encountered during drilling (see examples in the table below; 10 voids of up to 5 feet were noted by McMillen Jacobs Associates [2021]). Significant discrepancies were also encountered between borehole packer test results (water injection under pressure into sealed borehole segments) and groundwater yields from onshore pumping tests, as described below. Much higher yields were observed in the pumping tests, which included pumping from thicker rock intervals than in the borings. Especially noteworthy is that borings did not penetrate to the full depth at which the tunnel would be advanced in many cases (DEIS Section 4.4.3.1.1), meaning that the rock layers sampled do not represent all of the actual layers in which the tunnel will be constructed.

The Enbridge-WSP report, Appendix F-4, Section 1.5 – Conclusions, states, "*the fractured rock mass will result in the zones of highest hydraulic conductivity dominating the drainage of the rock mass for dewatering. Comparing the aquifer pumping test results to the packer testing results, the hydraulic conductivity resulting from the aquifer pumping test is 3 to 5 times higher than expected based on the maximum packer test results." The results of the pumping test suggested that an additional source of recharge might be influencing*

the drawdown, rather than local groundwater alone. The reported hypothesized that the water might be coming "from an alternate source, possibly the nearby lake" (Appendix F-4, Section 1.3.5 Constant Discharge Pumping Test – Results). This illustrates the potential for drawing lake water into aquifers during the tunnel construction, dewatering, and operation phases.

Select Occurrences of Voids and Other Notable Features in Borings (WSP geotechnical report)		
Location, Depth	**Description**	**Risks**
Boring BH19-07, 169-173 feet	4-foot void, extremely weathered, fractured, brecciated for several feet above and below	Collapse, uncontrolled water or gas infiltration, difficulty grouting
Boring BH19-15, 159-160 feet	1-foot void, very weak above with extreme fracturing above and below	Uncontrolled water or gas infiltration, difficulty grouting
BH19-17, approx. 194 feet	Highly weathered zone, persistent collapse at 194 feet, difficulty sealing for packer test, difficulty logging, hole collapsed from 143 to 115 feet during grouting and abandonment	Difficulty boring, collapse, uncontrolled water or gas infiltration, difficulty grouting
BH19-26, 305.8-320.5 feet	Cobbles of mixed lithologies up to 6-inch diameters, quartzite boulder at 316-9-317.6 feet	Difficulty boring (if encountered in collapsed fissures), collapse, uncontrolled water or gas infiltration, difficulty grouting, possible connection pathway from bedrock to lake bottom waters
BH19-27, 201.8-231.3 feet	Cobbles and gravel, mixed lithologies, angular to rounded up to 8-inch diameters, voids	Difficulty boring, collapse, uncontrolled water or gas infiltration, difficulty grouting, possible connection pathway from bedrock to lake bottom waters
BH19-27, 319.6-322.6 feet	Gypsum	Subject to dissolution and creation of voids
BH19-37, 203-208 feet	Very soft void-like drilling from 203-206 feet, crushed from drilling at 207-208 feet, extremely fractured, abundant calcite dissolution	Collapse, uncontrolled water or gas infiltration, difficulty grouting

Enbridge – McMillen Jacobs Associates (MJA) Technical Memorandum, FINAL Risk Mitigation for the Line 5 Replacement Tunnel (Jan. 2021)

This memo was prepared in response to questions submitted to Enbridge by the State of Michigan. Among the details in the memo was an incident noted by the State of Michigan, described as follows: "*There was a notable rock tunnel failure that occurred during construction in Southeast Michigan in 2003* [Detroit Outfall No. 2*]. Grouting was excessive, resulting in excessive infiltration, and the ability to dewater proved undersized. The 20-foot diameter tunnel flooded.*" Experts from MJA were aware of the incident and had visited the work site prior to the accident. They also pointed out that more than half of the geotechnical borings did not reach the full planned tunnel depth. The approaches for dealing with this lack of data, as

described by MJA, is as follows: *"…significant emphasis must be placed on either excavation techniques that control ground and groundwater at the tunnel heading (such as pressurized face TBMs), and/or probing ahead of the TBM to assess the upcoming rock conditions before excavating.*" These approaches provide substantially less confidence in safe and successful execution of the tunneling project than a more comprehensive geotechnical study, which would include all geotechnical borings reaching below the full planned tunnel depth. Tunneling guidance from the Federal Highway Administration (FHA, 2009) recommends that geotechnical boring spacing for rock tunneling under adverse conditions should have a typical spacing of 50 to 200 feet and that borings should extend at least 1.5 tunnel diameters below the bottom of the tunnel. The L5TP geotechnical boring spacing was approximately five times the upper limit suggested by the FHA (about 1,000 feet versus 200 feet) and only 7 of 21 borings extended below the base of the planned tunnel transect.

Enbridge – Stantec Wetland Delineation Report, Great Lakes Tunnel Project (Nov. 2023)

Consistent with results of summer 2023 joint site visits with USACE and Tribal experts, Stantec reported that "*difficult wetland situations can be challenging to interpret, due to multiple disturbed and/or problematic wetland criteria, and other complex variables of climate, geology, soils, specialized plant communities, and dynamic hydrological conditions common to the Straits region*". Wetlands W3, W8, and W19 (**Figure 9**) are most likely to be impacted by shaft dewatering at the North Shore site. These wetland areas consist of Northern Hardwood Swamp, Rich Conifer Swamp, Coastal Fen, Emergent Marsh, Palustrine Scrub-Shrub, and Lacustrine Littoral Shore that are wet or inundated seasonally or after storms. Stantec did not attempt to link wetlands with potential dewatering impacts at the site and acknowledged the dynamic and seasonal aspects of these sensitive wetlands. The problematic nature of these wetlands may present challenges when attempting to document any adverse impacts of dewatering, given the highly variable baseline conditions.

Comments on USACE Draft EIS (DEIS) (May 2025)

Key sections of the USACE DEIS (May 2025) that discuss groundwater are discussed by number in the following sections, including review comments regarding concerns, omissions, inconsistencies, and risks.

3.4.2 Groundwater

3.4.2.1 Groundwater
3.4.2.2 Groundwater Uses
3.4.2.3 Groundwater Quality
Figure 3.4-1. Onshore Groundwater Wells – South
Figure 3.4-2. Onshore Groundwater Wells – North Side
Table 3.4-1. Depth to Groundwater Summary for South Side Wells
Table 3.4-2. Depth to Groundwater Measurement Summary for North Side Wells

These sections of the DEIS provide a very brief overview (5.5 pages, including figures and tables) of surficial aquifer baseline groundwater conditions at South Shore and North Shore L5TP sites. It was noted in background discussions that, "*Results* [of aquifer tests at the South Side site] *suggested the influence of groundwater recharge from at least two different sources, one of which could be the nearby lake*." In addition to presenting the possibility of negative lake-aquifer interactions induced by the project, this raises the

additional challenge of the potential infiltration of large volumes of lake water via groundwater pathways into the South Side tunnel portal during and after construction. Impacts on groundwater of the L5TP are not discussed in these sections.

3.8.2 Geological Formations

This section contains the following descriptive text:

"*A portion of Mackinac Breccia Formation is also present north of the Straits. The Mackinac Breccia developed when the historic presence of large cavities (up to 200 meters or approximately 656.2 feet) formed from dissolved layers of the Pointe Aux Chenes Formation and subsequently collapsed, resulting in a jumbled mass of broken rock (blocks) in a range of sizes (WSP 2020). Over time, the spaces between the blocks became filled by limestone deposition and recemented into a singular formation; therefore, cavities may be present in areas where the breccia did not fully recement or where limestone has dissolved (Landes et al. 1945). Section 3.8.4 discusses the occurrence of karst conditions and limestone."*

The text highlights the potentially problematic nature of rock formations along the tunnel transect including cavities; collapsed, broken, or jumbled rock masses; and karst features. While mentioned explicitly in these descriptions, potential implications for tunnel construction, dewatering, and operation are not routinely considered in detail in many of the relevant subsequent report sections.

3.8.4 Karst Conditions

This section contains the following descriptive text:

"The aquifer consists mostly of limestone and dolomite in all three states but locally contains interbedded shale and evaporite beds (areas where water has evaporated, leaving a layer of minerals). Where the aquifer is unconfined but also overlain by the surficial aquifer system, carbonate rock like limestone and dolomite are easily dissolved. This dissolution can result in the development of karst features (sinkholes). Known areas of karst features occur in Emmet, Cheboygan, and Mackinac counties outside the area of analysis (USGS 1992). While no known karst features are mapped within the area of analysis, the presence of the Silurian-Devonian aquifer and the underlying bedrock geology indicates there is potential for karst features to develop."

While the text highlights the potential for karst features to develop in the underlying bedrock in the area of analysis, it fails to mention the documented occurrences of at least 10 voids in geotechnical borings (Enbridge-WSP, 2019; Enbridge-MJA, 2021). Voids such as these present construction and operational risks related to sealing the tunnel from groundwater and gas (methane and hydrogen sulfide) infiltration, as well as threats to the tunnel's structural integrity due to adjacent voids that may remain undetected or expand after construction.

3.14.1.2.1 Gas Build-Up and Explosion Risk

This section contains the following descriptive text:

"*Gases pose a risk when there is potential water seepage into the main tunnel, allowing gases to separate from the groundwater and mix with the air in the tunnel. Gases such as methane pose an explosion risk if they*

reach their lower explosive limit (LEL) when mixed within the enclosed atmosphere in addition to posing an inhalation hazard to workers within the tunnel."

