4th Floor, Centennial Building
1660 Hollis Street
Halifax, NS B3J 1V7

August 5, 2022

Lachlan MacLean
Impact Assessment Agency of Canada

Re: Boat Harbour Remediation Project
Round 1 Information Request Responses for IRs 1 to 81, Consolidated Report

Dear Mr. MacLean;

Nova Scotia Lands Inc. is advising you that responses for Round 1 Information Requirements (IRs) 1 to 81, previously submitted and conformed, have been consolidated into one document. This is in response to the Impact Assessment Agency of Canada's request for a consolidated document relating to the Boat Harbour Remediation Project Environmental Impact Statement (EIS) review and is being submitted to the Agency today via posting to the Agency's Portal.

We trust that all is in order and if you have any concerns that you advise us as soon as possible.

Yours truly,

<Original signed by>

Ken Swain
Project Leader

Boat Harbour Remediation Project Consolidation of Information Requests

Boat Harbour Remediation Project
Pictou Landing, Nova Scotia

Nova Scotia Lands Inc.

July 28, 2022

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Appendices

List of Acronyms

AAQS	Ambient air quality standards
ASB	Aeration Stabilization Basin
ASTM	American Society for Testing and Materials
BH	Boat Harbour
BHCC	Boat Harbour Clean-Up Committee
BHEAC	Boat Harbour Environmental Advisory Committee
BHETF	Boat Harbour Effluent Treatment Facility
BHSL	Boat Harbour Stabilization Lagoon
BHRP	Boat Harbour Remediation Project
BMP	Best Management Practices
CAEAL	Canadian Association for Environmental Analytical Laboratories
CEAA	Canadian Environmental Assessment Act
CC	Containment Cell
CCME	Canadian Council of Ministers of the Environment
CHS	Canadian Hydrographic Surveys
CLC	Community Liaison Coordinator
CM	Construction Manager
cm	centimetre
CMOC	Construction Management and Oversight Consultant
COC	Contaminants of Concern
COPC	Contaminants of Potential Concern
CRP	Complaint Response Protocol
CSA	Canadian Standard Association
CSM	Conceptual Site Model
CWS	Canada Wildlife Services
DEFRA	Department of Environment Food and Rural Affairs
DFO	Fisheries and Oceans Canada
D/F	Dioxins/Furans

D/F TEQ	Dioxin/Furan Total Equivalency Factor
DOC	Dissolved Organic Carbon
DPM	Diesel Particulate Matter
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EDI	Estimated Daily Intake
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EEM	Environmental Effects Monitoring
EM	Environmental Manager
EMP	Environmental Management Plan
EPC	Exposure Point Concentration
ESA	Environmental Site Assessment
ESC	Erosion and Sediment Control
EQS	Environmental Quality Standards
FCSAP	Federal Contaminated Sites Action Plan
FHWA	Federal Highway Administration
FML	Flexible Membrane Liner
FOC	Fraction of Organic Carbon
g	grams
GCL	Geosynthetic Clay Liner
GHD	GHD Limited
GHG	Greenhouse Gas
GNS	Government of Nova Scotia
ha	Hectares
HASP	Project Health and Safety Plan
HC	Health Canada
HDPE	High Density Polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
HHERA	Human Health and Ecological Risk Assessment

HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
hr	Hour
IA	Industrial Approval
IAAC	Impact Assessment Agency of Canada
IM	Independent Monitor
IR	Information Requests
IRR	Information Request Responses
ISC	Indigenous Services Canada
ISQG	Interim Sediment Quality Guidelines
kg	kilograms
km	kilometres
L	litre
LCS	Laboratory control samples
LFG	Landfill Gas
LFN	Low Frequency Noise
LLDPE	Linear Low Density Polyethylene
m	metres
mm	millimetre
m^2	square metre
m^3	cubic metre
MAC	Maximum Acceptable Concentration
mAMSL	Metres Above Mean Sea Level
MBCA	Migratory Bird Convention Act
mbgs	meters below ground surface
MEEM	Marine Environmental Effects Monitoring
mg	milligrams
Mill	Kraft Pulp Mill
MRL	Minimum Risk Level
MS	Matrix Spike

NAPS	National Pollutant Surveillance Network
ng	nanograms
NOAA	National Oceanic Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NSLI	Nova Scotia Lands Inc. or Proponent
NSE	Nova Scotia Environment
NS DLF	Nova Scotia Department of Lands and Forestry
NSDTIR	Nova Scotia Department of Transportation and Infrastructure Renewal
NTU	Nephelometic Turbidity Units
PAH	Polycyclic Aromatic Hydrocarbon
PEPP	Project Environmental Protection Plan
PELs	Probable Effects Levels
pg	picograms
PHASP	Project Health & Safety Plan
PLFN	Pictou Landing First Nation
PM_{10}	Particulate Matter with Aerodynamic Diameter less than or equal to 10 microns
$PM_{2.5}$	Particulate Matter with Aerodynamic Diameter less than or equal to 2.5 microns
POL	Petroleum, Oils, or Lubricants
PPER	Pulp and Paper Effluent Regulations
PPT	parts per trillion
PQRA	Preliminary Quantitative Risk Assessment
PRA-HHRA	Project Related Activities– Human Health Risk Assessment
PWGSC	Public Works and Government Services Canada
QA/QC	Quality Assurance/Quality Control
QMP	Quality Management Plan
RBCA	Risk Based Corrective Action
RfD	Reference Dose
RMP	Risk Management Plan
RMA	Risk Management Areas
RODD	Remedial Options Decision Document

RSA	Regional Study Area
RSL	Regional Screening Levels
SAF	Soil Allocation Factor
SAR	Species at Risk
SARA	Species at Risk Act
SB	Settling Basins
SMP	Spills Management Plan
SOCC	Species of Conservation Concern
SSEPP	Site-Specific Environmental Protection Plan
SPLP	Synthetic Precipitation Leachate Procedure
SSTL	Site Specific Target Levels
SWAC	Surface Weighted Average Concentration
TDI	Tolerable Daily Intake
TDS	Total Dissolved Solids
TEQ	Toxic Equivalence
TKN	Total Kjeldahl Nitrogen
TLTS	Temporary Leachate Treatment System
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TRV	Toxicity Reference Value
TSM	Total Suspended Matter
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
TVOC	Total Volatile Organic Compound
UCLM	Upper Confidence Level of the Mean
USEPA	United States Environmental Protection Agency
VC	Valued Component
VOC	Volatile Organic Compound
WWTF	Wastewater Treatment Facility
%HA	Percent Highly Annoyed

1. Information Requirements for Boat Harbour Remediation Project Responses

This report consolidates the Information Request Responses (IRRs) prepared by Nova Scotia Lands Inc. (NSLI) in support of the Environmental Impact Statement (EIS) for the Boat Harbour Remediation Project (the Project or BHRP). NSLI received Information Requests (IRs) outlined in this document from the Impact Assessment Agency of Canada (IAAC) as follows:

- Round 1, Part 1 dated March 1, 2021
- Round 1, Part 2 dated May 11, 2021
- Round 1, Part 3 dated September 15, 2021
- Round 1, Part 4 dated October 7, 2021

The Table of Concordance (Table 1.1) should be read in conjunction with this document. Each of the IRs are responded to in Section 2 of this document, with supporting information (where applicable) provided as a Figure or Appendices to this IRR document.

This document consolidates IRRs prepared in response to Round 1 of the IRs received from IAAC between March and October 2021 (IAAC-1 to IAAC-81, Round 1 Parts 1 to 4). Responses were previously prepared by NSLI and submitted as follows:

- Response to IRs IAAC-03 to IAAC-13, 15, 16, 17, 18, 20, 21, 22, 24, 28, IAAC-30 to IAAC-39 and IAAC-41 to IAAC-77 (GHD Report 41, September 2021)
- Response to IRs IAAC-14 and IAAC-40 (GHD Memorandum 90, October 2021)
- Response to IRs IAAC-01, IAAC-02, IAAC-19, IAAC-23, IAAC-25, IAAC-26, IAAC-27, and IAAC-29 (GHD Memorandum 91, October 2021)
- Supplementary Response to IAAC-16, 33, 36, 39, 62 (GHD Memorandum 93, November 2021)
- Response to IAAC-78, 79, 80, and 81 (GHD Memorandum 92, November 2021). A separate memorandum is being prepared specific to IAAC-82 which was also included as an IR in the IAAC letter Round 1, Part 4 dated October 7, 2021.
- Supplementary Response to IAAC-14 (GHD Memorandum 97, January 2022)

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-01	IAAC	Part 1, Section 4.3 Part 2, Section 7.5	Sections 7.2.6 7.3.1.6 7.3.2.6 7.3.3.7 7.3.4.6 7.3.5.5 7.3.6.6 7.3.7.6 7.3.8.6 7.3.9.6 7.3.10.6 7.3.11.5 7.3.12.5 7.3.13.5 7.3.14.5 7.3.15.6 7.3.16.7 7.3.17.5 7.3.18.5	The EIS Guidelines require a description of the methodology used to assess project- related effects, and to include an analysis of the pathway of the effects of environmental change on each valued component (VC). Part 2, Section 7.5 of the EIS Guidelines requires the predicted changes to the environment to be described in terms of the magnitude, geographic extent, duration and frequency, and whether the environmental changes are reversible or irreversible. As per the Agency's document, *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012*, and referenced in Part 2 Section 7.5 of the EIS Guidelines, the magnitude of an environmental effect should be expressed in measurable or quantifiable terms, whenever possible. There may be multiple measurable parameters relevant to a VC. When using quantitative or qualitative descriptions of magnitude, clear definitions of terms should be provided. The definition of these terms may vary according to the VC under consideration. The EIS describes magnitude categories of environmental effects in general terms in Table 7.2-4. The EIS also states that where possible, criteria are described quantitatively; however, magnitude is not defined quantitatively for any VC. The EIS provides minimal information regarding the methodology followed to determine the significance of project-related effects. In the significance of residual effects section for each VC in the EIS, no quantitative measures or qualitative descriptions to justify or explain the rankings of the residual environmental effects characteristics (e.g., magnitude, geographic extent, timing, duration, frequency, reversibility, ecological or social context) are provided. A rationale is critical for the Agency and other readers to understand the basis for the proponent's determination, so that it can be assessed objectively.	Describe the methodology and provide the rationale used to assess the significance of project-related effects (e.g., magnitude, geographic extent, timing, duration, frequency, reversibility, and ecological or social context). Provide VC-specific definitions of each category of magnitude, using quantifiable terms when possible. Update Section 7 of the EIS with VC-specific definitions and revise the environmental effects assessment for each VC based on the newly defined magnitude categories.	The methodology and rationale used to assess the significance of project-related effects (e.g., magnitude, geographic extent, timing, duration, frequency, reversibility, and ecological or social context) is provided in the EIS (Section 7.3 for each respective VC) and is based on IAAC guidance documents, a review of other projects of a similar nature in Canada and discussions with various agencies through the development of the Project Description and EIS. VC-specific definitions for each category of magnitude, using quantifiable terms has been provided where appropriate, however in a number of instances, it was more appropriate to provide a qualitative application. Changes to the effects evaluation is limited to specific VCs associated with the potential implementation of mitigation measures to reduce levels of total suspended solids once Boat Harbour is returned to tidal conditions, as detailed in the Supplemental Coastal Hydraulic Modeling Memorandum completed as part of IAAC-14 (namely Surface Water, Marine Environment, and Fish and Aquatic Habitat). Careful review of these specific VCs was completed and changes, should the mitigation measures be applied, are limited to those discussed in the response specific to IAAC-14 (GHD memorandum dated October 2021). Updated residual effects tables specific to these VCs and environmental effects associated with the supplemental modeling results (magnitude, geographic extent, timing, duration, frequency, reversibility, and ecological or social context) are included in Appendix C of this document (associated with IAAC-14 responses), should the mitigation measures be implemented. The tables included in Appendix C are the revised residual effects Tables from Section 7.3.7 (Table 7.3-313 Residual Environmental Effects for Surface Water), Section 7.3.11 (Table 7.3-200 Residual Environmental Effects for the Marine Environment) and Section 7.3.12 (Table 7.3-218 Residual Environmental Effects for Fish and Aquatic Habitat) of the EIS.
IAAC-02	IAAC	Part 1, Section 3.2.2	Section 7.3.10.2 Table 7.2-2 Table 7.3-186 Table 7.4-26	The EIS Guidelines require that spatial boundaries be defined taking into account the appropriate scale and spatial extent of potential environmental effects. The EIS contains contradicting information about whether effects on mammals and wildlife will occur within the Site Study Area or extend to the Local Study Area. Table 7.2-2 and Section 7.3.10.2 state that effects from the Project on mammals and wildlife will be confined to/potentially occur within the Site Study Area. However, Table 7.3-186 lists disturbances to mammals and wildlife, caused by project activities related to the dam decommissioning, as a residual effect of the Project that will extend to the Local Study Area. Table 7.4-26 also states that the potential for adverse residual effects to mammals and wildlife occurs within the Local Study Area. This contradiction must be resolved for the Agency to assess the potential effects of the Project on mammals and wildlife.	Clarify the discrepancy in the spatial boundary for effects on mammals and wildlife and update the effects assessment as applicable.	Table 7.3-186 of the EIS should have noted that the effects on mammals and wildlife are limited to the Site Study Area. With this noted correction, no update of the effects assessment is required.
IAAC-03	NSE	Part 2, Section 3.2 Part 2, Section 7.2.2	Section 7.3.6.4.1	The EIS Guidelines require a description of the project activities, including activities associated with the containment cell modifications. Sufficient information must be included to predict environmental effects, with an emphasis on activities that involve periods of increased environmental disturbance or the release of materials into the environment. Section 3.2.1.1 of the EIS states that the containment cell and leachate collection and liner systems will be upgraded prior to receiving additional waste from the remedial activities. During the upgrade, the existing waste will be temporarily relocated to either existing site infrastructure, such as the settling basins or aeration stabilization basin (ASB), or to newly constructed staging areas. The EIS does not provide information explaining how the waste temporarily stored in the ASB or settling basin would be kept from interacting with the surface water and surficial groundwater that currently discharges into those areas. Furthermore, the EIS does not provide information related to the option of storing the waste in a new staging area, including the construction, location, and leachate collection of the new staging area. This information is required to assess potential effects on surface water (including wetlands) and groundwater from the relocation of existing waste.	Clarify how the existing containment cell waste, if transported to the ASB or settling basins, will be isolated to prevent interactions with the surface water or surficial groundwater. Should waste be temporarily stored in a new staging area, provide information on the design of this area (e.g., location on a site map, construction and leachate collection, additional mitigation measures) and evaluate the potential effects.	Information requested is provided in Section 2 below.
IAAC-04	NSE	Part 2, Section 3.1	Table 1.4-1 Anticipated Federal Legislative and Regulatory Requirements Table 1.4-2 Anticipated Provincial Legislative and Regulatory Requirements	The EIS Guidelines require information about the management of proposed control, collection, treatment, and discharge of surface drainage and groundwater seepage to the receiving environment from all key components of the project infrastructure, including sludge disposal cell effluent. The EIS refers to leachate pretreatment in Tables 1.4-1 and 1.4-2; however, this process is not described in any further detail. It is unclear how pretreatment would be utilized (e.g., nature of that pretreatment). Details about this pretreatment process are required to assist in understanding the potential environmental effects.	Provide information about the leachate pretreatment processes, including the intended effect, actual means, and verified performance.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-05	ECCC NSE	Part 2, Section 3.1	Section 3.1.4 Section 3.2	The EIS Guidelines require a description of the Project components, associated and ancillary works, and other characteristics that will assist in understanding the environmental effects. Section 3.1.4 of the EIS states: "Treated effluent from the TLTF that meets the appropriate discharge criteria would be conveyed to the discharge point of the BHSL to the estuary." Section 3.2 of the EIS states: "A floating pipeline would also be used for conveyance of treated interim leachate treatment system effluent to the approved discharge point…" The location of the discharge point for the treated effluent is not clear. It is also not clear if effluent from the temporary leachate treatment facility (TLTF) will be released into Boat Harbour and mixed with bulk water prior to discharge into the estuary, or if the effluent will discharge directly into the estuary via the pipeline, with no mixing in Boat Harbour. An understanding of the overall wastewater flows and management is required to understand the potential effects of the Project.	Clarify the point of discharge of effluent from the TLTF and clarify whether effluent will undergo mixing in Boat Harbour prior to being discharged into the receiving environment.	The pre-treated effluent from the Temporary Leachate Treatment System (TLTS) will discharge to the Estuary without undergoing mixing with the water in the Boat Harbour Stabilization Lagoon (BHSL). As noted in Section 3.14 under Leachate Management of the EIS, the TLTS becomes operational once all dredging operations are completed and the interim cover is put on the containment cell.
IACC-06	DFO	Part 2, Section 7.1.6	Section 7.1.6.2 Table 7.1-31	The EIS Guidelines require a description of the marine environment in the estuary and along the strait shorelines immediately outside of the mouth of Boat Harbour, including: • Marine fauna, including benthic organisms, fish, marine mammals and sea turtles and their associated habitat; and • Federally and provincially listed marine species at risk. Table 7.1-31 lists fish species caught within the estuary and does not list Striped Bass. In Section 7.1.6.2, a statement is made that Striped Bass were observed within the estuary. There appears to be a discrepancy between the two sections of the EIS. Section 7.1.6.2 refers to a fish survey, but does not describe the methodology used. This information is needed to assess the potential impacts on the marine environment and fish and fish habitat.	Describe the methodology used for the fish survey mentioned in Section 7.1.6.1.1. of the EIS. Clarify if Striped Bass were caught or observed within the estuary, and reconcile or provide rationale for the discrepancy of fish species in Table 7.1-31 and Section 7.1.6.2 of the EIS.	Information requested is provided in Section 2 below.
IAAC-07	DFO	Part 2, Section 3.2.3	Section 3.1	The EIS Guidelines require an outline of a decommissioning and reclamation plan for any components associated with the Project. Table 7.3-151 (page 7-415) of the EIS notes that a reclamation program will be undertaken to re-establish native riparian vegetation communities; however, an outline has not been provided. Riparian resources such as trees, shrubs, and other vegetation provide important fish habitat functions, including stability, shade, food sources, and shelter. A preliminary outline of the reclamation plan that provides any information or commitments regarding fish habitat conditions at the site is needed to assess the potential impacts of the Project on fish and fish habitat.	Provide the preliminary outline for the reclamation plan to re-establish native riparian vegetation communities.	Information requested is provided in Section 2 below.
IAAC-08	DFO	Part 2, Section 7.1.7	Section 7.1.6.2	The EIS Guidelines require a description of natural obstacles (e.g. falls, beaver dams) or existing structures (e.g. water crossings) that hinder the free passage of fish. Page 7-133 of the EIS states: "An overall assessment of fish passage reveals that several streams have impediments due to physical barriers (natural or created through the course of creating and operating Boat Harbour) or water levels/elevation issues that prevent movement from Boat Harbour to the watercourses and within watercourses in many cases." The EIS does not identify which watercourses have barriers, what the barrier is, and where the barrier is located. Additional details are required to confirm physical barriers are present. DFO has noted that water levels in Nova Scotia can fluctuate seasonally and so cautions the use of water levels alone to conclude a physical barrier unless multi-year, multi-season observations have been made. This information is needed to assess the potential effects of the Project on fish and fish habitat.	Provide information on the location of each physical barrier, identify the type of barrier, and explain how conclusions were reached regarding the status of fish passage of each barrier.	Information requested is provided in Section 2 below.
IAAC-09	DFO	Part 2, Section 7.1.7	Section 7.1.6.2.1	The EIS Guidelines require a description of primary and secondary productivity in affected water bodies with a characterization of seasonal variability. Page 7-139 of the EIS states, in relation to primary and secondary productivity, that "given these watercourses are very small in width and channel depth, these watercourses will not be discussed further." DFO notes that watercourses of any size can play an important role in a variety of functions, including primary and secondary productivity (see Wohl, 2017[1]). Therefore, watercourses should be fully assessed prior to reaching such conclusions. This information is needed to assess the potential effects of the Project on fish and fish habitat.	Provide a description of primary and secondary productivity, including seasonal variability, for the previously dismissed watercourses. Alternatively, provide a justification as to why this information is not needed.	Information requested is provided in Section 2 below.
IAAC-10	DFO	Part 2, Section 7.3.1	Section 7.3.12	The EIS Guidelines require information on how project construction timing correlates to key fisheries windows of any sensitive life history stages for freshwater and anadromous species, and any potential effects resulting from overlapping periods. This information, including instream work window dates, was not provided. This information is needed to assess the potential impacts of the Project on fish and fish habitat.	Provide key timing windows for freshwater and anadromous species found within the Study Area and compare these with the timing of project construction activities. As applicable, update the effects assessment and mitigation measures for fish and fish habitat or provide the Agency with rationale as to why this is not required.	Information requested is provided in Section 2 below.
IAAC-11	DFO	Part 2, Section 7.1.7	Section 7.1.6.2	The EIS Guidelines require a description and location of suitable habitats for fish species at risk that are present or likely to be found in the study area. Table 7.1-34 refers to the likelihood of fish species as "Habitat Present or Absent at Site". It is unclear if the site being referred to is the Site Study Area, the Local Study Area, or the Regional Study Area. This information is required to complete the effects assessment of fish and fish habitat.	Clarify the definition of "site" as used in Table 7.1-34 and update the effects assessment as applicable.	Table 7.1-34 Habitat available within Site Study Areas for Priority Fish Species refers to the likelihood of fish species as "Habitat Present or Absent at the Site", the Site being referred to is the Site Study Area. The Site Study Area spans from the effluent pipeline from the first standpipe on the Kraft Pulp Mill property, below the East River, through existing and historic BHETF lands, Boat Harbour and its banks, extending to Northumberland Strait, and PLFN, located between Boat Harbour and Northumberland Strait. Figure 7.1-1 in Section 7.1.1.1 of the EIS document shows the Site Study Area.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-12	DFO	Part 2, Section 7.1.7	Section 7.1.6.2	The EIS Guidelines require a characterization of fish populations on the basis of species and life stage for potentially affected surface waters. The EIS makes the following statement in Section 7.1.6.2: "The majority of watercourses at the Boat Harbour Effluent Treatment Facility (BHETF) site lack the appropriate physical habitat features to sustain populations of adult Brook Trout." The EIS provides some information to support this statement; however, references to peer-reviewed literature were not provided. This information is needed to assess the potential effects of the Project on fish and fish habitat.	Provide supplementary information (e.g., peer-reviewed literature) to support the statement that the physical habitat at the BHETF lacks the appropriate features to support adult Brook Trout populations.	Information requested is provided in Section 2 below.
IAAC-13	ECCC	Part 2, Section 3.1 Part 2, Section 7.2.2	Section 3.1.1	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. Page 3-5 of the EIS states: "When comparing the forecasted leachate quality to groundwater criteria, lead and zinc are the only parameters to exceed the criteria, and therefore are carried forward as contaminants of concern with regards to the service life." However page 3-41 of the EIS states the following: "The existing leachate contains elevated concentration as compared to criteria for chloride, ammonia, nitrite and nitrate, as well as select metals including aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, silver and zinc, based on the containment cell – BHETF – 2018 Monitoring Report (Dillon, 2019)"; "The contaminants of concern in the effluent based on pilot and bench scale testing include PHCs, dioxins and furans, cyanide, and metals (i.e., cadmium, chromium, copper, lead, mercury, and zinc.)"; and finally "Contaminants of concern would include those listed above for both existing leachate and dewatering effluent." It is unclear from the statements above why lead and zinc were the only parameters carried forward as contaminants of concern in the predicted leachate quality. This information is needed to better understand potential changes to groundwater and surface water from the Project, which can impact Mi'kmaq of Nova Scotia health, fish and fish habitat, and the marine environment.	Provide a reference to where the "forecasted leachate quality" is provided. Carry forward the other contaminants of concern identified on page 3-41 of the EIS as contaminants or concern and update the effects assessment as applicable. Alternatively, provide a justification as to why lead and zinc are the only parameters carried forward as contaminants of concern.	Information requested is provided in Section 2 below.
IAAC-14	DFO ECCC NSDFA NSE	Part 2, Section 7.1.6 Part 2, Section 7.2.2	Section 7.3.6 Section 7.1.6.1.1 Section 7.1.6.2 Section 7.3.7.4.3 Section 7.3.7.6 Appendix Z – Coastal Hydraulic Modeling (WSP 2020; Appendix Z)	The EIS Guidelines require a detailed description of the baseline conditions to assess the potential changes to the marine environment in the estuary and along the Northumberland Strait shorelines immediately outside of the mouth of Boat Harbour, including potential changes to: • marine water quality; • marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae, and phytoplankton; • marine fauna, including benthic organisms, fish, marine mammals and sea turtles and their associated habitat; and • federally and provincially listed marine species at risk. Section 7.1.6.1.1 of the EIS describes the estuary and Pictou Road shorelines at a very high level and appears to be based on land and wetland surveys with no discussion of the marine benthic habitats. It is not clear from the EIS if the proponent incorporated Indigenous and local knowledge baseline information into the marine environment and fish and fish habitat assessments. The Coastal Hydraulic Modeling Report in Appendix Z of the EIS includes modelling for a potential increase in total suspended solids (TSS) based on the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (Marine). The modelling predicts an increase in TSS, well above the CCME guidelines of 25 mg/L above background levels, flowing into the estuary and strait for at least one year after the dam is removed and Boat Harbour is returned to tidal. The EIS determined that the effects on surface water are not significant; however, Appendix Z is not referenced in this analysis. DFO has noted that sensitive receptors, such as eelgrass beds, could be reduced or lost as a result of elevated TSS. Elevated concentrations of suspended sediment and increased turbidity may result in adverse effects in as little as days and biomass reductions in months. The Nova Scotia Department of Fisheries and Aquaculture stated that the commercial industry has expressed concerns with potential impacts of the Project on water quality. Information about how fisheries resources such as aquaculture and seafood facilities may be impacted by the potential increase in TSS is required. The Coastal Hydraulic Modeling Report indicates that approximately 140,000 m3 of sediment leaves the modeled domain with an unknown end point. The model domain does not address potential effects to nearby marine habitat. Figure 5.16 in the Coastal Hydraulic Modelling Report shows the sediment anticipated to be deposited on the sea floor in the Pictou Road area; however, the sediment deposition thickness is unclear. This information is important for assessing the potential effect of an increase in TSS on water quality, the marine environment, and fish and fish habitat - including the commercial fishing industry.	Provide more detailed information on the baseline conditions in the estuary and the Northumberland Strait shorelines immediately outside of the mouth of Boat Harbour. Use this information and the results of the WSP 2020 Coastal Hydraulic Modeling Report (Appendix Z) to update the effects assessment of surface water, marine environment, and fish and fish habitat. This should include a discussion of the impacts from both water column increases in TSS and deposition of sediment on: • marine water quality; • marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae, and phytoplankton; • marine fauna, including benthic organisms, fish, marine mammals and sea turtles and their associated habitat; • federally and provincially listed marine species at risk; and • fisheries resources, such as aquaculture and seafood facilities. Provide sediment deposition thickness data for the marine environment in the Pictou Road area and update any relevant information such as the effects assessment, mitigation measures, and follow up monitoring.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-14 (Conformity Review)	DFO ECCC NSDF NSE			Same as above.	A. Provide more detailed information on the baseline conditions in the estuary and the Northumberland Strait shorelines immediately outside of the mouth of Boat Harbour. Use this information and the results of the WSP 2020 Coastal Hydraulic Modeling Report (Appendix Z) to update the effects assessment of surface water, marine environment, and fish and fish habitat. This should include a discussion of the impacts from both water column increases in TSS and deposition of sediment on: • marine water quality; • marine plants, including all benthic and detached algae, marine flowering plants, brown algae, red algae, green algae, and phytoplankton; • marine fauna, including benthic organisms, fish, marine mammals and sea turtles and their associated habitat; • federally and provincially listed marine species at risk; and • fisheries resources, such as aquaculture and seafood facilities. B. For the WSP 2020 Coastal Hydraulic Modelling Report: • Expand the model to include nearby marine habitat, provide the revised model results and update any relevant information such as the effects assessment based on those results. Alternatively, justify why the current model domain is sufficient. C. Provide sediment deposition thickness data for the marine environment in the Pictou Road area and update any relevant information such as the effects assessment, mitigation measures, and follow up monitoring. **Conformity Response (IAAC)** A. Conforms B. The response did not include an expanded modelling domain for the TSS, nor did it contain a justification for not doing so. C. Conforms (see note in email). NS Lands is required to: • Expand the domain of the model to include nearby marine habitat, provide the revised model results and update any relevant information such as the effects assessment based on those results. Alternatively, justify why the current model domain is sufficient.	Item B | Information request is provided in Section 2 below. Item C | Figures 1 and 2 in Section 2, below, present the sediment thickness data for the extent of the model domain.
IAAC-15	NSE	Part 2, Section 7.2.2	Section 7.3.6 Appendix Z	The EIS Guidelines require that the proponent clearly describe how mitigation measures will be implemented and how a follow-up program would be designed to determine the effectiveness of the mitigation measures. It is unclear how confinement of suspended sediments to the area undergoing dredging will be demonstrated, and how areas outside the silt curtains, including those already remediated, will not be impacted. Section 7.3.7.4.2 of the EIS needs to provide specific details around the use of silt curtains as a mitigation measure, including the type of curtain, uncertainty around effectiveness, and additional mitigation measures that can be implemented, if required. Details on the monitoring and sampling program that will be used to verify silt curtain effectiveness during dredging activities should also be provided. Without the specific details on the monitoring and sampling program, it is difficult to assess whether the proposed mitigation approach is reasonable.	Provide additional details on the use of silt curtains to mitigate the potential redistribution of contaminants in surface waters through the resuspension of sediments during remediation activities, including: • what type of curtain will be used and why; • the uncertainty in the effectiveness of this type of mitigation measure; • what additional mitigation measures can be implemented if the silt curtains fail; and • how silt curtain effectiveness will be verified.	Information requested is provided in Section 2 below.
IAAC-16	DFO	Part 2, Section 7.1.6	Appendix BB – Marine Environment Baseline – NSCC 2017 Topo-Bathymetric Lidar Research to support remediation of Boat Harbour	The EIS Guidelines require a description of the marine environment in the estuary and along the strait shorelines immediately outside of the mouth of Boat Harbour. Ground truth analysis was used to validate the Light Detection and Ranging (LIDAR) data in Appendix BB of the EIS. The majority of the ground truth data are not evenly distributed throughout the LIDAR study area, with few located immediately outside of Boat Harbour or within the area predicted to be impacted in the sediment transport modeling conducted by WSP (2020) in Appendix Z. The uneven distribution of the ground truth points may bias the LIDAR data outputs. In addition, sediment and vegetation mapping was created using LIDAR data; however, ground truthing showed some classifications were not accurate (e.g., mud with only 25% agreement). This information is required to assess the potential effects on the marine environment and fish and fish habitat, including the commercial fishing industry.	Provide justification as to why the ground truth data points were not evenly distributed throughout the LIDAR study area. Provide evidence that the uneven distribution of ground truth points did not bias the LIDAR data outputs. Explain how the sediment and vegetation mapping was created, given some ground truth classifications were not accurate, and how any uncertainty was factored into the effects assessment for the marine environment and fish and fish habitat.	LIDAR is a method used to collect continuous data from land and near shore and can be accurate in shallow water depths (typically up to 6 metres) depending on water clarity. NS Lands completed ground truthing for the LIDAR data obtained from NSCC. Ground truthing included GPS grade survey for near shore areas. The difference between the survey elevation and LIDAR was -17 cm with a standard deviation of 25 cm. In addition, NS Lands compared multibeam echo data from CHS for deeper areas that overlapped the LIDAR. The difference between survey elevation and LIDAR was -3 cm with a standard deviation of 32 cm. Mapping of sediment and vegetation through LIDAR remains in the research domain for the LIDAR technology. The categories of entices classes presented was reflective of ground truthing photographs. With respect to sediment, all classes compared well to the ground truthing except for the mud, which was based on orthophotos and depth.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-16 (Conformity Review)	DFO			The Environmental Impact Statement (EIS) Guidelines require a description of the marine environment in the estuary and along the strait shorelines immediately outside of the mouth of Boat Harbour. Ground truth analysis was used to validate the Light Detection and Ranging (LIDAR) data in Appendix BB of the EIS. The majority of the ground truth data are not evenly distributed throughout the LIDAR study area, with few located immediately outside of Boat Harbour or within the area predicted to be impacted in the sediment transport modeling conducted by WSP (2020) in Appendix Z. The uneven distribution of the ground truth points may bias the LIDAR data outputs. In addition, sediment and vegetation mapping was created using LIDAR data; however, ground truthing showed some classifications were not accurate (e.g., mud with only 25 percent agreement). This information is required to assess the potential effects on the marine environment and fish and fish habitat, including the commercial fishing industry.	A. Provide justification as to why the ground truth data points were not evenly distributed throughout the LIDAR study area. B. Provide evidence that the uneven distribution of ground truth points did not bias the LIDAR data outputs. C. Explain how the sediment and vegetation mapping was created, given some ground truth classifications were not accurate, and how any uncertainty was factored into the effects assessment for the marine environment and fish and fish habitat. **Conformity Response (IAAC)** A. Conforms. B. Conforms. C. The proponent was requested to explain how the sediment and vegetation mapping was created in light of the discrepancies between the LIDAR measurements and ground truthing and how this discrepancy or uncertainty was factored into the effects assessment for the marine environment and fish and fish habitat. • The IR response did not explain how the mapping products were created. The response did indicate that the use of LIDAR for the purpose of mapping sediment and vegetation is experimental and thus an unproven methodology. The response also indicated that a portion of the sediment classes in the mapping products (mud) is inaccurate. • The IR response did not explain how the uncertainty in mapping was factored into the effects assessment for the marine environment and fish and fish habitat. NS Lands is required to: • Describe how the LIDAR data was used to create the sediment and vegetation mapping. • Discuss how the uncertainty of ground truthing was factored into the effects assessment for the marine environment and fish and fish habitat.	Additional Information requested specific to Item C is provided in Section 2 below.
IAAC-17	DFO	Part 2, Section 7.1.6 Part 2, Section 7.3.3 Part 2, Section 7.3.4	Section 7.1.6.1 Appendix BB NSCC 2017 Topo-bathymetric LIDAR Research report	The EIS Guidelines require a description of the marine environment in the estuary and along the strait shorelines immediately outside the mouth of Boat Harbour, including marine plants. The presence of eelgrass is identified in Section 7.1.6.1.1 of the EIS but no further details about its location or extent is discussed. Although the 2017 NSCC Topo- bathymetric LIDAR Research Report (Appendix BB), including maps 3-19 to 3-21, clearly show bottom type classifications and eelgrass distribution within the LIDAR study area, it is unclear if this information was used in the EIS to assess potential impacts to the marine environment and fish and fish habitat. Marine plants such as eelgrass provide important nursery habitat for many aquatic species. Appendix BB provides a clear understanding of the location of sensitive receptors and should be included in the effects assessment on the marine environment and fish and fish habitat.	Update the effects assessment for the marine environment and fish and fish habitat to include the findings of the 2017 NSCC Topo-bathymetric LIDAR Research Report. Alternatively, describe how information contained in the Report, including maps 3-19 to 3-21, has been used in identifying and understanding potential changes in the marine environment and fish and fish habitat.	Information requested is provided in Section 2 below.
IAAC-18	IAAC ECCC	Part 2, Section 7.3.5	Section 7.3.13.5	The EIS Guidelines require the EIS to identify direct and indirect effects to migratory birds. As per the Agency's document, *Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under CEAA 2012*, geographic extent is one of the key criteria for determining significance. Geographic extent is intended to describe the spatial area over which an environmental effect is predicted to occur and should be quantitative whenever possible. The EIS does not describe the prediction of temporary or permanent bird habitat loss quantitatively. A quantitative prediction of temporary or permanent bird habitat loss (e.g. hectares of habitat change) is required to assess the effects of the Project on migratory birds and the significance of the effects.	Update the effects assessment on migratory birds to include a quantitative prediction of temporary or permanent bird habitat loss.	Information requested is provided in Section 2 below.

