Impact Assessment Agency of Canada | Agence d'évaluation d'impact du Canada

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September 15, 2021

Sent by E-mail

Ken Swain
Project Leader
Nova Scotia Lands Inc.
Halifax, NS Canada
Email: Ken.Swain@novascotia.ca

Dear Ken,

SUBJECT: Boat Harbour Remediation Project – Information Requirements, Round 1 - Part 3

The Impact Assessment Agency of Canada (the Agency) has determined that additional information is required to complete the technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Boat Harbour Remediation Project, as per the information requirements (IRs) attached.

The Agency is finalizing IRs developed from Pictou Landing First Nation's technical review submission and will issue these additional IRs in the near future.

The responses to IRs may be in a format of your choice; however, the format must be such that the responses to individual IRs can be easily identified. You may wish to discuss certain IRs with the Agency or other government experts, as necessary, to obtain clarification or additional information, prior to submission of the responses. Working directly with government experts in this manner will help to ensure that IRs are responded to satisfactorily. The Agency can assist in arranging meetings with government experts, at your request.

The IRs and your responses will be made public on the Canadian Impact Assessment Registry Internet site: https://iaac-aeic.gc.ca/050/evaluations/proj/80164.

Please confirm receipt of this message and contact me if you require further information.

Sincerely,
<Original signed by>

Lachlan Maclean
Project Manager – Atlantic Regional Office
Impact Assessment Agency of Canada

Cc: Chief Andrea Paul – Pictou Landing First Nation
Stephen Zwicker – Environment and Climate Change Canada
Sean Wilson – Fisheries and Oceans Canada
Jason Flanagan – Transport Canada
Dae Young Lee – Health Canada
Bridget Tutty – Nova Scotia Environment
Beth Lewis – Office of L'nu Affairs

Attachment 1 - Information Requirements for the Boat Harbour Remediation Project, Round 1 – Part 3, September 15, 2021

Boat Harbour Remediation Project
Information Requirements for the Environmental Impact Statement Review
Round 1 – Part 3, September 15, 2021

INTRODUCTION

The Impact Assessment Agency of Canada is continuing its technical review of the Environmental Impact Statement (EIS) and associated EIS Summary for the proposed Boat Harbour Remediation Project. The Agency's review is supported by submissions from government experts, Pictou Landing First Nation, and an External Technical Review. The Agency determined that information is required, as per the information requirements below.

ACRONYMS AND SHORT FORMS

EA	Environmental Assessment
EIS	Environmental Impact Statement
HELP	Hydrologic Evaluation of Landfill Performance
HHA	Hydrogeologic and Hydraulic Assessment
HHERA	Human Health Ecological Risk Assessment
IAAC	Impact Assessment Agency of Canada
IA	Industrial Approval
NSECC	Nova Scotia Environment and Climate Change
PLFN	Pictou Landing First Nation
RODD	Remedial Option Decision Document

ATTACHMENT 1: INFORMATION REQUIREMENTS FOR THE BOAT HARBOUR REMEDIATION PROJECT (ROUND 1, PART 3)