As noted previously, such a gas build-up and fatal explosion occurred previously in another tunnel under Lake Huron, and hydrogen sulfide was released from groundwater that flooded another tunnel during construction in Detroit (Enbridge-MJA, 2021). Similar conditions are likely to be encountered beneath the Straits, and mitigation measures such as normal ventilation may be inadequate to present problems during and after construction.

3.14.1.3 Tunnel Operation

This section contains the following descriptive text:

"*Post-construction, tunnels have the risk of potential seepage of methane through groundwater. Having an air ventilation system to continuously replace the contaminated air within the tunnel with breathable air from the surface reduces gases such as methane from building up to its LEL. Seepage of groundwater or flooding due to large water inflow also creates collapse potential, as was seen in the Seikan Tunnel in Japan…*"

Again, post-construction seepage of groundwater and dangerous gases is to be expected in a tunnel of this diameter and length that will be advanced through the type of low-quality bedrock that is present beneath the Straits. Normal precautions to prevent accidents during tunnel operation may be inadequate, such as the use of cement lining and pressure grouting, which failed to prevent four accidents in the Seikan Tunnel in Japan. Section 3.14.1.2.2 mentions that the EIS for the Rondout Aqueduct Tunnel project in New York City stated, “A second liner, made of steel segments, would be installed within specific segments of the tunnel in areas that consisted of unstable and disintegrated rock formations, to act as a structural support system.” No such secondary steel liner has been proposed for any segments of the L5TP. Seepage estimates mentioned below (Section 4.4.3.2.1) seem surprisingly low. Even though the tunnel conditions have been characterized as “potentially gassy” (DEIS, p. 4-192), an estimate of nominally worst-case methane seepage rates concluded that “it would take 2,452 years for methane to reach its LEL without ventilation” (DEIS, p. 4-195). This calculation fails to note that much of the actual proposed tunnel path and associated groundwater were not sampled by geotechnical borings, making such a calculation fundamentally unconstrained.

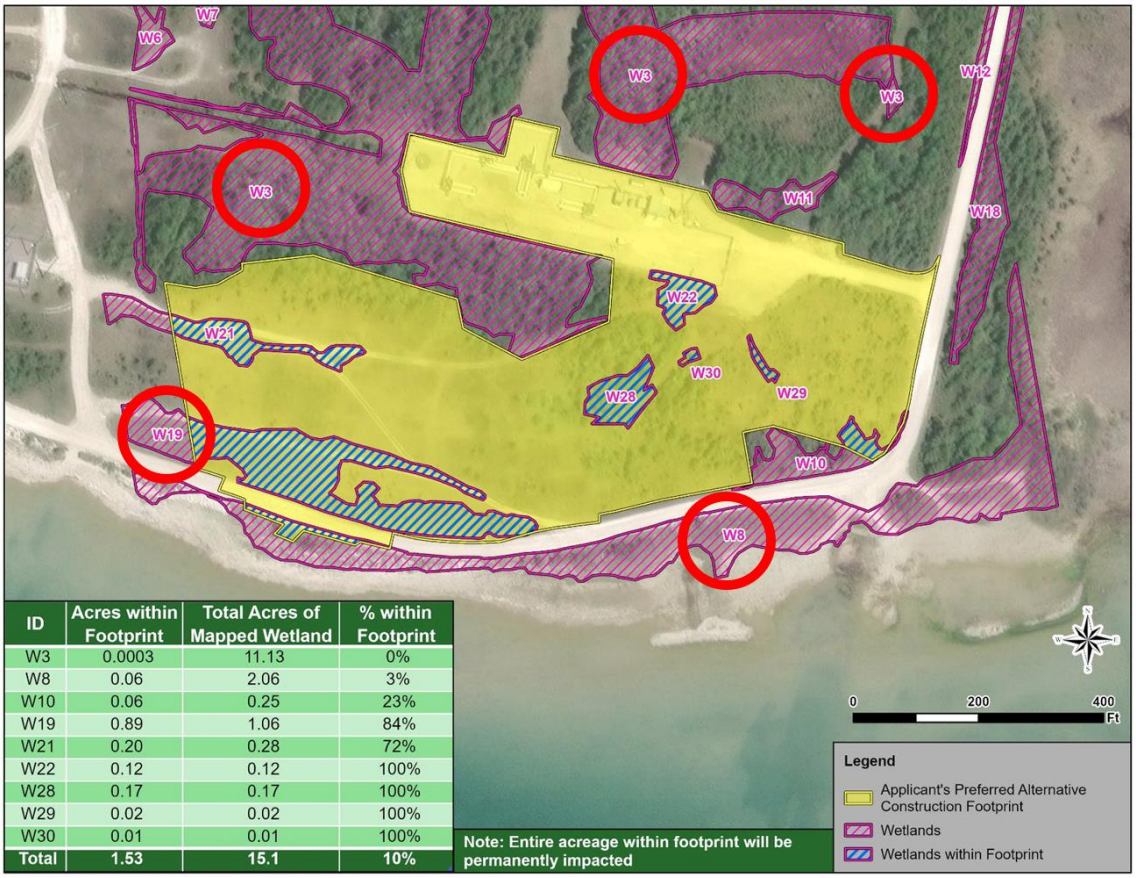
Table 4.4-1. Summary of Key Issues for Water Resources – Action Alternatives

The row of this table that summarizes "Groundwater Drawdown" contains the following descriptive text:

"Direct, detrimental impacts would occur for the duration of shaft/portal construction (6/8 months, respectively) and during TBM operations. Maximum drawdown during shaft/portal construction would be 2 feet within a 360-foot radius."

Although a summary, this statement minimizes the likely actual impacts in terms of depth and duration of drawdown, especially at the North Shore site, which may result in permanent damage to wetlands within the 360-foot radius mentioned (**Figure 9**).

A subsequent row in the table covering "Surface Water/Wetland Disturbance" mentions, "*Indirect, detrimental impact if loss of hydrology results in unanticipated additional permanent wetland losses*."



ID	Acres within Footprint	Total Acres of Mapped Wetland	% within Footprint
W3	0.0003	11.13	0%
W8	0.06	2.06	3%
W10	0.06	0.25	23%
W19	0.89	1.06	84%
W21	0.20	0.28	72%
W22	0.12	0.12	100%
W28	0.17	0.17	100%
W29	0.02	0.02	100%
W30	0.01	0.01	100%
Total	1.53	15.1	10%

Figure 9. Modified version of USACE DEIS "Figure 4.4-1. Permanent Wetland Impacts under the Applicant's Preferred Alternative" with wetlands at the North Shore site that would be impacted by shaft dewatering circled in red.

4.4.3 Applicant's Preferred Alternative

4.4.3.1 Construction
4.4.3.1.1 Groundwater
4.4.3.1.2 Surface Water
4.4.3.1.1 Special Aquatic Sites

These sections contain the following descriptive text (italicized), which is followed by brief comments:

4.4.3.1.1 "*The currently available geotechnical data contains gaps, as multiple borings conducted along the middle portion of the proposed alignment terminated prior to reaching the anticipated depth of the Tunnel bottom. As a result, conditions along several portions of the alignment are currently unknown (WSP 2020; McMillen Jacobs Associates 2021b). Section 4.14 discusses exploratory drilling ahead of the TBM (i.e., probing) in more detail, as it relates to identifying and mitigating risks associated with fractured rock and groundwater*

inflow."

Comment: The DEIS highlights here observations that were previously noted about critical geotechnical data gaps (Enbridge-MJA, 2021).

4.4.3.1.2 "*During HDD installation of the water intake pipe, approximately 20,000 gallons of drilling fluid (primarily consisting of water and bentonite with additives such as lubricants and greases) could be released at the interface of the HDD and the lakebed.*"

Comment: The basis for this estimate of the volume of HDD fluid loss is unclear—it could be substantially higher, with greater associated impacts to benthos, spawning sites, and water quality. Additionally, HDD drilling fluid, which is prone to inadvertent releases to groundwater and surface water, may contain per- and polyfluoroalkyl substances (PFAS) in proprietary additives. While HDD drilling fluid may not carry substantial loads of PFAS, the water quality standard for PFAS is measured in parts per trillion due to its tendency to bioaccumulate in animals and humans. Even a small increase in background concentrations will have lasting negative impacts, specifically to groundwater. Furthermore, material data sheets for HDD drilling fluid are likely not thorough due to proprietary information and reporting requirements.

4.4.3.1.3 "*Alterations to wetland hydrology would also occur if the underlying groundwater table were to lower in response to dewatering associated with retrieval shaft construction, as described in Section 4.4.3.1.1. Wetlands that rely on groundwater hydrology and are located within 360 feet of the retrieval shaft (the distance at which the influence of aquifer drawdown was modeled to extend) would have the potential to be impacted… portions of W3, W8, and W19 occur outside the construction footprint but within 360 feet of dewatering activities associated with shaft construction. Based on information gathered during the wetland delineation, the portions of these wetlands that are within the region of influence for groundwater drawdown do not receive hydrology primarily from groundwater and would be unlikely to be affected if the water table lowers for a period of 6 months.*"

Comment: The wetland delineation methods were not sufficient to determine whether wetlands receive hydrology primarily from groundwater so the assertion that drawdown is unlikely to affect these wetlands is unsupported.