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IAAC-19	NSL&F	Part 2, Section 7.1 Part 2, Section 7.1.4	Appendix AA, Wildlife and Habitat Baseline Review, Section 3.3.1	The EIS Guidelines require a description of riparian, wetland, and terrestrial environments, including a description of animal species and their habitats with a focus on species at risk, species of conservation concern, and species that are of social, economic, cultural, or scientific significance. Wood turtles are listed as threatened under the *Species at Risk Act* (SARA) and by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Section 3.3.1 of the Wildlife and Habitat Baseline Review (Appendix AA) states that wood turtle surveys were completed between the months of May and June, and during the duration of the survey, no wood turtles were observed. The Department of Lands and Forestry notes that turtle surveys should be done twice a year (once in spring, once in fall) to capture peak activity periods for the species.	Given that peak activity periods for wood turtles occur in spring and fall, and wood turtle surveys were not completed during the fall, provide specific mitigation measures for wood turtles assuming their presence at suitable habitat locations. Update the effects assessment as appropriate. Alternatively, provide evidence to justify the conclusions in the EIS that no wood turtles occur in the Project area, given that fall surveys were not completed.	Dedicated wood turtle surveys including habitat suitability were completed in the spring and described in the EIS. Dedicated wood turtle surveys were not completed in the fall; based on past experience and previous regulatory consultation, baseline surveys are recommended in advance of July 1st during the pre-nesting/nesting period. No significant or critical habitat was identified within the study area, therefore the probability of wood turtles at the site is low due to limited habitat suitability. Furthermore, there were no incidental observations of wood turtles noted during other fall season surveys at the site. As part of NSLI's commitment to protect the environment it will ensure mitigative measures are included in the Project Environmental Protection Plan that will: • If the presence of a confirmed or suspected SAR is discovered (e.g., wood turtle) on-site during any phase of construction, work shall halt until consultation has been initiated. NSL&F Regional Biologist will be notified as soon as possible and within a maximum of 24 hours of the observation. If possible, a photo of the animal will be taken, and its location noted. • Wood turtles, if encountered at the worksite during construction activities, will be allowed to exit the site on their own, via a safe route. Construction staff will not attempt to handle or capture wildlife. Improper handling of wildlife can result in injuries to both workers and the animal. • If turtles are encountered that do not leave the site readily, the NSL&F Regional Wildlife Biologist will be contacted for direction. No construction work will continue within 50 m of an identified SAR that has not readily left the construction site. Workers will not touch animals or harass them to leave the area.
IAAC-20	IAAC NSE NSL&F	Part 2, Section 7.4	Section 7.3.14.3 Section 7.1.5.1 Appendix B (Project Environmental Protection Plan Sections 5.2.3 and 7.5.11)	The EIS Guidelines state that the EIS will identify and describe mitigation measures to avoid, or lessen potential adverse effects on species and/or critical habitat listed under SARA as well as those for listed COSEWIC species. Section 7.1.5.1 of the EIS states "Black Ash was observed in localized areas in the southern portion of the Site Study Area and is believed to have been planted and not naturally occurring. Discussions with PLFN indicated that Black Ash (known as Wisqoq in Mi'kmaw) was planted in the area a few years ago."	Provide mitigation measures for Black Ash, which is located within the Site Study Area, and listed under SARA and COSEWIC. Update the effects assessment to include Black Ash and determine the significance of those effects on Black Ash.	No remediation will occur within Wetland WL-10 and watercourses WC-6 and WC-4. General mitigation measures will be employed for tree protection.
IAAC-21	ECCC NSL&F	Part 2, Section 7.1.8 Part 2, Section 7.4	Section 7.1.7 Appendix CC, Section 2.1, Table 2.2, Section 2.3.4, Figure B3	The EIS Guidelines require descriptions of birds and their habitats that are found, or likely to be found, in the study area. The EIS Guidelines also require the EIS to identify and describe mitigation measures to avoid, or lessen, potential adverse effects on species and/or critical habitat listed under SARA. The EIS used the Canadian Nightjar Survey Protocol to collect baseline data for the Common Nighthawk. The Canadian Nightjar Survey Protocol may not be appropriate, given that it is designed to estimate trends over time from fixed points in subsequent years. In addition, the survey data for Common Nighthawk appears to be incomplete, specifically in the northern section of the Site Study Area between the stabilization ECCC notes that the Eastern Whip-poor will, a provincially and federally listed species, should be considered in any Nightjar surveys in Nova Scotia. While the EIS did not identify Eastern Whip-poor-wills in the Site Study Area, it is not clear that this species was targeted during the Nightjar surveys. Section 2.3 of the Birds and Birds Habitat Baseline Review Report (Appendix CC of the EIS) states that line transects were spaced throughout the Project Area so that all habitats were represented. However, Section 2.1 of the Wildlife and Wildlife Habitat Baseline Review (Appendix AA of the EIS) states that approximately 22.5% of the forest stands were classified as softwood and this habitat type was not represented in the line transect surveys. The Department of Lands and Forestry notes that this may result in under-representing species diversity on site. Based on the avian surveys presented in the EIS, there is potential for migratory birds, including species at risk, to be underestimated in the Project Area and any potential effects unmitigated. Section 7.3.14.3 of the EIS states that Barn Swallows (listed under SARA) were observed nesting on the operations building and have the potential to nest on other buildings to be demolished, which would result in direct effects to Barn Swallows due to the permanent loss of their habitat. Although Barn Swallows or their nests were not identified at any of the buildings during the 2018 surveys, specific mitigation measures are required to protect the species during demolition activities, and to adequately assess the potential effects of the Project on species at risk. This information is necessary to assess the effects of the Project on migratory birds and avian species at risk. ECCC also notes that for wetlands (including coastal area wetlands) where direct and indirect effects cannot be avoided, or be entirely minimized, the implementation of conservation allowances would be an important element to consider in satisfying the requirement to minimize effects to wetland-associated species at risk in the Project Area as per section 79 of SARA and the Federal Policy on Wetland Conservation. This information is needed to assess the potential impacts of the Project on migratory birds and species at risk.	Provide specific mitigation measures for avian species at risk found, or likely to be found, in the Site Study Area, including the Common Nighthawk, Eastern Whip-poor-will, and Barn Swallow and update the effects assessments as appropriate. Mitigation measures must: • be consistent with best available information, including any Recovery Strategy, Action Plan or Management Plan in a final or proposed version; and • respect the terms and conditions of SARA regarding protection of individuals, residences, and critical habitat of Extirpated, Endangered, or Threatened species. ECCC notes that section 79(2) of SARA, as well as the *Federal Policy on Wetland Conservation* (for any wetlands that may occur on federal lands or that support habitat for avian species at risk) should be considered in preparing mitigation measures. The avoidance hierarchy should be documented, including the following: • plans to maintain/improve wetland functions; • areas where avoidance is not possible, and justification; • amount of wetland area and functions loss; • mitigation measures for minimizing impacts to wetlands; • as a last resort, identification of compensation measures (e.g. conservation allowances) with the goal of no net loss of wetland functions, including those required to support bird species at risk; and lastly, • a plan to monitor mitigation measures.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-22	ECCC	Part 2, Section 7.3.5 Part 2, Section 7.3.6	Appendix A Human Health and Ecological Risk Assessment	The EIS Guidelines require the proponent to assess the environmental effects of the Project on migratory birds and species at risk, including the deposit of harmful substances in waters that are frequented by migratory birds, losses or changes in migratory bird habitat, considering the critical breeding and migration periods for the birds, potential adverse effects of the Project on species at risk listed under SARA (flora and fauna) and, where appropriate, their critical habitat. Page viii of Appendix A states: “The ERA did not identify substantive risks to ecological receptors, including plant and soil invertebrate communities, mammals, birds and species at risk (SAR). Hence, risk management or remediation measures for the protection of ecological receptors associated with the Upland Areas, Freshwater Wetland and Estuary are not required.” This study focused on the wetland and estuary areas; however, these guidelines have been more broadly applied to the overall project, including the stabilization lagoon. This information is needed to assess the potential impacts of the Project on migratory birds and species at risk.	Conduct an ecological risk assessment (ERA) for the other project components, including the stabilization lagoon, and update the effects assessment as applicable. Alternatively, provide the rationale and validity of applying the conclusions and criteria from the ERA to those areas of the Project not specifically included in the human health and ecological risk assessment.	Information requested is provided in Section 2 below.
IAAC-23	NSL&F	Part 2, Section 7.1.9 Part 2, Section 7.4	Table 7.3-1 Mitigation Measures and Best Management Practices Table 8.1-1 Mitigation Measures and Best Management Practices	The EIS Guidelines require the identification of potential adverse effects of the Project on species at risk listed under SARA and, where appropriate, its critical habitat. The EIS does not identify critical habitat areas within or near the Project site; however, the following mitigation measure is identified throughout the EIS: "Refuel 20 m from any identified critical habitat areas". It is unclear whether the EIS is referring to critical habitat as identified under SARA. If referring to critical habitat as defined under SARA, critical habitat must be identified within the EIS to ensure that the potential adverse effects of the Project can be assessed. This clarification is needed to assess the potential effects of the Project on species at risk.	Clarify whether the term "critical habitat" refers to critical habitat as defined under SARA. If such critical habitat may be affected by the Project, provide an ecological characterization of the critical habitat and update the effects assessment to account for any potential effects to the critical habitat as required.	The term “critical habitat” in the EIS does not refer to critical habitat as defined by SARA. Where “critical habitat” occurs in the EIS document it should be replaced with “sensitive environmental areas” and be regarded as areas where special protection is afforded through avoidance, scheduling of activities, mitigation or management that is outlined in the EIS, Environmental Management Plan and Project Environmental Protection Plan or other Project related documents that have been submitted as part of the EIS or IR process. With this in mind, no critical habitat as defined by SARA will be affected by the Project and as such, no update to the effects assessment is required.
IAAC-24	DFO	Part 2, Section 7.1.6	Section 7.1.6.1.3	The EIS Guidelines require a description of the marine environment in the estuary and along the strait shorelines immediately outside of the mouth of Boat Harbour, including marine species at risk. The assessment of marine species at risk contains high-level information related to the temporal occupation period of species at risk that is not supported by any references (page 7-127). As well, the EIS refers to potential species presence in categories (high, moderate to high, moderate, low to moderate and rare to null) but lacks information on what each category represents, the difference between each classification and what they are based on (page 7-126). This information is needed to assess the potential effects of the Project on the marine species at risk.	For the potential for occurrence of marine species at risk: • Explain what the ratings of potential occurrences of marine species at risk were based on (e.g. number of sightings per day/month/year). • Describe the occupation period of each species at risk, including a temporal period when they could be present within the Study Area and provide references.	Information requested is provided in Section 2 below.
IAAC-25	IAAC	Part 2, Section 7.6.1	Section 7.4.1.2	The EIS Guidelines require an analysis of the risks of accidents and malfunctions, a determination of their effects, and the preliminary emergency response measures. Section 7.4.1.2 of the EIS contains a list of credible scenarios and an assessment of effects. However, one credible scenario, the "release of off-specification effluent from temporary water treatment facility" was identified as a credible scenario but not assessed. The EIS needs to provide an analysis of this scenario to complete the analysis of accident and malfunctions.	Provide an analysis of the risk and potential effects of a release of off-specification effluent from the water treatment facility and provide preliminary emergency response measures to mitigate effects.	It should be noted that the correct reference in 7.4.1.2 should be release of off-specification effluent from the Temporary Leachate Treatment Facility (TLTF). As described in Section 3.1.4 of the EIS, treated effluent from the TLTF that meets the appropriate discharge criteria would be conveyed to the discharge point in the estuary. Effluent from the TLTF that does not meet the criteria, if any, would be recirculated and retreated. From an accidents and malfunctions perspective, the likelihood of a release of off-specification effluent is extremely low based on the monitoring requirements in place to test the effluent prior to release. The risks associated with the release of off-specification effluent will be reduced by regular inspections of equipment, preparation of a contingency plan, and implementation of an on-site emergency response procedure including necessary equipment and trained personnel to manage any potential discharge of off-specification effluent. Discharge of off-specification effluent is likely to be small and of short duration and will not have significant adverse effects. The assessment methodology for accidents and malfunctions is described in Section 7.4.1.1 of the EIS, and a new table has been established that provides the ranking levels to identify the likelihood of the interactions between this scenario and the VCs (see separate table established as part of the IR response in Section 2 of this document). No interactions are anticipated between a potential discharge of off-specification effluent to the majority of VCs as shown in Table 2.8 of Section 2 below. Based on Best Management Practices (BMPs) as well as standard mitigation measures, training of on-site personnel, and the Site's Emergency Response Plan (ERP), any potential discharge of off-specification effluent will be relatively minor, short duration and will not have significant adverse effects. Additional information specific to IAAC-25 is also provided below in Section 2.