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement
Alternatives Assessment					
IAAC-68	PLFN IAAC	Part 2, Section 2.2	EIS, Section 2.2.1.1 Identification of Alternative Means EIS, Section 2.2.1.2.1 Waste Management Remedial Option Decision Document (GHD 2018), Section 4	The Environmental Impact Statement (EIS) Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects. In accordance with the Canadian Environmental Assessment Agency Operational Policy Statement Addressing "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*, a proponent is to develop criteria to determine the technical and economic feasibility of each alternative means option and to use those criteria to analyze which technically and economically feasible alternative means should be carried forward to the next step of the analysis. The rationale should be provided in sufficient detail for a reviewer to understand why each option is or is not considered to be technically and economically feasible. Section 3.7.1 of GHD's 2018 Remedial Option Decision Document (RODD) outlines the key comments noted during the Remedial Options Decision Workshop; however, the details of the stakeholder input and discussions were not provided in the report. This information is needed to assess how the selected design requirements and evaluation criteria accommodated the input received during that workshop. Section 2.2.1.1 of the EIS states that "*The initial identification of Alternative Means for each remedial component was largely based on technical expertise of the team, collaboration with subject matter experts, and research. The Alternative Means were refined through collaborative workshops with NSLI and select stakeholders…Alternative Means remaining following the workshop were carried into the assessment of potential remedial technologies, as documented in the Remedial Option Decision Document (RODD) (GHD, May 2018).*" The full range of alternatives removed from consideration during the workshops, prior to the application of the initial screening, is missing. Therefore, it is difficult to assess the range of alternatives considered. For example, section 2.2.1.2.1 of the EIS stated that while incineration has been mentioned as a viable option, it was dismissed as an undesirable option without sufficient discussion to allow an appropriate review of this option. The second filtering step applied two stages of binary screening filters to eliminate Alternative Means that must: 1) meet the project goals and 2) be technically and economically feasible. Within this screening step, waste management approaches to develop a new containment cell and use of a combination of existing and new cells were discarded; however, the information presented regarding why these two approaches were discarded is insufficient to assess those decisions. This information is required to ensure that the assessment of alternative means was sufficient to allow for the evaluation and the selection of the preferred alternative for waste management.	Provide details of the stakeholder input and discussions around the waste management options, including how the selected design requirements and evaluation criteria accommodated stakeholder input. Provide the full list of initial waste management alternatives considered at the workshops, including incineration. Include details on why they were not carried forward to Step 1 of the alternatives analysis. Provide further details on why the initial alternatives for waste management identified in Step 1 of the RODD were not carried forward to Step 2 for further consideration.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement
IAAC-69	PLFN IAAC	Part 2, Section 2.2	EIS Section 2.2.1.1 Remedial Option Decision Document (GHD 2018), Section 4	The EIS Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects. In accordance with the Canadian Environmental Assessment Agency Operational Policy Statement Addressing "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*, a proponent is to develop criteria to determine the technical and economic feasibility of each alternative means option and to use those criteria to analyze which technically and economically feasible alternative means should be carried forward to the next step of the analysis. The rationale should be provided in sufficient detail for a reviewer to understand why each option is or is not considered to be technically and economically feasible. It is unclear from the EIS whether the cost for sludge removal from the existing cell, its temporary storage in the existing settling basins or aeration stabilization basin, and double handling for final storage back into the upgraded containment cell were considered as part of the cost estimate provided in the RODD. This information is required to ensure that the assessment of alternative means was sufficient to allow the evaluation and the selection of the preferred alternative for waste management.	Clarify whether the cost for sludge removal from the existing cell, its temporary storage, and double handling for final storage back into the upgraded containment cell was considered as part of the cost estimate. If this was not considered, discuss how this might impact the preferred waste management alternative.