4.4.3.2 Operations

4.4.3.2.1 Groundwater

This section contains the following descriptive text:

"*During operation of the Applicant's Preferred Alternative, it is anticipated that approximately 21,000 gpd of groundwater would infiltrate the Tunnel. Additionally, it is anticipated that approximately 3,060 gpd and 1,500 gpd would seep into the portal and shaft, respectively."*

Given the dimensions of the tunnel, portal, and shaft, and the highly porous and fractured nature of rock formations through which the tunnel passes, these estimates are surprisingly low. The total surface area of the tunnel and shaft alone is approximately (tunnel circumference x length) + (shaft circumference x depth) = 1.6 million sq. ft. The seepage rate amounts to 0.014 gallons per day per square foot, or approximately 3.6 tablespoons per day per square foot. Even these extremely low estimates would result in some persistent drawdown of aquifers along and on either end of the tunnel. For comparison, international standards for permissible leakage rates for transit tunnels range from 0.1 to 2 gallons per minute (gpm) per 100,000 square feet, or 144 to 7,200 gallons per day (Nazarchuk, 2008). Given the surface area calculated above 1.6 million square feet for the L5TP, the equivalent infiltration range would be 2,300 to 115,200 gallons per day. The high end of this range would be more than five times greater than the Enbridge estimate, resulting in a corresponding increase in groundwater drawdown. Note that these values are design standards, not actual infiltration rates observed in operating tunnels, which can be much higher.

4.8.3 Applicant's Preferred Alternative

4.8.3.1 Construction

This section contains the following descriptive text:

"Groundwater drawdown has been shown to affect ecology and hydrology in karst areas, altering the physical and chemical properties of the soil, speed of soil erosion, growth rates of plants, and compositions of plant communities (Lv et al. 2020). As demonstrated in Section 4.4, groundwater drawdown associated with Tunnel excavation and portal/shaft construction would not be expected to result in long-term impacts to the aquifer or onshore ecological features such as wetlands."

The assertion that drawdown would not result in long-term impacts to the aquifer or wetlands is not supported by information presented elsewhere in the DEIS due to recognized uncertainties in the amount and duration of drawdown and the nature of groundwater influences on wetlands at the North Shore site.

4.14 Reliability and Safety

4.14.1 Summary of Key Issues
Table 4.14-1. Summary of Key Issues for Reliability and Safety – Alternatives

Table excerpt:

Factor	No Action Alternative	Applicant's Preferred Alternative	Existing Dual Pipelines Engineered Gravel/Rock Protective Cover Alternative
Tunnel Collapse	N/A	Potential to encounter unstable geology during drilling. The TBM would be equipped with sensors to monitor pressure and with the ability to inject grout to stabilize the geology.	N/A
Exposure to Hazardous Gases	N/A	Potential to encounter hazardous gases that could pose a risk of explosion or asphyxiation. The Applicant would mitigate this risk through ventilation and air monitoring.	N/A

This table summarizes the risk of collapse, explosion, and asphyxiation associated with construction and operation of the tunnel. While mitigating measures are discussed and considered, many are not planned for full implementation due to conclusions that the risks of such incidents are extremely low. This assessment of risks may be overly optimistic.

Appendix F – Description of Alternatives Analyzed in Detail Within the EIS

F1.2.1.2 Tunnel Construction Activities Described by the Applicant
F1.2.1.2.1 South Side
F1.2.1.2.1 North Side

These sections contain the following descriptive text:

"Ground within the portal would be excavated following diaphragm wall completion and a concrete slab would be poured and grouted along the base of the portal to limit the potential for upward flow of water into the portal. The Applicant performed groundwater modelling for the proposed portal using Visual MODFLOW Pro – Classic Interface (Enbridge 2024c). Table F-5 provides anticipated groundwater drawdown during the 8-month construction period for the portal base slab and the radius of influence based on this modelling."

"During shaft excavation, the majority of the water inflow would occur approximately over the first 6 months until the shaft base slab[11] is installed. Following this point, water inflow would be minimized or eliminated. Due to watertight shaft construction, only minimal leakage would need to be managed by sump-and-pump methods within the shaft (Enbridge 2024c). The Applicant performed groundwater modelling for the proposed shaft using GeoStudio 2020 version 10.2.2.20559 SEEP/W 2D groundwater flow analysis software (Enbridge 2024d)."

The referenced report (likely Enbridge. 2024c. Dewatering Estimates. Data Need/Request No. 37. September 6, 2024) was cursorily reviewed and the modeling results do not seem unreasonable. The primary concern would be related to the basic assumptions used in the models. Primarily among these would be the effectiveness of diaphragm walls and base slab seals in the portal and shaft for excluding groundwater infiltration (i.e., "watertightness"). The possible need for installing dewatering well points outside the diaphragm wall is mentioned elsewhere in the DEIS and source documents, but this is likely not considered in models. Because of this, the simulated groundwater withdrawal rates and associated drawdowns may be too low. Additionally, the assumptions about project duration (6-8 months) may be overly optimistic, considering the uncertainties and challenges associated with similar tunnel boring projects in other locations. Longer duration would likely mean additional infiltration and drawdown.

Appendix G – 3.4.1.1 Groundwater Infiltration into Tunnel – Construction Calculations

This section includes calculations showing a tunnel infiltration rate of 625,633 gallons of water/day (or 434 gallons/minutes). This calculation is based on a hydraulic conductivity estimate for the surrounding aquifer that may be too low in many tunnel segments based on the occurrence of voids, fractures, and high-permeability zones. As mentioned previously (DEIS section 3.14.1.3 comments), resulting estimates of methane flux into the tunnel during the construction and operational periods would also be too low due to overly optimistic seepage volume assumptions and low methane concentration assumptions that are

unconstrained by actual groundwater quality data along most of the proposed deep tunnel segments. Finally, the resulting vertical aquifer drawdown and diameter of the cone of depression around tunnel entrance and exit points would also be greater than estimated if higher pumping rates for dewatering are necessary.

7 CONCLUDING STATEMENT

The geological and hydrogeological conditions present beneath the Straits along the proposed tunnel transect, where investigated by actual geotechnical boring observations, are known to consist of fractured, brecciated, and unstable bedrock with frequent voids. The tunnel transect has high potential for infiltration of large volumes of groundwater and dangerous gases during tunnel construction and operation. Because of inadequate boring depth penetration, the tunnel boring machine will be “flying blind” along much of the transect. In the process of moving the pipeline from the lakebed to the proposed tunnel, there appears to be a simple exchange of one set of pipeline risks (e.g., anchor strikes) for another set (e.g., tunnel collapse and explosion, with hydrocarbon release risk to groundwater and surface water, and permanent wetland dewatering).

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Attachment C

MARINO ENGINEERING ASSOCIATES
A UES Company

June 26, 2025

Ms. Whitney Gravelle,
President, Bay Mills Indian Community
Tribal Association
12140 W. Lakeshore Drive
Brimly, MI 49715

Re: Proposed Enbridge Line 5 Tunnel Project

Dear Ms. Gravelle,

As requested, in this preliminary report MEA provides a summary of our investigation into the impact that the proposed on-land blasting and construction activity will have on the surrounding areas. The blasting is necessary in order to excavate the bedrock for TBM portal/shaft construction. Comments are also provided on the noise impacts on the north and south side construction activity. Our investigation of the blast and construction induced noise was performed from an engineering perspective and is merely a discussion of the results reported in the Stantec/Enbridge/US Corp of Engineers (USACE) documents which were provided to MEA. This investigation was based solely upon the information provided to us by Earthjustice. Below is our review and evaluation of the submittals made by Stantec in 2023, and Enbridge in 2025 followed by the USACE investigation report in May of 2025.

1.0 STANTEC SUBMITTAL 2023

Blasting Plan

It is our understanding that there will be 3 blasts per day on the south side and up to 3 blasts per day on the and north side, respectively, during daylight hours for 6 months (Stantec's Ambient Sound Survey Report dated 10/18/2023). The maximum charge of the blasts is not provided and is stated that it will be determined from a week

of blast tests to assess the acceptable level. To our knowledge no details are provided on how this testing will determine the total simultaneous charge (with insufficient period separation) that is acceptable. Important information missing includes:

- Blasting sequence,
- Location(s) of blast sites,
- Location(s) of the monitoring seismograph(s),
- Ground vibration threshold(s) which determine acceptability,
- Air noise threshold(s)
- Location(s) of sound monitoring device(s).

Blast-Induced Damage

It is stated in the 2023 Stantec report that the blasting will be monitored and limited to below the expected damage threshold as determined by the Peak Particle Velocity (PPV) of the induced ground vibration. Stantec considers the USBM PPV criteria as the "common industry standard" for structures. There are, however, other recognized standards which are more conservative and are discussed below. This USBM criteria considers the following PPV blast limits for damage:

PPV (in/sec)	CATEGORY
2.0	Average to good structural condition
0.75	Drywall/plaster cracking or opening of old cracks
0.5	Fragile structures in poor condition

There was no mention of vibration effects on roosting bats, bald eagles or other animal habitats in the surrounding area.