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IAAC-26	IAAC		Section 7.4.1.3.2.1	The EIS Guidelines require the proponent to conduct an analysis of the risks of accidents and malfunctions, determine their effects, and present preliminary emergency response measures. The assessment must include an identification of the magnitude, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment. Section 7.4.1.3.2.1 states that potential impacts from erosion/sedimentation control measure failure would be short term because areas impacted by an increase in fine sediment would be flushed clean by the non-impacted upstream areas. Section 7.4.1.3.2.1 also states "Due to response and mitigation measures to an erosion or sedimentation event and the watercourse's and aquatic species natural ability to survive such events, it is not anticipated that an erosion and sediment control failure will permanently alter the habitat of the receiving environments or affect long-term survival of aquatic species." However, no explanation or rationale is provided to support either of these statements. This information is required for the Agency to complete the analysis of accident and malfunctions.	Explain why the fine sediment is not anticipated to settle before being flushed by non-impacted upstream areas, and whether the downstream areas would be impacted by an erosion/sedimentation control measure failure. Provide rationale to support the conclusion that the watercourse and aquatic species have a natural ability to survive an erosion or sedimentation event.	The impacted sludge and marine sediment directly beneath the sludge within Boat Harbour is fine and nears the density of water as documented in the Pilot Scale Testing Construction Report (Reference Document 17 of the EIS; GHD, 2019). As such, settling of resuspended solids will not occur rapidly. Mitigation measures will be in place to minimize the effects of release of sediment laden water during remediation as documented in Table 7.3-117 of the EIS. Mitigation measures include the use of silt curtains and controlling the discharge should elevated TSS levels occur. As detailed in the Environmental Management Plan (Appendix B of the EIS, Section 5.3), in the event of a failure of the primary and secondary means of turbidity containment (dual silt curtain system), the water level control structure can be raised to provide several days of storage at average flow, which will permit the silt to settle and testing to be completed prior to release of any potentially impacted bulk water. NSLI will ensure the Project Environmental Protection Plan uses BMPs to limit TSS and turbidity around areas of active dredging and/or on event basis to monitor the efficacy of Erosion and Sediment Control (ESC) measures. The details of the monitoring programs will be refined and developed in consultation and collaboration with regulatory agencies and prior to the work commencing. As part of IAAC-14, GHD completed supplemental modelling with respect to TSS concentrations in the Estuary and Northumberland Strait. It was identified that increases in sediment deposition following dam removal activities are similar to natural suspension and re-deposition fluxes in the Northumberland Strait (Kranck, 1971) and that the likely effects to marine habitat and biota from both TSS concentrations and sediment loading in this particular part of the Study Area are considered insignificant compared to background. In addition, the effects on water quality were determined to be short-term, less than 4 months for nominal TSS levels (25 mg/L) and likely less than 20 days if background is considered. While TSS concentrations are elevated immediately after dam removal, they are approximately equal to or well below levels that, according to CCME (2002), harm fish directly (i.e., 190 to 330,000 mg/L). With this in mind, any failure of the erosion and sediment controls is not anticipated to result in releases of TSS greater than the modelling completed with respect to the dam removal, therefore, no impacts to aquatic habitat are expected.
IAAC-27	IAAC	Part 2, Section 7.6.1	Section 7.4.1.3.8.1 Section 7.4.1.3.8.2	The EIS guidelines require the proponent to conduct an analysis of the risks of accidents and malfunctions, determine their effects, and present preliminary emergency response measures. The worst-case scenario identified for an off-site trucking accident was the release of a full tanker load (up to 14,000 L) into the environment. Section 7.4.1.3.8.1 states "With a single release event into environment, such as the scenarios described, environmental effects on water quality would be short-term, as contaminants are flushed downstream and become diluted". Furthermore, Section 7.4.1.3.8.2 states "It is anticipated that in the highly unlikely event of a large diesel spill into a watercourse, resident fish populations would re- establish within the affected area within 1 to 2 years." This information is required to assess the potential effects on the marine environment and fish and fish habitat, including the commercial fishing industry.	Clarify whether these determinations are based on the worst- case scenario (a large diesel spill of up to 14,000 L), and if so, provide more information to show that the release of a large quantity of diesel fuel into or near surface water would only result in short-term effects to water quality. Explain how it was determined that resident fish populations would re-establish within the affected area within 1 to 2 years after a large diesel spill into a watercourse.	As described in the Project Environmental Protection Plan (Appendix B of the EIS), mitigation measures with respect to accidental spills will require that the contractor(s) ensure the spills management plan is in effect and its procedures are fully communicated to staff. While this plan will be focused on on-Site activities, the contractor will be required to ensure a spills management plan is in place for their fleet, including tanker trucks. The spills management plan includes having spill response resources ready for immediate implementation to control accidental releases which includes (but not limited to) absorbent materials, small hand-held equipment and fire extinguishers. In addition, spills on and off-site would follow the applicable provincial legislation and protocols through the Nova Scotia Department of Environment, via the Environmental Monitoring and Compliance (EMC) division and the *Emergency Spill Regulations* (GNS, 1995), as well as Federal regulations where appropriate. Based on typical mitigation and monitoring measures, it is reasonable to assume that this highly unlikely event would be short-term and managed to ensure minimal impacts to fish populations. Although each accidental release is unique and requires a detailed assessment of the contaminant released as well as the receiving environment (including fish and fish habitat), the Project Environmental Protection Plan provides a framework for spill reporting, source containment, clean-up procedures, testing and monitoring to limit long-term effects of the release. In addition, site-specific mitigation measures would be evaluated and implemented including involvement of Provincial and Federal (i.e. DFO/ECCC) agencies during the spill response and remedial activities to ensure any required re-establishment of fish population in an affected watercourse occurs in a timely fashion. It is acknowledged that the nature and duration of the impact on the environment from any release is dependent on a number of factors, including the receiving environment, type of contaminant released, response time and recovery activities. However, accidental diesel releases will be effectively managed following the Project Environmental Protection Plan given the chemical and toxicological characteristics of the contaminant, available collection and remediation technologies and natural attenuation (e.g. biodegradation) that support recovery of an affected watercourse in 1-2 years timeframe.
IAAC-28	ECCC	Part 2, Section 7.1.5	Section 7.1.5.2 Appendix A Section 7.2.2.4, Table I-1.3 and Table C-1.4A	The EIS Guidelines require information about surface water quality, including lab analytical results for metals, major ions, and other contaminants of concern. The EIS does not provide dioxin/furan analysis for freshwater wetland surface waters. This information is required to assess the potential effects of the Project on surface water.	Provide analytical results for dioxins/furans in freshwater wetland surface waters or provide rationale why this information is not required.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-29	IAAC	Part 2, Section 1.3 Part 2, Section 7.3.8	Section 7.1.5.2 Section 7.3.9	The EIS Guidelines require the location of federal lands in relation to the Project. It is unclear from the EIS whether any wetlands to be remediated occur on federal lands. This information is needed to ensure the *Federal Policy on Wetland Conservation* mitigation hierarchy is followed, where required.	Clarify whether any project components to be remediated, including wetlands, are located on federal lands. Update the mitigation measures and effects assessment, as required, in consideration of the Federal Policy on Wetland Conservation.	The extent of wetlands that require remediation was determined via a human health and ecological risk assessment (HHERA) which is still under review by Health Canada. Figures provided in Section 3 of the EIS and Appendix K of the HHERA report (Appendix A of the EIS) depict the limits of wetland remediation anticipated based on the findings of the HHERA. Remediation of Wetland 13a shown in Figure 3.1-6 of the EIS and Figure K-3 of Appendix K of the HHERA (Appendix A of the EIS) may slightly encroach on Federal lands, however the exact limits of wetland disturbances on Federal lands will be carefully analyzed before any remedial activities would commence. With this in mind, the HHERA was a determining factor with respect to areas of remediation that may require wetland disturbance to achieve the goals of the project. The *Federal Policy on Wetland Conservation* was reviewed to determine how the hierarchical sequence of mitigation measures (avoidance, minimization and compensation) could also be applied to ensure areas of wetlands remain undisturbed by other project activities (i.e. non-remediation activities and placement of supporting infrastructure). It is noted that the wetlands that may be disturbed that are on Federal lands are on Indian Reserve Property (identified as Indian Reserve No. 37) and as such, any activity will require approval through the federal department of Indigenous Services Canada as well as a Band Council Resolution from PLFN with an associated review on impacts to the environment.
IAAC-30	DFO	Part 2, Section 7.2.2 Part 2, Section 7.3.1	Table 7.3-193 Table 7.3-200	The EIS Guidelines require the identification of potential adverse effects to fish and fish habitat from the modification of hydrological conditions and a description of changes in hydrological functions in wetlands. One mitigation measure suggested in Tables 7.3-193 and 7.3-200 of the EIS is the identification of natural channels running through the estuary prior to remediation to protect the integrity of hydrology in the wetland. Further information was not provided to confirm how the identification of natural channels would protect the hydrology of wetlands supporting fish and fish habitat. It is also unclear what specific actions (e.g., avoidance or reinstatement) will be undertaken to protect wetland hydrology. There is also no discussion in the EIS on the reinstatement of the wetland channel to maintain hydrology between Wetland 16 and the ASB that was noted in the Coastal Hydraulic Modeling Report in Appendix Z of the EIS. A change in wetland hydrology could have adverse effects on fish and fish habitat due to drawdown, elevated temperatures, disruption of habitat connectivity, concerns with adequate flows and fish passage. This information is needed to assess the potential impacts of the Project on fish and fish habitat.	Identify the specific mitigation measures that will be taken to protect the hydrology of wetlands supporting fish and fish habitat and update the effects assessment if required. Describe when the reinstatement of the wetland channel between Wetland 16 and the ASB would occur and how this would mitigate impacts to fish and fish habitat.	Information requested is provided in Section 2 below.
IAAC-31	IAAC DFO NSE	Part 2, Section 7.6.2	Section 7.4.2.1.1 Table 7.1-10 Table 7.4-17	The EIS Guidelines require details of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the Project. Section 7.4.2.1.1 of the EIS states: "The Project will be designed to withstand more extreme precipitation events, including the effects of these events such as flooding and erosion." Table 7.1-10 of the EIS states that the stormwater management system is designed based on the current 1:100 year storm intensity-duration-frequency. The stormwater runoff ditches are sized to accommodate a 1:25 year stormwater event, while the stormwater management pond is sized to accommodate a 1:100 year stormwater event. The EIS acknowledges that it is now more common for Nova Scotia to experience record breaking storms. In a 1:100-year storm, the 1:25-year stormwater ditches would be overcapacity. Undersized stormwater ditches create opportunities for runoff to bypass overland where unintended receptors may be affected. Further, it is unclear why the 1:25 year risk has been considered in the design of infrastructure intended to be in place for 75 or more years. Given the potential for increasing flood risk due to climate change in the future and the long term nature of the containment cell, it is unclear why only current risk is considered in the design. This information is needed to assess the potential effects of the environment on the Project.	Provide the rationale to design the stormwater pond for a 1:100-year event while the stormwater ditches are only designed for a 1:25-year event or redesign the capacity of the stormwater ditches. Update the system design to consider the potential for increasing flood risk due to future climate change. Alternatively, provide rationale for relying on current 1:100- year storm event, and intensity-duration-frequency curves in the system design. Clarify whether and how increasing precipitation and risk of extreme events was considered in the design of the containment cell stormwater runoff system.	Table 7.1-10 of the EIS contained an error. The stormwater management system for the sludge disposal cell (Containment Cell) includes stormwater runoff ditches, sized to accommodate the 1-in-100 year storm event under post-closure/capped conditions. The stormwater management pond has been sized to accommodate the 1-in-100 year storm event with six percent contingency capacity for climate change consideration for the projected 2080 rainfall increase. A detailed Stormwater Management Plan will be submitted to Nova Scotia Environment in support of the Industrial Approval Application.
IAAC-32	HC NSE IAAC	Section 7.3.7 Mi'kmaq of Nova Scotia Section 7.4 Mitigation measures	EIS, Table 7.3-1-Mitigation Measures and Best Management Practices	The EIS Guidelines require the description of mitigation measures that are specific, achievable, measurable and verifiable, and described in a manner that avoids ambiguity in intent, interpretation and implementation. Many of the mitigation measures presented in Table 7.3-1 of the EIS do not provide sufficient detail to enable an understanding of potential residual effects on valued components, including human health. For example, the EIS lists "Control noise by maintaining separation distance between source and receptor and equipment design, where feasible" as a mitigation measure. However, no justification or rationale is provided to support the effectiveness of such an approach nor how feasibility would be determined. This information is needed to evaluate the adequacy of the mitigation measures proposed to protect human health due to the lack of necessary details, including: • The COPCs (contaminants of potential concern) and pathway of exposure targeted. • The threshold value(s) of the COPCs at which mitigation is necessary (with applicable rationale, as needed). • The mitigation measure(s) to be employed for each threshold limit that is exceeded with evidence supporting its anticipated effectiveness. • Proposed monitoring activities to determine effectiveness of the proposed measure(s). • Additional mitigation measures to be utilized, as necessary, to reduce the risk to human health to acceptable levels. Additional details about the proposed mitigation measures are required to assess the potential adverse environmental effects of the Project on Mi'kmaq of Nova Scotia health.	Provide additional information, including supporting evidence (e.g., published, peer-reviewed literature) for the effectiveness of all proposed health-related mitigation measures and additional mitigation measures, as necessary, in accordance with Health Canada guidance documents. Update analysis and determinations of significance, as required, based on revised mitigation measures.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-33	HC	Section 7.3.7 - Mi'kmaq of Nova Scotia	HHERA (Appendix A), Section 6.4.3	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia, including their health. In Section 6.4.3 of the Human Health and Ecological Risk Assessment (HHERA – Appendix A of the EIS), it is stated that "Since vanadium was either not detected or detected at concentrations less than the guidelines for groundwater and surface water, exposure to vanadium through water is considered to be negligible. Therefore, exposure to water can be eliminated for vanadium. Vanadium is not volatile. Furthermore, vanadium was not identified as a COPC in soil and the Upland Study Area soil concentration is less than the background soil concentration. Furthermore, exposure to vanadium in airborne particulates is expected to be negligible for sediments. Therefore, exposure to air can also be eliminated for vanadium. Vanadium is also not expected to be associated with any consumer products at the Site. Therefore, the only applicable exposure media remaining at the Site for vanadium are sediment and food. Using the equation presented above, the target Hazard Quotient (HQ) value can be increased from 0.2 (100%/5 exposure media) to 0.5 (100%/2 exposure media) for assessing potential hazards at the Site from vanadium." Health Canada does not support the methodology used to adjust the target Hazard Quotient for vanadium to 0.5 in the Risk Characterization Section of the HHERA. While this methodology may be appropriate for adjusting the Soil Allocation Factor (SAF – a numerical parameter used in site-specific target level (SSTL) calculations), it is not an appropriate basis to adjust the target HQ. For example, although vanadium was "not detected or detected at concentrations less than the guidelines for groundwater and surface water", it is not possible to ascertain that these concentrations represent an HQ of 0.2 unless the exposure pathways from these media have been deemed inoperable. A target HQ of ≤ 0.2 should be applied when background (i.e., off-site) exposures to the same substance may occur from other sources unrelated to the subject contaminated site and at locations other than the contaminated site. If these background exposures are not quantified (as is the case in the HHERA), they cannot be assumed to be absent. Therefore, applying a target HQ value of ≤ 0.2 minimizes the likelihood that total exposure (i.e., site + background) will exceed the toxicity reference value from all sources and locations to which a person may be exposed to the substance. The HHERA identified SSTLs for both vanadium and dioxins/furans toxic equivalency (TEQ) values in sediment but the report did not consider non-soil on-site exposure pathways in its equation. Health Canada notes that a SAF of 0.2 is recommended for soil in the default scenario for guideline development to allow for 80% of the remaining tolerable incremental exposure for other on-site exposures to air, water, food, and consumer products. This information is required to ensure appropriate risk estimates for assessing how changes to the environment caused by the Project would potentially affect human health.	Revise the risk estimates considering that project-related sources of exposure should achieve a HQ of ≤0.2. Alternatively, provide justification for the appropriateness of using a HQ >0.2 for a specific pathway. Provide a numerical SAF in the SSTL equation to account for exposure to COPCs in other on-site media and update the effects assessment as necessary. Alternatively, provide a detailed rationale as to why the current equation is sufficiently protective of human health.	Information requested is provided in Section 2 below.
IAAC-33 (Conformity Review)	HC			Same as above	A. Revise the risk estimates considering that project-related sources of exposure should achieve a HQ of ≤0.2. Alternatively, provide justification for the appropriateness of using a HQ >0.2 for a specific pathway. B. Provide a numerical SAF in the SSTL equation to account for exposure to COPCs in other on-site media and update the effects assessment as necessary. Alternatively, provide a detailed rationale as to why the current equation is sufficiently protective of human health. **Conformity Response (IAAC)** A. Conforms. B. The response did not include a numerical Soil Allocation Factor (SAF) into calculations for Site-Specific Target Level (SSTL)1 nor a rationale as to why it was not required. The SAF value could not be found in the SSTL equations in Table 2 through 5 for vanadium and dioxins/furans (pdf p. 180-183 of the IR submission document). NS Lands is required to: ● Provide a numerical SAF in the SSTL equation to account for exposure to COPCs in other on-site media and update the effects assessment as necessary. Alternatively, provide a detailed rationale as to why the current equation is sufficiently protective of human health.	Additional information requested specific to Item B is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-34	HC	Section 3.2.3- Spatial and Temporal Boundaries Section 7.3.7 - Mi'kmaq of Nova Scotia	HHERA (Appendix A), Figure 1A, Sections 1 and 6, Figure 12.	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. The EIS Guidelines also require a description of the spatial boundaries of each valued component used in assessing the potential adverse environmental effects of the Project. It is unclear which portion of the Study Area, and therefore which data, is included within the scope of the HHERA. Sections 1 and 6 and Figure 1A in the Human Health and Ecological Risk Assessment report (HHERA – Appendix A) indicates that data collected from the Boat Harbour stabilization lagoon (BHSL) was included in the HHERA dataset. However, the conceptual site model for Human Receptors at the Boat Harbour Effluent Treatment Facility (BHETF) shown in Figure 12 of the HHERA report does not appear to include the BHSL study area. The conceptual site model for human receptors depicted in Figure 12 of the HHERA report does not include exposure to contaminants in any media located within the BHETF areas even though throughout the report it indicates that the spatial scope of the HHERA includes the BHETF areas. The exclusion of these areas of the site from the conceptual site model and from evaluation in the HHERA could underestimate potential risks to human health to future users of the site. The HHERA report states, "the main purpose of the SSI [Supplemental Site Investigation] and HHERA was to determine if remediation is also required in the surrounding Upland Areas, Freshwater Wetlands and Estuary (including the outfall to the Northumberland Strait) as part of the Boat Harbour remediation project." However, none of the Figures included in the report identify the location of the Uplands Area boundaries, which makes it difficult to comment on the adequacy of the site characterization (e.g., sampling density). This information is required to assess the potential risks to human health for future users of the site.	Provide a Figure outlining the Study Area boundaries with respect to the scope of the HHERA, including the Uplands Area boundaries. Clarify whether environmental data collected from the BHSL was included in the HHERA dataset. Discuss whether operable exposure pathways exist in the BHETF areas or provide rationale why these areas were not included in the conceptual site model. Include in the discussion how risk management decisions in the BHETF areas will be protective of human health, considering all potential exposures by future users of the site. Provide the locations of the environmental samples within the Uplands Areas in a Figure.	Information requested is provided in Section 2 below.
IAAC-35	HC	Section 7.3.7 - Mi'kmaq of Nova Scotia	HHERA (Appendix A), Sections 6.3 (Toxicity Assessment) and 6.4 (Risk Characterization), Tables H-2.10 to H-2.22 of Appendix H	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. Section 6.3 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A) indicates that sub-chronic toxicological reference values (TRVs) for vanadium and dioxins/furans TEQ were applied to calculate risks from direct sediment contact to multiple receptors at the site. Site users are anticipated to be exposed to sediment on a less-than-ongoing basis (30 weeks a year, with repeated annual exposure), yet the country food exposures for the same COPCs were identified as chronic in the report (i.e., people may be exposed to COPCs through food consumption over a year, with repeated annual exposure). Health Canada notes that the report does not provide justification for designating the 30-week- a-year exposures as sub-chronic, although a sub-chronic TRV was applied. Health Canada's Guidance on Human Health Detailed Quantitative Risk Assessment for Chemicals document recommends that human exposures occurring over a period greater than 90 days be considered chronic. Furthermore, for both chemicals, as the sub-chronic TRVs have different primary target organs than the chronic TRVs, it appears that the corresponding risk (in HQ units) is split between two toxic endpoints (immunological and developmental for dioxins/furans TEQ, and hematological and biochemical for vanadium), which will result in an underestimation of risk for exposure scenarios. Health Canada also notes that sub-chronic TRVs were also applied in the SSTL calculations presented in Table H-2-19 of Appendix H. This information is required to assess the potential risks to human health for future users of the site.	Apply a chronic TRV to evaluate ongoing chronic exposure, with risk estimates provided for the elevated total exposure over the summer months to all media (e.g., direct contact with sediments and food consumption). If risks for total exposure to all media are estimated to be above the target HQ, identify measures to mitigate the exposure. Update the SSTL calculations to include the chronic HC TRVs for vanadium and dioxins/furans TEQ. Alternatively, provide a rationale to support the TRV used to assess exposures and health risks from exposure to vanadium and dioxins/furans TEQ.	Information requested is provided in Section 2 below.
IAAC-36	HC	Section 7.3.7 - Mi'kmaq of Nova Scotia	HHERA (Appendix A), Section 6.1.1.7, Section 4.3.4, Figure 12	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. It is unclear from the EIS if plant tissue is an operable exposure pathway in the Uplands Area. Section 6.1.1.7 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A) states that "the PLFN (Pictou Landing First Nation) community is likely to collect and consume plants throughout the entire Site in the future." However, plant tissue data appears to have only been collected from the Freshwater Wetlands and the Estuary portions of the site (see Section 4.3.4, Tissue Analytical Results), while no samples appear to have been collected from the Upland Areas. In addition, the conceptual site model shown in Figure 12 of the report indicates that vegetation uptake of COPCs from contaminated soil is a viable transport pathway, via vegetation and wild game uptake. However, vegetation consumption is considered an inoperable exposure pathway due to "COPC – None (no exceedances and bio-accumulative COPC limited and/or within background in Soil)". It is unclear whether this pathway (consumption of country food, i.e., plants) is inoperable in the Uplands Area given the statement that plants are likely to be collected and consumed throughout the site. It is also unclear whether plant tissues from the Uplands Area are contaminated as no plant tissue samples have been collected. This information is required to assess the potential risks to human health for future users of the site.	Revise the country food exposure assessment to incorporate the vegetation transport pathway in the Uplands Area and provide information on the operability of the country foods exposure pathway in the Uplands Area. Update the effects assessment, as applicable. Alternatively, provide a rationale for why this pathway inoperable.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-36 (Conformity Review)	HC			Same as above.	Same as above. **Conformity Response (IAAC)** No response information was provided on whether consumption of plant tissues is an operable exposure pathway in the Uplands Area. NS Lands is required to: ● Revise the country food exposure assessment to incorporate the vegetation transport pathway in the Uplands Area and provide information on the operability of the country foods exposure pathway in the Uplands Area. Update the effects assessment, as applicable. Alternatively, provide a rationale for why this pathway is inoperable.	Additional information requested is provided in Section 2 below.
IAAC-37	HC NSL&F	Section 7.3.7 - Mi'kmaq of Nova Scotia	HHERA (Appendix A), Section 6.4.3.6, Table 6.25 (Uncertainty Analysis) HHERA (Appendix A) Table H-1.12 Occurrence, Distribution, and Identification of Chemicals of Concern (COC) in . Game Meat HHERA (Appendix A), Section 6.1.1.10 Game Meat (Mammals) COPCs	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia, including their health. As part of this, the EIS must consider the current and future availability and contamination of country foods in its analysis. The uncertainty analysis in Table 6.25 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) states that "The assumptions that were applied in the HHRA are based on a heavy consumer rather than the average consumer" and indicates that the corresponding health risk is therefore likely overestimated. However, this is contradicted in Section 6.4.3.6 of the report where it qualitatively eliminates the Pictou Landing First Nation Resident Game Consumption of Organs as an exposure pathway, stating "Based on the average game [organ] ingestion rate, the HQ values are less than 0.2." If the average game organ ingestion rate is applied instead of the 95th percentile ingestion rate, it is unclear how this results in an overestimation of potential human health risk for this receptor. The HHERA report focuses on wetland species (beaver and muskrat) as game meat in the discussion on country foods. However, the Mi'kmaq of Nova Scotia Ecological Knowledge Study report (Appendix T of the EIS) indicated that rabbit (likely snowshoe hare) and deer were food sources, and both species were present within the project Study Area. Contaminant level determinations in game meat tissue were based on only one sample. Health Canada notes that data from a single sample may not be sufficiently representative of chemical concentrations in game meat and may not be appropriate to estimate the exposure levels and potential human health risks. Additional information to support the elimination of game meat consumption as an exposure pathway is required to assess the potential adverse environmental effects of the Project on human health.	Describe and discuss the level of uncertainty associated with ingestion exposures using the qualitative elimination of the 'Pictou Landing First Nation Resident Game Consumption of Organs' as an exposure pathway. Within the discussion, clarify whether the HQ values were based on heavy or average game organ ingestion rate. Provide the rationale to support the exclusion of terrestrial game mammals, like rabbit and deer, from sampling and analysis. Provide rationale to support using data from a single game meat sample to represent contaminant levels in game meat to estimate relevant exposure levels and potential human health risks.	Information requested is provided in Section 2 below.
IAAC-38	HC	Part 1: Sections 4.2, 4.3 Part 2: Section 7.3.7 - Mi'kmaq of Nova Scotia	HHERA (Appendix A), Section 1.3 (Page 15) HHERA (Appendix A), (Page 58) Table C-1.13 of Appendix C-1	The EIS Guidelines require all data, models and studies to be documented such that the analyses are transparent and reproducible and all data collection methods will be specified. In addition, when relying on existing information, the EIS should comment on how the data were applied to the Project, separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from the existing information. Section 4.3 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) indicates that data provided by Dalhousie University, including shellfish field data from the Northumberland Strait, was incorporated into the HHERA. However, the report does not present a quality assurance/quality control (QA/QC) analysis of the Dalhousie data, nor is there a discussion on the validity of using such data and/or any limitations associated with its quality and/or use in the HHERA. This information is required to ensure a thorough evaluation of the environmental effects of the Project on human health for future users of the site.	Provide an analysis and discussion on QA/QC from the collection, analysis and interpretation of field data from Dalhousie University to demonstrate the applicability for its use in the HHERA, noting any limitations and/or discrepancy in this data compared to other data collected for this project.	Information requested is provided in Section 2 below.
IAAC-39	HC	Section 7.3.7 Mi'kmaq of Nova Scotia	PRA-HHRA (EIS- Appendix A) Figures 3.2 to 3.5	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. Health Canada notes that an exposure pathway is considered operable if one or more receptors can be exposed to a COPC. However, in the Project Related Activities-Human Health Risk Assessment report (Appendix A of the EIS), potentially operational pathways were eliminated based on the concentration of the COPCs, not whether receptors could be exposed. For example, Figure 3.5 of the report (Appendix A of the EIS) depicts the conceptual site models for human receptors during dam removal-related activities. For the source media "Sediment", the exposure pathways of "Sediment Dermal Contact/Incidental Ingestion" and "Consumption of Country Foods" were both identified as inoperable based on concentrations of COPC and not the potential for exposure. In addition, as receptors may be exposed to COPCs through multiple pathways, Health Canada recommends that the risk associated with human health should be based on the total exposure, as lower level exposures still contribute to the overall project-related exposure and risk to human health. For example, sediment released in the re-naturalization process (opening Boat Harbour up to the Northumberland Strait) may impact recreational water use areas in the Northumberland Strait, within Boat Harbour, and in the estuary, all of which may result in sediment dermal contact and/or accidental ingestion of potentially contaminated sediment that may pose a risk to human health. For additional information Health Canada refers the proponent to: Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment (Health Canada, 2019). https://www.canada.ca/en/health- Canada/services/publications/healthy-living/guidance-evaluating-human-health-impacts-risk- assessment.html Determining which exposure pathways are operable is important for assessing the potential adverse environmental effects of the Project on Mi'kmaq of Nova Scotia health.	Revise and re-evaluate the operability of potential exposure pathways in the Project Related Activities-Human Health Risk Assessment report in accordance with Health Canada guidance. Update the effects assessment in the EIS, as appropriate. Alternatively, provide rationale for why the operability of the exposure pathways provided in the report were appropriate.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-39 (Conformity Review)	HC			Same as above.	Same as above. **Conformity Response (IAAC)** No additional information/rationale is provided for why the operable exposure pathways are not updated for the PRA-HHRA. The proponent's response (Section 2.2.8 and Table 2.11, pdf p.109 to 110) reiterates that both soil and groundwater were "Not carried forward as concentrations of COPCs below screening levels or background." However, as noted in the IR, Health Canada considers an exposure pathway operable if one or more receptors can be exposed to a COPC. Potentially operational pathways should not be eliminated based on the concentration of the COPCs if there is a possibility that receptors could be exposed to any level of COPC. Additionally, Health Canada recommended in IR IAAC-39 that, as receptors may be exposed to COPCs through multiple pathways, lower level exposures should not be excluded as they can still contribute to the overall project-related exposure and risk to human health. The Conceptual Site Model in Figures 3.2 to 3.5 (Appendix A, pdf p.5339 to 5342) are not updated to reflect this. NS Lands is required to: ● Revise and re-evaluate the operability of potential exposure pathways in the PRA-HHRA report in accordance with Health Canada guidance. Update the effects assessment in the EIS, as appropriate. Alternatively, provide rationale for why the operability of the exposure pathways provided in the report were appropriate.	Additional information requested is provided in Section 2 below.
IAAC-40	HC	Section 3.2.3- Spatial and Temporal Boundaries Section 7.3.7 - Mi'kmaq of Nova Scotia	PRA-HHRA (EIS- Appendix A) Figure 3.1 EIS, Figure 7.1-1 Coastal Hydraulic Modelling Report (EIS- Appendix Z)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. The Coastal Hydraulic Modeling report in Appendix Z of the EIS states that "A portion of suspended silt and clay exits the model domain into the Northumberland Strait, whereas sand tends to remain nearby the entrance channel. A total of approximately 270,000 m3 (in-situ, including porosity) of sediment, primarily silt and clay, is mobilized during the re-naturalization process of which approximately 140,000 m3 exits the model domain." Health Canada noted that the area of sediment impact (as total suspended solids – TSS) modelled in the report extends beyond the regional study area identified in the Project Related Activities-Human Health Risk Assessment report (Appendix A of the EIS). It is not clear if the outflow of sediment would affect the numerous recreational areas in close proximity to the Project. Health Canada also noted that potential impacts to country foods associated with the release of this sediment into the Northumberland Strait was not evaluated in the EIS, including the potential risks associated with COPCs in the released sediment. The Northumberland Strait supports First Nation's food, social, ceremonial and commercial fisheries, as well as non- Indigenous fisheries. The release of this sediment may have a direct impact on marine organisms or may result in food chain impacts through the bioaccumulation or biomagnification COPCs. Section 7.3.7.4.3 of the EIS states "The majority of potential effects from TSS will increase effects on other VCs [valued components], namely from the marine environment perspective, which are addressed in subsequent Sections. It should be noted that the types of effects are considered temporary/short-term as the total TSS and turbidity from the dredging activity is expected to quickly return to background levels." However, the Coastal Hydraulic Modeling report (Appendix Z) predicts an increase in TSS flowing into the estuary and Northumberland Strait for at least one year after the dam is removed. This suggests that impacts will occur in the medium- to long-term rather than only the short term, which may result in chronic or sub- chronic exposure to COPCs associated with these sediments that may impact recreational water users and country foods. Potential health risks associated with these chronic or sub- chronic exposures to COPCs were not evaluated and may contribute to overall underestimation of risks to human health. This information is need to evaluate potential risks to human health associated with the project-related activities.	Update the Project Related Activities-Human Health Risk Assessment to expand the spatial boundaries and include the potential impacts and potentially impacted receptors for the release of sediment into the Northumberland Strait. Evaluate the potential impacts of sediment release on human health in the EIS, including country food and recreational water use pathways, as well as any other relevant human exposure pathways. Include COPC that may bioaccumulate or bio magnify within food chains in the evaluation. Alternatively, provide rationale for why the release of sediment is not expected to impact country food and recreational water use.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-41	HC	Section 7.3.7 Mi'kmaq of Nova Scotia	PRA-HHRA: Figure 3.5, p. 2 Risk Management Plan (Appendix K) of the HHERA (EIS- Appendix A)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. The Project Related Activities-Human Health Risk Assessment report (Appendix A of the EIS) states that the suspended sediment in surface water exposure pathway' during and post dam removal was not carried through for evaluation because "Sediment potentially mobilized following dam removal will have concentrations of COPCs below remedial targets, based on protection of human health through the direct ingestion/dermal contact pathway." However, according to Figures K-1 to K-8 of the Risk Management Plan in Appendix K of the Human Health and Ecological Risk Assessment report (Appendix A of the EIS) remediation will not be required for numerous samples that exceed the proposed SSTL for dioxins/furans TEQ (29 pg./g) based on the Exposure Point Concentration (EPC) risk management approach. Therefore, the rationale for not assessing the 'suspended sediment in surface water exposure pathway' is not justified as concentrations above remedial targets, based on protection of human health through the direct ingestion/dermal contact pathway, will not be remediated. For example, the highest COPC concentration not requiring remediation based on the EPC risk management approach is dioxins/furans TEQ 61.9 pg./g (Figure K-7 of the Risk Management Plan), which is greater than twice the proposed SSTL. Since the 'suspended sediment in surface water exposure pathway' during and following dam removal was not carried through for evaluation, the potential risks to human health associated with the resuspension and transport of sediment contaminated with COPCs above the proposed SSTLs for dioxin/furans and vanadium were not fully evaluated. This may underestimate the potential health risks associated with project-related activities for receptors (i.e., recreational water users and country food consumers). This information is need to evaluate potential risks to human health associated with the project-related activities.	Evaluate the potential risks to human health associated with exposure to potentially contaminated sediment released during the re-naturalization process for acute, chronic and sub-chronic exposure, as applicable. Alternatively, provide a justification for why this information is not needed.	Information requested is provided in Section 2 below.
IAAC-42	HC	Section 7.3.7 - Mi'kmaq of Nova Scotia	PRA-HHRA (EIS- Appendix A), Section 2.1.4	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. Section 2.1.4 of the Project Related Activities-Human Health Risk Assessment report (Appendix A of the EIS) states that the dewatering effluent will mix with the bulk water and subsequently will be "managed through natural attenuation." It is unclear how persistent or bio accumulative COPCs in the dewatering effluent are anticipated to attenuate in the natural environment or how they have been considered in the report. As certain contaminants are highly bio accumulative (e.g., methylmercury), their concentrations at the discharge point may not necessarily be a good indicator of the contaminant accumulation in country foods via the aquatic food chain. Therefore, even though their concentrations are below the screening criteria at the discharge point, their characteristics may allow for bioaccumulation at high levels in country foods and lead to potential adverse health effects. This information is need to evaluate potential risks to human health associated with the project-related activities.	Provide additional discussion on the expected fate and transport of persistent and/or bio accumulative substances from dewatering effluent as they relate to potential human exposure and subsequent adverse health effects.	Information requested is provided in Section 2 below.
IAAC-43	HC	Section 7.3.7 - Mi'kmaq of Nova Scotia	Section 5 of Appendix G (Surface Water Quality/Mass Balance Predictions) of PRA-HHRA (located at end of HHERA (Appendix A)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the Mi'kmaq of Nova Scotia, including health. The Project Related Activities-Human Health Risk Assessment report (Appendix A of the EIS) indicates that the proponent modelled future chemical concentrations in the surface waters of the BHSL prior to discharge into the Northumberland Strait (Appendix G of the Project Related Activities-Human Health Risk Assessment report). This water is understood to comprise effluent from the sludge dewatering process (i.e., Geotube® effluent) and groundwater and surface water entering Boat Harbour. Health Canada was not able to locate the water quality data, including QA/QC information such as sample collection methodology, number of samples collected, etc., used to represent the Geotube® effluent in this model. While Section 5.3 states "A summary of the pilot water treatment composite effluent samples is provided in Table 4 (attached)," Table 4 could not be located in the report. This information is need to evaluate potential risks to human health associated with the project-related activities.	Identify where the Geotube® effluent water quality pilot data is located in the EIS. If it is not included, provide the information for review along with supporting QA/QC information such as sample collection methodology, number of samples collected, etc. Provide rationale for the representativeness of this data as a proxy for future Geotube® effluent water quality data. Indicate the location of relevant samples provided in the data Tables presented in the Project Related Activities-Human Health Risk Assessment report (i.e., which Table and the sample identifier), including the appendices, if relevant.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-44	HC	Section 7.1.1 Atmospheric Environment	Appendix W - Noise Assessment Documentation Section 2 - Methodology Appendix W- Noise Assessment Documentation, Table 3.2-1 - Results of Background Sound Level Measurements (p. 5 to 11) Appendix W - Noise Assessment Documentation, Section 3.1 - Observations (p. 4) Appendix W - Noise Assessment Documentation, Section 2 Methodology (p.2)	The EIS Guidelines require that the EIS contain ambient noise baseline data. Section 2 of the Noise Assessment Documentation states “as per industry practices sufficient background data should encompass 48 hrs of monitoring data without interruption from precipitation or wind speeds in excess of 20 km/h, and within instruments operation tolerance as related to relative humidity and temperature”. When measuring baseline noise levels, Health Canada’s guidance on evaluating noise impacts in environment assessments recommends that wind speed should not exceed 14 kilometres per hour, any free-field monitor and microphone should be sheltered from exposed areas, there should be no precipitation, and all applicable conditions as per ISO 1996-2:2007 should be met. Table 3.2-1 of the Noise Assessment Documentation indicates that some noise measurements used in the calculation of baseline noise levels were taken during moments of precipitation and/or when wind speeds exceeded 14 kilometres per hour. Furthermore, information on the type of windscreen(s) used or a description of the physical location of the monitor was not provided in the report. Section 3.1 Noise Assessment Documentation states “While WSP staff were on site during commissioning, and data checks, the following sources were audible in the general vicinity and were the most likely causes of background sound levels measured: (a) Wildlife;…” Section 6.2.1 of Health Canada’s guidance document on evaluating noise in environmental assessments states, “sounds that are not generated by human activity (e.g. ocean, wind and animal noises) should not be included in determining a baseline sound level.” It is unclear whether non- anthropogenic sounds were excluded from the reported baseline sound levels as wildlife was noted as one of the sources of background sound. Section 2 also noted that the monitoring stations were deployed in November 2017 for one month. Health Canada notes that both Northern Pulp’s kraft pulp mill and the BHETF were in operation during this time. As the kraft pulp mill and the BHETF have since ceased operation, baseline noise measurements may not represent current noise levels. The baseline noise levels used will impact the calculations used in the determination of the change in percent of highly annoyed (%HA). For example, a +10 dB adjustment should be applied to baseline (ISO 1996-1:2003; ANSI, 2005) as well as predicted noise levels for all project phases for a “quiet rural community”, which, in the calculation of %HA, is intended to produce a greater change in %HA than would occur with unadjusted noise levels, to account for an expected heightened sensitivity to noise. If current baseline noise levels are lower than those monitored and are more representative of a quiet rural area at some points of reception (PORs), an adjustment may be warranted in the %HA calculations.	Recalculate the baseline noise levels to determine representative baseline conditions, as per ISO 1996-2:2007, by excluding data containing: • Wind speeds exceeding 14 kilometers per hour. • Natural sounds, including but not limited to: wildlife and precipitation. • Operation of the pulp mill and BHETF. Update the baseline monitoring and noise assessment, as required. Alternatively, provide rationale as to why calculated baseline noise levels are representative of current baseline conditions at the selected PORs and the appropriateness of using this data to calculate future changes in %HA. Provide additional information on the use of windscreens and the locations of equipment during the monitoring period (e.g., were they sheltered from the wind, the size of the windscreen, etc.).	Information requested is provided in Section 2 below.
IAAC-45	HC	Section 7.2.1 Changes to the atmospheric environment Section 7.3.7 Mi’kmaq of Nova Scotia	EIS, Figure 7.3-2 - Point-Of-Reception & Operation Location Plan (p. 7-274) EIS, Section 7.3.3.3 - Predicted Changes to Noise (p. 7-273) EIS, Section 7.3.3.5 Project Activities and Noise Interactions and Effects and Mitigation Measures (starting p. 7-275) EIS, Section 7.3.3.6 Noise Monitoring (p. 7-288) EIS, Section 7.3.3.5.4 - Bridge at Highway 348 (p. 7-281) and Section 7.3.3.5.7 - Dam (p. 7-287) EIS, Figure 3.1-8 - Pipeline (p. 3-20) EIS, Table 7.3-49 - Potential Interaction Between Pipeline Decommissioning and Noise and the Significance of the Resulting Potential Effects from the Interactions (p. 7-284) EIS, Table 8.1-2 Summary Table of Environmental Impact Assessment (p. 8-11) 9.2 Monitoring		Update the effects assessment to include the receptor at 6792 Pictou Landing Road or provide a rationale for why it was not considered. Update the effects assessment to include predicted nighttime noise for each project activity at all receptor locations, including the new receptor at 6792 Pictou Landing Road, if applicable. Include a discussion on the sources and duration of noise during the nighttime period, and if applicable sound level adjustments were applied. Clarify how regular checks for excessive noise on-site, during both daytime and nighttime and in proximity to sensitive receptors, will be undertaken if no monitoring is planned. Provide the quantitative noise assessment model output file and related calculations that were used to support the predicted noise levels, contour maps, %HA calculations, and other noise-related information in the EIS. Include the %HA calculations (including inputs and outputs and adjustment factors used) and information on the project scenarios that were modeled (i.e., “project only” or “project + baseline” and pre- or post-mitigation).	Information requested is provided in Section 2 below.
IAAC-46	HC	Section 7.2.1 Changes to the atmospheric environment Section 7.3.7 Mi’kmaq of Nova Scotia	EIS, Section 3.2.1.2 - Dredging (p. 3- 38) EIS, Section 3.2.2.4 - Bridge at Highway 348 (p. 3-46) EIS, Section 7.3.3.3 - Predicted Changes to noise (p. 7-271)	This information is needed to complete its assessment of the potential effects of noise on human health.	Clarify whether there will be impulsive sounds produced by project activities and the source(s). Should impulsive sounds occur, update the effects assessment and provide additional information as to: • Whether it was considered in the noise modelling, and how, • Whether it was considered in the %HA calculation, and if so, whether it was done in accordance with ISO 1996-1:2003. • How it will be managed/mitigated.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-47	HC	Section 7.2.1 Changes to the atmospheric environment Section 7.3.7 Mi'kmaq of Nova Scotia	EIS, Section 7.3.3.2 - Predicted Changes to Noise (p. 7-271)	The EIS Guidelines require an assessment of the predicted changes to ambient noise levels. Section 7.3.3.2 of the EIS states: "Due to large separation distance between the Site Study Area and the existing residential areas vibration is considered to have an insignificant impact beyond 30 m of any vibratory activity" Low frequency noise (LFN) can travel longer distances with less attenuation than higher frequencies and may induce vibrations; however, this is not discussed in the EIS. It is unclear whether the proponent has made the conclusion that "an insignificant impact beyond 30 m of any vibratory activity" based on an assessment of project-induced LFN. Significant LFN (i.e., above 65 dBC at receptors) should be evaluated using Health Canada's guidance on evaluating noise impacts in environment assessments, which provides additional information on how LFN can be modelled/assessed and considered in %HA calculations in Appendix C. This information is required for the Agency to complete its assessment of the potential effects of noise on human health.	Discuss whether LFN may occur as a result of project activities. Should LFN be thought to occur, update the effects assessment and provide information as to: - Whether it was considered in the noise modelling, and how. - Whether it was considered in the %HA calculation, and if so, whether it was done in accordance with ANSI 2005 standards (see Appendix C of Health Canada's guidance on evaluating noise impacts in environment assessments); and - How it will be managed/mitigated.	Information requested is provided in Section 2 below.
IAAC-48	HC	Section 7.2.1 Changes to the atmospheric environment Section 7.3.7 Mi'kmaq of Nova Scotia	EIS, Section 7.3.3.3 Predicted Changes to Noise (p. 7-273) EIS, Section 7.3.1.1 Predicted Changes to Air Quality and Odour, PM Impacts – Scenario 1 and 7 (p. 7-232) EIS, Figure 7.3-2 Point-Of-Reception & Operation Location Plan (p. 7- 274) EIS, Section 3.1.2 Dredging (p. 3-11) EIS, Section 3.2 - Project Activities, Site Preparation and Construction (p. 3-32) EIS, Section 3.2.1.2 Dredging (p. 3-38) EIS, Table 7.3-43 Potential interactions Between Wetland Management and Noise and the Significance of the resulting Potential Effects from the Interactions (p. 7-280)	The EIS Guidelines require the proponent to assess the predicted changes to ambient noise levels caused by Project activities, including impacts on human health. Section 7.3.3 of the EIS only lists four of the "environmentally significant noise sources" that were included in the quantitative noise assessment (i.e., four bulldozers, four excavators, ten haul route trucks per hour during the construction phase and two haul route trucks per hour and three dredging barges during the operation phase). It is unclear what other project-related noise sources were included in the noise assessment (e.g., diesel generators, other stationary equipment), whether worst-case scenarios (i.e., when all equipment for concurrent project activities are running simultaneously) were modeled for each POR during each project phase, and how and to what sources time-weighted adjustments (p. 7-272 of the EIS) were applied. It is unclear which project activities/phases are included in determining the hourly number of trucks and which PORs will be affected by truck-related noise. While Figure 7.3-2 of the EIS indicates the main truck route and the Section of Highway 348 occupied by the causeway as linear sources of noise, it is unclear whether the noise assessment includes other Sections of the highway (e.g., Section passing through PLFN community) as a linear source, given the project includes off-site disposal of demolition debris, as described in Section 3.1.2 of the EIS. The EIS also states, in Section 7.3.3.1, that more than 100 trucks may be travelling on the access road per day during containment cell final capping. It is unclear whether this truck traffic was considered in the noise impact assessment. Sections 3.2 and 3.2.1.2 of EIS indicates that construction of access roads and clearing of vegetation may be required for dredging of the Boat Harbour stabilization lagoon and estuary shorelines and for dam demolition activities. It is unclear whether construction of access roads and vegetation clearing were considered in the noise assessment and which POR(s) it may affect. Given construction of access roads and clearing of vegetation within access points for the remediation of wetlands is predicted to have moderate noise impacts on PORs (as indicated in Table 7.3-43 of the EIS), it may be relevant to assess the potential noise impacts of construction of access roads and clearing of vegetation within access points for all relevant project components. This information is required for the Agency to complete its assessment of the potential effects of noise on human health.	Describe all noise sources that were evaluated in the quantitative noise assessment, including: • The numbers of each type of equipment that will be used and its location and proximity to receptors. • The time-period when the equipment will be generating noise. • Which sources were evaluated on a time-weighted base and for what duration of time they were modelled. • Which receptor locations were impacted. Provide information to support the assumption used as input into the quantitative noise assessment of ten haul route trucks running per hour during day/evening/night periods for the construction phase and two haul route trucks running per hour during operational phase. Clarify whether haul trucks will have potential noise impacts on PORs located along stretches of Highway 348 during construction and operation phases in addition to the linear noise sources presented in Figure 7.3-2. If additional noise impacts exist revise the noise assessment to include these sources. Alternatively, provide a rationale for why specific noise sources, locations, and project activities (e.g., additional haul routes, and access road construction and vegetation clearing) were excluded.	Information requested is provided in Section 2 below.
IAAC-49	HC	Section 7.3.7 Mi'kmaq of Nova Scotia	Risk Management Plan (Appendix K) of the HHERA (EIS-Appendix A)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the health of the Mi'kmaq of Nova Scotia. The Agency is aware that further sampling and delineation of the contaminants in the freshwater wetlands within the BHETF area have been completed since the EIS submission. To complete the analysis of the Risk Management Plan report (RMP), located in Appendix K of the Human Health and Risk Assessment report (Appendix A in the EIS), the results of the additional sampling and delineation is needed because: • Results from additional samples may impact the areas designated to be removed based on SSTL exceedance. • The EPC, which the proponent is using to identify wetland areas for removal, is an estimate of the average chemical concentration in an environmental medium; therefore, any modifications to the EPC calculations that result from the additional sampling may change the wetland areas designated to be removed. This information is required to complete the analysis of the RMP and determine whether there are potential adverse environmental effects of the Project on the Mi'kmaq of Nova Scotia.	Update the RMP based on the results from the additional sampling completed since the submission of the EIS. Include all relevant information to support the sampling methods, analysis and integration of these results into the RMP.	Further delineation work is underway by Acadia University; however, the results are not complete at this time and are only intended to be used to refine dredge quantities for tendering.
IAAC-50	HC ECCC NSE IAAC	Part 2, Section 7.3.7 Mi'kmaq of Nova Scotia Part 2, Section 7.1.4 Riparian, wetland and terrestrial environments	Risk Management Plan (Appendix K) of the HHERA (EIS-Appendix A) EIS Section 7.3.9.4.3	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect fish and fish habitat and the health of the Mi'kmaq of Nova Scotia. The EIS Guidelines require that the uncertainty, reliability, sensitivity and conservativeness of models used in the EIS must be indicated. Section 7.3.9.4.3 of the EIS identifies two different approaches to delineate contaminated areas to be removed from the wetlands and estuary (termed risk management areas or RMA in the EIS), based on either the SSTLs or the EPCs. However, it is unclear which approach will be utilized for the remediation of each of the RMAs.	Provide clarification on which proposed risk management approach (SSTL or EPC) will be utilized for the remediation of each RMA. Discuss the potential uncertainties in the EPC based-approach, including uncertainty in the sampling approach, calculations, and application of this remediation approach in the field.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
				The Risk Management Plan report located in Appendix K of the Human Health and Risk Assessment report (Appendix A in the EIS) proposes to remediate areas based on EPC, to achieve an EPC below the SSTL of 29 pg./g for dioxins/furans TEQ in sediment in both the freshwater wetlands and the estuary. Samples with concentrations exceeding the SSTL are to be removed until an EPC below 29 pg./g is achieved. The RMP predicted post-remediation EPCs for the wetland sediment (28.92 pg./g) and for the estuary sediment (28.17 pg./g), which are only slightly below the SSTL of 29 pg./g. EPCs are statistical estimates, and the practical application (in the field process) of removing impacted sediments to the target level is not precise. No discussion around the uncertainty in this risk management approach (either in the calculations or field application) is provided in the EIS. A systematic approach to incorporating a buffer into the RMP could protect against potential errors in both statistical calculation and/or incomplete removal; thus providing additional assurance to the protection of human health. Figures K-1 to K-8 of the Project-Related Activities Human Health Risk Assessment report (PRA-HHRA – Appendix A in the EIS) and Figures 7.3-19 to 7.3-23 in the EIS show the RMAs that were delineated using both the SSTL and EPC approaches. However, no information is presented in the EIS to comprehensively support the delineation of each RMA. For example, RMA 5 (Figure K-5 in the PRA-HHRA) has relatively few sampling points to delineate the COPCs in the wetland: • Sample FSP3-SED-12 exceeds the dioxins/furans TEQ SSTL, but no additional samples were presented beyond this point; therefore, it is unclear how the delineation of the RMA was determined to be inclusive of all areas exceeding the SSTL. • The area to be removed based on the EPC encompasses sample FSP3-SED-7A and the next closest sample to the south does not exceed the proposed SSTL for dioxins/furans (FSP3-SED-4); however, the line to delineate the EPC area has been drawn between these points with no evidence to support its location. This information is required to assess the potential adverse environmental effects of the Project on the health of the Mi'kmaq of Nova Scotia.	Discussion how uncertainty in the RMP will be minimized and whether a buffer will be incorporated into the RMP to account for any uncertainty. Update the RMP to include additional information to comprehensively support the delineation of the wetland and estuary areas to be removed, based on both EPC and SSTL for each RMA.	
IAAC-51	HC ECCC NSE IAAC	Section 7.3.7 Mi'kmaq of Nova Scotia Part 2, Section 3.1	Risk Management Plan (Appendix K) of the HHERA (EIS-Appendix A) Section 3.1 Project Components	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project could potentially affect the health of the Mi'kmaq of Nova Scotia. The Risk Management Plan report located in Appendix K of the Human Health and Risk Assessment report (Appendix A in the EIS) states: "Risk Management Areas 3 (FSP2) and 5 (FSP5) are located within a densely vegetated cattail marsh. In their existing condition, the presence of the vegetation would act as a sufficient barrier to contact with the underlying impacted sediment (Figures K-3 and K-5)... Therefore, two risk management alternatives are recommended for this area: 1) monitor and maintain the existing vegetative cover, and 2) in the case where vegetative cover is absent or its future presence is affected by the BHETF Remediation Project (e.g. change in water levels), removal of the sediment is recommended." However, more information is required to evaluate the effectiveness of this approach, including scientific evidence and details on how the vegetation will be monitored and maintained. Assuming the vegetation cover is maintained in its current state for each of these two risk management areas, there still appears to be two potential pathways that may result in human exposure to COPCs in this sediment: • Erosion over time may cause the sediment to be suspended in the water column and transported to recreational water areas in Boat Harbour or out in the Northumberland Strait. • Vegetation growing in the wetlands may take up contaminants from the sediment. This contaminated vegetation may then be consumed directly by human receptors or indirectly through the trapping and consuming of animals in the area that feed on this vegetation, which could result in a bioaccumulation or biomagnification of the contaminants in the food chain. The RMP does not provide details to address these potential exposure pathways nor does it discuss controls that would be in place to prevent exposure, such as restricted site access, etc. There is uncertainty concerning the future state of Boat Harbour, the freshwater wetlands, and the estuary once the site is returned to a tidal estuary. Section 7.3.9.1 in the EIS states "The removal of the flow control structure found at the mouth of the BHSL has the potential to alter the water levels in the area, this change may cause wetlands to expand, shrink, or dry up depending on the wetland location within the watershed." Future water levels and salinity in portions of the site are unknown, which may result in additional human exposure routes as: • Changes in water level and salinity could impact the viability of the current vegetation in the wetlands, and if vegetation dies, contaminated sediment may get suspended in the water column and enter Boat Harbour and eventually the Northumberland Strait; and • A change in water levels may also increase the accessibility of these areas to recreational users, resulting in increased exposure to COPCs. This uncertainty is not discussed in the RMP. If it is determined that cattails are insufficient to prevent access to contaminated sediments, the RMP states that sediment will be removed; however, the report does not address: • The potential impacts to human health from contaminants during sediment removal; and • Where the contaminated sediment will be placed if it is determined that the sediment needs to be removed after the remediation project is complete and the containment cell capped. Section 3.1 of the EIS states "Cattails and other organic material where deemed necessary will be removed from the wetlands through clearing and grubbing activities. The material will be mechanically processed through chipping and grinding and stockpiled for future use as mulch/soil amendment. This material may also be removed as part of the dredging operation and disposed of within the containment cell." However, the EIS does not describe how cattails and other organic material will be characterized to determine whether suitable for mulch/soil amendment or requires disposal in the containment cell. This information is needed to assess the potential effects on Mi'kmaq of Nova Scotia health, fish and fish habitat, and the marine environment.	Provide scientific evidence (e.g., published, peer-reviewed literature) to support the use of the risk management plan proposed for RMAs 3 & 5, including details on how maintenance of the vegetation will be conducted. Provide additional information to address the potential exposure pathways in RMAs 3 and 5 from sediment transport and the consumption of contaminated vegetation by humans or other animals. Include any controls that would be in place to prevent exposure to contaminated vegetation within wetlands. Discuss the potential for vegetation loss, due to water level and salinity changes, to expose the contaminated sediment and increase accessibility of these sites to recreational users. Provide information, including potential mitigation measures, to address the potential contamination of the surrounding area, including associated impacts to human health, if it is determined in the future that sediment must be removed because the cattails were not sufficient for preventing access to sediment. Clarify how cattails and other organic material will be characterized as either being suitable for a mulch/soil amendment or as requiring disposal. Describe where sediment will be disposed of after the containment cell is capped, if it is determined that the cattails need to be removed.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-52	HC NSE	Section 7.3.7 Mi'kmaq of Nova Scotia	Risk Management Plan (Appendix K) of the HHERA (EIS -Appendix A)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project would potentially affect the health of the Mi'kmaq of Nova Scotia. The calculation of one EPC to represent all of the freshwater wetlands may not be adequately protective of human health. Statistics used to generate the freshwater wetland and estuary EPCs should consider measured differences in COPC distribution and concentrations as well as in relevant microenvironments. According to the Risk Management Plan in Appendix K of the Project-Related Activities Human Health Risk Assessment (PRA-HHRA – Appendix A of the EIS), the freshwater wetlands and estuary EPCs for the COPCs in sediment were based on the 95% upper confidence limit (UCL) for dioxins/furans and vanadium. However, it is unclear from the report if the presence of potential microenvironments was considered in the statistical analysis. Health Canada recommends that statistics used to generate an EPC consider microenvironments and exposure patterns. Analysis of microenvironments would identify areas where elevated exposures may occur. Figures K-1 to K-8 of the RMP report identify impacts concentrated in some of the freshwater wetland risk management areas in comparison to others and in some microenvironments within the freshwater wetlands and the estuary (i.e., "hot spots"). However, no rationale was provided to support whether a 95% UCL value to represent an EPC in sediment for the entire site would accurately represent measured differences in COPC distribution and concentrations between the various freshwater wetlands (risk management areas) and within discrete regions within those freshwater wetlands or within discrete regions of the estuary. An EPC is an estimate of the average chemical concentration in an environmental medium in a defined area. The 'defined area' in the United States Environmental Protection Agency's (US EPA) guidance document Calculating Upper Confidence Limits For Exposure Point Concentrations At Hazardous Waste Sites refers to a 'defined area' as an exposure unit. The exposure unit as defined in the US EPA guidance document is: "the area throughout which a receptor moves and encounters an environmental medium for the duration of the exposure; an individual receptor is assumed to be equally exposed to media within all portions of the exposure unit over the time frame of the risk assessment, unless there is site-specific evidence to the contrary." Based on the information provided in the RMP report, it is unclear if using only one EPC to represent all of the freshwater wetlands is adequate to support the assumption that an individual receptor is "…equally exposed to media", considering the site-specific differences between the wetland areas and the lack of a current pattern of usage for the freshwater wetlands at the BHETF. Additional information is required to support this assumption. Insufficient information was provided to support the calculation of the EPC for each COPC, including sampling methodology, vertical delineation, or sample representativeness. This information is required to assess the potential adverse environmental effects of the Project on surface water and groundwater, which can impact fish and fish habitat and Mi'kmaq of Nova Scotia health.	Provide information to support the use of one EPC in sediment for the entire site to represent all of the freshwater wetlands and the estuary, taking into consideration: • The site-specific differences between the various wetland areas (composition, layout, accessibility). • The lack of a current pattern of usage for the freshwater wetlands at the BHETF. • The potential for measured difference within discrete regions (microenvironments) of the wetlands and estuary. Provide additional details on the EPC calculations, including any information: • To support whether the number of sample measurements was sufficient to accurately characterize the site for the purposes of calculating the EPCs. • To demonstrate that random sampling was utilized for the collection of samples (for each RMA). • Regarding any potential bias introduced through sampling methodology; • Regarding the vertical delineation of the sample measurements used for the EPC calculations. • To support that samples used to calculate the EPC were representative of "site-related" concentrations expected to be routinely cont	See Response to IAAC-50
IAAC-53	HC NSE	Section 7.3.7 Mi'kmaq of Nova Scotia	EIS: Section 4.4.1.2; Section 7.1.4.1.3; Section 7.3.6.2; Section 7.3.6.4.2 PRA-HHRA (Appendix A): Section 3.1.4.2.2	The EIS Guidelines require the assessment of impacts to Mi'kmaq of Nova Scotia human health resulting from potential changes to water quality (drinking, recreational and cultural uses). In Table 4.4-2 of the EIS, the proponent's response to the public question: "Will groundwater be protected?" is recorded as "We have tested groundwater at different points in the pre-remediation process and there are no signs of contamination. Best practices will be in place to ensure groundwater remains clean." However, Section 7.1.4.1.3 of the EIS states "Groundwater samples exceeded the applicable provincial and/or federal groundwater criteria for some metals and general chemistry parameters." Clarification is required on the state of groundwater contamination in the Project Area.	Clarify the state of groundwater in the project area, including future use as a potable source. Include all groundwater sampling results to date, represented on Figure(s) of appropriate scale to show location and date of sampling. Any exceedance of applicable health-based criteria, such as the Canadian Drinking Water Quality Guidelines (CDWQGs), should be clearly indicated.	Information requested is provided in Section 2 below.
			PRA-HHRA (Appendix A), Section 3.1.4.2, human health screening Table H.1.2	There are inconsistencies in the EIS in relation to the future potential for potable groundwater wells within the Site Study Area. Section 7.3.6.2 of the EIS states "The NSE Tier 2 Pathway Specific Standards (PSS) for groundwater discharging to surface water will be applied, as the future use of the Site will be non-potable for groundwater." However, Section 3.1.4.2.2 of the Project-Related Activities Human Health Risk Assessment (PRA-HHRA – Appendix A in the EIS) states "Should the addition of potable wells be proposed within the Site Study Area in the future, groundwater will need to be sampled and analyzed to confirm compliance with Health Canada's drinking water quality guidelines (Health Canada, 2020), as is standard practice for potable water supplies". The EIS did not carry forward manganese in groundwater despite concentrations well over human health guidelines, according to human health screening Table H.1.2 of Appendix A. Section 3.1.4.2 of the PRA-HHRA report states that elevated manganese in groundwater on-site is likely related to natural geological conditions; however, background manganese concentrations were not provided. Given that the groundwater on-site has been identified as potentially potable, the choice of background data used in this screening step could impact the chemicals carried forward into the human risk assessment. Section 7.3.6.4.3 states "Should groundwater impacts above applicable criteria for the Site be detected during monitoring the effects would be further evaluated by a re-sampling and if found to be indicative of an effect, mitigation measures would be employed in consultation with appropriate regulatory agencies as per the draft PEPP." No information is provided as to what the indicator and mitigation criteria would be during remediation. This information is required to assess the potential adverse environmental effects of the Project on surface water and groundwater, which can impact fish and fish habitat and Mi'kmaq of Nova Scotia health.	Update the effects assessment to include manganese in groundwater as a COPC or provide a justification as to why the manganese concentration in groundwater was not carried forward in the effects assessment. Provide additional information related to the indicator and mitigation criteria for groundwater remediation.	