IAAC-70	IAAC		EIS – Section 2.2.1 Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) Pilot Scale Testing Construction Report (GHD, December 23, 2019)	The EIS Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects. In accordance with the Canadian Environmental Assessment Agency Operational Policy Statement Addressing "Purpose of" and "Alternative Means" under the *Canadian Environmental Assessment Act, 2012*, a proponent is to develop criteria to determine the technical and economic feasibility of each alternative means option and to use those criteria to analyze which technically and economically feasible alternative means should be carried forward to the next step of the analysis. The rationale should be provided in sufficient detail for a reviewer to understand why each option is or is not considered to be technically and economically feasible. Section 2.2.1.1 of the EIS states that "*The findings from the Pilot Scale Testing Program and the final draft HHERA (GHD, February 2020) were used to refine the Qualified Remedial Options and determine the Alternative Means to be considered in the EIS*." However, it is not explained how the technical and economic analysis varied from the RODD as cost estimates (and associated quantities) appear unchanged from the RODD to the EIS economic evaluation. This information is required to ensure that the assessment of alternative means was sufficient to allow the evaluation and the selection of the preferred alternative for waste management.	Explain how the refinements from the Pilot Study and the Human Health Ecological Risk Assessment (HHERA) were incorporated into the Alternative Means assessment in the EIS. Include a discussion on the variations to the technical and economic analysis from the RODD as a result of these refinements, if any.
IAAC-71	PLFN IAAC	Part 2, Section 2.2	Remedial Option Decision Document (GHD 2018), Section 4.2.1 EIS Section 2.3.1	The EIS Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects. Section 4.2.1 of the RODD refers to discussions with Nova Scotia Environment and Climate Change (NSECC) regarding the viability of adapting the existing containment cell Industrial Approval permit (IA No. 94-032) and the challenges of getting the waste accepted at off-site permitted facilities in Nova Scotia. The details of these discussions were not provided in the EIS to assess this aspect of the regulatory evaluation.	Provide a summary and outcome any discussions with NSECC regarding the potential to construct a new or modified containment cell/landfill at another existing industrial/landfill site or elsewhere, including why the proposed location was preferred.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement
				This information is required to ensure that the assessment of alternative means was sufficient to allow the evaluation and the selection of the preferred alternative for waste management.	
IAAC-72	PLFN IAAC	Part 2, Section 2.2 Section 3.1	EIS Section 2.3 RODD Section 4.4 and Appendix H	The EIS Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects. Section 2.3 of the EIS and the RODD presented the alternatives means assessment methodology and selection of the preferred alternative means of carrying out the Project. The rationale for quantitative scoring assignments within the RODD is not clearly presented. For example, for waste management: • Landfill disposal is considered less technically mature (score 4.7) than disposal with Geotubes® on site (score 5.0). However, the "track record" of traditional landfill disposal is significantly longer than Geotube® technology. • Reliability/effectiveness/durability is scored 4.6 for the Geotube® on-site disposal option; while off-site landfill disposal is scored 3.4. The score deficit for off-site disposal appears largely due to interpreted uncertainties related to receiving provincial and potentially federal approval of a site to accept hazardous waste, the ability of the site to handle the waste, the ability to implement contingency measures at the site, and long-term maintenance requirements. • Community acceptance is scored the same (3.3) for the on-site and off-site disposal options; however, the reasoning for some of the sub-scores within that criteria category is not presented. For example, the Pictou Landing First Nation (PLFN) community's main concern throughout the EA has been the containment cell remaining on-site; therefore, it is unclear why community acceptance would score the same for both on-site and off-site disposal. While the sub-scores provided in Appendix H of the RODD provide some context to the overall indicator scores, the determination of those indicator sub-scores is missing. Furthermore, it is noteworthy that the waste management decision resulted in weighted scores of 411 for use of the existing containment cell on site, and 375 for off-site disposal of waste, which is a difference of less than 10% and appears based on a preliminary design level. Given the magnitude and complexity of the remedial approaches (and the overall remediation approach) under consideration, economic comparison at a conceptual level of design has large margins of uncertainty. In addition, the logistical challenges and implementation details for the various remedial tasks would likely have significant impact on the costs, and not be quantifiable without more detailed design and potentially a preliminary execution plan. Some adjustment of scores based on alternative interpretations or due to updated waste or leachate quantities, design details or implementation planning, might influence the determination of the preferred Alternative Means. This information is required to ensure that the assessment of alternative means was sufficient to allow the evaluation and the selection of the preferred alternative for waste management.	Provide additional rationale on how the scoring assignments for waste management alternatives were determined, including for the indicator sub-scores. Discuss the uncertainty in scoring cost estimates at the preliminary design level and how this could influence the preferred alternative selected.
IAAC-73	IAAC		RODD – Section 4.4 and Appendix H EIS – Section 2.3.1 EIS – Section 3 – Project Description	The EIS Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects.	Discuss the uncertainty associated with the estimated waste volume and the achievable volume reduction. Include a discussion of the potential for the capacity of the on-site containment cell to be