There are other recognized standard references which indicate lower vibration thresholds which were not considered which are summarized in Caltrans, 2004)[1]. These PPV thresholds are summarized below:

PPV (in/sec)	CATEGORY
1.0-1.5	Engineered structures
0.5	Above structures with wood ceilings/walls with masonry veneer
0.4-0.5	Drywall in good condition
0.2-0.3	Plaster walls
0.3 (typical)	Historic fragile buildings

Therefore, there are significantly lower threshold magnitudes when comparing the above reported thresholds given in the Caltrans Manual with those considered by Stantec. In other words, the acceptable blast against damage based on induced ground vibration can be significantly lower and depends on the nature of the structure. Moreover, to our knowledge, there has been no assessment for what the maximum PPV would be for each surrounding structure. For example, the maximum PPV for

[1] California Department of Transportation (Caltrans) Environmental Program, Environmental Engineering, Noise, Vibration and Hazardous Waste Management Office. “Transportation- and Construction-Induced Vibration Guidance Manual”, June 2004.

modern Industrial Facility would be different and much higher than the historic McGulpin Point Lighthouse or Old Mackinac Point Lighthouse.

Blast-Induced Noise

The anticipated level of noise with distance from the north and south side blast sites were modeled by Stantec. The blast considered in the sound propagation model assumed a Sound Power Level (SPL) of 100 dBA[2]. This, however, appears to be too low resulting in modeled noise propagation distances with intensity less than actually would exist. Note for even a small dynamite charge the SPL is approximately 140dBA, which is even greater than the 100 dBA assumed in the Stantec analysis. This is especially concerning considering that there is no plan to control blasts (or construction activity) based on the resulting and acceptable noise level.

To compare the modeled noise propagation intensities with distances to baseline ambient sound levels at different locations in the area, sound monitoring devices were installed in different locations. These locations are noted at ML# in Figures 1 and 2 for the north and south sides, respectively. The 24-hr monitoring took place from June 7 to June 9, 2023. The ambient noise level for each ML location was then quantified into these equivalent continuous sound level (LA_{eq}) and the residual sound level (LA_{90}) to establish the baseline for each area. These values are summarized in Table 1. Note that the residual LA_{90} noise levels were calculated to be lower than the respective LA_{eq} (except ML06) as the residual values are minus sound spikes and thus should be lower.

The approximate areas which each ML represents have been delineated by dashed lines in Figures 1 and 2. As can be seen from these figures, there are significant areas which were not monitored for baseline ambient noise levels. For example, it would be expected that wooded and park areas where animal habitats exist would have lower baselines but were not monitored. These areas may present the lowest ambient

[2] Means weighted for frequencies humans can hear.

noise levels and should be established if important environmental impacts are deemed present.

Table 1 summarized the various data reported in this Stantec study related to the ambient noise investigation from blasting and construction activity. As can be seen from Table 1, even for the relatively small dynamite charge considered at less than 1 lb, the modeled blast will exceed the calculated baseline ambient sound for the monitored ML02 area (i.e., the blast sound will exceed the baseline level up to a distance of 558 ft from the blast whereas the ML02 area is as close as about 380 ft from the blast). Therefore, a larger blast would create a significantly greater blast induced noise impact.

Construction Activity Noise

The Stantec noise investigation in 2023 also covered the noise propagation with intensity from the associated construction activities on the north and south sides. The modeled construction activity noise at all monitored ambient noise stations far exceeds the distances to these ML locations and are calculated to be up to 7,932 ft (1.5 miles) away from the construction site during the day. See Table 1. Therefore the Stantec analysis indicates the noise from the surface construction far out weighs the noise impact of a small blast but not for a larger blast charge.

2.0 ENBRIDGE SUBMITTAL 2025

Blasting-Induced Damage

The same thresholds which were reported in the 2023 Stantec report were noted in the Enbridge Submittal 2025 (see above). However, Stantec noted that a PPV of 0.30 in/sec would be similar to jumping on the floor which is not included in the reported thresholds. Also see below under blast noise for estimate of charge assumed for the noise analysis.

Blast-Induced Noise

The most unrealistic small blast discharge assumption, at least in part, appears to have been recognized in the Line 5 Tunnel EIS – Data transmission dated March 6, 2025, which states: "…The modeling was done in October 2023 and the assumption made that the noise from a blast at the source was lower than what the contractor is estimating based on the blasting plan that is being developed. Because of this Enbridge now knows that the noise propagation distance of bench blasting until reaching ambient sound levels will extend beyond what was modeled in the 2023 Stantec Ambient Sound Survey and Area of Potential Impact Assessment…". It is further stated "Sound contour maps for blasting activities will be provided in the near future…". These contour plots were prepared by Stantec later in March, 2025. The noise contour maps provided by Enbridge are included for reference in Attachment A. As can be seen from these plots the noise contours extend into and across the Straits of Mackinac. As can be seen from Table 1, based on the modeled contour plots provided, there is a significant difference in the noise propagation from the initial submittal discussed above. As noted above, the initial model blast of 100 dBA was too small. This seems to have been corrected for the March 6, 2025 Enbridge submittal. However, as in the 2023 submittal, the size of the blast considered was not disclosed and basis for that blast magnitude assumed or whether or not the north and south blast were taken at different magnitudes are not known. Without this data, evaluation is not possible.

As can be seen from Table 1 and Attachment A, the north side daytime blast will exceed the baseline ambient noise monitored areas ML01, 02, and 03 and even reach or exceed levels on the south side monitored areas for ML07 and 08. For the south side, the assumed blast exceeded the baseline levels for all monitored areas (ML05, 06, 07, 08, and 09) with the blast noise extending to the north side and reaching the ambient noise level at least for the area for ML01. This means that based on these submitted predictions the frequency of the exceeded blast noise can be up to double in an area if the blasting is carried out during the same period of time on the north and south sides.

As mentioned above, the noise baselines for expected quieter forest areas were not monitored or provided, but should be assessed. It is expected that in these areas the blasts will be louder than the baseline levels. Moreover, the blast noise may very well be the controlling factor in limiting the blast charge if recognized.

The blast magnitude used in the revised noise propagation predictions is not provided however the maximum noise contour shown on both the north and south sides is 75 dBA which is within the construction disturbed zone. In an attempt to understand the sound magnitude assumed at the blast point source, the predicted dBA blast contours (shown in Attachment A) were plotted with distance from the blast source location. These plots are shown in Figures 3 and 4. These plots were projected to the blast location (i.e. zero distance) indicating dBA magnitude of the blast at the source points. For both the north and south side it appears the assumed magnitude was less than 90 dBA which represents a fairly small (such as 1lb or less of explosives) dynamite charge which is unrealistic.

Construction Activity Noise

For the submitted Stantec noise contour maps by Enbridge for construction activity are to be fairly similar to the initial submittal in 2023 (See Table 1 and Attachment A). However, the input used to establish the noise propagation results shown on the contour maps is not given. The construction noise is calculated to be much lower than from blasting as is evident from the propagation distance in Table 1 and the extent of the contours on maps in Attachment A. For example, critical levels of construction noise are not shown to extend from the north or south sides to the other. From an engineering perspective, however, because this is constant noise conditions the modeling should have superimposed the effects from the north and south sides.

As can be seen from Table 1 (and Attachment A), the construction noise is expected to extend out to lesser distances than from blasting and is below baseline levels to across The Straits. For the north side, the constant daytime construction noise is predicted to exceed the ambient baseline levels for monitoring areas ML01, 02, and 03. On the south side all baseline ambient noise monitoring areas are exceeded by the

construction noise. It should be noted that in the modeling, the construction noise levels generated are considered conservative as all elements (i.e., noise generated by different construction operations) of construction noise are stated to be assumed to act simultaneously. However, the specific details on how the construction noise levels were generated were not provided in this submittal. As noted above, not all project areas were monitored for ambient levels. These forested/park areas are likely to have quieter ambient noise and be more sensitive to the construction noise.

3.0 USACE ASSESSMENT REPORT

Blast-Induced Vibration Impacts

The USACE evaluated the effects of the included ground vibrations from the continuous construction activities and from blasting in terms of resulting nuisance and damage. For the nuisance and expected damage from blast induced vibrations USACE considered the following threshold criteria.

PPV (in/sec)	CATEGORY
0.3	Fragile structures
0.5	Non-fragile structures
1.0	Disturbing to human receptors at residential properties
2.0	Underground pipelines

The above criteria provides lower tolerance than initially recommended in the 2023 Stantec submittal (see above) and is more in conformance with the values MEA provided from Caltrans, 2007 (see above). However there are no definitions or descriptions which provides what constitutes fragile and non-fragile structures. Also, the use of a limiting PPV of 1.0 in/sec for human vibratory disturbance appears too high as floors can bounce at 0.3 in/sec as reported in this same report. This conflicts with the

much higher limit of 1.0 in/sec. No disturbance threshold(s) are provided for habitats or humans in recreational forested areas. USACE also states: “Blasting vibration limits would be included in the construction specifications and it is the onsite structures and features closest to the blasting activities that would control the overall allowable blast vibration limits”. Therefore, it is unknown how these thresholds will be applied and monitored with seismographs to the specific project features of concern. Despite the above USACE concludes “Detrimental vibration effects to human receptors and structures from blasting activities would be unlikely” assuming approximately 1 pound (or less) of embedded explosive per blasting event. This is an unrealistic amount of explosive to be used per hole. Based on our experience, for even only a 5 ft lift of rock about 16 lbs (3 ft stem + 2 ft x 8 lb/ft) of explosives would be required for a PPV sensitive area. Higher amounts of explosive would increase the PPV magnitude and spread and thus significantly increase the disturbance and damage potential areas.