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-54	HC	Section 3.2.3. Spatial and temporal boundaries	EIS, Section 7.3.1.2 Air Quality and Odour Boundaries (p.7-234) Appendix A, Section 3.1.1 Identification of Study Boundaries (p.15) EIS Section 7.1.1.1, Figure 7.1-1 (p. 7-7) Appendix A, Figure 3.1 (pdf p.5338) and Appendix U, Figures D-1 to D-3 (pdf p.104 to 106) Appendix U, Figures E-1 to E-13 (pdf p.112 to 124)	The EIS Guidelines require the description of spatial boundaries taking into account the appropriate scale and spatial extent of environmental effects, community knowledge and Aboriginal traditional knowledge, current or traditional land use and resource use by Mi'kmaq of Nova Scotia, ecological, technical, social and cultural considerations. The proposed regional study area (RSA) in the atmospheric dispersion and deposition modelling presented in the Air Quality Impact Analysis report (Appendix U of the EIS) and the Project- Related Activities Human Health Risk Assessment report (PRA-HHRA – Appendix A of the EIS) is inconsistent with the RSA defined in the air quality assessment in Section 7.3.1.2 and Figure 7.1-1 of the EIS. The RSA for the air quality assessment was set to encompass all lands and water within 3 to 5 kilometers from the Site Study Area (SSA) perimeter. In contrast, the RSA for the atmospheric dispersion and deposition modeling and PRA-HHRA was reduced to an area within approximately one kilometre from the SSA perimeter (Appendix A, Figure 3.1; Appendix U, Figures D-1 to D-3). The reduced RSA includes human receptor locations only within the Pictou Landing First Nation community, and along the Pictou Landing and Chance Harbour Roads (Appendix U, Figure D-1) and it remains unclear whether other human receptors besides the permanent residences considered in the EIS may be exposed to elevated levels of air contaminants near the project site during traditional land and resource use activities (e.g., hunting, fishing, trapping, plant gathering, ceremonial or spiritual practices). It also remains unclear whether the ingestion of contaminated soil and country foods due to deposition of air quality contaminants, as well as direct inhalation of air contaminants, was considered in health effects assessment. This information is required for the Agency to complete its assessment of the potential effects to air quality on human health.	Update the atmospheric environment effects assessment to include the RSA identified in Section 7.3.1.2 and Figure 7.1-1 of the EIS, with consideration of traditional land use receptors. Alternatively, provide a rationale for the specific RSA selected in the atmospheric dispersion and deposition model. Update the health effects assessment to include the consideration of the ingestion of contaminated soil and country foods due to deposition of air quality contaminants, as well as direct inhalation of air contaminants. Alternatively, confirm that these exposure pathways were considered and provide details on how they were incorporated into the assessment.	Information requested is provided in Section 2 below.
IAAC-55	HC NSE	Section 7.1.1. Atmospheric environment Section 7.6.3	EIS, Section 7.1.2.1 Air Quality and Odour (p.7-8) Section 7.4.3.4.1.3 Cumulative Effects on Air Quality and Odour (p.7-737) "Construction activities for the BHRP are scheduled to commence in 2021 and have the potential to overlap with the construction phase for Northern Pulp's proposed new effluent treatment facility." Appendix U, Air Quality Baseline Review (WSP 2018), Tables 3-1 to 3 (p.12 to 14)	The EIS Guidelines require a baseline survey of ambient air quality and an assessment of the Project's cumulative effects by comparing future scenarios with the Project and without the Project. In the Air Quality Impact Analysis report (Appendix U of the EIS) air quality data used to establish baseline levels reflect two different datasets. Baseline levels for particulate matter were established after the closure of the Northern Pulp's kraft pulp mill in January 2020. However, baseline levels for other air pollutants, such as nitrogen dioxide (NO2), sulfur dioxide (SO2) and carbon monoxide (CO), were established based on monitoring data of two National Air Pollution Surveillance stations from 2016 to 2018, when the kraft pulp mill was still operational (Appendix U, Tables 3-1 to 3). It is not clear whether potential resumption of the Northern Pulp's kraft pulp mill operations was also considered in the cumulative effects assessment. This information is required for the Agency to complete its assessment of the potential effects to air quality on human health and cumulative effects.	Provide a discussion on the uncertainties related to the baseline air quality levels used in the Air Quality Impact Analysis report given the closure of Northern Pulp's kraft pulp mill in 2020, including: - How these uncertainties impact the overall air quality effects assessment; and - A rationale for why baseline particulate matter was established using air quality data collected after the mill was closed while NO2, SO2, and CO, were established based on monitoring data collected while the mill was still operational. Clarify whether potential resumption of the Northern Pulp' kraft pulp mill operations was considered in the cumulative effects assessment. If it was not included, provide a rationale or update the cumulative effects assessment to include it.	Information requested is provided in Section 2 below.
IAAC-56	HC	Section 7.2.1. Changes to the atmospheric environment	EIS, Section 7.3.1.1 Predicted Changes to Air Quality and Odour (p.7-233) EIS Table 7.3-5 Comparison of Anticipated Air Quality Concentrations to Canadian Ambient Air Quality Standards (CAAQS) (p.7-232) Appendix U, Air Quality Impact Analysis (GHD 2020), Appendix E Air Modelling Results, Figures E-1 to E-18a (PDF p.111 to 131) EIS 7.3.1.1 Predicted Changes to Air Quality and Odour EIS Table 7.3-1 Mitigation Measures and Best Management Practices (p.7-219 and 7-220)	The EIS Guidelines require the assessment of atmospheric emissions from various project- related activities. Diesel exhaust (DE) emissions can be generated from project activities, such as transport truck traffic and operation of heavy equipment during construction activities related to the Project. For example, the Air Quality Impact Analysis report (Appendix U of the EIS) predicted elevated levels of PM2.5, NO2 and SO2, which are commonly associated with DE emissions, near the human receptor locations within the PLFN and along the Pictou Landing Road (Appendix U, Figures E-4 to E-13). The EIS concluded that the predicted air contaminant levels are not likely to impact Local Study Area/Regional Study Area (LSA/RSA) during the construction phase, partly because construction activities will be of short duration. However, there are potential adverse health effects associated with both short-term and long-term inhalation exposure to several air pollutants. Changes to air quality and associated health effects should be fully assessed for both short- and long-term exposures during all phases of the project. The project-associated air pollutant emissions, especially DE emissions, may contribute considerably to elevated levels of polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and diesel particulate matter (DPM) in air. Although most of these DE components are considered carcinogens, the EIS provided only an evaluation of non-cancer health effects of DPM based on the short-term (1 hour) and long-term (annual) exposure values. The EIS did not carry forward air contaminants associated with DE, such as PAHs and VOCs, to the Air Quality Impact Analysis (Section 7.3.1.1) or Project-Related Activities Human Health Risk Assessment (Appendix A, Section 3.1.4.7) as the baseline levels of these contaminants were not affected by the Pilot Scale Remediation activities. However, the truck traffic volume is predicted to be the greatest (i.e., more than 100 trucks travelling on the access road every day) during the Containment Cell Final Capping and Grading (Scenario 7), which was not considered in the air quality study for the Pilot Scale Remediation. The large volume of truck traffic was evaluated only as a source of fugitive dust, such as ambient total suspended particles, PM10 and metals (EIS 7.3.1.1 p.7-234), and not properly investigated as a source of DE emissions. This information is required for the Agency to complete its assessment of the potential effects to air quality on human health.	Assess the potential health risks associated with short-term exposures of PM2.5, NO2, VOC, PAH and DPM for all phases of the Project and include additional measures, as required, to minimize/mitigate short-term emissions. Assess potential health risks posed by additional air contaminants associated with DE emissions, such as PAH, VOCs, and DPM, during all phases of the Project. Alternatively, provide a detailed rationale if an assessment is deemed unnecessary for any air pollutants or if the use of other assessment approaches, including the use of surrogates and/or a qualitative assessment, is considered appropriate. Include an estimate of the uncertainty associated with the use of the alternative approaches.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-57	HC	Section 7.2.1. Changes to the atmospheric environment	Appendix U, Air Quality Impact Analysis (GHD 2020), Table 7.3-2 Air Quality Modelling Scenarios (p.6): Scenario 4, Sources. EIS, Section 3.1.2 Dredging (p.3-11) EIS, Section 7.3.9.4.2 Dredging – Project Activities and Wetlands Interactions and Effects and Mitigation Measures (p.7-423) EIS, Section 7.1.10.3 Human Health, Figure 7.1-54 (p.7-200) Appendix A Human Health Risk Assessment (GHD, 2020), Table 3.1 (p.16) Appendix U Air Quality Impact Analysis (GHD 2020), Table 1.2 (p.6)	The EIS Guidelines require the assessment of atmospheric emissions from various project- related activities. Section 1.3 of the Air Quality Impact Analysis report (Appendix U of the EIS) categorized project activities into seven different scenario groups and identified air contaminant emission sources associated with each group. In Scenario 4 (Shoreline Dredging), air contaminants are assumed to be released from dredging pump diesel engines and exposed sediments during dredging due to shallow water levels. All sediment is assumed to be dredged or excavated in a wet condition. The shorelines of the effluent ditches, twin settling basins, aeration stabilization basin, BHSL, wetlands and estuary will be mechanically excavated and the material will be transported by trucks to the containment cell. However, it remains unclear how many transport trucks are anticipated to operate in Scenario 4 or whether the trucks are considered as a DE emission source in the air quality assessment. In addition, some of the shoreline excavation areas within the remediation boundary (i.e., the current high water mark) are not submerged in water (EIS, Figure 7.1-54 Human Health Risk Assessment Study Area Boundaries, p.7-200) and may be excavated under dry conditions, which could allow the release of fugitive dust and volatilized sediment contaminants at much greater rates than predicted in Scenario 4 (i.e., based on an assumption that all sediment will be excavated in wet condition). Decommissioning of the existing infrastructure, such as the wastewater effluent pipeline, treatment buildings and small structures, berms, and a water dam, is anticipated to occur during a 4-year period (Years 2 to 6) (Appendix A). However, it is unclear whether these activities are reflected in the Air Quality Impact Analysis report (Table 1.2 – Appendix U of the EIS). This information is required to complete the assessment of the potential effects to air quality on human health.	Clarify how many transport trucks are anticipated to operate in Scenario 4 and whether diesel exhaust emissions from the trucks are considered in the air quality assessment and PRA-HHRA. Update the effects assessment as necessary. Update the health effects assessment to consider the potential air emissions in a dry sediment excavation scenario. Alternatively, provide rationale on how it can will be ensured that all shoreline sediments are excavated in wet condition. Clarify whether existing infrastructure decommissioning activities are considered in the Air Quality Impact Analysis. If not, provide a rationale for its exclusion or update the analysis to integrate the existing infrastructure decommissioning activities.	Information requested is provided in Section 2 below.
IAAC-58	HC NSE	Section 7.3.7. Mi'kmaq of Nova Scotia	Appendix A Human Health Risk Assessment (GHD, 2020), Section 3.1.4.5.2 BHRP-Related Activities Scenario (p.38) PRA-HHRA (located at end of HHERA (Appendix A), Section 3.3.1 Appendix U - Air Quality Impact Analysis Technical Report Section 2.1.2	The EIS Guidelines require the assessment of impacts to human health resulting from potential changes to air quality. The Project-Related Activities Human Health Risk Assessment report (PRA-HHRA – Appendix A of the EIS) does not consider contaminants resulting from truck traffic-related DE emissions, such as PAHs and DPM, which may deposit onto soils. There exists the potential for deposition of PAHs and DPM onto soil, edible plants and surface waters. DPM also has the potential to adsorb other chemicals, which as a result may also settle onto soil, edible plants and surface waters. Additionally, dust suppression is identified as a best management practice that may be used to mitigate dust from construction and demolition activities. The Air Quality Impact Analysis Technical Report (Appendix U) states that water will occur twice daily and is expected to achieve 80 percent control over untreated roadways for fugitive dust emissions. Nova Scotia Air Quality Unit notes that the Government of Canada's 'Road Dust Emissions from Unpaved Surfaces: Guide to Reporting' states that water twice a day achieves a control of 55 percent. The PRA-HHRA states that the dust suppressant may be water but further details about the source of water are not provided. This information is required for the Agency to complete its assessment of the potential effects to air quality on human health.	Evaluate the potential for atmospheric deposition of air pollutants from DE emissions, including PAHs and DPM, onto nearby soils and subsequent bioaccumulation by country food species (e.g., edible plants). Provide rationale on why this is not an operable pathway. Identify the dust suppressant to be used at the site. If a chemical suppressant is intended as the dust suppressant at the site, provide a discussion on potential human exposures. If water is intended as the dust suppressant at the site, identify the source of the water and how the conclusion was reach that it would achieve 80 percent control over fugitive dust emissions.	Information requested is provided in Section 2 below.
IAAC-59	HC	Section 7.2.1. Changes to the atmospheric environment	EIS, Section 7.3.1.1 Predicted Changes to Air Quality and Odour (p.7-226) EIS, Table 7.3-3 Summary of Air Quality Modelling Results (p.7-230) Appendix Y, Section 5.1-Sediment Quality (p.49 to 53)	The EIS Guidelines require the assessment of impacts to human health resulting from potential changes to air quality. Section 7.3.1.1 of the EIS considered only H2S, dioxins/furans and petroleum hydrocarbons (PHC) as potential air contaminants. However, contaminants present in sediment can be released to air through volatilization process during wet excavation, dredging, and dewatering of sediment. No rationale is provided for why other potential air contaminants, such as VOCs (1,2-dichlorobenzene and toluene), whose levels are also elevated in sediment and volatilization characteristics are similar to those of the selected contaminants, are not considered for further evaluation. For example, the Geology and Geochemistry Assessment documentation (Appendix Y of the EIS) reported that concentrations of the following sediment contaminants were determined to be above ecological quality criteria for sediment or human health criteria for soil: • Metals (exceeding provincial human health criteria for soil): aluminum, cadmium, iron, thallium, and vanadium • PAHs (exceeding the freshwater or marine sediment criteria) • PHC (exceeding the freshwater or marine sediment criteria): Fraction 1, 2, and 3 • VOC (exceeding the freshwater or marine sediment criteria): 1,2-dichlorobenzene and toluene • PCB (exceeding the freshwater sediment criteria): total PCBs • PCDD/PCDF (exceeding the freshwater or marine sediment criteria) This information is required for the Agency to complete its assessment of the potential effects to air quality on human health.	Update the air quality effects assessment to include an analysis on the atmospheric release of sediment contaminants, including but not limited to VOCs, through volatilization. Alternatively, provide a rationale for why the atmospheric release of certain sediment contaminants are not considered in the effects assessment of air quality.	Scenarios 3 (open water dredging), 4 (shoreline dredging), and 5 (dewatering) are the primary activities that involve the disturbance of sediments. Volatilization of PCDD/PDCF, H2S, and PHC was evaluated for Scenarios 4 and 5. Other contaminants detected in the sediments were screened out as part of the original HHRA and not considered airborne contaminants of concern and not evaluated in the air quality assessment.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-60	HC	Section 9.2. Monitoring	EIS, Section 9.2 - Monitoring Programs, Table 9.2-1 (p.9-11) EIS, Section 3.2.3.1- Waste Management (p.3-47) EIS, Table 9.1-1 (p.9-5) Appendix A- Human Health Risk Assessment (GHD, 2020), Section 3.1.2 Identification of Human Receptors (p.17)	The EIS Guidelines requires an outline of preliminary environmental monitoring programs. The Independent Ambient Air Monitoring Program will continue to support monitoring of ambient air quality during the construction and operation phases until completion of major remediation activities. The Independent Ambient Air Monitoring Program specifies four air contaminants to be monitored in real-time (Table 9.2-1). Considering insufficient evaluation of project-associated DE contaminants, such as PM2.5 and NO2, and their health effects at sensitive receptor locations (see HC-AQ-03), monitoring of PM2.5 and NO2 at a frequency that is consistent with the averaging time period and the statistical form associated with the CAAQS. It is unclear whether air contaminants of potential health concerns, including VOCs and Reduced Sulfur Compounds (RSCs) that may be released as part of Landfill Gas (LFG), will be monitored after the site closure (i.e., Containment Cell Final Capping and Grading). It is prudent to continue air quality monitoring as the entire SSA, except for the containment cell, will become accessible for PLFN residents' recreational use after the remediation is completed (Appendix A, Section 3.1.2, p.17) and as the containment cell will not be decommissioned for an indefinite period (3.2.3.1 Waste Management, p.3-46). This information is required for the Agency to complete its assessment of the potential effects to air quality on human health.	Update the long-term monitoring plan for air contaminants to include PM2.5 and NO2, and emissions from LFG after the site closure. Alternatively, justify why air quality monitoring of these potential air contaminants is not required during the post-remediation phase.	This comment is related to the long term monitoring plan and post remediation. The air quality impact assessment considered the impacts of the remediation project. Since the remediation activities are temporary, the impacts are not carried through post remediation. LFG monitoring will be included as part of post closure care of the containment cell. a LFG monitoring program will be included in the application submitted to NSE for the Industrial Approval Application.
IAAC-61	HC	Section 7.5. Significance of residual effects	EIS Table 7.2-4 Characterization Criteria for Residual Environmental Effects (p.7-215) EIS, Section 7.3.1.3 - Air Quality and Odour Standards or Thresholds for Determination of Significance (p.234)	The EIS Guidelines require the identification of criteria used to assign significance ratings to any predicted adverse effects. The magnitude of residual effects (Table 7.2-4 of the EIS) was determined partly based on whether the effects deviate from the baseline conditions within (or outside of) "the range of natural variation" or whether the effects "marginally" exceed the guideline values. It is unclear what the range of natural variation is and what the marginal exceedance scale is in relation to the baseline conditions and air quality guidelines, respectively. Furthermore, no explanation is provided on how the proposed judgement criteria were developed, or whether they are adequate to protect human health. The Canadian Air Quality Management System explicitly recognizes that health effects occur below the CAAQS values, and proposes additional management levels in recognition of the health and environmental benefits that can be realized by taking actions to decrease or maintain background levels of air pollution. Therefore it is unclear how the proposed "low- magnitude" significance criterion for residual air effects would adequately protect against human health considering some air contaminants are non-threshold and health effects may occur below the CAAQS. The duration of residual effects was determined based on the amount of time for the effects to become reversible. For example, the long-term residual effect is reversible within a "defined length of time". However, it is unclear what the defined length of time is or whether it corresponds to the "2 percent of the time" that is used as part of significance determination criteria in Section 7.3.1.3. This information is required to complete its assessment of the potential effects to air quality on human health.	Update the criteria for determining significance of adverse residual effects for air quality and describe the following: • How the proposed judgement criteria were developed and how they are protective of human health; • The range of natural variation and marginal exceedance scale in relation to the baseline conditions and air quality guidelines, respectively; • The amount of time for the residual effects to become reversible; and • How the proposed "*low magnitude*" significance criterion for residual air effects would adequately protect against human health considering some air contaminants are non- threshold and health effects may occur below the CAAQS.	Information requested is provided in Section 2 below.
IAAC-62	HC	Part 2, Section 7.3.7	HHERA, Table H-1.15, Section 6.1.1.12, Section 5.2	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia, including their health. The EIS must consider the current and future availability and contamination of country foods in its analysis. Table H-1.15 and Table C-1.12 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) reported that shellfish tissue collected from the Northumberland Strait, at the outfall of the estuary, have concentrations of aluminum, lead and manganese above the shellfish tissue screening guidelines and background level concentrations. The HHERA stated that these contaminants were not evaluated further because: • The distinct exceedances were observed only in three out of ten clam tissue samples and the contaminant levels of the remaining seven samples were similar to or below the selected screening criteria or background concentrations. • Aluminum and manganese are ubiquitous in sediment and the elevated levels are not necessarily related to the BHETF. • The clam tissue samples were not depurated prior to laboratory analysis (i.e., contaminants in stomach could have been detected in addition to the ones truly accumulated in tissue). However, it is noted that aluminum and manganese concentrations in all ten clam tissue samples were above their respective background concentrations. Furthermore, the high concentrations of aluminum, manganese and lead in clam samples are not observed consistently from the same samples (i.e., samples higher in aluminum do not necessarily have corresponding higher manganese or lead, which is what you might expect if it was just background). The analytical results, although limited in sample size, appear to be normally distributed. Therefore, the elevated contaminant concentrations in all clam tissue samples should be properly evaluated in the HHERA. Furthermore, contaminant concentrations in clam tissue from the project site were compared to "background concentrations" if the site concentrations were above the screening guidelines. However, Section 6.1.1.12 of the HHERA indicates that the background concentrations used for comparison were collected from several shellfish tissues, including crab, lobster and mussels, rather than from clam. It is inappropriate to determine COPCs or characterize potential health risks from consuming contaminated clams based on the background data collected from crustacean shellfish and other bivalve species. The Canadian Guidelines for Chemical Contaminants and Toxins in Fish and Fish Products (CFIA guidelines)[7] were used to determine whether arsenic, lead, mercury and dioxins/furans be qualified as COPCs in fish and shellfish. However, they are not valid screening guidelines for arsenic and lead in fish and shellfish as these values are specifically designed for fish protein or a standardized concentrated product (described under B.021.027 of the Food and Drug Regulations), but not for the commonly consumed muscle tissue of finfish or shellfish. Health Canada also does not recognize these guidelines as a safety standard for dioxins/furans in fish as the value does to consider the current approach to deriving dioxin/furan toxicity or concentrations.	Carry forward the aluminum, lead, and manganese in clam tissue samples to a full HHERA. Alternatively, provide additional rationale to support screening them out of the HHERA. Determine COPCs in fish and shellfish country foods based on a comparison to the levels observed at a reference site (i.e., background concentrations). In the absence of such background data, the contaminants (i.e., lead, vanadium, arsenic, mercury, and dioxin/furans in fish) should be carried forward as COPCs to a full HHERA. Alternatively, provide evidence-based rationale supporting the use of the selected screening criteria; include a discussion on the uncertainties in using this criteria. Provide a detailed rationale on how the proposed background contaminant concentrations from crab, lobster, and mussels can support proper screening of contaminants in clam tissue and assessing potential human health risks.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
				Furthermore, the CFIA guidelines are developed to determine compliance of commercial foods and thus the underlying assumptions (e.g., consumption pattern) may not be directly applicable to the screening of country foods. Therefore, the guidelines for mercury is also not an appropriate screening criteria for the project. Clarification and additional information about the screening criteria used to determine COPC in fish and shellfish is required to assess the potential adverse effects of the Project on country foods, which can impact Mi'kmaq of Nova Scotia health.		
IAAC-62 (Conformity Review)	HC			Same as above.	A. Carry forward the aluminum, lead, and manganese in clam tissue samples to a full HHERA. Alternatively, provide additional rationale to support screening them out of the HHERA. B. Determine COPCs in fish and shellfish country foods based on a comparison to the levels observed at a reference site (i.e. background concentrations). In the absence of such background data, the contaminants (i.e. lead, vanadium, arsenic, mercury, and dioxin/furans in fish) should be carried forward as COPCs to a full HHERA. Alternatively, provide evidence-based rationale supporting the use of the selected screening criteria; include a discussion on the uncertainties in using this criteria. C. Provide a detailed rationale on how the proposed background contaminant concentrations from crab, lobster, and mussels can support proper screening of contaminants in clam tissue and assessing potential human health risks. **Conformity Response (IAAC)** A. Conforms. B. Conforms. C. The proponent's response (Section 2.2.25, pdf p.128) provides rationale for not carrying forward the contaminants that were identified at elevated concentrations in clam tissue: "In shellfish (clams) collected from Northumberland Strait, lead was detected at concentrations marginally greater than the background shellfish samples (crab, lobster, and mussels). Lead was not identified as a COPC in sediment within the Study Area, lead is not associated with the historical activities of the BHETF, and lead is not considered bio-accumulative in sediment. As such, lead in clam tissue was not considered further as part of the HHERA specific to the Boat Harbour Remediation project". However, this response does not justify the proponent's screening of the contaminant levels in clam tissue against the background contaminant concentrations in other shellfish, such as crab, lobster, and mussels. NS Lands is required to: ● Provide a detailed rationale on how the proposed background contaminant concentrations in crab, lobster, and mussels (i.e., other species) can appropriately support screening of contaminants in clam tissue to assess potential human health risks.	Additional information requested specific to Item C is provided in Section 2 below.
IAAC-63	HC	Part 2, Section 7.3.7	HHERA, Table H-1.15	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia, including their health. The EIS must consider the current and future availability and contamination of country foods in its analysis. Table H-1.15 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) indicates several contaminants, including arsenic, cadmium, and mercury, were not included as COPCs in shellfish as their measured levels were determined to be non-detect, or below the analytical limits of detection (LOD). For these contaminants, the health-based guideline values cannot serve as adequate screening criteria as the guideline values are also lower than the LOD. Alternative screening criteria, such as background concentrations, were not provided. Health Canada recommends that when the measured concentration of a contaminant is below the LOD, and the LOD is higher than the background concentration or the health-based guideline value, the contaminant should be considered as a COPC and the potential health effects should be properly evaluated. Dioxins/furans were not included as a COPC in the HHERA. Health Canada recommends dioxins/furans to be included as a COPC due to their potential to accumulate in country foods. Additional information regarding the screening of COPCs in country foods is required to assess the potential adverse effects of the Project on country foods, which can impact the health of the Mi'kmaq of Nova Scotia.	Revise the HHERA to include arsenic, cadmium, mercury and lead as COPCs for further assessment. Alternatively, justify why arsenic, cadmium, mercury, and lead were not assessed further, considering their potential toxicity to human health (irrespective of the COPC screening results). Revise the HHERA to include dioxins/furans as a COPC due to their potential to accumulate in country foods. Alternatively, justify why dioxins/furans are not anticipated to accumulate in country foods.	Information requested is provided in Section 2 below.

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-64	HC	Part 2, Section 7.3.7	HHERA (EIS- Appendix A), Section 6.4.3.6 (p.143)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia, including their health. The EIS must consider the current and future availability and contamination of country foods in its analysis. Table 6.15 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) provides a risk summary for the consumption of game organs by PLFN residents or recreational users. Based on an oral absorption factor of 1.0, the HQs calculated for cadmium and vanadium were both over the target HQ of 0.2. The HHERA suggests that although the HQs exceed the 0.2 HQ target, the oral absorption factor used (1.0) is much higher than the US EPA's gastrointestinal absorption factors for cadmium (0.025) and vanadium (0.026). Although the HQs are above the 0.2 target when using an oral absorption factor of 1.0, the HHERA states that this is overly conservative, and by using US EPA's gastrointestinal absorption factors, the HQ values for cadmium and vanadium would be well below the HQ target value of 0.2. Additional information is required to substantiate application of an absorption factor of less than 1.0 for cadmium and vanadium. Several factors should be considered to determine whether an absorption factor of less than 1.0 is applicable for a study. For example, the proponent must demonstrate that the absorption factor for the contaminated medium used in the critical study is substantially different from the exposure scenario considered in the present HHERA, or that the test species used in the critical study absorbs the contaminant to a much greater extent than the target population in the present HHERA. Health Canada recommends that the proponent assume 100% of contaminants present in animal tissues is bioavailable and absorbed by humans in the gastrointestinal tract through food ingestion. Rationale for using an absorption factor of less than 1.0 for cadmium and vanadium is required to assess the potential adverse effects of the Project on Mi'kmaq of Nova Scotia health.	Update HHERA assuming 100% of contaminants present in animal tissues is bioavailable and absorbed by humans in the gastrointestinal tract through food ingestion. Alternatively, provide detailed rationale on how the proposed absorption factors of less than 1.0 for cadmium and vanadium can meet the specific requirements for an application to the present HHERA.	Information requested is provided in Section 2 below.
IAAC-65	HC	Part 2, Section 7.3.7	HHERA (EIS- Appendix A) Section 6.4.3 Quantitative Interpretation of Health Risks (p.138 -) HHERA (EIS- Appendix A) Table H-1.11 Occurrence, Distribution, and Identification of Chemicals of Concern (COC) in Fish (Fillet) Tissue [...] (pdf p.4911)	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia, including their health. The EIS must consider the current and future availability and contamination of country foods in its analysis. Section 6.4.3 of the Human Health and Ecological Risk Assessment report (HHERA – Appendix A of the EIS) assessed the potential exposure level and associated health risks for each contaminant in each type of country food (plant, game organ, waterfowl) separately, instead of providing a combined exposure level from all operable country food exposure pathways and a total risk estimate for that contaminant. The approach may lead to an underestimation of potential health risks. Mercury concentrations in shellfish and fish fillet samples were not available for review. Mercury concentrations were presented in whole fish samples rather than in specific tissues/organs (e.g., muscle) that may be consumed by local consumers. In the absence of information on the mercury concentrations in specific tissues/organs of fish and other aquatic food species, health risks from consuming mercury-contaminated aquatic food species may be underestimated. This information is required to assess the potential adverse effects of the Project on country foods, which can impact Mi'kmaq of Nova Scotia health.	Assess the potential health risks associated with combined exposure from all country foods for each COPC. Alternatively, provide rationale for why a combined exposure level is not necessary. Provide updated mercury exposure estimates and associated health risks based on mercury concentrations in shellfish fish tissues/organs that may be consumed by local consumers. Alternatively, provide rationale for why whole fish samples were adequate for determining health risks from consuming mercury-contaminated aquatic food species.	Information requested is provided in Section 2 below.
IAAC-66	ECCC	Part 2, Section 7.2.2	Section 7.1.5 Groundwater and Surface Water Appendix Z Groundwater and Surface Water Assessment Documentation	The EIS Guidelines require the EIS to assess the potential changes to groundwater and surface water caused by the Project. The Hydrologic Evaluation of Landfill Performance (HELP) model does not include a component for water quality and is used for calculating infiltration and leachate. According to the HELP manual (EPA, 2020[5]), there are some limitations in the application of the model, and these are linked to modeling procedures being based on many simplifying assumptions. These include: • Estimation of snow portion of precipitation and snowmelt processes (e.g., melt factor); • Prediction of frozen soil conditions, runoff computation (e.g., assuming that areas adjacent to the landfill do not drain into the landfill); • Calculation of evapotranspiration; vegetative growth (i.e., crop growth model) assumptions; • Vertical flow through layers (i.e., layers are assumed to be homogeneous); • Lack of preferential flow (through cracks, fractures, holes, etc.); • Estimating conditions for unsaturated flow; • Conditions for percolation through the soil liners; • Leakage through the geomembrane(s); and • Conditions triggering subsurface inflow. The model and monitoring elements of the Project should be considered in concert (e.g., uncertainty in modelling may be addressed in the monitoring design). This information is needed to better understand potential impacts of the Project to groundwater and surface water, which can impact Mi'kmaq of Nova Scotia health, fish and fish habitat, and the marine environment.	Discuss the assumptions and limitations of the HELP model in its application to the specific design of the containment cell. Clarify how model uncertainties have influenced the design of the follow-up monitoring program.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-67	DFO NSE	Part 2, Section 7.1.5 Part 2, Section 7.2.2	Section 7.1.4.1 (page 7-93) - Surface and Groundwater Interactions Appendix Z – two studies Boat Harbour Hydrogeology Assessment (AECOM 2016), p. 208 Well Field Evaluation Report (GHD 2018), p. 300 and Vol IV, p. 7-53 and Vol IV, P. 7-329	The EIS Guidelines require a hydrogeological conceptual model of the project area that includes a description of the hydro stratigraphy and groundwater flow systems. The model should include a delineation and characterization of groundwater – surface water interactions and the locations of groundwater discharge to surface water and surface water recharge to groundwater. The hydro stratigraphic conceptual model presented in the EIS and appendices is unclear. In Appendix Z, two different studies seem to provide different views on the source of groundwater and impacts of construction to groundwater for the PLFN Wellfield. The 2016 AECOM Boat Harbour Hydrology Assessment Report indicates that the PLFN off-peninsula groundwater wellfield source capture zone is hydraulically connected to precipitation recharge. The report concludes that changes in groundwater levels in the PLFN wellfield will be present, although relatively small. Section 7.1.4.1.2 of the EIS further states “there is a downward vertical gradient between either the overburden or shallow bedrock and the deep bedrock” at the PLFN wellfield. Conversely, the 2018 GHD Well Field Evaluation Report states that there is no direct hydraulic connection between groundwater in the overburden/ shallow bedrock layers and the deeper PLFN wellfield and that the dewatering during remediation would not affect either the quality or quantity of groundwater in the PLFN wellfield. However, no evidence is provided in the EIS for an effective stratigraphic confining layer that is assumed in their conceptual hydro stratigraphic model to limit vertical hydraulic conductivity between the shallow aquifers and the deeper PLFN wellfield. Section 7.1.4.1 of the EIS states while there is limited interaction between surface water and groundwater in the project area, although groundwater does enter portions of some watercourses. However, the EIS does not specify which watercourses or the location of these surface water and groundwater interactions. Knowledge of these locations is important because temperatures in surface waters can change where groundwater and surface water interact. A detailed description of a conceptual hydro stratigraphic model is required to assess any potential project effects on surface and ground water quality and quantity, fish and fish habitat, and PLFN’s water wellfield.	Provide a detailed description of a conceptual hydro stratigraphic model for the PLFN groundwater wellfield that uses all available information to: • Evaluate the PLFN off-peninsula wellfield source capture zone; • Describe model layer infiltration, vertical and horizontal conductivity and flow; • Describe the confining layer for the deeper groundwater zone, if present; • Describe the potential for the Project to lower groundwater levels; and • Update the effects assessment, as required. Describe the locations where the groundwater interacts with the surface water and any temperature changes in the surface water that may result. Update the effects assessment for surface and ground water quality and quantity and fish and fish habitat, if required.	Information requested is provided in Section 2 below.
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 Options 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 the 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. 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 adequately accommodated stakeholder input. Provide the full list of initial waste management alternatives considered at the workshops and 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.	Information requested is provided in Section 2 below.
IAAC-69	ETR	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 were considered as part of the cost estimate. If this was not considered in the cost estimate, provide a discussion on how this might impact the preferred waste management alternative.	Management of the waste from the existing containment cell was accounted for in the remediation option assessment as this waste will need to be removed and dewatered under all waste management scenarios carried forward. The Economic Indicators for both on-Site and off-Site disposal were the same when considering capital and operation and maintenance costs as detailed in Appendix H of the Remedial Option Decision Document (RODD) [GHD Document 15 of the EIS].

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-70	IAAC		EIS – Section 2.2.1 Human Health and Ecological Risk Assessment Report 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 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.	Information requested is provided in Section 2 below.
IAAC-71	ETR	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 (NSE) 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. 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 a summary and outcome any discussions with NSE 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.	Letter from NSE regarding facilities approved to accept dioxin and furan impacted sediments is provided as Appendix I.
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 Geotubes® 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. The reasoning for some of the sub-scores within that criteria category is not presented. 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.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-73	IAAC		RODD – Section 4.4 and Appendix H EIS – Section 2.3.1 EIS – Section 3 – Project Description 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	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 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 BHSL 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.	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 exceeded and the need/options for a contingency plan. Update the alternatives analysis, as necessary.	Information requested is provided in Section 2 below.
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 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, 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 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.	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.	Information requested is provided in Section 2 below.
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 metres (m) to 3 m 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.	Information requested is provided in Section 2 below.

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IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-76	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. This information is required to assess the potential environmental effects from the preferred alternative for waste management.	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.	Information requested is provided in Section 2 below.
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 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.	Information requested is provided in Section 2 below.
IAAC-78	PLFN	Part 2, Section 7.3.7	EIS, Section, 7.1.6	The Environmental Impact Statement (EIS) Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia. Section 7.1.4.1 of the EIS states that numerous treatment buildings would be decommissioned and demolished, and footing and foundations left buried. However, there is no discussion regarding whether leaving below grade infrastructure in place would impact the future use of the site by Pictou Landing First Nation (PLFN). This information is needed to better understand potential impacts of the Project on the ability of PLFN members to practice their traditional activities.	Describe how leaving the infrastructure below grade could impact the ability of PLFN to use the area after remediation and describe how any identified impacts would be mitigated.	The removal of structures to a set elevation below final finished grade is typical for projects where the anticipated future use is unknown. The removals of foundations and structures at the site will be removed to an elevation of 0.9 m below existing grade. This will facilitate backfilling, regrading, and seeding of the area for use as open space. Should a new structure be proposed in the future (by others), removal of the remaining below grade foundation and footings would need to be completed as required to allow for the new infrastructure construction.
IAAC-79	PLFN	Part II: 7.5. Significance of residual effects	HHERA (EIS- Appendix A) Section 3 Selection of Screening Criteria (p.26-27) HHERA (EIS- Appendix A) Section 4.4.2.4 Discussion (p.90)	The EIS Guidelines requires clear and sufficient information to enable the Agency, government reviewers, the Mi'kmaq of Nova Scotia, and the public to review the proponent's analysis of the significance of effects. Section 3 of the Human Health and Ecological Risk Assessment (HHERA)report (HHERA – Appendix A of the EIS) presents a hierarchy of chemical concentration limits or guidelines used in the study. However, it is not clear how the hierarchy is applied. In addition, Section 4.4.2.4 of the HHERA states "While the maximum concentrations of several other chemicals in sediments triggered exceedances of sediment quality guidelines, these guidelines are very conservative and based on, at best, toxicity to benthic invertebrates, not plants. Thus, exceedance is not evidence of toxicity, much less toxicity to plants." This statement is confusing and seems to create the impression that the guidelines are not useful or relevant. A clear understanding of how guidelines are applied to different chemicals and environmental components is needed for PLFN to better understand and provide input on potential impacts to the health of their community.	Provide a clear description of which guidelines were used and applied to different chemicals and environmental components in the HHERA.	An overview of the screening methodology and guidelines used in the HHERA are provided in Section 3 of the HHERA (Appendix A of the EIS). Specific screening values used in the human health risk assessment are detailed in Section 6.1 and the associated screening tables in Appendix H of the HHERA report (Appendix A of the EIS). Similarly, specific screening values used in the ecological risk assessment are detailed in Section 7.2 and the associated screening tables in Appendix I of the HHERA (Appendix A of the EIS). An overview of the screening guidelines used in the HHERA and methodology for guideline selection is also summarized in the text of this document (see Section 2 below).

Table 1.1 Information Requirements for the Boat Harbour Remediation Project - Table of Concordance

IR Number	External Reviewer ID	Reference to EIS Guidelines	Reference to EIS	Context and Rationale	Specific Question/Information Requirement	NSLI Response
IAAC-80	PLFN	Part 2, Section 7.3.7	EIS, Section 2.2.1.1	The EIS Guidelines require a description and analysis of how changes to the environment caused by the Project will affect the Mi'kmaq of Nova Scotia. Section 2.3.7.1 of the EIS states "*Temporary water supply service would be required during causeway removal and bridge construction activities. Upon completion of bridge construction, permanent water supply services would be reinstated. Permanent water supply services will be conveyed suspended from the bridge, and will require continual electric power source/supply for heat tracing.*" The specifics of the temporary service were not described, including potential impacts to the community during connection, which season the temporary water supply service would be required, etc. There is insufficient detail regarding the reinstatement of permanent water supply services across the replacement bridge. The community is in a growth phase and there is concern as to whether the bridge design will allow for additional pipelines, if required. This information is needed to better understand potential changes to PLFN's drinking water supply, which can impact PLFN's health and socio-economic well-being.	Provide additional details on how the temporary water supply service will operate, including: • The estimated timeframe that the community will rely on a temporary water supply; • The time of year that the temporary water supply will operate; and • Any potential impacts to the community during connection. Clarify whether the permanent piping across the bridge was designed to incorporate future community growth, including the potential need for additional pipelines.	A temporary watermain will be required during the causeway removal and bridge construction periods. The temporary watermain will connect into the existing watermain on both ends of the causeway. It is anticipated that the causeway removal and bridge construction will be completed over one construction season, but may take up to one year. During the installation of the temporary watermain, water supply will be temporarily interrupted for a few hours while the connection to the existing system is being completed. This will occur at the start of the causeway removal works and again when the connection to the permanent portion of the watermain is completed as part of the final bridge construction works. Other than these very short supply interruptions (few hours), no other water supply impacts are anticipated to be associated with the project. NSLI will consult with PLFN on the exact timing of the temporary service disruption as it is possible that the disruption period of a few hours could be scheduled to occur overnight or during a lower use daytime period. The new watermain piping is the same size as the existing piping of 150 mm, providing a like-for-like replacement. If the forcemain size is required to increase at a future date to accommodate growth, the existing bridge support points are capable of carrying a pipe size of up to 250 mm diameter without modification of the bridge or structure.
IAAC-81	PLFN	Part 2, Section 3.1	EIS, Page 89: Table 7.1-17 EIS, Page 7-15; Table 7.1-6 and 7.1-7	The EIS Guidelines require information about the management of proposed control, collection, treatment, and discharge of surface drainage and groundwater seepage to the receiving environment from all key components of the project infrastructure, including sludge disposal cell effluent. In Section 7.1.3.2 of the EIS, Figure 7.1-5 indicates that the overburden in the containment cell area is only 5 m thick, with the water level between 2 and 4 meters below ground surface (mbgs). Based on this information, the existing waste in the containment cell could potentially be in contact with groundwater. However, there is no assessment on the potential impact of the base of the new liner being in contact with groundwater. In addition, it is unclear how groundwater would be managed during the excavation and transportation of existing sludge from the containment cell. This information is needed to better understand potential changes to groundwater and surface water from the Project, which can impact PLFN's health, fish and fish habitat, and the marine environment.	Clarify, with supporting rationale, if the base of the liner for the containment cell could come into contact with groundwater. If so, describe the potential impacts and provide any required mitigation measures. Describe how the groundwater will be managed in the existing containment cell during the excavation and transportation of existing sludge from the containment cell.	The double liner system is designed to prevent water transmission into or out of the containment cell. Based on the Hydrological and Hydraulic Assessment - Containment Cell, prepared by GHD for NSLI in February 2020, groundwater is anticipate to be at an elevation of approximately 6 metres above mean sea level (mAMSL) in the middle of the cell and 4.5 mAMSL at the downstream side. The top of the existing clay liner of the containment cell is 8.5 mAMSL in the middle and 7.5 mAMSL at the downstream side, so under operational conditions, the liner and waste will be between 2.5 to 3 m above groundwater. The leachate collection and pumping system within the cell will lower the water level within the cell to keep the waste out of contact with liquid. As a result of the lowered leachate level within the containment cell, in the unlikely event the groundwater table is higher than the base of the cell or if there is any movement or flow of liquid across the liner, it would be a flow of groundwater into the cell not out of it. Once within the cell, water would be collected by the installed collection system, so there is no operational impact to the groundwater in the natural environment. During construction and transfer of existing sludge and cell contents from the containment cell to the ASB, surface water and leachate within the containment cell will continue to be transferred to the ASB using the existing gravity infrastructure or through pumping in accordance with the Industrial Approval. As noted above, the groundwater elevation is 2.5 to 3 m below the liner, and as such, groundwater does not enter the containment cell.

2. IAAC Responses

2.1 IAAC-01

Response provided in Section 1, Table of Concordance (Table 1.1).

2.2 IAAC-02

Response provided in Section 1, Table of Concordance (Table 1.1).

2.3 IAAC-03

There are no plans to develop a new temporary waste staging area for waste sludges.

Modification of the existing containment cell will occur in years 1 and 2 of the BHRP and will be completed before removal of the sludge/sediment from the Boat Harbour Effluent Treatment Facility (BHETF) commences. Waste from the containment cell will be relocated to portions of the BHETF (settling basins or Aeration Stabilization Basin [ASB]) or to the pilot scale temporary treatment pad to facilitate containment cell modifications. Surface water and groundwater that comes in contact with the relocated waste will be managed as leachate in the same manner as the water that comes in contact with the waste currently in place. Water that is collected in the settling basins is conveyed to the ASB via the settling basin outfall structure and effluent ditches. Water from the ASB is discharged to Boat Harbour (BH) stabilization basin via a gravity outfall. Water collected in the pilot scale temporary treatment pad is conveyed to the ASB via the temporary storage pad outlet structure.