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement
			EIS – Section 3.2.2.1 Pilot Scale Testing Construction Report (GHD, December 23, 2019) - Section 3.3.4 Pilot Scale Testing Construction Report (GHD, December 23, 2019) - Section 3.5.5 Geobag Loading Analysis, Donald F. Hayes Pilot Scale Testing Construction Report (GHD, December 23, 2019) EIS – Sections 2.3.8 and 3.1.3 HHERA – Appendix A	Section 3 of the EIS and the Pilot Scale Testing Construction Report (GHD, December 23, 2019) indicates that there is a level of uncertainty in the total volume of waste to be managed in the waste containment cell. For example: • The pilot scale testing report indicated that it was difficult to differentiate between the sludge and the Boat Harbour Stabilization Lagoon sediments using an excavator to remove sludge in dewatering areas during dry dredging, as the two materials mixed throughout the operation. This could result in higher waste volumes being removed near the shorelines, where sludge excavation is being proposed. • The pilot scale testing report demonstrated a sludge volume reduction through Geotube® dewatering was lower than expected, which could impact the storage capacity of the containment cell. • Section 3.1.3 of the EIS states that interpreted limits of wetlands and estuary requiring remediation have been established; however, further sampling was being conducted to refine these limits, potentially increasing the amount of sludge to be stored in the containment cell. • Section 3.2.2.1 of the EIS indicates that sludge will be end-dumped in 1 m to 3 m thick lifts in the containment cell to fill the gaps (i.e., air space) between the Geotubes®, followed by compaction of the sludge. It is unclear whether the end-dumped sludge has the potential of "blinding off" the Geotube® geotextile material, potentially reducing the dewatering rate and/or decreasing the overall dewatering volume, thereby increasing the overall volume of material. The uncertainty in both the total volume of sludge to be contained and the achievable reduction in that volume during remediation means the redesign of the existing containment cell may have insufficient storage capacity. This information is required to ensure that the assessment of alternative means was sufficient to allow the evaluation and the selection of the preferred alternative for waste management.	exceeded and the need/options for a contingency plan. Update the alternatives analysis, as necessary.
IAAC-74	IAAC	Part 2, Section 2.2 Part 2, Section 7.6.1	EIS Section 2.3.1 EIS Section 3.2.2.1 Pilot Scale Testing Construction Report (GHD 2019)	The EIS Guidelines require the identification and assessment of alternative means of carrying out the Project that are technically and economically feasible, and their potential environmental effects. The Pilot Scale Testing Construction Report (GHD 2019) External Technical Review noted that the proposed remediation timeline has the potential to be influenced by several factors associated with the proposed Geotubes® technology, specifically with the placement of empty Geotubes®, filling of Geotubes® with sludge, expected dewatering duration, expected number of refills needed to maximize storage capacity, and accessibility to the placed Geotubes®. Furthermore, Section 3.2.2.1 of the EIS indicates that sludge will be end-dumped in 1 metre to 3 metre thick lifts in the containment cell to fill the gaps (i.e., air space) between the Geotubes®, followed by compaction of the sludge. It is unclear whether the end-dumped sludge has the potential of "blinding off" the Geotube® geotextile material, ultimately reducing the dewatering rate, thereby increasing the time to completely fill a Geotubes®. The external technical reviewers noted that the existing clay liner and berms are comprised of fine-grained soils, which are susceptible to deterioration under wet conditions, thawing, frequent heavy trafficking, etc. This can present challenges in terms of constructability, which	Discuss the uncertainties in the remedial implementation timeline due to constructability challenges, including the use of Geotubes®, and whether these challenges would impact the preferred alternative selected.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement
				could weigh heavily on potential construction schedule delays, increased construction costs, and even feasibility of the approach. It is unclear whether these risks were assessed or considered in the alternatives assessment. In addition, differential dewatering/consolidation of the Geotubes® has implications for the design's overall slope stability, constructability, cover liner performance, and construction time frame. It is unclear if these time challenges were considered by the proponent in their alternatives assessment. This information is required to ensure that the assessment of alternative means was sufficient to allow the evaluation and the selection of the preferred alternative for waste management.	
Containment Cell					
IAAC-75	IAAC	Part 2, Section 2.2	EIS Section 3.2.2.1	The EIS Guidelines require a description of the sludge disposal facility, including footprint, location, preliminary designs, and sludge disposal cell modifications. Section 3.2.2.1 of the EIS states that sludge will be end-dumped in 1 metre to 3 metre thick lifts to fill the air space between the Geotubes®, followed by compaction of the sludge. The water content of the sludge is expected to be high and thus unlikely able to support conventional compaction equipment. Insufficient information was provided to demonstrate that the sludge will be satisfactorily compacted to maintain the design side slopes and provide a competent subgrade for the cover liner system. Insufficient information was available to indicate how the end-dumped sludge will be contained during construction without it flowing over the perimeter berms and out of the containment cell. It is also unclear if the end-dumped sludge will be placed to the final sludge design elevation. This information is required to assess the potential environmental effects from the preferred alternative for waste management.	Describe how the end-dumped sludge will be placed into the containment cell to fill the air spaces between the Geotubes®, including additional details on: • how the sludge can be compacted to maintain the design side slopes and provide a competent subgrade for the cover liner system; and • how the end-dumped sludge will be contained without flowing in an uncontrolled manner out of the containment cell; and whether end-dumped sludge will be placed to the final sludge design elevation.
IAAC-76	PLFN IAAC	Part 2, Section 2.2	EIS Section 3.1.1 EIS Figure 3.1-3 EIS Section 3.2.2.1 Pilot Scale Testing Construction Report (GHD, 2019)	The EIS Guidelines require a description of the sludge disposal facility, including footprint, location, preliminary designs, and proposed modifications. The results presented in the Pilot Scale Testing Construction Report (GHD, 2019) highlighted potential challenges with the storage capacity, timing, and constructability of the proposed containment cell design. An assessment of the lateral/slope stability of the perimeter berms to support the Geotubes®/sludge loading was not documented, and thus it is unknown if a stability analysis has been conducted and considered for the design. Insufficient information has been provided to demonstrate that the containment cells 4H:1V or 3H:1V side slopes meet a minimum factor of safety criteria in terms of global stability. Furthermore, the performance of the final cover system, considering potential consolidation and/or differential settlement of the Geotubes® occurs, the cover geomembrane liner may undergo high tensile strains resulting in stress cracking and the development of holes. The long-term integrity of the geomembrane liner was also not demonstrated or discussed.	Assess the lateral/slope stability of the perimeter berms to support the Geotubes®/sludge loading. Provide information to demonstrate that the containment cell's side slopes meet a minimum safety criteria in global stability. Provide information to demonstrate the performance of the final cover system over the life of the Project, including the integrity of the geomembrane liner.