For monitoring during blasting and construction the USACE sets a “review level” for buildings at PPV of 1.0 in/sec which exceeds the above thresholds which cause damage and disturbances. Therefore the damage and disturbance impacts can potentially occur under the monitoring “review level”. The “Alert Level” for monitoring is even higher at a PPV = 2.0 in/sec. Moreover, stipulated remedial steps when the level is exceeded do not explicitly include an extensive survey of any resulting disturbance or damage effects. Construction is stated to occur over a long time. It is stated it will be roughly 5 to 6 days a week for 10 hrs/day for about 7 months for first year and then 24 hrs/day for 5 to 6 days per week for several years after. Moreover, there is no discussion about the means and methods for mitigation of flyrock issues during blasting.

Blast-Induced Noise

It is expected that blasting will take about a year to perform the blasting excavation that “may be required” on both the north and south sides (Stantec 2023 states for 6 months). A week of blast testing is noted but no additional data is provided other than that in 2023 Stantec submittal (see above). For residential properties a sound threshold of 80 dBA (stated from Mackinac City ordinance) is considered for impulse sounds (by blasts) which is equivalent to older (and louder) vacuum cleaners or a police

car siren. However the blast charge considered in Enbridge modeling is too small and therefore a realistic comparison of the anticipated large blast related noise cannot be made. No other blast noise thresholds are considered or habitat impacts evaluated.

In evaluating this disturbance USACE uses the blast noise contours given as part of the 2025 Enbridge submittal and therefore our analysis of this submittal applies here.

Construction Vibratory Impacts

For continuous vibration source from construction activities the following impact thresholds were adapted by USACE.

PPV (in/sec)	CATEGORY
0.1	Above ground fragile structures
0.2	Above ground non-fragile structures
0.2	Human receptors at residential and outdoor recreational areas
1.6	Buried/underground pipelines

The threshold criteria appears reasonable. USACE considers various likely construction elements with a pile driver having the maximum vibratory impact and the only construction activity which can damage up to 3 residences and McGulpin Point Lighthouse depending on their conditions. USACE concludes “Direct, local detrimental vibration effects to structures and to human receptors from general construction activities (non-blasting) are unlikely to occur at the South Side or North Side as projected continuous vibration levels are not expected to exceed the impact thresholds”. As noted above, this statement contradicts damage of up to 3 residences and McGulpin Point Lighthouse assessment expressed above. Moreover, there is no discussion for the threshold of various habitat.

USACE determined the use of horizontal directional drilling (HDD) for construction of proposed water intake structure and Tie-10 would have “no detrimental vibration effects”. Based on the information provided this evaluation seems reasonable.

USACE also investigated the vibratory impact normally during daytime between Monday to Saturday that the anticipated construction truck traffic will have during the period of construction. They determined that near the expected truck haul roads that detrimental effects are unlikely. It was assumed the haul truck induced vibrations were below nuisance and damage level at a distance of less than 25 ft. It has been our experience that these truck induced vibration can be a nuisance/disturbance significantly beyond 25 ft. Moreover, there has been no specific hauling route analysis performed by any investigator to understand which roadways and surrounding areas would be significantly impacted.

Under vibratory damage or disturbance investigations, there is no threshold(s) or study by USACE provided on the impact of this project from induced ground vibrations on cultural resources above or below ground.

Construction Activity Noise

In lieu of comparing predicted noise levels to the measured ambient noise levels for the different ML monitored level of a region USACE considers acceptable threshold levels which are much greater in intensity. If any of the below thresholds considered by USACE are exceeded the area is assumed impacted.

- 10-dBA increase over the existing ambient noise level
- Residential properties- 60 dBA outdoors day
  50 dBA indoors day
  55 dBA outdoors night
  45 dBA indoors night
- Public forests/parks – 57 dBA
- Outdoor recreational activities – 67 dBA

For example, USACE considers in residential areas the daytime baseline is 45 dBA for night indoors. This is higher than what's recorded at ML monitoring locations which are actually is as low as 36 dBA (day) and 31 dBA (night). Moreover, the above criteria states that 10 dBA can be added resulting in an acceptable residential limit of 55 dBA. This is a moderate noise level (mdhearingaid.com). This added acceptable noise limit of 10 dBA results in a ten fold allowable increase in noise (USACE misnotes a 2 fold increase, p4-155).

Notes in Figure 4.12.1 and 4.12.2 show large sensitive receptor areas for south side with no ML monitor within the interior of the space. For the north side no sensitive receptor areas are shown despite forested areas being present. See Figures 4.12.3 and 4.12.4.

USACE's premise is that it is acceptable that the construction or blasting noise can exceed the monitored level of sound during the 3 day period from June 7-9, 2023. Area sounds may be dampened compared to winter or other seasons or may be more or less depending on seasonal noise (e.g., changes in human and wildlife activities and weather). More monitoring of ambient noise conditions on both the north and south sides would eliminate these more ambiguous baseline noise conditions.

USACE states construction noise, based on the modeled results will exceed the acceptable noise threshold of 57 dBA for the northern up to 150 acres for the Headland International Dark Sky Park. However this 57 dBA criterion exceeds their own limit 10dBA above the ambient with the closest ML station (ML07) indicating a lower value of 36 dBA (day)or 31 dBA (night) or a minimum threshold of 41 dBA (see Table 1). Therefore their noted acceptable level of 57 dBA exceeds their own criteria of 41 dBA (31 dBA + 10 dBA). Also using their analyses, USACE states 28 residences will be impacted by the construction noise (p4-153).

USACE investigated the noise impacts from various construction activities including use of common construction equipment, horizontal directional drilling (HDD), EMPS (excavated material placement site) and blasting. For the HDD on the north and south side USACE states that this noise would not impact the residences with an overall

noise level of 119 dBA at the source, However HDD noise effects would be felt at Headlands International/Dark Sky Park and the shorelines on both the north and south sides. From an engineering perspective, there is no discussion about the effect of the superposition of the construction activities and the HDD noises on the neighboring areas. USACE states noise barriers can be installed in residential areas if needed. HDD is estimated for a few weeks.

For EMPS (excavated material placement site), the added haul traffic would involve the improvement of local roads for the transport of excavated tunnel material of site. For the noise associated with the road improvement activities the noise is estimated at 80 dBA at 50 ft which would impact 14 residences (p4-154). This activity is estimated to last up to 3 months.

The increased truck and vehicle traffic noise due to the construction activities was also evaluated by USACE. In assessing the traffic noise USACE converted the truck volume to the “noise equivalent of 47 passenger cars”. The calculated traffic noise was then compared to the thresholds given above, however the government states that there are a lack of traffic data along many of the affected roads but concluded the added traffic noise in some of the road areas “may experience detrimental noise effects” (p4-158-60).

Table 2 summarizes the baseline ambient noise for the different ML regions and compares these values to the predicted noise levels for the different regions and whether the predicted values exceed the USACE assumed threshold criteria. For the predicted blast-noise, USACE only considered residential property threshold of 80dBA (equivalent to a police siren). As can be seen in Table 2 all ML regions are below this limit, however, other environment threshold of periodic blasts are not considered and the blast charge assumed in the noise prediction seems vastly understated. This significantly affects the noise predictions.

As can be seen from above and Table 2, the construction noise thresholds given above varies depending on the environment. Using this criteria the limiting threshold for the different environmental category is shown in Table 2 for each ML area. Comparing

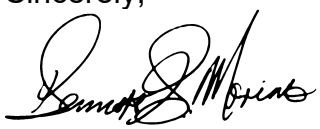
the predicted noise for each ML area, it can be seen that a number of areas exceed the limiting thresholds. For residential areas limits are exceeded for ML1 and ML5. In Shoreline/Park/Forested areas, limits are all or are in part exceeded (ML1, ML3, ML5, ML7, and ML8). Moreover, note that there has been no discussion by USACE of noise monitoring to be done during construction. Upon request MEA can review noise standards assumed by USACE.

From our review of the USACE report, the impact of the added construction traffic on the wear and damage of the affected roads should be investigated but has not been analyzed by the government.

Please note the above review does not include review of any damage or disturbance impacts of decommissioning, tunneling or proposed gravel/rock protective cover over dual existing pipelines.

If you have any additional questions regarding this project, please contact me.

Sincerely,



Gennaro G. Marino, Ph.D., P.E., BC.GE., F.ASCE
President

ENCLOSURES:

FIGURE 1: BLASTING LOCATION AND THE APPROXIMATE RANGE OF DISTANCE FOR MONITORING LOCATION (ML) NOISE AT THE NORTH SIDE OVER SATELLITE IMAGE.

FIGURE 2: BLASTING LOCATION AND THE APPROXIMATE RANGE OF DISTANCE FOR MONITORING LOCATION (ML) NOISE AT THE SOUTH SIDE OVER SATELLITE IMAGE.

FIGURE 3: PROJECTION OF dBA MAGNITUDE AT BLAST FOR NORTH SIDE

FIGURE 4: PROJECTION OF dBA MAGNITUDE AT BLAST FOR SOUTH SIDE

TABLE 1: SUMMARY OF AMBIENT SOUND LEVEL MEASUREMENTS AND PREDICTIONS AT NINE MONITORING LOCATIONS.

TABLE 2: BASELINE AMBIENT NOISE LEVEL, PREDICTED CONSTRUCTION AND BLAST NOISE, AND USACE APPLIED THRESHOLDS AT ML MONITORED LOCATIONS

ATTACHMENT A: ENBRIDGE 2025 NOISE GENERATED CONTOUR PLOTS FOR NOISE PROPAGATION FROM BLASTING AND CONSTRUCTION ACTIVITY ON THE NORTH AND SOUTH SIDES.