2.4 IAAC-04

Details on the pre-treatment system and Water Treatment Compliance Criteria are presented in the Pilot Scale Testing Construction Report (GHD Report 19, Appendix F). This was submitted with the Environmental Impact Statement (EIS) as Reference Document 17.

The pre-treatment system design is based on the pilot testing performed at the site. The specification and contractor requirement overall is performance based, but is generally designed to include leachate storage, pH and coagulation injection, mixing (static mixing, rapid mixing, and polymer addition and slow mixing), followed by clarification via inclined plate clarifier prior to tertiary treatment through filters (multimedia filter consisting of organoclay media and GAC). Following filtration is a final pH monitoring and adjustment step, followed by mixing and release. The treatment system quality will be regularly monitored at discharge, influent, and intermediate steps (between unit processes) for both monitoring health of the system and in accordance with plans that will be submitted to Nova Scotia Environment (NSE) as part of the Industrial Approval (IA) application.

The proposed system including mass balance is shown in detail on Drawing CC-P-03a and 03b for peak and average flows respectively, provided in Appendix A of this document.

The proposed discharge criteria is presented in Appendix G of the Human Health Risk Assessment (HHRA) which was submitted as Appendix A of the EIS. Discharge criteria and design basis have been developed using a risk-based approach considering Canadian Council of Minister of the Environment (CCME), NSE Environmental Quality Standards (EQS) Tier 1 (Marine discharge) as well as criteria established in other jurisdictions.

2.5 IAAC-05

Response provided in Section 1, Table of Concordance (Table 1.1).

2.6 IAAC-06

The fish identified in Table 7.1-31 were from the following report, which was included in Appendix BB of the EIS.

Hoover, Z., Panneerselvam, E., Adesida, A., Carrier, A.J., Francis, L., Hoover, J., Pham, M.N., Nicholson, A., Williams, J., Zhang, X., Oakes, K. (2020). Boat Harbour Fish Population Assessment. Cape Breton University.

Striped bass were not identified in the above noted study. Rather, the striped bass discussed in the text below Table 7.1-31 and in Section 7.1.6.2.1 are from the following report, which was included in Appendix A of the EIS.

GHD. 2020. Quantitative Human Health and Ecological Risk Assessment. Boat Harbour Effluent Treatment Facility. Boat Harbour Remediation Planning and Design. Pictou Landing, Nova Scotia. Final Draft for Review.

During GHD's fall 2019 supplemental site investigations (GHD, 2020), striped bass were observed to be present in the Estuary and appeared to be migrating in and out of the Estuary with the tide cycle.

To reduce the uncertainties associated with human consumption of fish and address the comments received from Health Canada (HC) on the draft Human Health and Ecological Risk Assessment (HHERA) Report, in 2019 GHD attempted to collect samples of larger (edible size) fish that may be present in the Estuary. As part of this sampling program, one gill net was set in the northern end of the Estuary at the upstream end of the outlet channel and left for approximately 12-hours (a License to Fish for Scientific Purposes was obtained from Fisheries and Oceans Canada - Gulf Region prior to attempting to collect fish tissue samples in 2019). Striped bass were caught in the net during the first attempt at edible size fish collection. All fish caught were identified and counted and 10 striped bass were kept for subsequent laboratory analysis.

The methods used for the fish survey summarized in Table 7.1-31 of the EIS were provided in the Hoover et al., 2020 report and are summarized in the following text.

All sampling occurred between September 23 and October 10, 2019. Fish were sampled using both active (electrofishing) and passive (gill net, minnow trap) methods in the Estuary. The Estuary was divided into pelagic cross-basin transects and shore transects. Captured fish were identified, measured, and most were released adjacent to the transect of capture; a subset of each species was lethally sampled by a lethal overdose of tricaine methanesulfonate. Condition factor data was collected for all captured fish. Shore and cross-basin transects in the Estuary were demarcated in ArcGIS Pro 2.4.1. Shore transects were 200 metres (m) long, with the following exceptions: E-ST12 = 92 m, E-ST14 = 148 m, and E-ST20 = 211 m. The Estuary was divided into 20 shore transects. Cross-basin transects were generally at least 110 m long to accommodate the length of the gill nets, with transect boundaries located at the junction of two shore transects. When possible, cross-basin transects extended between visible points of land that could be used for easy navigation. Additionally, the Estuary was initially divided into distinct zones for comparison, and similar numbers of cross-basin transects were assigned to each zone. The Estuary was divided into 21 cross-basin transects.

Active sampling was performed daily on weekdays between 9:00 AM and 5:00 PM. Passive sampling was performed over the same intervals, and gear was often left in place overnight. Upon capture, fish were identified by species, weighed with a battery-powered scale (0.01 gram [g] resolution), measured for total length, and released. A subset of each species was lethally sampled for metals and organics analyses.

The Estuary salinities proved amenable for surveying with an LR-24 backpack electrofisher, and 16 shore transects were surveyed by boat. E-ST01 and E-ST12 were surveyed by foot, being too shallow for the boat. E-ST13 and E-ST14 were excluded, as they were deemed too hazardous for crew safety. All cross-basin transects were also surveyed with the LR-24 by boat, except for E-CB01.

Experimental mesh gill nets are long straight nets anchored at both ends, with mesh openings that vary in size. These nets are made up of several panels, each panel having a specific mesh size. Gill nets entangle fish as they swim through, and because experimental nets have multiple size openings, they capture fish of various sizes. Fish mortality in gill nets can be relatively low if the nets are checked frequently. Nets were set starting from shore and extended 108.5 m toward the pelagic zone. Gill nets consisted of 12 panels (stretch mesh size/length of the panel in feet): 1½”/31’ – 2”/30’ – 3”/30’ – 4”/30’ – 5”/29’ – 6”/30’ – 1½”/31’ – 2”/29’ – 6”/30’ – 5”/29’ – 4”/26’ – 3”/31’. Gill nets were set for at least two-hours, then checked for fish. Water levels in most of the Estuary were too low to extend the gill nets fully vertically, so nets were placed in the deepest parts of the Estuary (E-CB02-04, E-CB14-18). Gill nets were set on six randomly chosen cross-basin transects, with one left overnight. Cumulatively, gill nets were set for 32:02 sampling hours in the Estuary.

Minnow traps are cylindrical tapered metal traps with concave funnel-shaped openings at each end. Fish swim into the opening but cannot easily find the way out. These traps can be used with or without bait, with baited traps being more appropriate for low-density and/or non-shoaling populations. Minnow traps generally have low mortality and escape rates if checked frequently. Minnow traps were placed at the midpoint of each shore transect in BH (n = 62), baited with dry dog food, and left in place overnight.

2.7 IAAC-07

The Project is to remediate BH and associated lands, return BH to tidal conditions, and remove the impediments to allow for natural restoration. The Project is not restoration. Some upland areas and low-lying areas will be seeded and planted for erosion protection and to create habitat. In general, shoreline areas in the wetlands and Estuary that are remediated through dredging and where the dam is removed will be planted and seeded. The exact limits will depend on final limits of dredging and infrastructure removal. Preliminary plans for restoration for these areas along with seed mixes and tree and shrub planting schedule on Drawings WR L 01 to WL L 05 provided in Appendix A of this document.

2.8 IAAC-08

The noted statement from Page 7-133 of the EIS was related to the following report, which was provided in Appendix BB of the EIS.

WSP. 2018. Boat Harbour Remediation Planning and Design. Fish and Fish Habitat Baseline Review.

A desktop review and site reconnaissance were conducted at the start of the project to identify the presence of fish habitat within the study area. Once the total length of a watercourse located within the study area was established, assessors chose a representative reach of 150 m to complete an in-depth assessment. The aquatic habitat assessment consisted of using a fish and fish habitat form developed from the guidelines and parameters outlined by Department of Fisheries and Oceans (DFO) and the United States Department of the Interior in association with the U.S. Fish and Wildlife Service. Watercourses identified included two ephemeral channels, 13 intermittent channels, three small permanent channels, and one large permanent channel. Presence of barriers to fish migration (full, partial, temporary, or none) was a habitat component included in the fish and fish habitat form. Watercourses (WC-1 to WC-19) are shown on Figure 7.1-42 of the EIS. Barrier information is presented in Appendix B of WSP, 2018, and a summary of watercourses with identified barriers is provided in the following text.

- WC-1 - Small Permanent: Partial barrier | A partial barrier was observed in the reach, identified as an older, inactive beaver structure. Beaver activity appears to be present in the south section of the assessed reach near transect 5.
- WC-2 - Intermittent: Full barrier | This watercourse was dry, save for one pool. It is likely that the ditch from an upstream roadway is the main source of water for the channel, but it is dry most of the time. The channel dissipates in the downstream end of the reach to many unconsolidated braids that further increase habitat fragmentation.
- WC-2A - Intermittent: Full barrier | Watercourse was dry in various sections; most of the area above the beaver pond was dry. Older beaver activity in the area has created various debris jams throughout the reach.
- WC-3 - Intermittent: Temporary barrier | Watercourse was a defined dry channel that runs for roughly 120 m then dissipates into ephemeral section; may resurface in spots further downstream.
- WC-4 - Ephemeral: Full barrier | Not likely fish habitat, only a drainage channel that runs for a short distance. No significant habitat features. ATV trail runs through the downstream section of the watercourse.

- WC-5 - Intermittent: Full barrier | Beaver activity was apparent in the outflow section of the large pool; it is unknown if these beavers are active presently at the site or if this activity was carried out in the past. Gradient from the pool to the culvert upstream was severe, and it is unlikely that adequate water depth would be present for fish species to traverse the area. Below the pool, the channel begins to braid and continues until dissipated completely.
- WC-6 - Intermittent: Partial barrier | Beaver activity was apparent in various sites form the headwater pond and continued through most of the reach. Dry section barriers were observed in several locations.
- WC-7 - Intermittent: Temporary barrier | Dry section barriers were identified numerous times during the initial assessment.
- WC-8 - Intermittent: Partial barrier | Channel runs for a short section before dissipating into the wetland downstream. Not likely fish habitat due to the small physical size and the amount of silt deposited into the watercourse during precipitation events from an upstream clear-cut.
- WC-10 - Intermittent: Partial barrier | The main action this channel performs is drainage for an upstream, hilltop wetland, and dry section barriers encountered throughout the reach cause habitat fragmentation.
- WC-11 - Ephemeral: Full barrier | This watercourse has very little potential for fish presence due to the lack of connectivity between the harbour below and the daylighted section. Seems to be more of an opportunistic drainage corridor for overland flow from the ATV trail rather than a natural stream.
- WC-12 - Intermittent: Full barrier | Watercourse is a dry scar through a small valley in an area of extreme gradient. No water was observed in the channel at time of assessment. Habitat is severely fragmented.
- WC-14 - Ephemeral: Full barrier | Ephemeral watercourse with a small daylighted section; this watercourse is not likely fish habitat and disperses into the wetland surrounding the daylighted section of channel.
- WC-15 - Intermittent: Partial barrier | A hung culvert found at the upstream end of the assessed area may be a partial barrier to fish passage depending on the amount of flow when traversing is attempted.
- WC-16 - Intermittent: Temporary barrier | A culvert identified at the top of the assessed reach was considered a partial barrier, as the plunge pool may not be adequate for fish in times of low flow.
- WC-18 - Intermittent: Temporary barrier | Dry sections in various areas throughout the assessed reach. Woody debris jams were also observed.
- WC-19 - Intermittent: Partial barrier | Some small barriers were noted in the form of elevation drops between pool areas, which may be difficult for fish to traverse in times of low flow.

2.9 IAAC-09

In addition to the open waters and marsh ecosystems, the Site also contains a number of very small, fluvial systems. WSP (2018) identified a total of 19 watercourses (Appendix BB of the EIS). These included two ephemeral channels, 13 intermittent channels, three "small permanent" channels, and one "large permanent" channel. Although definitions vary, ephemeral streams can be defined as lacking defined channels and only running immediately after storms or snowmelt (Nova Scotian Department of Transportation and Infrastructure Renewal [NSDTIR], 2018). Intermittent streams generally have defined channels and banks, but only flow during wetter seasons. Permanent streams are similar in structure to intermittent streams, but flow year-round. "Large" and "small" are defined based on bank-full width; "large" permanent streams have average channel widths greater than 5 m, while "small" permanent streams have smaller widths. It should be noted that the single "large" permanent stream identified at the Site, WC-9, is actually quite a small stream. Aside from one transect across a beaver pond, this stream had wetted width of only 3 m in late September 2017.

In Nova Scotia, streamflow is determined by recent precipitation or snowmelt and groundwater height. Because precipitation in the Pictou area, while relatively constant, is slightly lower in summer months, the primary factor affecting stream flows are snow melt and evapotranspiration. Hence, stream flows typically peak in spring, while flows in summer are only about one-third of average for the year (Brown and Davis, 1996). Applying this typical flow pattern to the Site's intermittent streams would suggest that they typically do not flow in warmer, sunnier months of the year. Similarly, flows in the four permanent streams will be lowest during Nova Scotia's growing season.

As with terrestrial areas, primary production in streams is dependent on temperature, light, and nutrient availability. The Site occurs in an area of Nova Scotia where nutrients allow moderate to high productivity (Brown and Davis, 1996). Streamflow during warmer periods will be essentially non-existent in intermittent streams, and very low in the four permanent streams. Moreover, sunlight will be limited during summer months because most of the intermittent and permanent streams at the Site occur in forests, and these watercourses have banks that are densely vegetated with mix of trees and shrubs. Even in the permanent streams, this shading by the canopy will constrain potential for autochthonous (i.e., in stream) primary production in the stream itself, either by attached algae or rooted higher plants.

That means that most organic carbon in small, forested streams comes from allochthonous sources such as adjacent riparian vegetation, primarily as tree litter or woody material (Hynes, 1970). For the tree litter, both deciduous leaves and coniferous needles, this primary production follows a similar temporal sequence as the described for marsh ecosystems. That is, the bulk of primary production occurs in the summer, but is largely unavailable to stream biota until the leaves or needles are shed in the fall. During late fall, winter, and early spring, this senescent vegetation is processed, by a combination of microorganisms and macroinvertebrates, in the detritovore pathway that represents the primary source of carbon in the stream food chain. In turn, those aquatic macroinvertebrates will be consumed by fish in streams that are potentially fish bearing.

As indicated, most of the watercourses at the Site are intermittent and are unlikely to support a significant fish population. The fauna of intermittent streams is limited to species that do not require a permanent supply of running water, inhabit the streambed only during the rainy season, or that are pool specialists. Characteristic fauna include amphibians such as immature or hibernating frogs and salamanders (NYSDEC, 2002). Macroinvertebrates in intermittent streams are dominated by species that have short-life spans or those that withstand periods without running water. Some fish species, including some salmonids, use intermittent streams during limited stages of their life cycles (Colvin et al., 2019). However, fish productivity of intermittent streams is limited by periodic drying, and the fish productivity of the intermittent streams on this Site will be further limited by their small size.

Similarly, the four permanent streams have limited potential for fish production because of their small size and generally limited habitat quality (WSP, 2018). In addition, none of the watercourses surrounding the Boat Harbour Stabilization Lagoon (BHSL) had significant spawning habitat (WSP, 2018). At best, streams were classified as Type II, good salmonid rearing habitat with minimal spawning habitat.

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WSP. 2018. Boat Harbour Remediation Planning and Design. Fish and Fish Habitat Baseline Review.

2.10 IAAC-10

Remediation activities in years 1 – 4 will occur upstream of the existing causeway. As indicated in the EIS, prior to implementation of the remediation activities (or concurrent with), existing fish within the BHSL and freshwater wetland areas will be captured for subsequent euthanization. As such, project construction timing that has the potential to overlap with fisheries windows of freshwater or anadromous species is generally limited to project related activities in the Estuary. Remediation activities downstream of the causeway are scheduled to begin in year 5, after the remediation of the upstream work is completed and before removal of the dam. Dredging of the Estuary is scheduled for year 5, removal of the causeway and construction of the bridge is planned for year 6, and removal of the dam and dredging of the inlet channel are scheduled for year seven. As indicated in the previous responses, Hoover et al., 2020 identified four fish species in the Estuary, including mummichog, ninespine stickleback, tomcod, and white perch, with most of the fish captured being mummichog. During GHD's fall 2019 supplemental site investigations (GHD, 2020), mummichog were also the primary fish species collected, with striped bass observed to be migrating in and out of the Estuary with the tide cycle. The striped bass observed and collected from the Estuary in 2019 were identified to be feeding on the mummichogs present in the Estuary.

Mummichog (*Fundulus heteroclitus*) spends its entire life cycle in shallow estuarine waters. This species uses salt marsh edge and surface habitat as refuge from predation, feeding areas, spawning sites, and juvenile fish habitat (as cited in Crum, Balouskus and Targett, 2017). Individual mummichog exhibit a high degree of site fidelity and a small feeding range (Lotrich, 1975). Alongshore movement of mummichog, based on tagging studies, has been reported to be 18 m or less over the course of a month (Lotrich, 1975) and mummichog were recaptured as far as 299 m away up to 166 days after tagging in marshes in southern New Jersey. Able, Vivian, Petruzzelli, and Hagan (2012) documented movements of 1000 - 1200 m over a 17-month study. This restricted home range suggests that mummichog feeding and growth reflect localized habitat conditions (Crum et al., 2017). Furthermore, the opportunistic diet of mummichog is largely determined by the available community of small benthic invertebrates, so mummichog growth and productivity can also serve as a reflection of benthic habitat quality along localized shoreline types (as cited in Crum et al., 2017). Mummichog are usually sexually mature in their second year, some in their first year, and spawn spring through summer or early fall and may spawn eight or more times during the season (U.S. Fish and Wildlife Service, 2020). Eggs normally incubate in air (aerial incubation apparently is essential for survival), and eggs hatch only when they are inundated, usually on spring tides (U.S. Fish and Wildlife Service, 2020).

Mummichog are common prey for larger estuarine species. Mummichog has been shown to be prey for other fishes, such as striped bass (*Morone saxatilis*), weakfish (*Cynoscion regalis*), and white perch (*Morone americana*) (as cited in Crum et al., 2017).

Prior to beginning remediation activities in the Estuary, rescue of the fish in the Estuary will be completed by certified professionals and will be overseen by the contractor(s) environmental manager (EM) and/or the construction management and oversight consultant EM. Rescued fish will be moved to a non-work area. Striped bass spawn in the spring, and young striped bass remain in streams and estuaries as they grow, and usually enter salt water before the first winter after they hatch. Striped bass entering the Estuary are there to feed on the mummichogs but striped bass spawning is not likely to occur under current conditions in the Estuary because this system is too small and too saline. Striped bass fertilized eggs, sac-fry, and smaller fry are planktonic, i.e., suspended in the water column at the mercy of water currents. Optimal nursery areas for eggs/fry are turbid, productive, oligohaline waters (North and Houde, 2001). Consequently, successful spawning typically requires long estuaries, which provide extended residence times in these optimal nursery areas for the planktonic eggs/fry to develop. The Estuary is much too small to allow extended residence of planktonic stages and younger fry of striped bass. The current water depths of the Estuary range from approximately 1 to 3.5 m (GHD, 2020), while the tides averages about 1.3 m per tide. The Estuary has an average depth of 2.25 m, about half of the Estuary's water, and any of its striped bass eggs/fry, would be ejected into the Strait each outgoing tide.

The Estuary is also too saline for optimal development of striped bass eggs and larvae. Optimal salinity for eggs is about 5 parts per trillion (ppt) (Reesor, 2012). After cessation of the artificial freshwater inputs, the Estuary's salinity would approximate that of the Strait, typically 25 ppt or more.

After rescue of the fish in the Estuary is completed, a net will be placed at the outlet of the Estuary to prevent any fish from moving into the Estuary during dredging activities. Silt curtains will be installed to contain the sediment within the active dredging area to reduce Total Suspended Solids (TSS) and turbidity while dredging.

As described in the Project Environmental Protection Plan (PEPP) mitigation measures that will be implemented to address potential adverse effects to the marine environment include, but are not limited to, the following:

- The contractor(s) will complete a pre-construction site meeting to educate staff on policies related to working around the Estuary.
- Any required regulatory permits or authorizations will be obtained, and all terms and conditions will be implemented.
- Personnel will be instructed not to enter areas of the Estuary that are outside of approved alteration areas.
- Care will be taken to keep riparian vegetation in good condition surrounding areas of potential fish habitat. No herbicides shall be used near possible fish habitat.
- The contractor(s) will ensure proper erosion and sediment controls are in place prior to the removal of the dam control structure.
- Compensation for permanent loss of fish habitat will be completed through fish habitat restoration activities, subject to DFO direction and approval.
- To protect the marine environment from accidental spills, the contractor(s) will ensure that the spills management plan is in effect and its procedures are fully communicated to staff.

It is not necessary to update the effects assessment as the original assessment did not include striped bass spawning in the Estuary; therefore the original effects assessment remains valid.

Able, K.W., Vivian, D.N., Petruzzelli, G., & Hagan, S.M. (2012). Connectivity among salt marsh subhabitats: residency and movements of the mummichog (Fundulus heteroclitus). *Estuaries and Coasts 35*: 743–753.

Crum, K. P., Balouskus, R. G., & Targett, T. E. (2017). Growth and Movements of Mummichogs (Fundulus heteroclitus) Along Armored and Vegetated Estuarine Shorelines. *Estuaries and Coasts (2018) 41 (Suppl 1)*: S131–S143. doi 10.1007/s12237-017-0299-x.

GHD. 2020. Quantitative Human Health and Ecological Risk Assessment. Boat Harbour Effluent Treatment Facility. Boat Harbour Remediation Planning and Design. Pictou Landing, Nova Scotia. Final Draft for Review.

Hoover, Z., Panneerselvam, E., Adesida, A., Carrier, A.J., Francis, L., Hoover, J., Pham, M.N., Nicholson, A., Williams, J., Zhang, X., Oakes, K. (2020). Boat Harbour Fish Population Assessment. Cape Breton University.

Lotrich, V. A. (1975). Summer home range and movements of Fundulus heteroclitus (Pisces: Cyprinodontidae) in a tidal creek. *Ecology, 56*: 191–198.

North, E.W., and E. D. Houde, 2001. Retention of white perch and striped bass larvae: biological-physical interactions in Chesapeake Bay estuarine turbidity maximum. Estuaries 24, 756–769.

Reesor, C.M. 2012. Temporal distribution of Morone saxatilis eggs and larvae and Neomysis americana in the Shubenacadie Estuary. Master's Thesis, Dalhousie University/

U.S. Fish and Wildlife Service. (2020). Mummichog (Fundulus heteroclitus) Ecological Risk Screening Summary.

2.11 IAAC-11

Response provided in Section 1, Table of Concordance (Table 1.1).

2.12 IAAC-12

As indicated in the EIS, in 2018 a fish and fish habitat baseline review of the watercourses surrounding the BHSL was completed and was included in Appendix BB of the EIS (WSP, 2018). The fish and fish habitat baseline review was completed using methodologies adopted from DFO guidance and the United States Department of the Interior in association with the U.S. Fish and Wildlife Service. As indicated in the EIS, the 2018 survey did not identify any of the watercourses at the site as Type I habitat for supporting salmonid species, and only six of the 19 watercourses that were assessed were identified as Type II (one of those was classified Type II Type III).

WSP, 2018 included the following table to classify each watercourse, which was developed based on the guidance cited above.

Table 1: Fish Habitat Descriptions

TYPE	FISH HABITAT DESCRIPTIONS
I	Good salmonid spawning and rearing habitat, often with some large pools and abundant riffle sections. Substrate is made up of mostly small and large gravels with some cobble interspersed. Dominant habitat types are riffle and pool, as these features are important for Salmonid spawning and rearing.
II	Good salmonid rearing habitat with limited spawning habitat. Pockets of gravel, with adequate foraging areas for adult and juvenile salmonids. Habitat types may include run, riffle, pool, snye or step pool.
III	Poor rearing habitat with no spawning capabilities. Fast flowing and turbulent water often categorized by cascades, chutes, small waterfalls, substrate often consists of cobble, boulder, and bedrock. Lack of pools.
IV	Poor juvenile salmonid rearing habitat with no spawning capability. May provide shelter and foraging areas for larger, adult salmonids. Sluggish or shallow flows, and substrate usually consists mostly of fine materials. Poor pool development.
V	Poor habitat for salmonids of all sizes and age. Shallow, narrow streams with sluggish flow and possibly dry sections. These watercourses usually don't have significant habitat upstream to create cause for salmonid migration. Poor foraging areas, with substrate containing mostly fine materials. Inadequate for salmonid spawning.

The U.S. Fish and Wildlife Service indicated that brook trout inhabit large and small lakes, rivers, streams, creeks, and spring ponds and prefers cover such as boulders and logs, where it is protected from strong currents and predators. Brook trout need high quality water and are sensitive to low oxygen, pollution, and changes in pH. Warm summer temperatures and low water flow rates stress brook trout, especially larger fish (U.S. Fish and Wildlife Service website, January 9, 2020). There is a recognized relationship between annual flow regime and the quality of trout habitat, with the most critical period being the base flow (lowest flows of late summer to winter): a base flow ≥55 percent of the average annual daily flow is considered excellent, a base flow of 25 to 50 percent is considered fair, and a base flow of < 25 percent is considered poor for maintaining quality trout habitat (Raleigh, 1982). A study completed by Ecret and Mihuc (2013) also indicated that water depth was the most prominent habitat variable exhibited for brook trout habitat use. Multiple size classes were more prevalent in pool habitats and were also found to occupy significantly deeper stream areas when compared to overall habitat availability. The 2018 fish and fish habitat baseline review completed for watercourses surrounding the BHSL concluded that overwintering habitat and habitat at low flow were largely absent, with very few large accessible pools noted, and a lack of water depth in most of the watercourses assessed at the site consistent with base flow conditions that are considered poor for maintaining quality trout habitat.

In addition to flow conditions, Raleigh (1982) indicated that brook trout deposit fertilized eggs in reeds excavated in stream gravels, and spawning success is related to the amount of fine sediments present in the watercourse. Suitable spawning gravel conditions were coarse sediments, gravel sizes of 3-8 centimetre (cm) with ≤5 percent fines. The fish and fish habitat baseline review completed in 2018 indicated that all site watercourses had at least 20 percent fines, and 15 of the 19 watercourses had substrates estimated to consist of ≥40 percent fines. This provides another line of evidence that the watercourses currently surrounding the BHSL are unlikely to provide suitable rearing habitat to support a substantial brook trout population.

Ecret, J. and Mihuc, T. B. (2013). Brook Trout (Salvelinus fontinalis) Habitat Use and Dispersal Patterns in New York Adirondack Mountain Headwater Streams. Northeastern Naturalist, 20(1), 19 36.

Raleigh, R. F. 1982. Habitat suitability index models: Brook trout. U. S. Dept. Int., Fish Wildl. Servo FWS/OBS 82/10.24. 42 pp.

WSP. 2018. Boat Harbour Remediation Planning and Design. Fish and Fish Habitat Baseline Review.

2.13 IAAC-13

The parameters listed on page 3-41 of the EIS includes all contaminants that have shown elevated concentrations amongst the site historical and recent leachate/effluent data; and these parameters are considered for site monitoring during and post remediation and in the design of the containment cell.

As a conservative measure when designing the containment cell liner system, the worst-case results from bench/pilot scale testing were evaluated against the NSE Tier 2 Table 3 Groundwater Discharge to Surface Water (Greater than 10 m from Surface Water Body, Marine). Through this comparison, only lead, zinc, and Total Petroleum Hydrocarbons (TPH) (Lube) exceeded the groundwater criteria. The presence of TPH (Lube) was attributed to the highly adsorptive TPH fractions that are not considered to mobilize into liquid phase long-term.

The forecasted leachate quality was projected based on the pilot scale testing results and reflects the maximum concentrations from Geotube® dewatering effluent grab samples, Geotube® dewatering effluent composite samples, and dewatered sludge Synthetic Precipitation Leaching Procedure (SPLP). Bench scale testing results were not used in the forecasted leachate quality as some of the methods and additives used in bench scale testing were not selected for pilot scale testing nor full scale remediation. The forecasted leachate quality is presented in Table 2.1 on the following page, meets NSE groundwater criteria with the exception of TPH (Lube) and will be included in the supporting documentation for the IA application.

Table 2.1 Forecasted Leachate Quality Response to IAAC-13 Boat Harbour Remediation Planning and Design Pictou Landing, Nova Scotia

Parameters	Units	NSE Tier 2 Table 3 GW Discharge to SW > 10m from SW Body, Marine	Pilot Testing Geotube Effluent (Grab)		Pilot Testing Geotube Effluent (Comp)		Pilot Testing Dewatered Sludge SPLP		Forecasted Leachate Basis of Design - Cell and TLTS Maximum - Worst Case	Forecasted Leachate Typical Average Quality
			Max	Average	Max	Average	Max	Average		
General Chemistry										
Cyanide	µg/L	10	1.1	1.1	1.3	1.2			1.3	1.2
Metals										
Mercury	µg/L	0.16	0.025	0.025	0.058	0.040	<0.0020	<0.0020	0.058	0.033
Methyl mercury	ng/L	0.04	<0.004	<0.004	0.027	0.016			0.027	0.016
Aluminum	µg/L		12000	5019	4400	2063	100	80	12000	2387
Arsenic	µg/L	125	2.9	1.8	1.4	1.4	<2	<2	2.9	1.6
Barium	µg/L	5,000	170	109	130	116	170	165	170	130
Cadmium	µg/L	1.2	0.33	0.12	0.5	0.225	<0.30	<0.30	0.5	0.175
Chromium	µg/L	15	2.5	1.8	3.8	2.5	<2	<2	3.8	2.1
Copper	µg/L	20	3.1	3.1	11	11	<2	<2	11.0	7.1
Lead	µg/L	20	2.9	2.0	3.3	2.2	<0.50	<0.50	3.3	2.1
Nickel	µg/L	83	2.5	2.5	3.1	3.1	<2	<2	3.1	2.8
Silver	µg/L	15	0.11	0.11	0.14	0.14	<0.50	<0.50	0.14	0.13
Thallium	µg/L	213	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0	0
Uranium	µg/L	1,000	0.30	0.23	0.17	0.17	<0.10	<0.10	0.30	0.20
Vanadium	ug/L	500	6.5	4.8	6.7	4.4	3.2	3.1	6.7	4.1
Zinc	ug/L	100	28	16.3	39	29	6.2	5.8	39	17
Chromium VI (hexavalent)	ug/L		<0.5	<0.5	<0.5	<0.5			0	0
Petroleum Products										
Methyl tert butyl ether (MTBE)	µg/L	50,000	<10	<10					0	0
Benzene	µg/L	4,600	<1	<1	<1	<1			0	0
Toluene	µg/L	4,200	<1	<1	<1	<1			0	0
Ethylbenzene	µg/L	3,200	<1	<1	<1	<1			0	0
Xylenes (total)	µg/L	2,800	<2	<2	<2	<2			0	0
Total Petroleum Hydrocarbons (C6-C10) Less BTEX - Gas	µg/L	13,000	10	10	<10	<10			10	10
Petroleum hydrocarbons F2 (C10-C16) - Fuel	µg/L	840	720	690	86	74	<20	<20	720	382
Total Petroleum Hydrocarbons (>C16-C21) - Fuel	µg/L	840	530	400	180	137	<20	<20	530	269
Total Petroleum Hydrocarbons (C21-C32) - Lube	µg/L	100	1500	1070	590	360	<50	<50	1500	715
Total Petroleum Hydrocarbons - Modified - Tier 1 - Gas/Fuel/Lube	ug/L		2700	2150	850	570	<50	<50	2700	1360
Dioxins & Furans										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	pg/L				<1.14	<1.14			0	0
TOTAL TOXIC EQUIVALENCY	pg/L	120			3.01	2.53			3.01	2.5
SVOAs										
1-Methylnaphthalene	µg/L	10			<0.05	<0.05	0.052	0.052	0.052	0.052
2-Methylnaphthalene	µg/L	20			<0.05	<0.05	0.081	0.070	0.081	0.070
Acenaphthene	µg/L	60			<0.02	<0.02	0.043	0.032	0.043	0.032
Acenaphthylene	µg/L	60			<0.01	<0.01	<0.01	<0.01	0	0
Benzo(a)pyrene	µg/L	0.1			0.015	0.015	<0.01	<0.01	0.015	0.015
Chrysene	µg/L	1			<0.03	<0.03	<0.01	<0.01	0	0
Fluoranthene	µg/L	110			0.035	0.028	0.017	0.015	0.035	0.021
Fluorene	µg/L	120			0.029	0.025	0.047	0.042	0.047	0.033
Naphthalene	µg/L	14			<0.2	<0.2	0.26	0.26	0.26	0.260
Phenanthrene	µg/L	46			0.037	0.023	0.045	0.040	0.045	0.031
Pyrene	µg/L	0.2			0.053	0.034	<0.01	<0.01	0.053	0.034
Fish Toxicity, Rainbow Trout Acute Lethality	(Pass/Fail)				Pass	Pass			Pass	Pass

2.14 IAAC-14 (Originally Submitted as GHD Memorandum-90, October 2021)

IAAC-14 requested more detailed information be provided on the baseline conditions in the Estuary and the Northumberland Strait shorelines immediately outside of the mouth of BH, including a discussion of the impacts from both water column increases in TSS and deposition of sediment on marine water quality, marine plants, marine fauna, federally and provincially listed marine species at risk, and fisheries resources. Further, IAAC-14 requested the results of WSP 2020 Coastal Hydraulic Modelling Report in Appendix Z of the EIS be used to update the effects assessment of surface water, marine environment, and fish and fish habitat, where required.

To address IAAC-14, data collected from the Estuary and Northumberland Strait as part of baseline conditions evaluations completed between 2017 and 2020 and included in the EIS document have been consolidated and summarized in the following sections. In addition, an additional desktop review of baseline environmental conditions in the Estuary and Northumberland Strait was completed and summarized in the following sections. Based on the results of the modelling study completed by WSP in 2020 to characterize the effect of tidal action following completion of remediation and removal of the BHETF dam (WSP, 2020), supplemental modelling was completed by GHD in 2021 (Appendix B of this document). GHD held a workshop with modellers and biologists to review potential options for mitigating elevated TSS concentrations at the model domain. The objective of the supplemental modelling was to assess mitigation measures to reduce the time to equilibrium and TSS concentration in water entering the Northumberland Strait post dam removal. The findings of the supplemental modelling and desktop review were used to report on the impact assessment of marine components (i.e., plants, benthic, fish), update significance determination and further define pre and post dam removal compliance monitoring. Results of the supplemental modeling completed by GHD (Appendix B of this document) and updated significance determination are summarized in the bullet points below and further details provided in Section 2.14.7 of this report below:

- Supplemental modelling repeated scenarios assessed by WSP (2020) with comparable results with respect to TSS concentrations and sediment mobilization following dam removal.
- A total of four dam removal scenarios were modelled (plus several sub-scenarios) and all modelled scenarios show a substantive reduction in TSS concentrations (>50 percent reduction) within 5 to 10 days of dam removal.
- Supplemental modelling demonstrated potential additional mitigation measures, specifically the addition of bed scour protection in the Estuary channel, can reduce the volume of sediment released and TSS concentrations in the Northumberland Strait following dam removal activities by >50 percent compared to the original modelling completed by WSP (2020).
- Supplemental modeling indicated potential additional mitigation measures such as bed scour protection can reduce TSS concentrations to within historical background conditions within 20 days and the nominal 25 milligrams/Litre (mg/L) within approximately 140 days of dam removal.
- The modeling results along with updated effects evaluation demonstrate planning for dam removal in the late fall or early winter season (outside ecologically sensitive breeding and migration windows as well as commercial fishing/harvesting seasons) can further mitigate potential negative effects of short-term increases in TSS immediately following dam removal with concentrations returning to seasonal background conditions in the Northumberland Strait within 20 days of dam removal
- Seasonal background TSS concentrations, specifically late fall, and early winter, in the Northumberland Strait adjacent to the Estuary to be verified with field measured TSS concentrations prior to dam removal.
- With the above measures in mind, the residual environmental effects characteristics were reviewed for the surface water, marine and fish and fish habitat Valued Components (VCs) with respect to the removal of the dam activity. It was determined that the frequency be modified from "Once" to "Regular" to better match the tidal influence that will occur. It should be noted though that the duration and reversibility remain "short-term" and "reversible", respectively for those effects characteristics.

– Based on the model results, the application of additional potential mitigation measures, and confirmation that the residual effects remain short-term and reversible, the residual effects to surface water, marine environment, and fish and aquatic habitat as a result of the dam removal are not significant.

2.14.1 Baseline Conditions

The following summarizes the review that was completed to address baseline information on the habitat characteristics of the Estuary and Northumberland Strait area near the BHETF requested as part of IAAC-14.

2.14.1.1 Sediment Chemistry

2.14.1.1.1 Estuary

Stantec Consulting Limited (Stantec) (2016) conducted sediment sampling in the Estuary in 2016. Eight sediment samples were collected from six locations in the Estuary and submitted for analysis of volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs), dioxins and furans, polychlorinated biphenyls (PCBs) and total metals. Concentrations of PAHs (acenaphthene, anthracene, fluorene, phenanthrene), PHCs, metals (Mn, Zn), and dioxins and furans (D/F) exceeding NSE EQS and CCME Probable Effects Levels (PELs) were present in the Estuary.

GHD completed a Phase 2 Environmental Site Assessment (ESA) in 2017 (Appendix Y of the EIS) that included 11 sediment samples plus two duplicate sediment samples collected from four locations throughout the Estuary (Figure 5 of GHD Phase 2 ESA Report). As was consistent with the Phase 2 ESA sediment program for the majority of the BHETF, sediment samples were generally collected from two depths at each sediment sample location. All sediment samples collected were submitted for laboratory analysis of general chemistry, metals, PCBs, PAHs, VOCs, PHCs, fraction of organic carbon (FOC), phenols, cyanide, and D/F. One sediment sample from the Estuary was also submitted for grain size analysis, and the deeper sample(s) from each location were submitted for laboratory analysis of chlorate and chlorite, and H_2S. Concentrations of metals (Cd, Fe, V, Zn), PAHs (anthracene), PHCs, and/or dioxins and furans in sediment samples collected from the Estuary in 2017 exceeded the provincial NSE EQS. The sediment sample submitted for grain size analysis consisted of 18 percent clay, 23 percent silt, and 59 percent sand.