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement
				This information is required to assess the potential environmental effects from the preferred alternative for waste management.	
IAAC-77	IAAC		Hydrogeologic and Hydraulic Assessment – Containment Cell (Appendix K of the EIS)	The EIS Guidelines require a description of potential changes to groundwater and surface water, including the seepage water quality from the landfill during remediation and long-term storage. The Hydrogeologic and Hydraulic Assessment report (HHA – Appendix Z of the EIS) included a predictive water quality mass-balance calculation to assess future leachate quality under post-closure conditions. The water balance inputs were based on the Hydrologic Evaluation of Landfill Performance (HELP) modelling (GHD, February 12, 2020a), whereas the site-specific leachate quality data was modelled based on the (single) underdrain liquid sample collected from MH-1 as part of the HHA study leachate quality. Section 6.3 of the HHA states that leachate from the containment cell will be "*sufficiently attenuated to meet applicable provincial and federal standards and guidelines*…". The mass-balance calculation included a single sample collected from the current underdrain, which does not reflect a robust dataset nor does it consider the potential changes in chemistry following chemical dosing of the sludge/sediment with placement in the Geotubes®. In addition, the anticipated chemistry of the dewatering effluent noted in the bench-scale or pilot scale tests do not appear to have been considered in this prediction of water quality compliance. Furthermore, although most of the proposed final cell design is comprised of the side slopes, the crown of the landfill (i.e., 6%, or where runoff percent is anticipated to be lower) was omitted in the HELP modelling, which may contribute to an underestimation of the leachate generation from the containment cell in post-closure. This information is required to assess the potential environmental effects from the preferred alternative for waste management.	Provide further details on the water quality predictions, including a discussion on: • how one sample is sufficient for the development of the leachate generation predictions; • the rationale for not including chemical results from the bench-scale or pilot scale tests in the water quality predictions; and • the uncertainties in water quality predictions and preliminary contingency plans in case the water quality is worse than predicted.