FIGURE 1 BLASTING LOCATION AND THE APPROXIMATE RANGE OF DISTANCE FOR MONITORING LOCATION (ML) NOISE AT THE NORTH SIDE OVER SATELLITE IMAGE

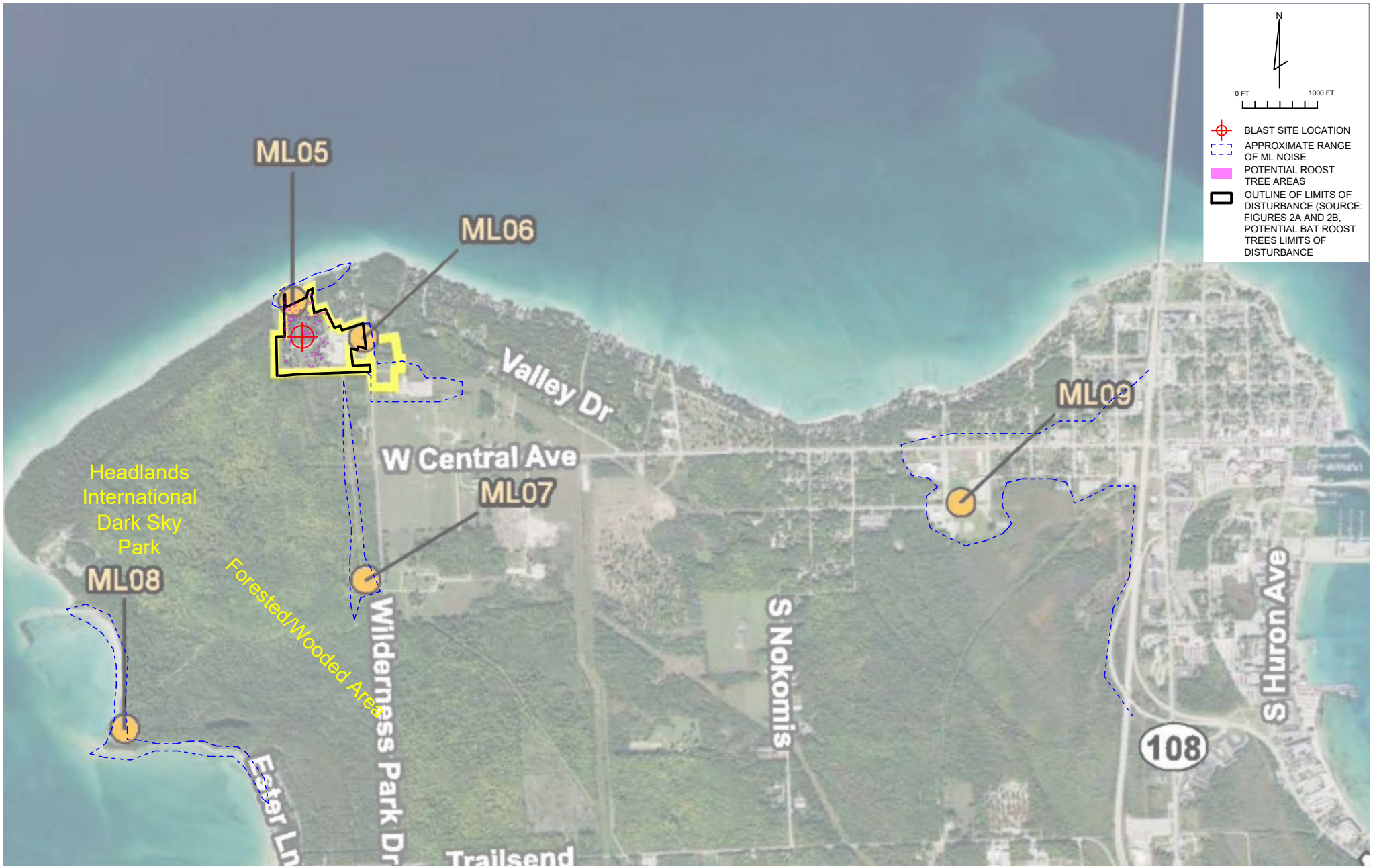


FIGURE 2 BLASTING LOCATION AND THE APPROXIMATE RANGE OF DISTANCE FOR MONITORING LOCATION (ML) NOISE AT THE SOUTH SIDE OVER SATELLITE IMAGE