The Phase 2 ESA sediment sample results were evaluated as part of GHD's quantitative HHERA in 2019 (Appendix A of the EIS). Based on the results of the previous Phase 2 ESA, 21 additional sediment samples plus duplicate samples were collected from the Estuary in 2018 and 2019 and analyzed for VOCs, PAHs, D/F, metals, PHCs or FOC. Nine samples were also submitted for grain size analysis. Sediment sample locations are shown on Figure 5 of the GHD HHERA report included as Appendix A of the EIS. Concentrations of metals in the Estuary were below applicable screening guidelines (NSE EQS or United States Environmental Protection Agency [USEPA]) with the exception of aluminum, iron, lithium, manganese, and vanadium. Similarly, concentrations of PAHs were below applicable NSE EQS for sediment quality with the exception of anthracene in two samples. Concentrations of PHCs in five of the sediment samples analyzed from the Estuary exceeded NSE EQS for sediment quality. Concentrations of D/F equivalence (TEQ) for humans in Estuary sediments were detected above the CCME screening guideline protective of human health (4 picogram/gram [pg/g]) in 11 of the 27 samples collected from the Estuary (including duplicates). Concentrations of D/F TEQ for mammals, birds or fish also exceeded the NSE EQS for protection of ecological receptors (21.5 pg/g) in 11 of the sediment samples collected from the Estuary between 2018 and 2019.

2.14.1.1.2 Northumberland Strait

Jacques Whitford Environment Limited (JWEL) (2004) evaluated sediment samples collected as part of a risk assessment that was completed for sediments in BH as well as the Pictou Road area and Moodie Cove (JWEL, 2003). The concentrations of analytes in the sediment samples collected from Moodie Cove and Pictou Road were generally below the CCME Interim Sediment Quality Guidelines (ISQG), except for dioxin and furan concentrations in Moodie Cove, which were slightly elevated above the ISQG (JWEL, 2004). CCME ISQGs relate to threshold level effects, below which adverse biological effects are not expected to occur. JWEL (2004) indicated that the substrate of Pictou Road sediment was characterized by sand in the nearshore regions, progressing to larger rocks and boulders offshore, with relatively low organic matter content. These observations were indicative of a generally erosional environment, with little deposition and retention of fine-grained sediments within the study area (i.e., outer Pictou Harbour, Moodie Cove, Pictou Road) (JWEL, 2004). Sediments in the littoral zone were predominantly fine to medium-grained sands with some variation. Nearshore sediments to the east of Pictou Harbour were mainly sand and gravel (greater than 5 percent gravel). Substrate in deeper water to the northeast and east of Pictou Harbour was sandy mud (5 to 50 percent sand). These observations suggested that while there may be silt deposition in the short term in near-field areas, in the longer term, natural erosional forces and water currents will disperse the fine-grained sediments over a large area, into deeper water areas, with very little accumulation in any one area (JWEL, 2004).

A total of seven Environmental Effects Monitoring (EEM) cycles have been completed associated with the operation of the mill, but only four reports were available for review (JWEL, 1996; Stantec, 2004; EcoMetrix Inc., 2007; EcoMetrix Inc., 2016) as part of previous research completed by Romo et al. (2019). Although second, fifth and sixth EEM cycles were unavailable, second cycle results were summarized in subsequent reports using data derived from Andrews and Parker (1999) and the fifth and sixth cycle results were inferred from the seventh cycle. The first three EEM cycles aimed to provide baseline data for future cycles to compare against, and determine components required for subsequent EEM programs and focused on analyzing biological tissue for morphological or immunological endpoints (Romo et al., 2019). EcoMetrix Incorporated (EcoMetrix) completed fourth cycle EEM in 2006 (EcoMetrix, 2007). The program included sublethal effluent toxicity testing, a fish survey, a benthic invertebrate community survey as well as a sediment quality evaluation. Sediment quality was characterized for total organic carbon (TOC), carbon to nitrogen ratio (C:N), total sulphides, particle size, and redox potential (Eh) concurrent with the fish and invertebrate community surveys. The fish survey included collections in an exposure area near the mouth of the Estuary and three reference areas within the region. Benthic invertebrate collections were completed at three exposure areas (i.e., near-field [about 300 m from the Estuary outlet], the far-field [about 600 m from the Estuary outlet], and the far far-field [about 1,250 m from the Estuary outlet]) and at a series of reference stations in the vicinity of the mill. Sediment chemistry measures were similar among all sampling areas and did not indicate a mill-related pattern (EcoMetrix, 2007). TOC levels were low across the study area (0.10 to 0.25 percent) and within the range of the levels seen in past surveys (as cited in EcoMetrix, 2007). The sediments from all areas were relatively well oxygenated (Eh ~ +70 to +80 mV), had relatively low sulphide levels (on average <5 milligrams/kilograms [mg/kg]), and relatively low C:N ratios. The low sulphide levels were indicative of low rates of organic decomposition, and low C:N ratios suggested that the carbon in sediments was likely not from mill-related sources (EcoMetrix, 2007). Bottom substrates were dominated by the sand-sized fractions (generally greater than 90 percent), with smaller amounts of silt, clay, and gravel. This was confirmed by observations made during the field work as the sediments within all the sampling areas were characterized qualitatively as fine sand (EcoMetrix, 2007).

GHD collected two sediment samples from the Northumberland Strait during the 2017 Phase 2 ESA (Appendix Y of the EIS) and five sediment samples during a supplemental Phase 2 ESA in 2018 (Appendix Y of the EIS) within approximately 400 m of the mouth of the Estuary (Figure 7 of GHD supplemental Phase 2 ESA report). All surface sediment samples were obtained using a Ponar grab sampler. The concentrations of VOCs, petroleum hydrocarbons, metals, PAHs and dioxin and furans were below applicable CCME or NSE EQS screening values with the exception of PHCs ($>C_{21}$-C_{32}), which exceeded the NSE EQS at all seven sediment sample locations. Two of the seven locations had particle size analysis completed, and both were composed of 98 percent sand.

Based on the results of GHD's previous Phase 2 ESA and supplemental Phase 2 ESA, five additional sediment samples were collected from the Northumberland Strait directly adjacent to the Estuary as part of the 2018 supplemental site investigation for the HHERA and analyzed for PHCs and FOC (Figure 5 of GHD HHERA report included as Appendix A of the EIS). Concentrations of PHCs in three of the five sediment samples collected in 2018 exceeded NSE EQS sediment quality standards.

Subsequent to GHD's sampling programs, a sediment sampling program in the Northumberland Strait near the mouth of the Estuary was completed by Chaudhary et al. (2020) which included evaluation of sediment conditions at 16 additional locations. Stations were distributed along two transects (8 kilometres [km] northeast and 7 km north) from the mouth of the Estuary. Samples were analyzed for grain size, TOC, metals (As, Cd, Cr, Cu, Pb, Zn), methyl mercury and D/F. Concentrations of all parameters in the sediment samples collected were determined to be less than CCME ISQGs. Metal concentrations measured in this study were compared with studies from harbours and inlets across the region (NS; NB; Gulf of Maine, USA). Chaudhary et al. (2020) indicated that sediment metal concentrations (As, Cd, Cr, Cu, Pb, and Zn) and methyl mercury in this study were generally lower than other studies from Nova Scotia and Eastern Canada, suggesting a lack of a pollution signature from effluents derived from BH. Sediment metal concentrations in Northumberland Strait were low, implying the BHETF has worked effectively to retain contaminants from pulp mill effluents (Chaudhary et al., 2020). Migration of contaminants from BH into Northumberland Strait was undetected in stations approximately 0.5-8 km from the mouth of the Estuary. Grain size of most sediments was coarse (sand size or greater), ranging from 60-100 percent (>75 micrometre [μm]). Out of 12 samples, two mid-field samples and one far-field sample were found to have fine (silt and/or clay) grain sizes with values of 42 percent, 34 percent, and 46 percent above the sieve size of >75 μm, respectively. Chaudhary et al. (2020) concluded that this baseline study indicates limited impacts in the marine environment from historical industrial wastewater effluent discharge.

2.14.2 Marine Water Quality

2.14.2.1 Estuary

GHD's Phase 2 ESA (Appendix Y of the EIS) included three surface water samples collected from the Estuary (Figure 9 of GHD Phase 2 ESA report). The samples were submitted for laboratory analysis of general chemistry, metals, mercury, PAHs, VOCs, PHCs, phenols, cyanide, chlorate and chlorite, resins, and fatty acids, and H_2S. Surface water samples from the Estuary were below applicable screening values such as NSE EQS excluding several metals (Cd, Cu, Hg, Na, Zn), PHCs, and/or general chemistry (Cl, CN).

Based on the results of GHD's previous Phase 2 ESA programs, surface water was re-sampled as part of 2019 HHERA (Appendix A of the EIS) and included the collection of surface water samples from the three previous Phase 2 ESA sampling locations within the Estuary (Figure 5 of GHD HHERA report; Appendix A of the EIS). The samples collected were submitted for laboratory analysis of total and dissolved metals including mercury, general chemistry including hardness, alkalinity, dissolved organic carbon (DOC), D/F, and cyanide (total and free). Concentrations of metals, general chemistry parameters and cyanide were generally below applicable screening values excluding dissolved concentrations of aluminum, cadmium, iron, magnesium, manganese, and sodium. For total metals, aluminum, barium, cadmium, copper, iron, magnesium, manganese, phosphorous, sodium, and zinc were detected at concentrations exceeding the screening guidelines. General chemistry parameters were generally below screening guidelines, with the exception of dissolved chloride, which was detected above the screening guideline for two of the three samples collected in 2019. Dioxin and furan concentrations were below the screening guidelines. The screening guidelines indicated above refer to guidelines protective of human health through recreational surface water exposure and aquatic life obtained from multiple sources depending on availability, including NSE EQS potable water standards, HC drinking water guidelines, NSE EQS surface water quality standards, USEPA regional screening levels for tap water, CCME water quality guidelines, Ontario aquatic protection values, and USEPA Region 4 surface water screening values.

2.14.2.2 Northumberland Strait

A sampling program to evaluate the water quality in Pictou Harbour, Pictou Road, and Moodie Cove was undertaken by JWEL in 2002 (JWEL, 2004). Surface water samples were analysed for total metals, nutrients, pH, TSS, and PAHs. Metals analysis included arsenic, cadmium, chromium, cobalt, iron, lead, manganese, nickel, zinc, and mercury. Most of the sampling sites had concentrations of metals in surface water below screening values (obtained from a variety of national and state guidelines), except one location at Murdock Shoal (Cr = 69 micrograms/Litre [μg/L]) and one location at Mackenzie Head (Mn = 130 μg/L). All PAH compounds analyzed in water samples collected were below laboratory detection levels for all sites (<0.01 to 0.2 μg/L). Nutrient levels at all stations were either below detectable limits or only marginally above detection limits. The pH of the water ranged from 7.9 - 8.1. Overall water quality was determined acceptable, according to available screening guidelines, for the parameters sampled (JWEL, 2004).

During the EcoMetrix 2006 fourth cycle EEM (EcoMetrix, 2007), samples for water quality were collected from the Northumberland Strait at the top of the water column and at the bottom of the water column and measured for dissolved oxygen, temperature, pH, and salinity. Samples were also collected from each fish survey area and invertebrate community survey area and analyzed for DOC, TOC, total phosphorus, ammonia, and total Kjeldahl nitrogen (TKN). At the time the invertebrate community survey was implemented, there was little indication of a mill-related water quality influence. Moreover, water quality was similar in top and bottom waters indicating that the water column was well mixed across the invertebrate community survey study area (EcoMetrix, 2007). Salinity was approximately 27 ppt and the pH of the water slightly basic at approximately 8.0 to 8.1. Dissolved oxygen levels ranged from 70 to 75 percent saturation and tended to be 2 to 5 percent higher in surface waters versus bottom waters (e.g., 70 percent saturation at the bottom of the water column and 72 percent saturation at the top of the water column). Ammonia was below detection (<0.05 mg/L) at most sampling locations. In the far-field sampling area, ammonia was 0.07 mg/L and 0.08 mg/L in surface and bottom waters, respectively. TKN ranged from 0.4 to 0.5 mg/L throughout the study area. In general, total phosphorus levels were below laboratory detection limits (0.03 mg/L). In the near-field area, total phosphorus was 0.04 mg/L and 0.03 mg/L in surface and bottom waters, respectively. Measurable total phosphorus levels were also seen at Merigomish (0.04 mg/L in bottom water) and near Chance Harbour (0.03 mg/L). Based on the TOC and DOC data, organic carbon in water was in its dissolved form almost exclusively. TOC and DOC levels were the same across the study area and ranged from 2.0 to 3.0 mg/L at all invertebrate community survey sampling locations. The influence of mill effluent on some parameters was relatively obvious, as were tidal influences. The relative influence of freshwater sources was most conspicuous at West River. At the West River sampling area, salinity ranged from 0.5 (falling tide) to 14 ppt (rising tide). At Merigomish, salinity ranged from 18 (falling tide) to 26 ppt (rising tide). The lack of freshwater influence was seen at Caribou, where the salinity was in the range of 24 to 26 ppt on both the rising and falling tides. Water temperatures varied at all the sites that had freshwater inputs by approximately 5 or 6°C over the tidal cycle, whereas at Caribou, water temperatures were the same and changed only as the result of daily warming due to solar inputs. Dissolved oxygen saturation varied widely at all sites (40 to 90 percent). Total phosphorus levels were highest at Merigomish (0.7 mg/L), lower at West River (0.10 to 0.15 mg/L), and lowest at Caribou (0.04 mg/L). TOC and DOC were similar across all fish collection locations (1.0 mg/L).

GHD's Phase 2 ESA in 2017 (Appendix Y of the EIS) included one surface water sample collected from the Northumberland Strait immediately outside the mouth of the Estuary (Figure 9 of GHD Phase 2 ESA report). The sample was submitted for laboratory analysis of general chemistry, metals, mercury, PAHs, VOCs, PHCs, phenols, cyanide, chlorate and chlorite, resins, and fatty acids, and H_2S. Concentrations of these parameters in the surface water sample collected were below applicable provincial guidelines excluding several metals such as boron (1200 µg/L), cadmium (0.12 µg/L), sodium (200,000 µg/L) and general chemistry parameters of chloride (250000 µg/L) and cyanide (1 µg/L).

The above noted HHERA completed by GHD in 2019 (Appendix A of the EIS) included the collection of one additional surface water sample from the Northumberland Strait (Figure 5 of GHD HHERA report). Concentrations of D/F, cyanide, metals, and general chemistry parameters were below applicable screening values (NSE EQS or USEPA water quality standards) excluding dissolved concentrations of calcium (116,000 µg/L), magnesium (82,000 µg/L), manganese (50 µg/L), and sodium (200,000 µg/L). For total metals, aluminum (5 µg/L), boron (1200 µg/L), calcium (116,000 µg/L), magnesium (82000 µg/L), manganese (50 µg/L), phosphorous (820 µg/L), and sodium (200,000 µg/L) were detected at concentrations exceeding screening guidelines.

2.14.3 Estuary Habitat

The Estuary is classified as a marsh/saltmarsh complex. The approximate area of wetlands and open water total 10.02 hectares (ha). There is little to no tree or shrub strata in either the freshwater marsh or saltmarsh portions of this wetland complex. A floral survey of the wetland plant community was completed in 2018 and results of the survey described in Section 4.4 of the HHERA (Appendix A of the EIS). Narrow-leaf cattail and hedge bindweed are the dominant plant species in the Estuary, particularly directly downgradient of the BHETF dam discharge. This area of the Estuary is referred to as the freshwater marsh. As the Estuary transitions to a more saline environment at the channel to the Northumberland Strait, smooth cordgrass is the dominant herbaceous species (referred to as saltmarsh). The wetlands are tidally influenced with the wetland hydrology indicators being standing surface water, a high-water table, and permanently saturated soil conditions. The Estuary provides suitable habitat for smaller forage fish and may provide feeding habitat for larger predatory fish that would feed on the forage fish present. During the 2018 supplemental site investigation for GHD's HHERA, GHD field staff noted mummichogs schooling in the shallow water areas of the Estuary. These same observations were reported by WSP and Dalhousie University representatives during previous investigations (personal communications). The freshwater/saline gradient at the mouth of the Estuary likely limits the number of resident fish species that would use the Estuary to those that are tolerant of brackish and fresh waters (e.g., mummichogs). The Estuary is connected to the Northumberland Strait by a 14 m wide and 40 m long channel.

2.14.3.1 Fish

EcoMetrix completed fourth cycle environmental effects monitoring in 2006 (EcoMetrix, 2007). As part of the pre-design phase of the first cycle EEM, fisheries resources were identified and reported in detail in the Cycle 1 Pre-Design Report (JWEL, 1993). An updated summary of this information was provided in subsequent cycle EEM reports. Large numbers of silversides (*Menidia menidia*), mummichogs (*Fundulus heteroclitus*), and sticklebacks ([F] *Gasterosteidae*) could be found on the downstream side of the effluent outfall.

An assessment of BH’s fish population completed by Hoover et al. (2020) identified four fish species in the Estuary, including mummichog, ninespine stickleback, tomcod, and white perch, with most of the fish captured being mummichogs. GHD completed supplemental site investigations in fall of 2019 which included attempting to collect samples of larger (edible size) fish that may be present in the Estuary. Mummichog were the primary fish species collected, with striped bass observed to be migrating in and out of the Estuary with the tide cycle. The striped bass observed and collected from the Estuary in 2019 were identified to be feeding on the mummichogs present in the Estuary. In addition to the Estuary sampling, fish surveys of the BHETF, surrounding wetlands and tributary watercourses were completed between September 23 and October 10, 2019, to identify, enumerate, and characterize the fish community (Hoover et al., 2020). The results of the fish habitat surveys and sampling programs are described in Section 7 of the EIS with the sampling results provided in Table 7.1-31 of the EIS. Additional clarification on the sampling programs completed and corresponding results was also provided in responses to IRs IAAC-06, IAAC-08, IAAC-09, IAAC-10 and IAAC-12 previously submitted to the Impact Assessment Agency of Canada (IAAC) in September 2021 (NSLI, 2021), and included in this document.

2.14.3.2 Benthic Invertebrates

As part of GHD's HHERA (Appendix A of the EIS), five sediment samples were collected from the Estuary in 2018 for benthic invertebrate community characterization. The benthic invertebrate community characterization work completed during the 2018 supplemental site investigation focused on collection of samples in the open water areas of the Estuary using bulk sediment sampling methods (petite Ponar grab sampler). This sample collection methodology produced very few benthic organisms (similar results were encountered in the BHETF Freshwater Wetlands and reference wetland). Therefore, the 2019 supplemental site investigation work focused on benthic invertebrate sampling in the vegetated areas of the Estuary using the Canadian Aquatic Biomonitoring Network (CABIN) protocol termed the "sweep method" (CABIN Wetland Macroinvertebrate Protocol, Environment and Climate Change Canada [ECCC], 2019) to allow for comparison with the reference data. Seven samples for benthic invertebrate community characterization were collected from the Estuary in 2019. Samples collected using the petite Ponar grab sampler in 2018 contained very few benthic organisms. The results of the 2019 sampling using the sweep method resulted in invertebrate abundance that ranged from seven to 195 individuals per sample. Taxon richness ranged from four to 12 taxa per sample. Dominant taxa in the Estuary were *Chironomus* sp. and *Ostracoda* sp.

2.14.4 Northumberland Strait Habitat

WSP completed a desktop review of previous reports that described several characteristics pertaining to the marine environment found near the BHETF (i.e., the Pictou Road shoreline) (WSP, 2018; Appendix BB of the EIS). Substrate in this area was identified to be sand, consistent with previous studies. The review also indicated extensive kelp beds do not form due to extreme fluctuations of water temperature, the erosion caused by sea ice, and generally turbid water. Some sheltered areas and small coves were assessed for biodiversity by JWEL in 2005 (as cited in WSP, 2018); seaweed species, such as rockweed (*Fucus serratus*) and red seaweed (*Furcellaria fastigiata*) were noted. Surveys at the mouth of the Estuary showed presence of softshell clam (*Mya arenaria*), oysters (*Crassostrea virginica*), blue mussels (*Mytilus edilus*), razor clams (*Ensis directus*), periwinkles (*Littorina littorea*), sand dollar (*Echinariachaius parma*), as well as seaweed species, such as water gut (*Entermorpha intestinalis*) and sea lettuce (*Ulva lactuca*). Visual surveys of the substrate found near the mouth of the Estuary showed no significant build-up of fine-grained sediment associated with historical effluent discharge and that deposited sand covered the bottom. This finding was also consistent with the findings of the sediment sampling program completed by Chaudhary et al. (2020) in the Northumberland Strait near the mouth of the Estuary.

In the summer of 2016, the Applied Geomatics Research Group of the Nova Scotia Community College used lidar to survey Pictou Harbour sediment and habitat conditions (Webster, Collins, and Vallis, 2017) (Appendix BB of the EIS). As discussed in response to IR IAAC-17 submitted to IAAC in September 2021 (NSLI, 2021) and in the EIS, the objective of this survey was to collect baseline information on the geomorphology and ecology of Pictou Harbour to characterize the coastal environment and develop a hydrodynamic model to stimulate baseline current flow, water level variations and water circulation with outer Pictou Harbour. Figures 3-17 through 3-21 presented in Section 3 of the EIS show the bottom type of classification and eelgrass distribution in the Pictou Harbour area. Specifically, Figure 3-19 shows the agreement between classification and ground truth points collected for bottom cover type and Figure 3-21 shows the presence and absence of submerged aquatic vegetation and agreement between classification and ground truth points. In general, the bottom type outside of the Estuary was a combination of sand and mud containing brown algae (*Fucus* sp.) and areas of eelgrass. The water appears mainly clear in the inner bay, northwest of Pictou. Towards Pictou Landing, on the eastern side of the study area, the water was darker, and the bottom appears to be composed mainly of mud and sand with a small amount of algae present (Webster et al., 2017). The information from this study aids in supporting conclusions drawn from other reports to characterize the eelgrass bed locations to monitor as well as identify changes and any potential impacts during remedial activities.

Additional historic information on habitat conditions in the area was also obtained from an underwater benthic habitat survey completed in 2005 at the Pictou Landing Small Craft Harbour in Pictou Harbour (AMEC, 2006). This small craft harbour is located within the Regional Study Area (RSA). Flora identified in the survey included eelgrass (*Zostera marina*), filamentous algae (*Phaeophyta* sp.), rockweed (*Ascophyllum nodosum*), knotted wrack (*Fucus* sp.), and kelp (*Laminaria* sp.). Fauna identified in the survey included green crab (*Carcinus maenas*), mysid shrimp (*Praunus flexuosus*), and barnacle (*Balanus* sp.).

The desktop review completed by WSP in 2018 (WSP, 2018) in addition to discussions with Department of Fisheries and Oceans officials indicated commercial fisheries in the Pictou Road area of the Northumberland Strait consisted mostly of American lobster (*Homarus americanus*), Atlantic herring (*Clupea harengus*), rock crab (*Cancer irroratus*), scallops and American eel (*Anguilla rostrata*). Historically, Atlantic cod (*Gadus morhua*) and redfish (*Sebastes* sp.) were fished in this area, but less so in recent years (WSP, 2018).

2.14.4.1 Fish and Shellfish

EcoMetrix completed the fourth cycle EEM in 2006 (EcoMetrix, 2007). As part of the pre-design phase of the first cycle EEM, fisheries resources were identified and reported in detail in the Cycle 1 Pre-Design Report (JWEL, 1993). An updated summary of this information was provided in subsequent cycle EEM reports. Diversity within the intertidal zone was limited to a number of shellfish species, and these are generally found in areas that remain wetted, though not inundated, under most tidal conditions. Common shellfish in the area include the soft-shelled clam, blue mussels, horseshoe mussels, oysters, razor clams, surf clams (*Spisula solidissima*), and moon snails (*Polinices heros*). Hermit crabs can also be found. The subtidal fish community includes shellfish, groundfish, pelagics and finfish. Shellfish commonly found in soft-bottom subtidal habitats are the same as those found in the intertidal area, although they tend to be less abundant than in the intertidal area. Some of the shellfish species found in the rocky reefs that predominate along the north-west shoreline of Pictou Road near Logan's Point include American lobster and rock crab. Common groundfish in the area include flounders (e.g., winter flounder, *Pseudopleuronectes americanus*), hake (*Urophycis* sp.), tomcod *(Microcadus tomcod)*, and skates (*Raja* sp.). Groundfish common specifically in hard-bottom areas include cunners (*Tautogolabrus adspersus*) and longhorned sculpins *(Myoxocephalus octodecemspinosus*). Fish that utilize the area on a seasonal basis include mackerel (*Scomber scombrus*), herring, alewife (*Alosa pseudoharengus*), smelt (*Osmerus mordax*), American eel, sea-run brook trout (*Salvelinus fontinalis*), and Atlantic salmon (*Salmo salar*).

The 16 sediment sampling stations included in the study completed by Chaudhary et al. (2020) also included collection of American lobster and rock crab and subsequent laboratory analysis of tissues for metals, methyl mercury and D/F. Blue mussels were also collected from eight sampling stations along the coastline of Pictou Harbour to a maximum distance of 7.5 km from BH. Results of the study indicated there was no significant impact on marine biota, except for exceedance of arsenic in lobster and rock crabs which is naturally elevated in water and sediments across Nova Scotia (Chaudhary et al., 2020). Considering the economic importance of fishing in the Northumberland Strait, it was suggested that the sediment and shellfish samples collected as part of this study could be used as a baseline for future sediment and biota monitoring (using the same species as this study) following completion of the BHRP.

2.14.4.2 Benthic Invertebrates

During the EcoMetrix 2006 fourth cycle EEM (EcoMetrix, 2007), benthic invertebrate collections were completed at three exposure areas (i.e., near-field, far-field, far far-field) and at a series of reference stations in the vicinity of the Kraft Pulp Mill (Mill). Total invertebrate density in the near-field area was in the range of about 1,100 to 2,500 animals/square metres (m^2), with a mean density of 1,954 animals/m^2. A total of 35 distinct invertebrate taxa were identified in the near-field. Taxa richness ranged from 14 to 20 animals/sampling station with a mean richness of 17. Numerically, polychaete worms and clams were dominant and comprised on average greater than 90 percent of total benthic invertebrate density. Total invertebrate density in the far-field area was in the range 3,700 to 5,200 animals/m^2, with a mean density of 4,530 animals/m^2. A total of 47 distinct invertebrate taxa were identified in the area. Taxa richness ranged from 20 to 25 animals/sampling station with a mean richness of 22. Numerically, worms and clams were dominant and comprised on average greater than 90 percent of the benthic invertebrate density. Snails comprised a further 7.5 percent of total abundance. Total invertebrate density in the far far-field area was variable in the range of about 3,500 to 15,500 animals/m^2, with a mean density of 7,255 animals/m^2. A total of 68 distinct invertebrate taxa were identified in the area. Taxa richness ranged from 19 to 41 animals/sampling station with a mean richness of 22. Numerically, polychaetes, clams, and snails were dominant and comprised on average greater than 97 percent of benthic invertebrate density.

A list of species identified in the Pictou Road area of the Northumberland Strait was compiled by Stantec (formerly JWEL) in 2004 and is provided in Table 7-1.32 of the EIS.

2.14.4.3 Marine Mammals and Reptiles

Section 7.1.6.1.3 of the EIS as well as the response to IR IAAC-24 provide a detailed discussion on the potential presence and temporal occupation of the marine mammals including at-risk marine species in the Northumberland Strait and Gulf of St. Lawrence area. Based on a desktop study complete by WSP (2019) and described in the EIS, there is low potential for marine mammals to be present in the Project Study Area at any time of the year with the exception of porpoises, Minke Whale (*Balaenoptera acutorostrata*) and seals. The potential presence of marine mammals was evaluated as "high" for Grey Seal (*Halichoerus grypus*), "moderate" for Minke Whale and Harbour Seal (*Phoca vitulina*), and "low" for Hooded Seal (*Cystophora cristata*). Dolphins (*Delphinus*) and Harp Seal (*Pagophilus groenlandicus)* are the least likely to be encountered. Other non-toothed whales, such as the Blue Whale (*Balaenoptera musculus*), the Fin Whale (*Balaenoptera physalus*) and the North Atlantic Right Whale (*Eubalaena glacialis*), are highly unlikely in the Project Study Area.

The chance that Leatherback Sea Turtles (*Dermochelys coriacea*) would occur at the Site was assessed to be "low to moderate". Appendix BB of the EIS includes a copy of the entire marine desktop study completed by WSP which is also summarized in response to IAAC-24.

2.14.5 Total Suspended Solids

The Northumberland Strait is characterized as having high naturally occurring suspended matter, resulting from a high production of phytoplankton and periodic resuspension of sediments. With respect to the latter, the Northumberland

Strait also has a highly dynamic sedimentary regime, due to strong winds and tidal currents (Kranck, 1971; Kranck, 1972; Rice et al., 1989). Bottom sediments are continuously being reworked and redistributed as a result (Kranck, 1972). The Northumberland Strait was referred to as the "la mer rouge" by early French colonists due to the high concentration of suspended red silt and clay influenced by strong tidal currents and water turbulence (Brookes, 2015). In addition, historical visual and anecdotal evidence from local residents suggest there are periods with high TSS and turbidity during strong winds or storm events in the Northumberland Strait. See Photograph A below of the Northumberland Strait taken approximately 20 km northwest of the Estuary in August 2021, and Photograph B below taken at Pauley Beach on the Northumberland Strait in August 2021 (approximately 90 km northwest of the Estuary). Both photograph locations are on the Nova Scotia side of the Strait.

Photograph A – Courtesy of Tony Walker

Photograph B – Courtesy of Peter Oram

Suspended matter concentrations within the Northumberland Strait vary with geographical area, seasonality, weather, and tides (Bugden et al., 2007; Rice et al, 1989). Tidal currents and flows in coastal areas of the Northumberland Strait are strongly dependent on tidal circulation, nearshore bathymetry, and topographic features of the shoreline (Stantec, 2017). Current velocity is the main factor influencing resuspension, transport, and dispersion of suspended particulates. Current velocities are increased by high winds and storm events which, therefore, impact the movement of suspended particles. During storms and spring tides, the surficial sand layer at the bottom of the entire Northumberland Strait may be disturbed, as reported by Kranck (1971). In addition to resuspension of bottom sediments during storm events and spring tides, the concentration of suspended sediments is influenced by semidiurnal and diurnal tides, freshwater flow, ecological and climate changes, fishing practices (i.e., draggers) and other anthropogenic disturbance (i.e., dredging) (Jacques Whitford et al., 2005). The processes which affect sediment resuspension, transport, and deposition in aquatic systems are well understood; however, the specifics of the processes in the Northumberland Strait are not well studied or understood (AMEC, 2007).

Regional trends in the Northumberland Strait indicate sediment deposition is influenced by tidal current energy in the Strait system. Stronger tidal currents (i.e., zones of high energy) prevent the deposition of muddy sediments. Thus, mud deposits only occur in the wider areas of the Northumberland Strait, such as near the Site, while sand and gravel sediments settle in the narrow sections. Despite studies completed to understand sediment classification and transport within areas of the Strait, there is no broad understanding of overall suspended sediment conditions (concentrations, transport, and deposition) in the open water areas of the Northumberland Strait (AMEC, 2007).

Erosion of sediments near the foundation of the Confederation Bridge (constructed in 1993) in the Northumberland Strait has been identified as an area of concern in terms of far-field deposition of sediments and high TSS. Local fishers in the area reported observations of sediment plumes up to 1.5 km away from the Confederation Bridge (AMEC, 2007). A study by Dr. Ollerhead (2005) assessed suspended sediment in the central part of the Northumberland Strait through the collection and analysis of water column samples. His study indicated an average TSS concentration of 30 mg/L, more than double the previously recorded average concentration over the past decades of 12 mg/L. Ollerhead confirmed reports of sediment plumes and increased turbidity by local fishers. Further, there is also evidence of sediments being deposited on the bottom of the Northumberland Strait and on fishing gear deployed in the vicinity of the Confederation Bridge.

Data obtained from the Marine Environmental Effects Monitoring (MEEM) program conducted between 1992 – 1998, including collecting water samples and analyzed monthly from May to November of each year, made several conclusions (JWEL, 2005). General conclusions were that TSS generally ranged from 5 mg/L to 25 mg/L but shallow nearshore waterbodies (i.e., bays and inlets) had rapid increases in TSS as a result of increased susceptibility to wind and wave events. In addition, the concentration of TSS was typically lower in the summer compared to the fall. Although typical TSS levels were generally below 25 mg/L, during storm event TSS levels were recorded as high as 50 mg/L. Further, a TSS value of 48.54 mg/L was recorded in a sample collected at the bottom of the Northumberland Strait in 1997 (JWEL et al., 2005). In summary, the results of the MEEM program indicate that TSS levels in the Northumberland Strait are highly variable and increased TSS levels commonly occur over the course of different seasons and weather conditions (JWEL et al., 2005). In addition, the sampling programs have been generally limited to a six-month window and are likely not be representative of the maximum TSS concentrations during fall or early winter storm events.

A study conducted by the Nova Scotia Department of Health and Environment in June of 1989 involved the collection and analysis of marine water samples at nearby beaches. Marine water samples were collected between Lighthouse Beach (including inside Moodie Cove and outside Pictou Road) and Sinclair's Island Beach. The study indicated TSS of 26-36 mg/L at Lighthouse Beach and 4.0-4.5 mg/L just to the east of BH, with TSS values in the Northumberland Strait ranging from 1-30 mg/L (JWEL, 1994). A sample collected in the vicinity of Pictou Harbour recorded a TSS value of 66 mg/L, higher than the typical ambient levels (Brewers and Person, 1972). Water samples collected as part of the 1989 Nova Scotia Department of Health and Environmental study were also analyzed for turbidity. Turbidity values in the Northumberland Strait typically range between 9 and 15 Nephelometric Turbidity Units (NTU). NTU is a measurement of turbidity. Turbidity and TSS are similar are they are both measuring the clarify of a liquid; however, turbidity relates to how well a light passes through liquid while TSS quantifies suspended particles (Westlab Group Ltd., 2021).

The above results show elevated turbidity and suspended solids, indicating a suspended solids plume occurring at Lighthouse Beach in the vicinity of Pictou Road (Painter and Stewart, 1992). Suspended solids were also sampled and analyzed for at Chance Harbour Beach, Sinclair's Island, and MacLennan's Camp. With water quality in these areas reported as generally acceptable; however, high suspended loads were an area of concern (Painter and Stewart, 1992). High values for suspended solids were also found in waters adjacent to Lighthouse Beach.

Further evidence supporting variable suspended solids and turbidity conditions in the Northumberland Strait is provided in a Technical Report published by Fuentes-Yaco et al. in 2020. This report highlighted the importance of including remotely sensed, ocean-colour analyses while planning and conducting LiDAR surveys, and airborne bathymetry detection data collection. This study indicated that the Northumberland Strait between Nova Scotia and Prince Edward Island is challenging for completing aerial lidar surveys due to highly variable water clarity (Fuentes-Yaco et al., 2020). Despite relatively low TSS measurements collected during surveys, completing aerial lidar surveys in the Northumberland Strait is difficult due to high variation in water clarity. This high variability in water clarity demonstrates the similarly highly variable nature of suspended matter.

Supplemental marine studies completed as part of the Environmental Impact Assessment (EIA) for the PEI-NB Cable Interconnection Upgrade Project aimed to investigate sediment deposition/transport and water column turbidity during Project Activities. Results of TSS analysis indicated higher values observed in near bottom samples, in comparison to surface or mid-water. Similar conclusions were presented in Fuentes-Yaco et al. 2020 technical report, where total suspended matter (TSM) measurements collected in-situ at three stations and three depths in the Northumberland Strait in 2016 showed the middle and bottom layers with higher turbidity than the surface (Fuentes-Yaco et al., 2020).

In addition to the myriad factors described above (e.g., tides, storms, currents), aquatic vegetation can also affect resuspension and settling of suspended sediments. Eelgrass has a degree of morphological plasticity which allows it to adapt and survive when conditions in their environment are changed (Plaisted et al., 2020). Seagrass beds have the capacity to improve water quality and clarity, including turbidity, through trapping of suspended particles, nutrient uptake and retaining organic matter, during periods of time when suspended particle concentrations are higher, to aid in their long-term survival (Moore, 2004). Growing together in beds of shallow water can also trap suspended particles, and aid in stabilizing sediments (Plaisted et al., 2020).

For context, the quantities of sediment dredged/dumped during construction of Confederation Bridge were estimated at 300,000 cubic metre (m^3) (Rice et al, 1989). In addition, the total volume of sediment to be released during this Project must also be reviewed in context of total sediment transport (bed load, suspended load) occurring naturally from coastal erosion, reworking of existing sediments and import from rivers. As described above by Kranck (1971), the distribution of sediments in the Northumberland Strait is a function of tidal currents. Areal distribution indicates that fine sediments (<0.018 mm) are being deposited as a blanket over older sediments in areas where tidal currents are less than 0.5 knots, while sand and gravels occur in areas where currents exceed this value. In addition to tidal redistribution of sediments, Rice et al. (1989) indicated that fluvial erosion of the unresistant sedimentary bedrock in the area is a source of sand-size sediment that contribute to the littoral sand transport. This process contributes approximately 100,000 to 200,000 m^3 of sediment to the littoral system annually.

2.14.6 Supplemental Coastal Hydraulic Modelling

As indicated above, WSP previously undertook a numerical modelling study to characterize the effect of tidal action following completion of remediation and removal of the BHETF dam (WSP Canada Inc., 2020; Appendix Z of the EIS). WSP study objectives were to: a) assess the time required for salinity levels to reach equilibrium conditions; b) assess the magnitude of sediment resuspension and the time required for suspended sediment levels to drop to equilibrium conditions, and c) assess the magnitude and duration of morphological changes induced in the BH entrance channel. The main outcomes of the WSP study are provided in Appendix Z of the EIS and summarized in the October 2021 memorandum prepared by GHD and included in Appendix B of this document (Supplemental Coastal Hydraulic Modelling of Mitigation Measures to Reduce TSS Concentration in Water Entering the Northumberland Strait, BHRP; GHD Memorandum-89). In addition, GHD completed further numerical modelling in 2021 to assess mitigation measures to reduce the time to equilibrium for TSS concentration in water entering the Northumberland Strait post dam removal. The results of the revised sediment modelling completed by GHD is also presented as Memorandum-89 in Appendix B of this document.

GHD carried out numerical modelling using both the Delft3D software package and the 2-dimensional component of the HEC-RAS software version 5.0.7 (USACE, 2016). The Delft3D software package was used to assess changes in salinity concentrations, bed morphology, and TSS concentrations as well as to derive parameters of interest for the design of embankment and bed erosion protection. The 2D HEC-RAS model was used as a check for the tidal hydrodynamic results and to expedite the process of deriving parameters of interest for the design of embankment and bed erosion protection.

The supplemental modelling completed by GHD assesses alternatives to the remediation configuration in the WSP Report (2020). The alternatives assessed in this report include:

1. Widening the channel hydraulic opening at the location of the Dam to the original shorelines – and protect the slopes and bed against scouring.
2. Dredging the inlet channel through the barrier beach to 34 m wide and an additional 1 m in depth and protecting the slopes and bed against scouring.
3. Protecting Estuary channel bed against scouring.