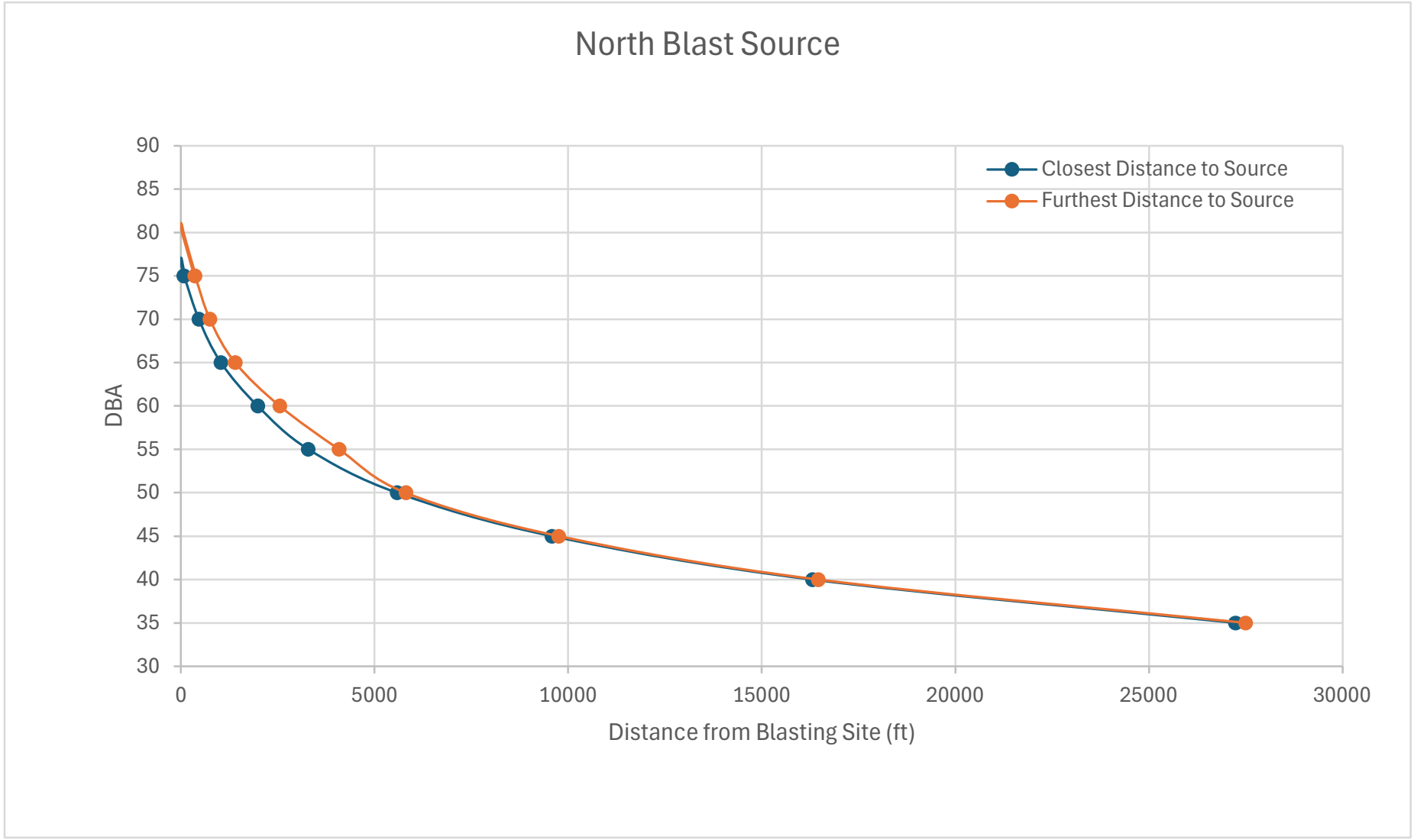


FIGURE 3 PROJECTION OF dBA MAGNITUDE AT BLAST FOR NORTH SIDE

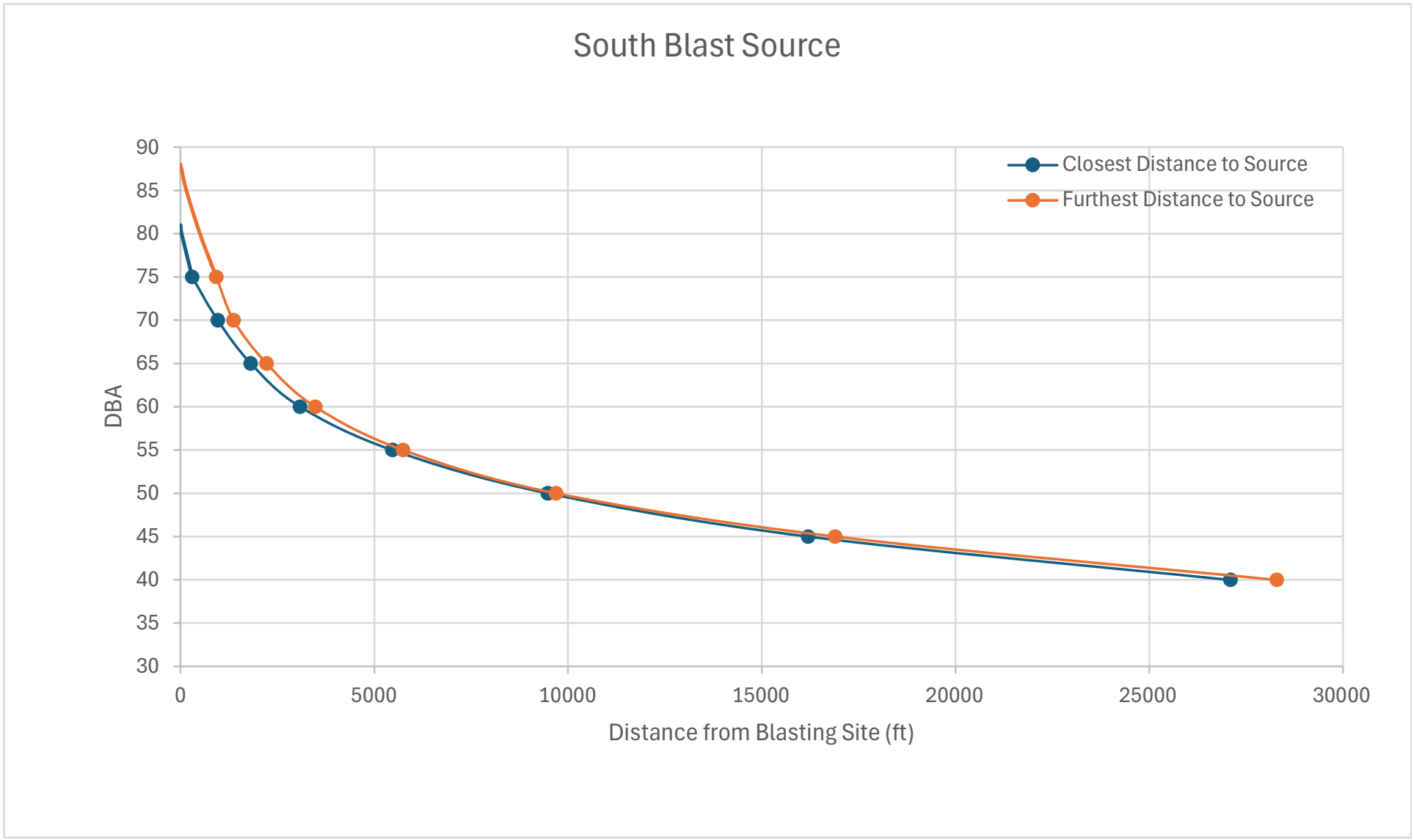


FIGURE 4 PROJECTION OF dBA MAGNITUDE AT BLAST FOR SOUTH SIDE

TABLE 1 SUMMARY OF AMBIENT SOUND LEVEL MEASUREMENTS AND PREDICTIONS AT NINE MONITORING LOCATIONS[11,12]

Monitoring Location (ML)[1] Site Information			Range of ML Noise Distance from the Noise Source (ft)		Measured Ambient Sound Level					Propagation Distances to Ambient Sound Level (ft)												
ID	Location	Description			LA_{eq}[2] [dBA]		LA_{90}[3] [dBA]		Site Measurement Description	Bench Blasting Noise[4,5]						Construction Noise (North Side)				Construction Noise (South Side)			
			North Side	South Side	Day	Night	Day	Night		Day	Night[7]	North Side[8]		South Side[9]		Day	Day (Revised)[10]	Night	Night (Revised)[10]	Day	Day (Revised)[10]	Night	Night (Revised)[10]
												Day (Revised)[10]	Night (Revised)[10]	Day (Revised)[10]	Night (Revised)[10]								
ML01	970 Boulevard Dr., St Ignace	Waterfront, residences and forested area west of north side Limit of Disturbance (LOD)	1,150 - 3,950	21,108 - 22,020	42	56	39	53	Ambient sound dominated by natural sounds and waves lapping against rocks during daytime and nighttime hours. Road noise audible to the east and north.	755	174	20,168	4,867	21,709	5,902	7,932	8,118	2,300	3,185	8,484	12,575	2,310	4,965
ML02	W706 Boulevard Dr., St Ignace	North side LOD	380 - 900	20,753 - 20,990	44	39	42	38	Ambient sound levels dominant by natural sounds during daytime hours. Distant road traffic noise audible. Ambient sound dominated by natural sounds during nighttime hours. No wave noise audible, likely masked due to winds from the west.	558[6]	853	15,846	24,361	16,810	23,288	6,288	7,185	8,522	9,053	6,754	10,502	9,136	13,329
ML03		Shoreline and heavily wooded area	1,250 - 4,900	21,458 - 24,441	47	38	43	35	Bird colony on island to the south dominant during daytime hours. Distant road traffic audible during nighttime measurements. No wave noise audible, likely masked due to winds from the west.	482	1,181	13,715	31,509	15,502	27,973	5,788	6,306	10,546	10,262	6,244	9,863	11,202	15,670
ML04	561 Boulevard Dr., St Ignace	St. Ignace urban residences and highway noise	5,120 - greater than 10,000	25,519 - greater than 29,550	61	58	54	45	Road traffic noise dominant during daytime and nighttime hours. Idling trucks and nearby HVAC units also contributing to ambient sound levels.	154	400	3,957	9,649	5,224	12,612	2,103	3,088	4,883	5,470	2,094	4,518	5,294	8,595
ML05	6770 David Dr., Mackinaw City	Shoreline and residential areas around south side LOD	19,296 - 20,116	480 - 1,180	52	43	50	42	Wave noise and natural bird sounds dominant during daytime hours. Distant intermittent boat noise audible. Water noise, waves lapping against rock dominant during nighttime hours.	236	558	7,792	16,560	7,805	17,203	3,078	4,829	6,288	8,544	3,085	6,196	6,754	10,587
ML06	360 Headlands Rd., Mackinaw City	South side LOD	20,016 - 21,044	670 - 2,270	59	59	59	58	Station noise dominant during daytime and nighttime hours with intermittent road traffic.	92	102	3056	3,465	2135	2,390	1,233	2,301	1,375	2,536	1,355	2,198	1,519	2,390
ML07	1425 W Central Ave., Mackinaw City	Heavily wooded area adjacent to Headlands Dark Sky Park with road noise	20,850 - 23,937	810 - 3,840	43	36	36	31	Ambient sound dominated by natural bird sounds. Infrequent car passbys during daytime and nighttime hours. Ambient nighttime measurements dominated by natural sounds.	1,050	1,785	26,178	>27,970	25,024	>27,200	9,843	12,293	13,576	>12,965	9,833	10,374	14,340	>10,920
ML08	15181 Esther Ln., Mackinaw City	Headlands Dark Sky Park and heavily wooded area southwest of south side LOD	24,662 - 26,572	4,510 - 6,250	40	44	38	43	Ambient sound levels dominated by birds and waves lapping against rock during daytime hours. Waves lapping against rocks dominant during nighttime hours.	853	492	24,446	15,482	21,222	14,322	5,566	10,954	5,788	7,993	9,085	12,800	6,244	9,344
ML09	507 W Central Ave., Mackinaw City	Mackinaw City with road traffic noise	21,100 - greater than 25,500	8,120 - greater than 13,200	52	40	44	36	Distant highway and road noise dominant during daytime and nighttime hours. No natural sounds audible over road traffic noise. Tonal hum from bridge audible at this location.	443	1,050	14,150	26,438	11,560	29,018	5,322	7,450	9,843	12,303	5,751	6,404	10,453	10,337

Monitoring Location Group:

1 Waterfront/shoreline areas where ambient sound dominated by natural sounds and waves lapping.
2 Urban residential areas where ambient sound dominated by road traffic noise.
3 Wooded areas where ambient sound dominated by natural sound with distant road traffic noise.

Notes:

1. No noise monitoring performed in park and forested areas where bat roosting areas exist and an active bald eagle habitat on north side.
2. Equivalent continuous sound level of measurement. The average sound level of a fluctuating noise measurement over the measurement period (Measurement period: June 7-9, 2023, 7am-7pm for daytime and 11pm-7am for nighttime).
3. Sound level exceeded for 90% of the sample period. Residual sound level excluding most intermittent, high intensity noise sources.
4. Noise propagation model assumed an equivalent blast of 100 dBA (small blast).
5. Portal blast up to 3 times per day during daylight hours on the North Side and 3 times per day on the South Side for 6 months per Stantec's Ambient Sound Survey Report dated 10/18/2023.
6. Exceeds residual noise level for a small blast.
7. No plan to conduct blasting at night per Note 5.
8. Source of blasting noise is from the North Side.
9. Source of blasting noise is from the South Side.
10. Distances are based on the provided sound level contours map from blasting and construction activities for the north and south LOD (from Attachments 1 to 4, Supplemental Information for Noise and Vibration Analysis and Transporation dated 3/6/2025 by ENBRIDGE).
11. No ambient noise monitoring planned during blasting.
12. In addition to other habitat, potential areas of bat roosting trees exist outside the limits of disturbance at the North and South Sides (see Figures 1 and 2).