The bullets below summarize the description of each scenario assessed in the Supplemental Coastal Modelling report (Appendix B of this document). The resulting parameters of interest for embankment and bed scouring protection and resulting changes in TSS concentrations and bed morphology development are presented in Sections 2.14.6.1 and 2.14.6.2 below. The description of the scenarios are:

A. Scenario A
    - Original Scenario in the WSP Report
B. Scenarios B
    - The hydraulic passage at the location of the Dam is widened to original shoreline position. Bed scouring protection is added.
    - The Inlet Channel through the Barrier Beach is kept at its original geometry. Two variants are considered: B1) No embankment and no bed scouring protection; B2) Adding embankment and bed scouring protection.
C. Scenarios C
    - The hydraulic passage at the location of the Dam is widened to original shoreline position. Bed scouring protection is added (as per Scenarios B).
    - The Inlet Channel through the Barrier Beach is enlarged. Two variants are considered: C1) No embankment and no bed scouring protection to the enlarged channel; C2) Adding embankment and bed scouring protection to the enlarged channel.
D. Scenarios D
    - The hydraulic passage at the location of the Dam is widened to original shoreline position. Bed scouring protection is added (as per Scenarios B and C).
    - The Inlet Channel through the Barrier Beach is enlarged and embankment and bed scouring protection is added (as per Scenario C).
    - Bed scour protection is added to the Estuary channel and into BH.

Results regarding TSS concentration and bed level development are summarized below as they relate directly to information request for IAAC-14.

2.14.6.1 TSS Concentration

Dam removal and the reintroduction of tidal influence to BH increases flow through the inlet and Estuary channels, which ultimately triggers scour and sediment resuspension in the entrance channel and the northern sections of BH. The suspended sediment is transported by tidal action throughout BH and offshore into the Northumberland Strait. A

TSS compliance threshold of 25 mg/L was assumed by WSP for potential suspended sediment releases into the marine environment. The same threshold of 25 mg/L, as well as background concentrations and the allowable limit of 25 mg/L above background, was considered for the supplemental modelling and analysis.

Following dam removal, TSS concentrations are elevated throughout BH, the inlet channel, and the Northumberland Strait. WSP's 2020 Coastal Hydraulic Modelling results (Appendix Z of the EIS) show that the TSS concentrations in BH gradually decline over a period of months due to settling within BH, dilution with relatively clear water from the Northumberland Strait during flood tides and dispersion in the Northumberland Strait on ebb tides. Results of Scenarios B – C of the supplemental modelling show that TSS concentrations are about the same values as for the original BHETF scenario assessed by WSP.

Results of Scenario D show that the TSS concentrations reached equilibrium values below the threshold limit of 25 mg/L (exclusive of background) in the marine environment after approximately 140 days following dam removal (see Figure 1-8 and TSS grid maps presented in Attachment 1 of attached GHD Memorandum-89, Appendix B of this document). As indicated above, background TSS concentrations in the Northumberland Strait are highly variable and dependent on tidal currents and wind turbulence with historical TSS concentrations recorded ranging from <10 mg/L to 66 mg/L. Using historical maximum background concentrations of TSS, the threshold limit would then increase to approximately 91 mg/L and decrease the duration to reach seasonal TSS concentrations to approximately 20 days. In addition, the historical background TSS concentrations are generally based on data collected from May to November and it is not known if the data collected included evaluation of TSS during storm events or periods of sustained high winds. Based on anecdotal evidence, it is reasonable to assume that maximum background TSS concentrations during storm events, particularly during late fall or early winter, would be substantially greater than previously recorded TSS concentrations.

The supplemental modelling scenarios identified that lowering of TSS concentrations to a compliance threshold within a reasonable timeline can be attained with reasonable remediation measures. Additional monitoring and mitigation measures are described in Section 2.10.8 below.

2.14.6.2 Bed Level Development

Understanding and quantifying the trend of the bed level change in the Estuary channel and embayment is essential to defining the significance determination. The coastal hydraulic model was also used to predict the morphological change in the bed profile and to identify the areas likely to experience erosion and/or deposition. Bed level changes, resulting from the dam removal, are assumed to reach an equilibrium after about 1-year simulation period in the entrance channel and major erosional zones; and slowed to negligible rates elsewhere in the model domain. At the end of the 1-year simulation some degree of bed level evolution continues, therefore, the bed level at the conclusion of the simulation period is termed near-equilibrium, rather than equilibrium. The results of the supplemental modelling show that erosion will mostly occur in the first 1.5 km of the inlet channel cross section, with up to 2 m of erosion in that channel. The most severe erosion will occur in the vicinity of the Highway 348 Bridge, both upstream and downstream. Bed level development between post dredging and near-equilibrium conditions of BH is presented on Figure 11 in Appendix B of this document.

Sediment deposition occurs mostly in the cove just southwest of Highway 348 and adjacent to the dredged entrance channel north of the inlet. Almost no erosion or sedimentation occurs in the ASB or wetlands. As a potential mitigative measure to minimize erosion from occurring that increases sediment mobilization and elevated TSS, protecting the Estuary channel bed using medium to coarse gravel material (with particle diameters ranging from 10 mm to 30 mm) results in substantial reduction in the volume of sediment released and TSS concentrations in the Northumberland Strait following dam removal activities.

2.14.7 Updated Significance Determination

2.14.7.1 Approach and Summary

Valued Components related to the enhanced data review for marine habitats and species as well as the recent modelling were reviewed in order to complete a revised characterization of residual effects and significance determination (see Residual Environmental Effects for Surface Water, Marine Environment and Fish and Fish Habitat Tables in Appendix C of this document, that are numbered the same as in the EIS for ease of review). Overall there are very limited variations from the original EIS assessment of impact significance and they do not result in an impact that is considered to be significantly adverse. As noted elsewhere in this document, there are ongoing and proposed data collection and review elements that are leading to a further reduction of negative impacts associated with the Project, specifically reductions in TSS concentrations following dam removal activities. Options such as timing the inlet channel dredging and/or dam removal (where TSS elevation and enhanced sediment flux is predicted and modelled) during a period with reduced biological breeding, lower species occupation and dormancy for some species are planned. The detailed timing and associated positive and negative aspects will be discussed with the appropriate regulatory agencies closer to the time of the required authorizations. Specific discussions of significance and impacts associated with various aspects of the Project that relate to IAAC-14 are presented below and the updated significance determination tables from Section 7 of the EIS are included in Appendix C of this document.

The nearshore marine habitat and current flora and fauna of the embayment of the Northumberland Strait to which BH discharges are described above. In this location, changes associated with the project are primarily due to temporarily high suspended sediments and sediment deposition. Both of these changes are described in more detail in the WSP modelling report and in the recent supplemental modelling by GHD (Appendix B of this document). The potential for impacts discussed below are based on the supplemental modelling of potential mitigation measures completed by GHD that includes the benefits of armouring portions of the Estuary bottom to minimize erosion thereby reduce subsequent transport of sediments out into the adjacent Northumberland Strait habitat.

The current understanding of suspended sediment dynamics and resident biota were based on readily available information, collected specifically for this area of the Northumberland Strait. Additional regular monitoring of TSS and sediment deposition along with benthic habitat surveys and seagrass bed mapping in the nearshore Northumberland Strait will enhance our understanding of sediment dynamics in the embayment area.

As demonstrated in the supplemental modelling with the inclusion of additional potential mitigation measures, specifically the addition of bed scour protection in the Estuary channel, the volume of sediment released and TSS concentrations in the Northumberland Strait following dam removal activities will decrease by >50 percent compared to the original modelling completed by WSP (2020). With specific reference to the potential additional mitigation measures such as bed scour protection, a reduction in TSS concentrations approaching historical background conditions is predicted to occur within 20 days and the TSS concentrations would reach the nominal 25 mg/L within approximately 140 days of dam removal.

Coupling the potential mitigation measures along with seasonal planning for dam removal in the late fall or early winter season (i.e., outside ecologically sensitive breeding and migration windows as well as commercial fishing/harvesting seasons) would further mitigate potential negative effects of short-term increases in TSS immediately following dam removal with concentrations returning to seasonal background conditions in the Northumberland Strait within 20 days of dam removal.

A commitment has been made to conduct seasonal background TSS concentration surveys, specifically late fall and early winter, in the Northumberland Strait adjacent to the Estuary prior to dam removal as a confirmatory exercise to refine background TSS concentrations adjacent to the Estuary during the late fall and early winter periods.

With the above modelling results, additional potential mitigation measures and timing considerations in mind, the residual environmental effects characteristics were reviewed for the surface water, marine and fish and fish habitat VC's with respect to the removal of the dam project component. GHD determined that it would be appropriate to modify the "frequency" criteria from "Once" to "Regular" to better reflect tidal influence as it relates to TSS concentrations. It should be noted though, that our review determined that the "duration" and "reversibility" criteria should remain "short-term" and "reversible", respectively for those effects characteristics.

Based on the model results, the application of additional potential mitigation measures, and timing considerations and confirmation that the residual effects remain short-term and reversible, the residual effects to surface water, marine environment, and fish and aquatic habitat as a result of the dam removal are not significant. Further details are provided below in Sections 2.14.7.2 to 2.14.7.6 of this document.

2.14.7.2 TSS and Sediment – Marine Habitat

According to this more recent modelling of TSS in the embayment area north of the Estuary (referred to as Gauge 3), armouring reduces the time needed to attain the nominal TSS concentration, 25 mg/L, to approximately 140 days. In addition, if historical background TSS measurements from the Northumberland Strait are considered in the evaluation of the nominal allowable TSS concentration, the value could be increased to approximately 91 mg/L (or higher) which would decrease the equilibrium time to meet this discharge criteria to approximately 20 days. It should be understood that average daily TSS concentrations immediately after dam removal would be about ten times higher than the nominal 25 mg/L and approximately five times higher than the nominal TSS concentration of 91 mg/L based on historical maximum TSS concentrations recorded. Baseline TSS concentrations in the Northumberland Strait are highly variable and dependent on tidal conditions and wind turbulence. Highest TSS concentrations are typically associated with fall and early winter storm and tide events (Rice et al., 1989). Establishing seasonal or typical background TSS concentrations in the Northumberland Strait is an important consideration for the timing of the dam removal and will be the subject of additional studies associated the Project as discussed in Section 2.14.8 below.

In addition to TSS concentrations, the modelling also shows that a significant portion of the sediments eroded from BH and the Estuary will be deposited immediately in the embayment area of the Northumberland Strait (Gauge 3 area). Although there are very localized areas with higher deposition predicted, and similarly small areas of where erosion of bottom sediments is predicted, most of the modelled area of the embayment is predicted to have a net deposition of between 4 and 10 centimetres (cm). Based on this nominal increase in sediment deposition, which are similar to natural suspension and re-deposition fluxes in the Northumberland Strait (Kranck, 1971), the effects to marine habitat and biota from both TSS concentrations and sediment loading in the embayment area and other areas of the Northumberland Strait are considered insignificant. Assuming that the potential for impacts to the marine habitat is the same as the modelling domain, the potentially impacted area is only about 150 ha within the Northumberland Strait which is approximately 560,000 ha (0.02 percent of the Northumberland Strait marine habitat). In addition, the effects on water quality are transitory – less than three months for nominal 25 mg/L and likely less than 20 days if background is considered. While TSS concentrations are elevated immediately after dam removal, they are approximately equal to or well below levels that, according to CCME (2002), impact fish directly. In particular, the CCME Water Quality Guidelines for the Protection of Aquatic Life Factsheet (CCME, 2002) indicate that LC50 for TSS in estuarine environments range from approximately 190 to 330,000 mg/L. Direct lethal effects of high TSS on estuarine invertebrates also occur at concentrations well above those modelled to occur in the Strait (Appleby and Scarratt, 1989). In addition, the Northumberland Strait generally experiences a west to east flow pattern (Rice et al., 1989; Natural History of Nova Scotia, 1998). Given the width (mean of about 25 km) and depth (average of about 20 m) of the Northumberland Strait, it would only take limited net flow, west to east, to have a substantial volume of dilution water over a year. Lauzier (1965) found that west to east flows were generally faster than approximately 5 km per day. This flow velocity produces an estimate of 9.1×10^{14} litres (L) of water flowing eastward out of the Northumberland Strait. Assuming approximately 140,000 m^3 of sediments leave the model domain under WSP coastal modeling scenarios (WSP, 2020), this would produce a very small and very short-lived addition (only about 0.3 mg/L) to the TSS concentrations and total particle flux from west to east, even if background TSS concentrations are low. This TSS loading would be even further reduced assuming scour protection measures are implemented prior to dam removal (Scenario D of the Supplemental Coastal Modelling [Appendix B of this document]).

2.14.7.3 Marine Mammals

It is unlikely that the short-duration and reversable elevated TSS would have any effects on marine mammals or turtles as these species breathe air and would be able to swim away from the turbidity plume and would not be adversely affected by passing through the temporary increase in TSS (NOAA, 2021). It is unlikely that the short-duration and reversable elevated TSS would have any effects on marine mammals or turtles as these species breathe air, would be able to swim away from a turbidity plume and would not be adversely affected by passing through a temporary increase in TSS (NOAA, 2021). These species also have not previously been observed to be present in the embayment area. The elevated TSS could potentially limit foraging efficiency of the sight-feeding seals, but the area affected is small and the duration of the potentially elevated TSS concentrations above assumed background conditions associated with the Project this short duration (e.g., <20 days). In addition, if dam removal activities are planned to be completed in the late fall or early winter when background TSS concentrations in the Northumberland Strait are expected to be highest, the probability of marine mammals and turtles (including aquatic species at risk) being present in the Strait are considered low (see Appendix BB of the EIS and response to IR IAAC-24). As such, potential impacts to marine mammals and turtles from the short-term and reversable elevated TSS concentrations or sediment deposition in the embayment area following dam removal activities are considered to be negligible.

2.14.7.4 Marine Invertebrates

Benthic invertebrates are present in the Northumberland Strait adjacent to the Site (e.g., polychaete worms) along with several common shellfish species including soft-shelled clam, blue mussels, horseshoe mussels, oysters, razor clams, surf clams, moon snails, American lobster, and rock crab. Sediment deposition in the embayment area does have the potential for negative effects of burial of benthic invertebrates. However, shellfish and other benthic invertebrates routinely dig into sediments, so they are equally capable of digging out of the very limited sediment deposition anticipated to occur.

Based on the above information, specifically sediment deposition following dam removal, impacts on marine invertebrates would be limited to a small area directly adjacent to Estuary and would be of short duration consistent with seasonal sediment redistribution. In addition, the project is not anticipated to have a significant negative impact on the marine invertebrate community of the Northumberland Strait.

2.14.7.5 Marine Flora

Plants like eel grass cannot dig in or out of sediments but seagrass beds typically trap and sequester sediments; hence, seagrasses naturally thrive under net sediment deposition rates of several centimetres/year (cm/yr) (Potouroglou et al., 2017). Hence, any effects of high TSS or sediment loading on aquatic biota including federally and provincially listed marine species at risk are more likely to be indirect effects, such as shading effects on photosynthesis of aquatic plants and phytoplankton. By reducing light penetration, TSS could potentially have impacts on plant growth. However, impacts on photosynthesis will be short-lived, no matter when the project occurs. These short-lived effects could be further reduced by removing the dam in late fall or early winter so that the high TSS concentrations occur during a period when photosynthesis is already minimal and background TSS concentrations in the Northumberland Strait are expected to be elevated.

Based on available information, the BHRP and specifically returning BH to tidal conditions through the dam removal portion of the Project is not predicted to have significant impacts on the marine habitat or ecology in the adjacent nearshore area of the Northumberland Strait. While elevated TSS concentrations are predicted to occur immediately after dam removal, the area potentially affected is small and these elevated TSS concentration are below those that cause acute effects on aquatic biota. Potential chronic impacts are averted by the short duration, about four months for nominal TSS concentration of 25 mg/L and <20 days based on historical background levels of TSS. Any potential chronic effects can be further reduced by scheduling the elevated TSS period to occur during winter, when metabolic rates of aquatic biota are lowest.

2.14.7.6 Commercial and Traditional Fisheries

In addition to limited impacts on the marine biota, scheduling the dam removal project in late fall or early winter would also be outside of the typical fisheries windows in the Northumberland Strait. In particular, the Northumberland Strait is known to be an important commercial and traditional fishery for lobster, herring, American eel, and scallops but these fisheries are typically limited to the months of April/May through to end of November. Weather conditions in the

Northumberland Strait are such that ice is present through the winter and early spring resulting in fisheries that differ from other areas of Nova Scotia and Atlantic Canada. See link for complete details on these variations by species. [Fisheries by species - Atlantic, Quebec and Arctic regions commercial fisheries (dfo-mpo.gc.ca)]

2.14.8 Current Conditions Monitoring

Based on the discussion above and current knowledge of fisheries resources including aquaculture and seafood facilities there are no changes to predicted impacts due to short-term water column increases in TSS and deposition of sediment as modelled. NSLI intends to regularly confirm model assumptions and outputs along with effects predictions by completing marine habitat surveys and monitoring of water quality (specifically TSS) and sediment deposition/flux to confirm current conditions in the Northumberland Strait embayment area directly north of the Estuary (pre and post dam removal). The monitoring program will be specifically completed prior to dam removal activities to document water quality and marine habitat conditions in the Northumberland Strait pre-dam removal. It is noted that the Dam removal is planned near the end of the BHRP in year 7 of the Project. This additional baseline conditions evaluation will focus on sediment transport (TSS and bed morphology/deposition evaluations) during the late fall or early winter periods when the dam removal is being proposed. In addition, underwater benthic habitat surveys (or similar evaluation techniques) will be used to document habitat conditions with a special emphasis placed on mapping and delineating seagrass beds in the area (including biomass and biodiversity). This information will be used to validate the effects assessment predictions post-dam removal.

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2.14.9 Additional Information to Support IAAC-14 (Originally submitted as GHD Memorandum-97, January 2022)

In response to IAAC-14 (GHD Memorandum-90 dated October 22, 2021, response provided above), supplemental modelling was completed to address the IR. The IAAC-14 response memorandum provided detailed findings of the supplemental modelling that were presented in Appendix B titled Supplemental Coastal Hydraulic Modelling Application of Mitigation Measures to Reduce TSS Concentrations in Water Entering the Northumberland Strait (Appendix B of this document). Based on the modelling results, it was determined the current model domain is sufficient to characterise the extent of TSS and bed level development (depositional rates) within the Estuary and strait for the following reasons:

1. Figure 1 (below) displays the bed level development (erosion is mapped as red and deposition in blue) between the post dredging and near-equilibrium condition of BH, without alternative remediation scenarios being applied. The simulation results show that sediment deposition mostly occurs in the cove just southwest of Highway 348 and adjacent to the dredged inlet channel north of the inlet, and there is little to no change in bed level development beyond this area towards the model domain boundary.
2. Alternative remediation scenarios were also modelled that would reduce the erosion and deposition following removal of the dam. The analysis of the alternative remediation scenarios is summarized in Section 2 of

Appendix B and the results for Scenario D is presented on Figure 2 (below). As shown on Figure 2, there is little to no change in bed level development other than in the area of the inlet channel, which is well within the model boundary.

3. Furthermore, the supplemental modelling results of alternative remediation Scenario D demonstrated that TSS concentrations could reach equilibrium within the model domain, below the threshold limit of 25 mg/L, after approximately 140 days following dam removal (as demonstrated in Figure 1.8 in Appendix B; and provided as Figure 3 [below]). In addition, if historical background concentrations of TSS are considered in the evaluation of TSS, the threshold limit would then increase to approximately 91 mg/L and decrease the duration to reach seasonal TSS concentrations to approximately 20 days.
4. Coupling the potential mitigation measures along with seasonal planning for dam removal in the late fall or early winter season (i.e., outside ecologically sensitive developmental and migration windows as well as commercial fishing/harvesting seasons) would further mitigate potential negative effects of short term increases in TSS immediately following dam removal with concentrations returning to seasonal background conditions in the Northumberland Strait within 20 days of dam removal and additional decreases in TSS concentrations anticipated over time.

As noted above, under both the planned remediation condition and alternative remediation scenarios modelled, the deposition of sediment would primarily occur immediately adjacent to the inlet channel, which is within the current model boundary and extending the model domain would not provide any additional information on TSS concentrations nor deposition to aid in the effects assessment evaluation. **Given the limited timeframe of elevated TSS concentrations above background conditions in the near-field environment and potential seasonal planning of the dam removal activities, it is GHD's opinion that extending the model domain for the purpose of the effects evaluation is not considered warranted at this time.**

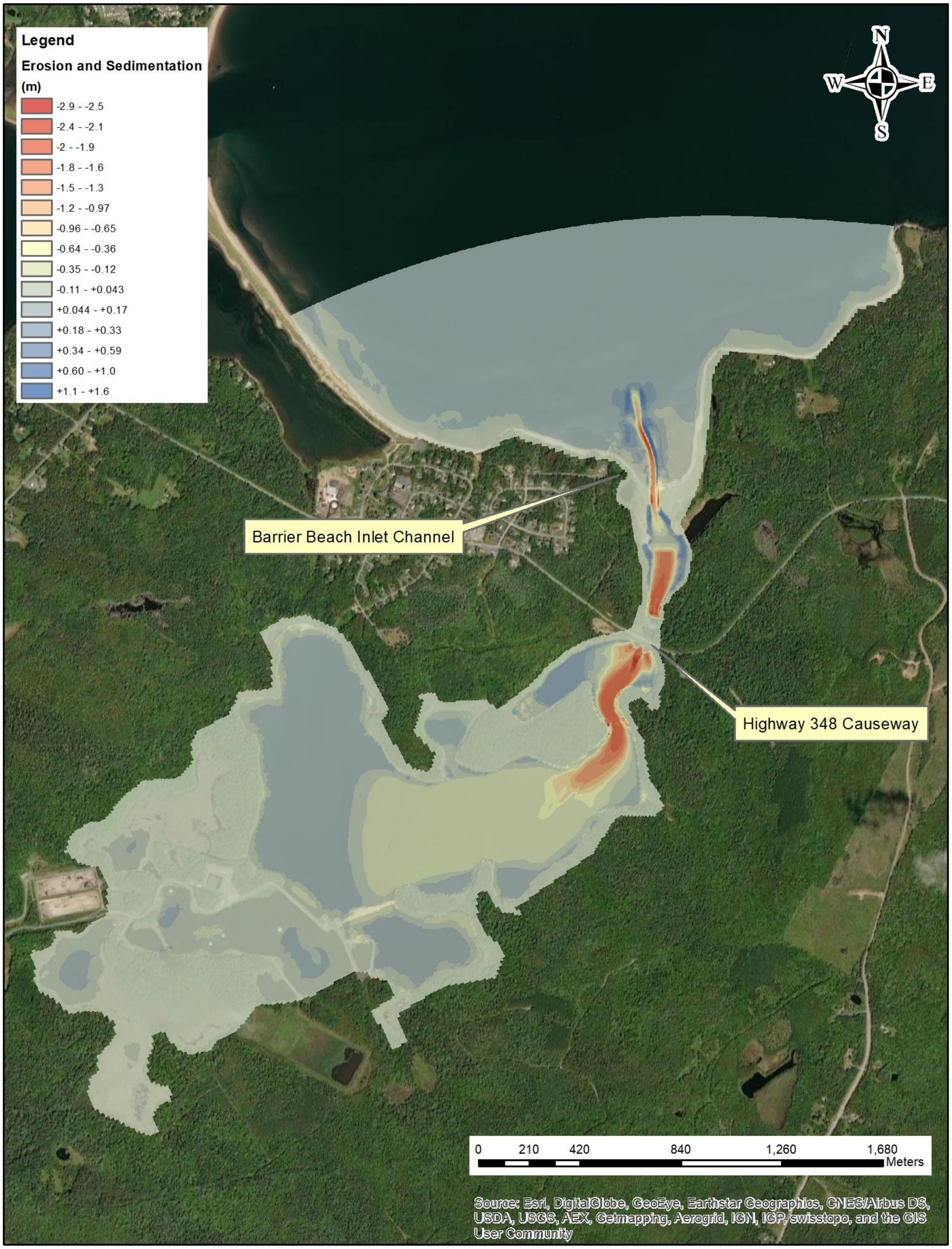


Figure 1 *Bed Level Development - Planned Remediation*

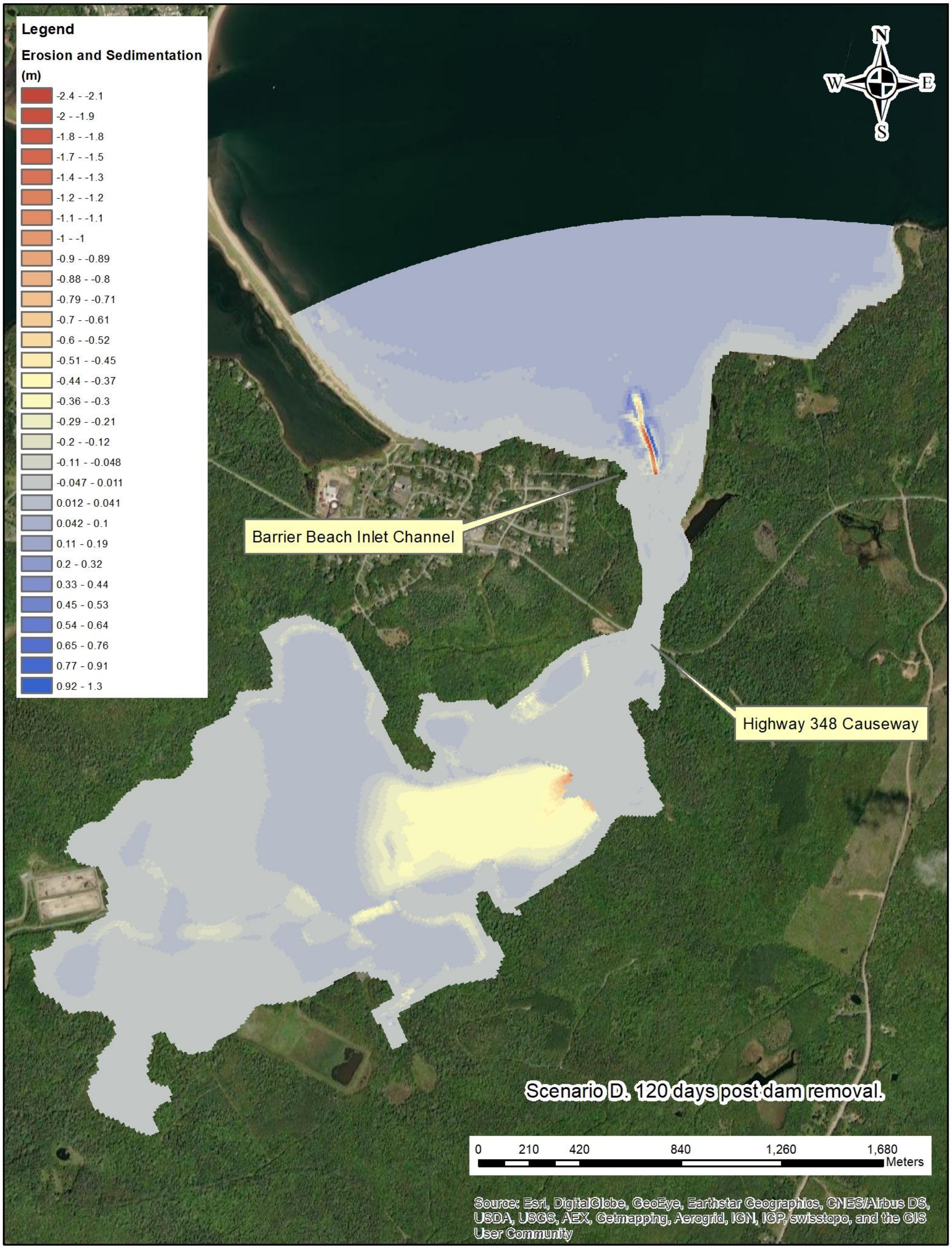


Figure 2 *Bed Level Development - Alternative Remediation Scenario D*

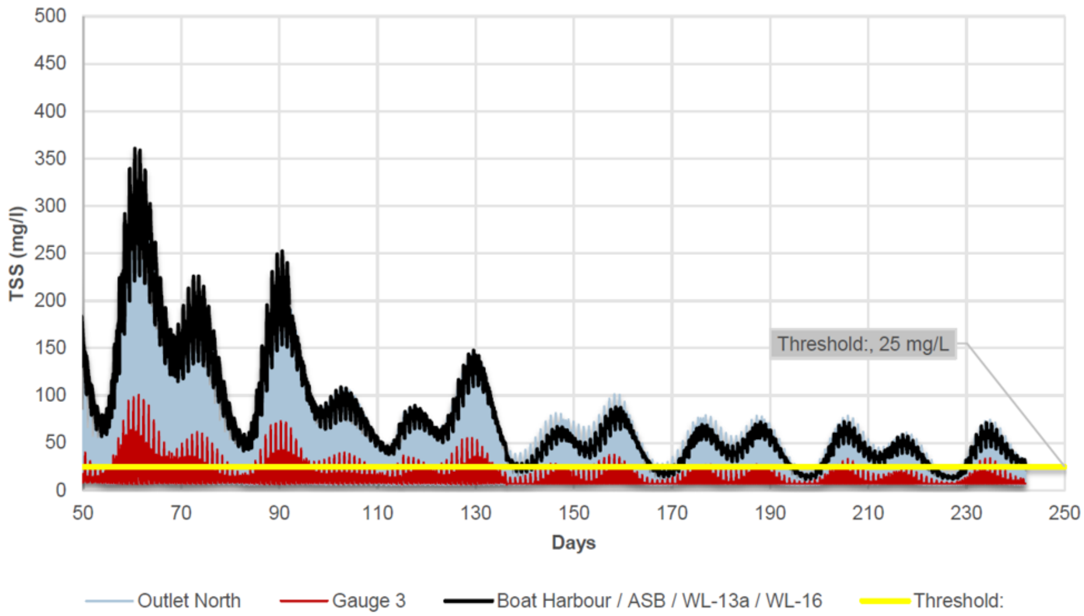


Figure 3 *Time-series of hourly-averaged TSS concentration. Long-term simulations to equilibrium conditions. Scenario D.*

2.15 IAAC-15

The silt curtains selected are impermeable silt curtains. These were selected due to the fine particle size of the sludge and underlying sediment being dredged. Drawing DR-C-34, detail 1 in Appendix A provides details of how the silt curtains will be installed. Generally, the curtain is a debris boom/silt curtain with flotation at top and an extension of freeboard such that it extends 0.5 m above water line, with a ballast pocket to rest on bottom. Curtains will be selected to contain sediment with 65 percent of particles smaller than 0.002 mm (as anticipated for the works). They will be installed between the active dredging cell and the adjacent cells. Impermeable silt curtains were tested as part of the Pilot Scale testing program at the Site.

A sediment monitoring program will be prepared as part of the IA application in consultation with NSE to verify performance of the silt curtains. As noted in the draft PEPP (Appendix B of the EIS), the TSS will be monitored in the Estuary before beginning remediation work. Monitoring will include the enforcement of limits on specific contaminants of concerns (COCs) that may be associated with the suspended solids (i.e., metals, dioxins, and furans).

The Contractor(s) will prepare a Site-Specific Environmental Protection Plan (SSEPP) using Best Management Practices (BMPs) to limit TSS and turbidity around areas of active dredging and/or on event basis to monitor the efficacy of Erosion and Sediment Control (ESC) measures. The details of the monitoring programs will be refined and developed in consultation and collaboration with regulatory agencies and prior to tendering the project.

These events will be defined as storms that are predicted to deliver more than 25 mm rain or equivalent in snowmelt to areas that have exposed soils (note that soils will be protected at non active construction Sites). When preparing the SSEPP, the Contractor(s) will accommodate for changing Site conditions, including water levels, surface ice, construction methodologies and general safety related to dredging and monitoring.

The purpose of this monitoring program is to identify areas that require additional protective measures. All data collected by the Contractor(s) EM will be submitted to the Construction Management and Oversight Consultant (CMOC) EM for further consideration and action (implementation of additional ESC measures). The CMOC EM may conduct a number of independent surveys to verify the Contractors results and observations.

The TSS samples will be collected at upstream and/or downstream locations near the following watercourses:

– Immediately downstream of the active remediation area.

– Downstream of Dam, within the Estuary prior to the Northumberland Strait.

Sampling stations will be located within 100 m of the dredging activity and marked to enable future return to the same upstream and/or downstream locations.

The sampling and sample handling procedures will be outlined in the SSEPP – Turbidity Monitoring. Turbidity will be obtained using a handheld turbidity meter in conjunction with automatic dataloggers to collect TSS.

Following completion of sampling, the Contractor(s) EM will visually inspect the ESC measures for signs of problems and note the nature of runoff water passing through/around the installations. Visual inspections will also be carried out at the non-active construction Sites to verify the performance of installed ESC measures. Photographs will be a useful addition to sampling notes. All field notes will be submitted to the CMOC EM in standardized form with a copy to the NSLI.

Should contractor activities have the potential to impact or impact any other waterbodies, the Contractor(s) will develop a Turbidity Monitoring and Reporting Table (Table 7.4 of the PEPP, Appendix B of the EIS) for those activities based on the monitoring strategy and submit to CMOC/NSLI for approval.

The following mitigation methods will be employed to reduce TSS and turbidity while dredging:

– Silt curtains will be installed to contain the sediment within the active dredging area.
– Turbidity monitoring will be conducted immediately outside the active dredging area every 5-hours to confirm that TSS concentrations do not increase above 25 mg/L above background concentrations (or other relevant Site Specific TSS turbidity relationship that may be developed as part of the Project).
– If turbidity concentrations immediately outside the active dredging area exceed the acceptable limit, the CMOC will be notified, and all dredging activities will cease until levels return to background concentrations.

2.16 IAAC-16

Original response provided in Section 1, Table of Concordance (Table 1.1).

2.16.1 Additional Information to Support IAAC-16 (Originally submitted as GHD Memorandum 93, November 2021)

Description of how LIDAR data was used to create the sediment and vegetation mapping

The bathymetric lidar (bathy-lidar) survey was conducted by Dr. Tim Webster at Nova Scotia Community College (NSCC), a foremost expert in the field. Dr. Webster has been a research scientist with NSCC Applied Research Group for over 20 years. The work was completed during favourable weather and sea conditions.

The maps were developed from the bathy-lidar data gathered and adjusted, as appropriate, based on the ground truthing. The following paragraph is taken from the conclusion section of the report (refer to Appendix BB of the EIS):

> *Ground truth data collected by AGRG with the help of Pictou Landing First Nation in August 2016 resulted in a thorough collection throughout the study area, and were helpful in determining water clarity, bottom type, and distribution of vegetation throughout the area at the time of the ground truth survey. This dataset was presented on a series of maps overlaid with the orthophoto mosaic. A seabed cover map was constructed from the aerial photos and the lidar derivatives and validated using the ground truth data.*

As discussed in the report prepared by NSCC, the correlation between the bathy-lidar data and the ground truthed data was poor (25 percent) for the mud substrate. More importantly, the bathy-lidar data had an excellent correlation (87.5 percent) with ground truthed points for eelgrass beds. The goal of the survey was to determine the location of eelgrass beds prior to remediation as they are an important habitat for fish species and a lidar survey can be readily repeated in a post remediation condition, as a high-level indicator of improved (or depleted) fish habitat. While bathy-lidar is a well proven technology, it does have limitations in deep water and dark coloured water (as was the case in BH proper, where no eelgrass beds would be expected as the baseline condition, since it is for all intents and purposes, a freshwater environment and eelgrass is a saltwater plant species).

The bathy-lidar results were presented to the Boat Harbour Environmental Advisory Committee (BHEAC) in April of 2017, which included notable marine biologists, scientists and regulators, including DFO for the sole purpose of seeking guidance/feedback. NSLI did not receive any specific guidance/feedback on the results at this time.

It is further noted that the survey included a portion of the East River where the effluent pipeline is buried. At the time of the survey, NSLI was considering removal of the effluent pipeline as part of the Project but has since determined that removal of the pipeline has the potential for negative effects to fish habitat in that area. As such, the Project plans put forward for the environmental impact assessment include capping and managing the pipeline in place. The pipeline is currently void of effluent and has been inspected by Northern Pulp during their site decommissioning activities overseen by NSE. The areas characterized as mud substrate are largely located in the East River and Moodie Cove area which are currently outside the area of any Project-related effects related to fish and fish habitat.

Uncertainty in the Effects Assessment for Marine Environment and Fish and Fish Habitat

Uncertainty was factored into the Impact Assessment and was described where appropriate within the EIS. As described in Section 7.2.3 of the EIS "*If the potential adverse effects resulting from an interaction between a Project component and Valued Component (VC) were moderate or major, then the activity was carried forward for further assessment.* ***<u>Where there was uncertainty</u>*** *with the significance of the potential adverse effects that could result from an interaction between a Project component activity and VC, then a conservative approach was taken, and the activity was also carried forward for further assessment.*"

As it relates to bathy-lidar and ground truthing data, potential interactions between the Marine Environment and the Fish and Fish Habitat VC's reviewed the potential interactions of proposed activities for wetland management, dredging and dam removal and identified moderate or major rankings with respect to "Potential Significant of Effects Resulting from Interaction". These elements were carried forward for further assessment and is in keeping with the application of the methodology described above in terms of taking a conservative approach with respect to elements of uncertainty.

Further, while it is recommended through IAAC Guidance documents that "*Caution should be exercised if the degree of uncertainty is unusually large*", uncertainty in the bathy-lidar and ground truthing data is not unusually large (87.5 percent correlation with ground truthed eel grass beds) and has been relied on to determine the location of eelgrass beds prior to remediation to assist in identifying potential changes in the marine environment.

Additional analysis on effects to Marine Environment (including eelgrass) was provided in response to IAAC-14, including additional coastal modelling as it relates to TSS following dam removal activities and potential effects in the marine environment. In addition to the results presented in the response to IAAC-14, a commitment has been made to confirm effects predictions to the marine environment and fish/fish habitat and validate the effects assessment. In particular, NSLI intends to confirm model assumptions and outputs along with effects predictions by completing marine habitat surveys and monitoring of water quality (specifically TSS) and sediment deposition/flux to confirm current conditions in the Northumberland Strait embayment area directly north of the Estuary (pre and post dam removal). The monitoring program will be specifically completed prior to dam removal activities to document water quality and marine habitat conditions in the Northumberland Strait pre-dam removal. Updated baseline conditions will focus on sediment transport (TSS and bed morphology/deposition evaluations) during the late fall or early winter periods when the timing of the dam removal is being proposed. In addition, underwater benthic habitat surveys (or similar evaluation techniques) will be used to document habitat conditions with a special emphasis placed on mapping and delineating seagrass beds in the area (including biomass and biodiversity). Based on the initial results of the bathy-lidar survey, this technology can be readily repeated in a post remediation condition, as an indicator of improved (or depleted) fish habitat, specifically related to eelgrass beds to support future ground truthing and associated effects evaluation. This information will be used to validate the effects assessment predictions post-dam removal and further refine potential uncertainties.