TABLE 2 BASELINE AMBIENT NOISE LEVEL, PREDICTED CONSTRUCTION AND BLAST NOISE, AND USACE APPLIED THRESHOLDS AT ML MONITORED LOCATIONS

Monitoring Location (ML) Site Information			Range of ML Noise Distance from the Noise Source (ft)		Measured Ambient Sound Level					Predicted Blasting Noise Range (dBA)[3]		USACE Blasting Threshold[1]	Predicted Construction Noise Range (dBA)		Category[4]	USACE Non-Blasting Threshold[2] (dBA)	
ID	Location	Description			LA_{eq}[2] [dBA]		LA_{90}[3] [dBA]		Site Measurement Description	North Side	South Side		North Side	South Side			
			North Side	South Side	Day	Night	Day	Night								Day	Night
ML01	970 Boulevard Dr., St Ignace	Waterfront, residences and forested area west of north side Limit of Disturbance (LOD)	1,150 - 3,950	21,108 - 22,020	42	56	39	53	Ambient sound dominated by natural sounds and waves lapping against rocks during daytime and nighttime hours. Road noise audible to the east and north.	55.78 - 66.46	43.82 - 44.37		51.37 - 65	<40	R S F	49 49 49	45 63 57
ML02	W706 Boulevard Dr., St Ignace	North side LOD	380 - 900	20,753 - 20,990	44	39	42	38	Ambient sound levels dominant by natural sounds during daytime hours. Distant road traffic noise audible. Ambient sound dominated by natural sounds during nighttime hours. No wave noise audible, likely masked due to winds from the west.	66.98 - 72.04	44.22 - 44.43	80dBA	67.15 - 80	<40	L	52	48
ML03		Shoreline and heavily wooded area	1,250 - 4,900	21,458 - 24,441	47	38	43	35	Bird colony on island to the south dominant during daytime hours. Distant road traffic audible during nighttime measurements. No wave noise audible, likely masked due to winds from the west.	52.42 - 64.40	42.3 - 43.9	80dBA	47.28 - 63.62	<40	S F	53 53	45 45
ML04	561 Boulevard Dr., St Ignace	St. Ignace urban residences and highway noise	5,120 - greater than 10,000	25,519 - greater than 29,550	61	58	54	45	Road traffic noise dominant during daytime and nighttime hours. Idling trucks and nearby HVAC units also contributing to ambient sound levels.	<45 - 51.22	<40 - 41.55	80dBA	<36 - 45.59	<40	R	50	45
ML05	6770 David Dr., Mackinaw City	Shoreline and residential areas around south side LOD	19,296 - 20,116	480 - 1,180	52	43	50	42	Wave noise and natural bird sounds dominant during daytime hours. Distant intermittent boat noise audible.	39.66 - 39.78	70 - 75	80dBA	<40	71.86 - 80	S R	60 50	52 45
ML06	360 Headlands Rd., Mackinaw City	South side LOD	20,016 - 21,044	670 - 2,270	59	59	59	58	Station noise dominant during daytime and nighttime hours with intermittent road traffic.	38.77 - 39.41	63.39 - 73.53	80dBA	<40	63.77 - 78.35	L	69	68
ML07	1425 W Central Ave., Mackinaw City	Heavily wooded area adjacent to Headlands Dark Sky Park with road noise	20,850 - 23,937	810 - 3,840	43	36	36	31	Ambient sound dominated by natural bird sounds. Infrequent car passbys during daytime and nighttime hours. Ambient nighttime measurements dominated by	37.25 - 39.05	59 - 72	80dBA	<40	56.94 - 76.87	PF	46	41
ML08	15181 Esther Ln., Mackinaw City	Headlands Dark Sky Park and heavily wooded area southwest of south side LOD	24,662 - 26,572	4,510 - 6,250	40	44	38	43	Ambient sound levels dominated by birds and waves lapping against rock during daytime hours. Waves lapping against rocks dominant during nighttime hours.	35.87 - 38.03	54.32 - 58.7	80dBA	<40	53.48 - 55	PF	48	53
ML09	507 W Central Ave., Mackinaw City	Mackinaw City with road traffic noise	21,100 - greater than 25,500	8,120 - greater than 13,200	52	40	44	36	Distant highway and road noise dominant during daytime and nighttime hours. No natural sounds audible over road traffic noise. Tonal hum from bridge audible at this location.	<35 - 39	<47 - 51.81	80dBA	<40	<40 - 45	R	50	45

1. Assumed Threshold by USACE at 80dBA for residential properties (reference City Ordinance)

2. Assumed threshold by USACE:
   - 10-dBA increase over the existing ambient noise level
   - Residential Properties 60dBA outdoors day
     50dBA indoors day
     55dBA outdoors night
     45dBA indoors night
   - Public forests/parks - 57dBA
   - Outdoor recreational activities - 67dBA

3. Blasting may be required for 1 year. Blast magnitute for noise study not provided but estimated to be a very small charge assumed (see MEA report). For vibration study, blast was considered too low at 1lb per hole.

4. L= adjacent to LOD (+10dBA default assumed)
   R= indoor residence
   S= shoreline
   F= forest
   P= park
   PF= park/forest

ATTACHMENT A:

ENBRIDGE 2025 NOISE GENERATED CONTOUR PLOTS FOR NOISE PROPAGATION FROM BLASTING AND CONSTRUCTION ACTIVITY ON THE NORTH AND SOUTH SIDES

Figure No.
1

Title
Estimated Noise Contours
Limits of Disturbance - North Side

Client/Project
Enbridge Great Lakes Tunnel Project

193705885

Project Location
Mackinac County, Michigan

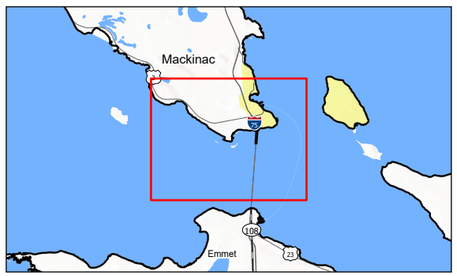
Prepared by JM on 2025-03-19
TR by AS on 2025-03-19
IR by XX on 2025-XX-XX

N

0 1,750 3,500 Feet
(At original document size of 11x17)
1:42,000

Legend
- Limits of Disturbance
- Construction Area
- Measurement Location (Day/Night Ambient Level dBA)

Sound Level Contour (dBA)
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80
- 85



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Enbridge, USGS, NADS
3. Background: NAIP 2022
4. Figure prepared by Stantec Consulting Services Inc.

ENBRIDGE

Figure No.
2

Title
Estimated Noise Contours
Limits of Disturbance - South Side

Client/Project
Enbridge Great Lakes Tunnel Project

193705885

Project Location
Emmet County. Michigan

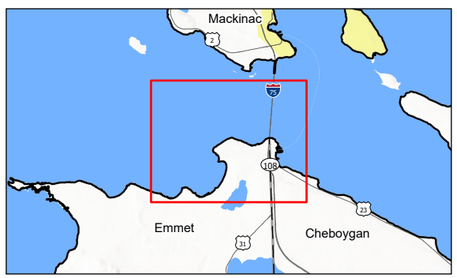
Prepared by JM on 2025-03-19
TR by AS on 2025-03-19
IR by XX on 2025-XX-XX

N

0 1,750 3,500 Feet
(At original document size of 11x17)
1:42,000

Legend
- Limits of Disturbance
- Construction Area
- Measurement Location (Day/Night Ambient Level dBA)

Sound Level Contour (dBA)
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80
- 85



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Enbridge, USGS, NADS
3. Background: NAIP 2022
4. Figure prepared by Stantec Consulting Services Inc.

ENBRIDGE

Figure No.
3

Title
Estimated Blasting Noise Contours
Limits of Disturbance - North Side

Client/Project 193705885
Enbridge Great Lakes Tunnel Project

Project Location
Mackinac County, Michigan

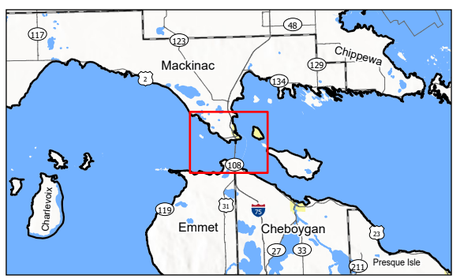
Prepared by JM on 2025-03-19
TR by AS on 2025-03-19
IR by SA on 2025-03-27

N

0 3,500 7,000 Feet
(At original document size of 11x17)
1:84,000

Legend
- Limits of Disturbance
- Measurement Location (Day/Night Ambient Level dBA)

Sound Level Contour (dBA)
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Enbridge, USGS, NADS
3. Background: NAIP 2022
4. Figure prepared by Stantec Consulting Services Inc.

ENBRIDGE

Figure No.
4

Title
Estimated Blasting Noise Contours
Limits of Disturbance - South Side

Client/Project 193705885
Enbridge Great Lakes Tunnel Project

Project Location
Emmet County. Michigan

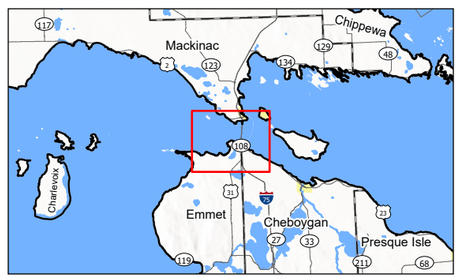
Prepared by JM on 2025-03-19
TR by AS on 2025-03-19
IR by SA on 2025-03-27

N

0 3,500 7,000 Feet
(At original document size of 11x17)
1:84,000

Legend
- Limits of Disturbance
- Measurement Location (Day/Night Ambient Level dBA)

Sound Level Contour (dBA)
- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75



Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Data Sources: Stantec, Enbridge, USGS, NADS
3. Background: NAIP 2022
4. Figure prepared by Stantec Consulting Services Inc.

ENBRIDGE