2.17 IAAC-17

The Applied Geomatics Research Group of NSCC surveyed Pictou Harbour using airborne topo bathymetric lidar in 2016 to obtain high resolution elevation data and imagery (Appendix BB of the EIS). The objective of this survey was to collect baseline information on the geomorphology and ecology of Pictou Harbour to characterize the coastal environment and develop a hydrodynamic model to stimulate baseline current flow, water level variations and water circulation with outer Pictou Harbour.

Figures 3-17 through 3-21 presented in the topo bathymetric lidar survey (Appendix BB of the EIS) show the bottom type of classification and eelgrass distribution in the Pictou Harbour area. Specifically, Figure 3-19 shows the agreement between classification and ground truth points collected for bottom cover type and Figure 3-21 shows the presence and absence of submerged aquatic vegetation and agreement between classification and ground truth points.

Lidar and photos were used to produce a bottom type of classification map, which separated bottom type as follows: eelgrass, fucus, mud, and sand. Ground truth points were compared to the bottom type of classification to produce percent agreement of the classification. Fucus and sand were correctly identified by the classification 100 percent of the time, eelgrass 87.5 percent of the time, and mud had a percent agreement of 25 percent. Figure 3-20 (Appendix BB of the EIS) shows the comparison of eelgrass bottom type compared to aerial photographs. In the absence of ground truth points collected in the southern portion of the BH Study Area, aerial photographs show good agreement of the eelgrass classification.

The bottom type of classification information serves as a detailed reference of the coastal environment as baseline data to aid in characterizing current conditions and bottom classification in the vicinity of BH, including water clarity, bottom type, and distribution of vegetation.

Further, the information from this study aids in supporting conclusions drawn from other reports to characterize the eelgrass bed locations to monitor as well as identify changes and any potential impacts during remedial activities. The survey data will assist in identifying changes in Pictou Harbour when the dam is removed and BH is returned to tidal. It is important to capture the current state of the coastal environment to evaluate changes to the marine environment and fish and fish habitat during and after remediation.

A hydrodynamic model was also developed using topo bathymetric lidar merged with CHS (Canadian Hydrographic Survey) multibeam data. The model was successful in simulating the current flow, water level variations and water circulation within outer Pictou Harbour and near BH. The model characterizes the baseline of conditions, which will be used for comparison purposes after remedial activities are complete and BH is returned to tidal.

Webster, T., Collins, K., Vallis, A. 2017. "Topo Bathymetric Lidar Research to support remediation of Boat Harbour" Technical report, Applied Geomatics Research Group, NSCC Middleton, NS.

2.18 IAAC-18

The table below provides a quantitative prediction of temporary and permanent bird habitat losses and gains.

Table 2.2 Quantitative Prediction of Temporary and Permanent Bird Losses and Gains

	Approximate Area (m^2)	Activity	Habitat Type	Temporary/Permanent
Loss	7,200	Widening of road along ASB to Containment Cell	Forested - mature, natural mixed wood stand	Permanent
	30,000	Clearing around	Forested - mature, natural mixed wood stand	Permanent

Table 2.2 Quantitative Prediction of Temporary and Permanent Bird Losses and Gains

	Approximate Area (m^2)	Activity	Habitat Type	Temporary/Permanent
		containment cell		
	385,000	Shoreline clearing	Cattails	Temporary - replanting/reseeding will occur in select areas of the wetlands to accelerate the reestablishment of vegetation along the shorelines; remaining areas will be left to naturally revegetate
	Up to 85,900 (this area includes open water and cattail areas)	Dredging of FSP3	Cattails	Temporary - cattail areas that are removed during in wetland dredging activities will be re-established naturally
	Up to 230,000 (this area includes open water and cattail areas)	Dredging of FSP2	Cattails	Temporary - cattail areas that are removed during in wetland dredging activities will be re-established naturally
Total Approximate Permanent Loss	37,200			
Total Approximate Temporary Loss	700,900			
Total Approximate Loss (Temporary + Permanent)	738,100			
Gain	38,000	Reinstatement of twin settling basins	Uplands mix with shrubs	Permanent
	13,200	Reinstatement of pilot scale treatment pad area	Uplands mix with shrubs	Permanent
Total Approximate Gain	51,200			

2.19 IAAC-19

Response provided in Section 1, Table of Concordance (Table 1.1).

2.20 IAAC-20

Response provided in Section 1, Table of Concordance (Table 1.1).

2.21 IAAC-21

As the project involves remediation/cleanup of all identified areas within the wetland and adjacent areas, those lands and habitats will be restored/compensated as part of the Project. Any areas outside of the cleanup areas, will be retained and impacts avoided/mitigated where possible, and in accordance with the project Environmental Management Plan/Project Environmental Protection Plan and approval conditions. The three-tier Conservation Allowances framework includes avoidance, minimizing impacts and offsets for residual impacts. Conceptual wetland restoration plans have been prepared to provide a framework for the commitments to restoration of the disturbed habitats (including wetlands). As the proponent advances through the approvals stages, the restoration plans will be advanced in consultation with agencies such as ECCC, and consideration of the diversity of target species and habitats the restored features will support. Species at Risk (SAR) birds have not been identified within the Study Area. Regardless, the final restoration plans will include creating a diversity of wetland and coastal wetland habitats that will benefit wetland-associated migratory birds, including potentially habitat for SAR.

The PEPP in Appendix B of the EIS outlines mitigation measures for Species at Risk (SAR). Section 5, *Project Construction Activities and Mitigations Measures*, indicates specific environmental mitigation measures applicable to Project Phases one (Site Preparation and Construction), Phase two (Operation) and Phase three (Decommissioning and Abandonment), including the requirement for all Site staff to be able to identify potential SAR, and follow proper procedure for reporting a sighting in the event of an observation as outlined in subsection 5.2.3 *Species at Risk Management*. SAR training will be provided by a Contractor(s) EM to all employees before they begin work on-Site. Reference sheets will also be posted in the office trailer to provide information on identification, photos, habitat, and timing windows for all SAR that may occur on-Site.

Subsection 7.5.11 *Species at Risk* of the PEPP (included in the EIS [Appendix B]) outlines the monitoring for SAR, including the responsibility of Contractor(s) to develop a SSEPP to protect SAR. Environmental monitoring shall take place after the Site is decommissioned, at wetland areas found near the Containment Cell, and the water quality will be monitored at the mouth of the BHSL. Further details of the monitoring requirements post-remediation and decommissioning are outlined in Section 7 of the PEPP (Appendix B of the EIS).

Monitoring requirements for potential SAR to be removed are included in the PEPP and are also outlined below.

Black Ash

Black Ash is a broadleaved hardwood tree reaching a height of 15 m to 27 m and is classified as a facultative wetland or facultative wetland and species throughout its range. It occurs most frequently in floodplain forests, basin, seepage and lacustrine swamp forests margins and fens.

Common Nighthawk

Common Nighthawk habitat is located within the Study Area. Common Nighthawk nests on the ground in open land or forest clearings, or on gravel roofs in cities. The Contractor(s) must ensure -all personnel working at the Site are familiar with and will comply with, the requirements of the *Migratory Birds Convention Act* (MBCA) as well as the federal *Species at Risk Act* (SARA). Common Nighthawk are provided additional protection under SARA.

Bank Swallow

Bank Swallow habitat is located within the Study Area. Bank Swallow breeds in a wide variety of natural and artificial sites with vertical banks, including riverbanks, lakes and ocean buffs, aggregate pits, road cuts, and stock piles of soil. Sand-silt substrates are preferred for excavating nest burrows. The Contractor(s) must ensure that all sub-contractors and personnel working at the Site are familiar with and will comply with, the requirements of the MBCA as well as the federal SARA.

Barn Swallow

Barn Swallow habitat is located within the Study Area. Barn Swallows have adapted to nesting in a variety of artificial structures (barns, bridges etc.,) and to exploit foraging opportunities in open, human-modified, rural landscapes. They nest mostly in caves, holes, crevices, and ledges in cliff faces. The Contractor(s) must ensure that all sub-contractors and personnel working at the Site are familiar with and will comply with, the requirements of the MBCA as well as the federal SARA.

Canada Warbler

Canada Warbler habitat is located within the Study Area. Canada Warbler breeds in a variety of habitats but is almost always associated with moist forests with a dense, deciduous shrub layer, complex understory, and available perch trees. The Contractor(s) must ensure that all sub-contractors and personnel working at the Site are familiar with and will comply with, the requirements of the MBCA as well as the federal SARA.

Piping Plover

Piping Plover habitat is located north of the Study Area. Piping Plover nest on sandy beaches. The Contractor(s) must ensure all personnel working at the Site are familiar with and will comply with, the requirements of the MBCA as well as the federal SARA. Piping Plover are provided additional protection under SARA. As such, breeding bird surveys will be completed by a qualified biologist prior to and during Project activities completed in this area of the Site between May 1 and July 31. If Piping Plovers (or other migratory birds or species at risk) are identified in this area of the Site, Project activities in the area will be immediately halted and appropriate regulatory authorities notified to establish appropriate mitigation measures (similar to those listed below). If Piping Plover are identified in the Study Area, a construction blackout period, with no planned Project activities in specific areas of the Site will also be implemented. This blackout period would be defined as May 1 to July 31 to avoid the most critical part of the Piping Plover nesting season. As there is potential for Piping Plover and other migratory birds to nest outside of this typical breeding window, the Contractor(s) must also:

- Conduct daily Site monitoring if work is scheduled between August 1 and September 30 or between April 15 and April 30 and in the vicinity of Piping Plover habitat.
- Establish a 300 m buffer around Piping Plover nests found during surveys (to remain in place until the young have naturally left).
- Report all sightings of migratory bird individuals and/or nests to the Contractor(s) EM, CMOC EM and ECCC's Canadian Wildlife Services.

NSLI will submit an Offsetting Implementation and Monitoring Plan to mitigate impacts on Piping Plover critical habitat that is consistent with the 2020 and the draft pending 2019 "Piping Plover Recovery Strategy" as well as ECCC's "Operational Framework for Use of Conservation Allowances". The plan will include a baseline assessment and post-construction monitoring of both On-Site and Off-Site offsets at years 1, 3, 5, and 10.

As per the NS DNR Forest Inventory (2007) layer, habitat type within the Project area is as described in Table 2.3. More specific descriptions of the habitat observed at each survey station is available within the Avian Assessment Documentation, which is available in Appendix CC of the EIS document (**https://www.iaac-aeic.gc.ca/050/evaluations/document/137959**).

Table 2.3 Habitat Analysis for the Boat Harbour Remediation Study Area

Habitat Type	Total Habitat Area (M^2)	Total Habitat Area (Ha)	% Study Boundary Area	Wp Code	Actual # Of Bbs Wps (Out Of 52)
ALDER (75% or greater cover - any forested area containing alders that compose less than 75% crown closure)	1184.03	0.12	0.02	ALD	1

Table 2.3 Habitat Analysis for the Boat Harbour Remediation Study Area

Habitat Type	Total Habitat Area (M^2)	Total Habitat Area (Ha)	% Study Boundary Area	Wp Code	Actual # Of Bbs Wps (Out Of 52)
ANTHROPOGENIC (chiefly of environmental pollution and pollutants originating in human activity)	338468.40	33.85	6.35	ANTH	3
BEACH	10913.93	1.09	0.20	BEACH	1
BRIDGE/GATE	1859.72	0.19	0.03	BRIDGE	1
BRUSH (any area containing less than 25% merchantable tree cover and contains non-merchantable woody plants consisting of at least 25% cover)	2945.64	0.29	0.06	BRUSH	1
CLEARCUT (any stand that has been completely cut and any residuals make up less than 25% crown closure and with little or no indication of regeneration)	66171.86	6.62	1.24	CC	2
CLEARED AREA	30298.26	3.03	0.57	CA	1
DUNES/COASTAL ROCKS	24220.03	2.42	0.45	CR	1
WETLAND (FIELD DELINEATED)	862427.93	86.24	16.17	WETL	8
GRAVEL PIT	7771.47	0.78	0.15	GP	1
HARDWOOD (less than 25% softwood species by basal area)	513340.99	51.33	9.63	HARD	5
INLAND WATER	1522188.36	152.22	28.55	IW	10
MIXEDWOOD (74-26% softwood species by basal area)	1046591.97	104.66	19.63	MIX	9
POWERLINE CORRIDOR	4703.52	0.47	0.09	PC	1
ROAD CORRIDOR	17063.52	1.71	0.32	RC	1
SOFTWOOD (75% softwood species by basal area)	882264.79	88.23	16.55	SOFT	6
TOTAL	5332414.4	533.2414	100	-	52

As per ACCDC (Data Report 5887), a number of priority avian species have occurrences within 5 km of the centre of the Study Area (see Table 2.4). Preferred nesting habitat and periods, as well as potential for nesting within the Study Area is presented in Table 2.4.

Table 2.4 Priority Species with Occurrences Within 5 km of the Central Point of the Study Area

Scientific Name	Common Name	Typical Nesting Habitat	Typical Nesting Timing	Potential for Breeding on Site	Observed on-site	COSEWIC	SARA	NS ESA	AC CDC	# of records within 5 km	Distance (km)
Charadrius melodus	Piping Plover melodus ssp	Beaches.	Mid-May to end of July	Low	N	Endangered	Endangered	Endangered	S1B	32	2.4 ± 1.0
Chordeiles minor	Common Nighthawk	Open habitats.	End of May to end of July	High	Y	Threatened	Threatened	Threatened	S2B	1	2.5 ± 7.0
Contopus cooperi	Olive-sided Flycatcher	Edges of coniferous or mixed forests with tall trees or snags for perching, alongside open areas, or in burned forest with standing trees and snags.	Early June to mid-August	High	Y	Threatened	Threatened	Threatened	S2B	1	2.5 ± 7.0
Hirundo rustica	Barn Swallow	Nest on structures, cliffs, crevices, caves; forage in open habitats.	Late May-July	High	Y	Threatened	.	Endangered	S2S3B	2	2.5 ± 7.0
Riparia	Bank Swallow	Banks along water bodies.	May to July	Low*	Y	Threatened	.	.	S2S3B	1	2.5 ± 7.0
Wilsonia canadensis	Canada Warbler	Variety of forest types. Prefer wet mixed forest with well-developed shrub layer as well as regenerating areas. Open tree canopy with tall shrubs and sphagnum covered forest floor.	Early June - mid July	High	Y	Threatened	Threatened	Endangered	S3B	2	2.5 ± 7.0
Dolichonyx oryzivorus	Bobolink	Grasslands, hayfields, and meadows.	Mid-May to end of July	Low	N	Threatened	.	Vulnerable	S3S4B	1	2.5 ± 7.0
Hylocichla mustelina	Wood Thrush	Mature deciduous and mixed wood forests.	Mid-May to end of July	None	N	Threatened	.	.	SUB	1	2.5 ± 7.0
Contopus virens	Eastern Wood-Pewee	Open Forest.	Early June - early Sept.	High	Y	Special Concern	.	Vulnerable	S3S4B	6	2.5 ± 7.0
Coccothraustes vespertinus	Evening Grosbeak	Southern boreal forest, high in spruce tree.	Mid-June - early Aug.	High	Y	Special Concern	.	.	S3S4B, S3N	1	2.5 ± 7.0
Sterna hirundo	Common Tern	Around lakes, rivers, marshes, and oceans.	Mid-May to end of July	Moderate	Y	Not At Risk	.	.	S3B	16	1.9 ± 0.0
Sialia sialis	Eastern Bluebird	Cavities in open areas.	End of April to early August	Low	N	Not At Risk	.	.	S3B	1	2.5 ± 7.0
Accipiter gentilis	Northern Goshawk	Dense mature forests.	Mid-April - late July	Low	N	Not At Risk	.	.	S3S4	1	2.5 ± 7.0
Circus cyaneus	Northern Harrier	Wetland and grassland.	End of April to end of July	Low	Y	Not At Risk	.	.	S3S4B	1	2.5 ± 7.0
Ammodramus nelsoni	Nelson's Sparrow	Wet meadows and freshwater marshes.	Early June to end of July	Low	N	Not At Risk	.	.	S3S4B	1	2.5 ± 7.0
Mimus polyglottos	Northern Mockingbird	Shrubs and trees.	Mid-May to mid-August	High	N	.	.	.	S1B	1	2.5 ± 7.0
Calidris minutilla	Least Sandpiper	Does not nest in NS.	.	None	Y	.	.	.	S1B, S3M	3	4.3 ± 0.0
Charadrius semipalmatus	Semipalmated Plover	Arctic breeders, gravel beaches.	.	None	Y	.	.	.	S1B, S3S4M	3	4.3 ± 0.0
Dendroica tigrina	Cape May Warbler	Mature spruce forests.	End of May to mid-July	High	N	.	.	.	S2B	1	2.5 ± 7.0
Molothrus ater	Brown-headed Cowbird	Other birds' nests.	Mid May - late July	High	N	.	.	.	S2B	1	2.5 ± 7.0
Carduelis pinus	Pine Siskin	Conifers.	Late Apr.-early Aug.	High	Y	.	.	.	S2S3	1	2.5 ± 7.0
Tringa semipalmata	Willet	Mud banks, tides, coasts, and coastal lagoons.	Early May to mid-July	Moderate	Y	.	.	.	S2S3B	4	1.9 ± 0.0
Petrochelidon pyrrhonota	Cliff Swallow	Vertical surfaces with overhead shelter.	End of May to mid-August	Low	N	.	.	.	S2S3B	3	2.5 ± 7.0
Pheucticus ludovicianus	Rose-breasted Grosbeak	Mixed and broad-leafed woods.	June-July	High	N	.	.	.	S2S3B	3	2.5 ± 7.0
Icterus galbula	Baltimore Oriole	Open woodland/forest edge high in trees.	Early June - mid Aug.	High	N	.	.	.	S2S3B	2	2.5 ± 7.0

Table 2.4 Priority Species with Occurrences Within 5 km of the Central Point of the Study Area

Scientific Name	Common Name	Typical Nesting Habitat	Typical Nesting Timing	Potential for Breeding on Site	Observed on-site	COSEWIC	SARA	NS ESA	AC CDC	# of records within 5 km	Distance (km)
Calidris melanotos	Pectoral Sandpiper	Does not nest in NS.	.	None	Y	.	.	.	S2S3M	1	4.3 ± 0.0
Poecile hudsonica	Boreal Chickadee	Cavity.	Mid-May to end of July	High	N	.	.	.	S3	1	2.5 ± 7.0
Sitta canadensis	Red-breasted Nuthatch	Excavated from dead trees.	Mid May - late July	High	Y	.	.	.	S3	2	2.5 ± 7.0
Charadrius vociferus	Killdeer	Bare ground in open habitats.	Late March - July	High	Y	.	.	.	S3B	4	2.5 ± 7.0
Gallinago delicata	Wilson's Snipe	Marshes, bogs, and fens.	Early May to mid-July	Low	Y	.	.	.	S3B	2	2.5 ± 7.0
Coccyzus erythropthalmus	Black-billed Cuckoo	Deciduous trees, shrubs, or brambles.	End of May to mid-August	High	N	.	.	.	S3B	1	2.5 ± 7.0
Tyrannus	Eastern Kingbird	Fields with scattered shrubs and trees, along forest edges.	Early June - late Aug.	Low	N	.	.	.	S3B	1	2.5 ± 7.0
Dumetella carolinensis	Gray Catbird	Shrubbery.	Late May - early Aug.	High	Y	.	.	.	S3B	3	2.5 ± 7.0
Tringa melanoleuca	Greater Yellowlegs	Wetlands.	May to June	High	Y	.	.	.	S3B, S3S4M	4	4.3 ± 0.0
Pluvialis squatarola	Black-bellied Plover	Does not nest in NS.	.	None	Y	.	.	.	S3M	4	3.6 ± 0.0
Tringa flavipes	Lesser Yellowlegs	Does not nest in NS.	.	None	Y	.	.	.	S3M	2	3.6 ± 0.0
Arenaria interpres	Ruddy Turnstone	Does not nest in NS.	.	None	Y	.	.	.	S3M	2	4.3 ± 0.0
Calidris pusilla	Semipalmated Sandpiper	Does not nest in NS.	.	None	Y	.	.	.	S3M	4	4.3 ± 0.0
Limnodromus griseus	Short-billed Dowitcher	Does not nest in NS.	.	None	Y	.	.	.	S3M	1	4.3 ± 0.0
Calidris alba	Sanderling	Does not nest in NS.	.	None	N	.	.	.	S3M, S2N	2	4.3 ± 0.0
Loxia curvirostra	Red Crossbill	Coniferous forests.	All year.	High	N	.	.	.	S3S4	1	2.5 ± 7.0
Anas discors	Blue-winged Teal	Border of Freshwater Wetlands.	Early May to end of July	High	N	.	.	.	S3S4B	1	2.5 ± 7.0
Actitis macularius	Spotted Sandpiper	Rocky shores, on beach dunes, in human-occupied areas (e.g., flat rooftops and jetties), and in coastal marshes.	Mid-May to mid-July	High	Y	.	.	.	S3S4B	4	2.5 ± 7.0
Empidonax flaviventris	Yellow-bellied Flycatcher	Swamps and damp coniferous forests.	Early June to end of July	Moderate	Y	.	.	.	S3S4B	5	2.5 ± 7.0
Regulus calendula	Ruby-crowned Kinglet	Conifers.	Mid May-early July	High	Y	.	.	.	S3S4B	3	2.5 ± 7.0
Catharus fuscescens	Veery	Broad-leaf forest.	Late May - late July	High	Y	.	.	.	S3S4B	5	2.5 ± 0.0
Catharus ustulatus	Swainson's Thrush	Spruce forests and dense streamside woods.	End of May to end of July	High	Y	.	.	.	S3S4B	1	2.5 ± 7.0
Note: Listed in order of status. *not likely breeding on site because there is no available habitat, but potentially roosting in cattails (Saldanha, 2016)**.**											

Mitigation measures to avoid, or lessen, potential adverse effects on species are described in Section 7.3 of the EIS, with some additional species specific and general bird mitigation measures described below in Table 2.5. Additional information has also been provided on pre-clearing surveys and set-back distances. No critical habitat was identified within the Study Area for avian species at risk.

Mitigation measures to avoid, or lessen, potential adverse effects on species are described in Section 7.3 of the Environmental Impact Statement, with some additional species specific and general bird mitigation measures described below in Table 2.5. Additional information has also been provided on pre-clearing surveys and set-back distances. No critical habitat was identified within the Study Area for avian species at risk.

Table 2.5 Mitigation Measures for Avian SAR that Could Breed Within the Project Area and other Avian Species

Potential Impacts	Species	Mitigation Measures
Habitat loss and alteration	Eastern Wood-pewee (*Contopus virens*)	Maintain large tracts of mixed-aged forest with a closed canopy and limited clear cuts. This species does not utilize clear cuts. The presence of mature trees is important for nest site selection in this species. The Eastern Wood-pewee uses dead branches as hunting perches and forages in open space below or within the canopy. This species also needs horizontal branches for nesting and has greater nesting success in mature forest where nests are placed further out on horizontal branches.
	Barn Swallow (*Hirundo rustica*)	Remove buildings outside of the nesting period. If a building needs to be removed during the nesting period (mid-April to late August), retain a biologist to inspect habitat (i.e., vacant buildings or other structures) prior to removal. In cases where presence of wildlife is confirmed or uncertain, demolition may need to be done in controlled stages, outside of relevant sensitive time(s), to reduce potential impacts and allow wildlife time to relocate.
	Bank Swallow (*Riparia riparia*)	If cattails are removed from the project area, new ones will be planted/transplanted as part of the restoration process so that the site can continue to provide suitable roosting habitat for the species. (Saldanha, 2016)
	Common Nighthawk (*Chordeiles minor*)	Large piles or patches of exposed soil (i.e., being used for stockpiling, or other activities) will not be left uncovered or un-vegetated during the breeding season. Ground-nesting species, such as the Common Nighthawk, will use this type of habitat for breeding. Any records of ground nests will be recorded, and mowing scheduled to avoid the nesting location/period.
	Eastern Whip-poor-will (*Antrostomus vociferus*)	Clearing of vegetation and/or harvesting activities, where possible, will avoid and/or minimize disturbance to Eastern Whip-poor-will resources and nesting habitat, including forested habitats (used for roosting and nesting) and open areas (used for foraging).
	Olive-sided Flycatcher (*Contopus cooperi*)	Clearing of vegetation and/or harvesting activities, where possible, will avoid and/or minimize disturbance to Olive-sided Flycatcher resources and nesting habitat, including tall trees or snags within clearings (required for perching and foraging), especially near wetlands or edges of mature coniferous forest stands.
	Evening Grosbeak (*Hesperiphona vespertina*)	Clearing of vegetation and/or harvesting activities, where possible, will avoid and/or minimize disturbance to Evening Grosbeak resources and nesting habitat, including thick coniferous forests and mixed deciduous habitats.
	Canada Warbler (*Cardellina canadensis*)	Clearing of vegetation, where possible, will avoid and/or minimize disturbance to Canada Warbler nesting habitat, including mature forest habitats with well-developed shrub layers and wetland habitats, and especially treed and shrub swamps.
	All birds	Clearing of vegetation where possible will occur outside of the nesting period (i.e., mid-April to late August).
Accidental mortality	All birds	Clearing of vegetation and/or harvesting outside of the nesting period (i.e., April 8 to August 28). If vegetation removal is proposed within the nesting season, a pre-clearing nesting bird survey and mitigation plan would be required in order to avoid the inadvertent harming, killing, disturbance or destruction of migratory birds, nests, and eggs (see details below this table).

Table 2.5 Mitigation Measures for Avian SAR that Could Breed Within the Project Area and other Avian Species

Potential Impacts	Species	Mitigation Measures
		In the event an active nest is found, it will be subject to site-specific mitigation measures (i.e., clearly marked protective buffer around the nest and/or non-intrusive monitoring). If an avian Species at Risk (SAR) or other species of conservation concern (SoCC) is encountered and that was not expected, appropriate mitigation measures will be applied in consultation with ECCC-CWS prior to further activities. Enforcing speed limits.
Sensory disturbance/ displacement	All birds	Heavy equipment will be outfitted (when feasible) with mufflers to dampen noise. Activities will follow activity restriction guidelines and set-back distances for birds.
Bird health	All birds	Implementing a Spill Management and Prevention Plan.

Pre-clearing Surveys

See Table 2.5 above for specific information related to potential effects and mitigation measures. As for mitigation, clearing of vegetation and harvesting will occur outside of the nesting period (i.e., April 8 to August 28). If this is not possible, a pre-clearing nesting bird survey and mitigation plan would be required in order to avoid the inadvertent harming, killing, disturbance or destruction of migratory birds, nests, and eggs. This would be prepared in consultation with CWS and NS Department of Lands and Forestry (NS DLF) to identify survey methods and determine:

- The specific seasonal window during which surveys are required for the study area.
- The timing of surveys in advance of proposed project activities (e.g., 2, 5, 10 days).
- Buffer zones and/or other mitigation efforts to be enacted for any nests that are found.
- Confirmation regarding the spatial extent of surveys required (i.e., buffer zones beyond the study area footprint).

Currently, there are no provincial or federal standards for conducting pre-clearing/harvesting nesting bird surveys. Surveys may include one or more of the following methods: Point counts, area searches using non-intrusive methods, and/or nest searches. In most cases, active nest search techniques are not recommended, because:

- The ability to detect nests is very low while the risk of disturbing or damaging active nests is high.
- Flushing nesting birds increases the risk of predation of the eggs or young, or may cause the adults to abandon the nest or the eggs.
- Disturbing or damaging nests is still likely to occur during disruptive activities even when active nest searches are conducted prior to these activities (ECCC, 2019).

Any confirmed or suspected (i.e., via significant evidence indicators of breeding activity) nest areas would be appropriately buffered using flagging tape and wooden survey stakes. No activities would be permitted within the buffered areas until they have been cleared of nesting activity by an experienced biologist. As previously noted, buffer distances would be identified in advance of the nest search surveys and in consultation with Regulators. Significant evidence or indicators of breeding activity include:

- Birds carrying food – for most songbirds (in particular), this activity indicates a nest or young in close proximity.
- Birds carrying nesting material – indicates a nest is likely nearby.
- Distraction displays – generally only performed within a few meters of an active nest site. Examples of distraction displays include, but are not limited to a killdeer, plover or sandpiper performing a broken-wing display, usually with an outstretched wing and flared tail; songbirds (wood-warblers and ground-nesters in particular) performing an injured display where both wings are tucked near to the body and fluttered rapidly; waterfowl performing an

injured display with both wings loping or dragging alongside the body, and raptors, gulls, or terns diving-bombing an intruder. Most distraction displayed are accompanied by emphatic vocalizations (ECCC, 2019).

A monitoring program will be implemented to determine the effectiveness of the measured taken to mitigate the identified adverse effects of the project on birds. Typically, this would involve regular avian monitoring by observation (e.g., via point counts). The monitoring plan would be prepared in consultation with CWS and NS DLF.

Set-back Distances

Set-back distances are typically established for sensitive species based on a review of the relevant literature, guidelines from other jurisdictions, and via consultation with ornithologists. NSLI will strive to schedule activities outside of the breeding season. If an activity is going to occur in suitable habitat during the breeding season and a nest (or potential nest) is identified, set-back distances would be implemented to minimize disturbance and the effects related to disturbance such as nest abandonment and increased predation.

Currently, there are no defined set-back distances for breeding birds in Nova Scotia. Set-back distances implemented to reduce the effects of disturbance on birds will be defined in consultation with the appropriate regulatory agencies (i.e., ECCC-CWS and NS DLF) during the process of developing the Wildlife Monitoring Plan. ECCC also provides some guidance on their website on how to establish buffer zones and setback distances (i.e., Guidelines to reduce risk to migratory birds); the Wildlife Monitoring Plan will follow this guidance: **https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.**

A. Common Nighthawks were observed throughout the Study Area using the Canadian Nightjar Survey Protocol. Locations for the surveys were selected based on coverage and access. Considering that Common Nighthawks were observed throughout the Study Area, it can be assumed that they have the potential to be nesting throughout the site where suitable habitat is present.

B. Dedicated surveys for Eastern Whip-poor-wills were not conducted because the nearest and only observation recorded within 100 km, according to ACCDC, was 47.9 km away. Also, based on the Maritime Breeding Bird Atlas, Eastern Whip-poor-will is sparsely distributed in NS, but mainly found in the western part of the province - there are very few records in the east. As a result, the probability of detection/presence is low for this species on-site.

   As with all migratory birds, the mitigation measures proposed for the Eastern Whip-poor-will is as follows:

   Construction activities involving the removal of vegetation will be restricted from occurring during the bird nesting period (mid-April to late August). If an activity is going to occur in suitable habitat during the breeding season and a nest (or potential nest) is identified, set-back distances will be implemented to minimize disturbance and the effects related to disturbance such as nest abandonment and increased predation.

C. As per the provincial forest base layer, and subsequent field verification, the following transects pass through softwood forest habitat:

   - NP5 to NP6
   - NP3 to NP4
   - NP13 to NP14
   - NP20 to NP21
   - NP29 to NP30 (partial transect through softwood)

D. The following mitigation measures will be implemented for Barn Swallows:

- Remove buildings outside of the nesting period (mid-April to late August).

  If a building needs to be removed during the nesting period, a biologist will be retained to inspect habitat (i.e., vacant buildings or other structures) prior to removal. In cases where presence of wildlife is confirmed or uncertain, demolition may need to be done in controlled stages, outside of relevant sensitive time(s), to reduce potential impacts and allow wildlife time to relocate.

E. Please see reports and figures provided in Appendices AA, BB and CC of the EIS document that provide additional details on aquatic and terrestrial environments in the Study Area including findings for specific field surveys that include migratory birds and species at risk.

ECCC. (2019, 09 19). *Guidelines to reduce risk to migratory birds*. Retrieved 05 13, 2021, from Canada.ca: **https://www.canada.ca/en/environmental-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html**.

Saldanha, S. (2016). Foraging and Roosting Habitat Use of Nesting Bank Swallows in Sackville, NB. Halifax, Nova Scotia, Canada. Retrieved from **https://dalspace.library.dal.ca/bitstream/handle/10222/72205/Saldanha-Sarah-MSc-BIO-August-2016.pdf?sequence=3&isAllowed=y**.

2.22 IAAC-22

As indicated in the EIS, the overall objective of the Project is to remediate BH and associated lands, return BH to tidal conditions, and remove the impediments to allow for natural restoration of the remediated area. To this end, the HHERA was originally completed in 2018 to determine if contaminants of potential concern (COPCs) in environmental media of the Freshwater Wetlands and Estuary area associated with the BHETF also required remediation to ensure protection of ecological receptors and human health. The initial investigation focused on collection of sediment, surface water, aquatic invertebrates, fish, amphibian, and aquatic mammal (beaver) tissue samples from the Freshwater Wetlands and Estuary. Based on comments received from ECCC and HC on the draft HHERA (in May/June 2019), additional biological tissue data, specifically benthic invertebrates, fish, amphibians, and waterfowl were collected from the BHETF for inclusion in the updated HHERA included in the EIS. Historical sediment and surface water data collected from the BHSL and Associated Basins were included in the updated Ecological Risk Assessment (ERA) to ensure the full suite of COPCs associated with the BHETF were considered in the HHERA (Appendix A to the EIS). Available amphibian and waterfowl tissue collected from BHSL and Associated Basins were also included in the updated HHERA. In addition to including this data as part of the ecological screening, several aquatic and semi-aquatic mammals and birds representing various trophic guilds were assessed. The sediment, surface water data, and biological tissue data collected from the BHSL and Associated Basins were included in the datasets used to conduct the food chain modeling through exposure and/or consumption of sediment, surface water, and food items.

Although the HHERA primarily utilized environmental data collected from the Freshwater Wetlands and Estuary, the data collected from these areas included evaluation of concentrations of COPCs in sediment and surface water along with biological data such as benthic community characterization, bioavailability monitoring (pore water monitoring), and biological tissue analysis. Screening of COPCs against guidelines for the protection of human health and ecological receptors determined the primary COPCs associated with the Freshwater Wetlands and Estuary were generally limited to D/F and metals in sediment. This data was consistent with the COPCs historically associated with the BHSL and Associated Basins (specifically D/F). In addition, the maximum concentrations of D/F observed in sediment of the Freshwater Wetlands was actually higher than the maximum concentrations of D/F identified in sediment of the BHSL and Associated Basins. Although elevated concentrations of D/F and some metals in sediment of the Freshwater Wetlands and Estuary was observed, results of the benthic invertebrate community assessment, pore water sampling and biological tissue analysis indicated these concentrations were not adversely impacting ecological receptors compared to reference locations in the area. In particular, biological tissue samples collected from the Freshwater Wetlands and Estuary (plant tissue, benthic invertebrate, fish, and aquatic mammals) had concentrations of COPCs, specifically D/F, that were statistically similar to refence tissue data.

As the HHERA indicated, unacceptable risks to ecological receptors from exposure to COPCs in sediment of the BHETF (including the BHSL and Associated Basins) were not identified under existing conditions (the assumption of leaving the sediments in-place). The remediation and/or risk management measures that are proposed for the BHETF are to address potential unacceptable health risks to human health from direct contact with sediment. The remedial target (site-specific target level or SSTL) for D/F in sediment for the BHETF is 29 pg/g, which is based on the protection of human health. This remedial target is approximately an order of magnitude lower than the exposure point concentration (EPC) used in the ERA for quantifying exposure to aquatic wildlife receptors where ecological risks were determined to be acceptable. The biological tissues that were collected from the BHETF were based on the sediment concentrations that are currently present, and are likely to decrease significantly following the remediation of the BHETF and this will further reduce potential risks to ecological receptors that recolonize the area post-remediation.

Although the benthic invertebrate community in the BHSL was not specifically evaluated as part of the HHERA, it is also noted that the D/F SSTL developed for the remediation project only marginally exceeds the CCME screening value of 21.5 pg/g for protection benthic invertebrates. As noted previously, the use of multiple lines of evidence such as pore water analysis, benthic community characterization and tissue residue/body burden analysis indicate that the concentrations of D/F in the Freshwater Wetlands and Estuary do not pose an unacceptable risk to benthic invertebrates even though the existing sediment concentrations are approximately an order of magnitude higher than the CCME screening guideline and the proposed SSTL. Based on the above noted rationale, it is considered reasonable to assume that the conclusions provided in the HHERA would also be applicable to the BHSL and Associated Basins and the remedial criteria being proposed are protective of ecological receptors expected to re-colonize the BHETF following remediation.

2.23 IAAC-23

Response provided in Section 1, Table of Concordance (Table 1.1).

2.24 IAAC-24

The high, moderate, low, and rare criteria for the potential presence of aquatic species at risk, marine mammals, and sea turtles was taken from the following report, which was provided in Appendix BB of the EIS.

WSP. 2019. Boat Harbour Remediation Planning and Design Project. Desktop Study: Aquatic Species at Risk, Marine Mammals, Sea Turtles.

The rating is based on the frequency each species was reported in Ocean Biodiversity Information System and other databases for the study area. It is a relative scale to give an idea of the number of sightings reported in the different databases. The criteria are meant to be qualitative more than quantitative as multiple sources of information were used. It is a qualitative characterization based on the occurrences and habitat type known for each of the species as listed in the literature. A "high" occurrence was assigned if the species was known to use the Northumberland Strait as habitat or if sightings were numerous and consistent over time. Then, the habitat preferences of each species were weighted to assess whether it could occur in the Strait, even if the literature did not necessarily mention it or if observations were only occasional. This then corresponds to the "moderate" potential. This potential could also correspond to species that have been observed but might prefer another type of habitat. The "low" potential was assigned if the species was observed in the Gulf of St. Lawrence, but not in the Strait, without excluding that the species could be found there from time to time. This potential meant that the chances of the species occupying the study area based on its biology/habitat preferences made it unlikely that the species would occur there. The "rare" potential was assigned for species that have been observed very few times in the Gulf of St. Lawrence.

WSP, 2019 included tables showing the potential presence and occupation periods of aquatic species at risk in the study area and are summarized in Tables 2.6 and 2.7 below.

Table 2.6 Potential Presence and Occupation Periods of Aquatic Species at Risk in the Study Area

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mysticetes cetaceans												
Blue whale (Gulf of St. Lawrence)[1]												
Fin whale[1]												
North Atlantic Right whale[1]												
Odontocete cetaceans												
Harbour Porpoise												
Elasmobranchii												
Smooth skate												
Winter skate[2]												
Thorny skate[3]												
White Shark[4]												
Actinopterygii												
Lumpfish[5]												
Atlantic Wolffish[6]												
Atlantic salmon												
Repitilians												
Leatherback Sea turtle[6]												

Sources: Baleines en direct; COSEWIC; Leatherwood et al., 1976; Lesage et al., 2007

[1] Yellow shading indicates low potential for presence of species in study area.

[2] Occurs primarily in shallow and warm waters during late summer and early autumn and dispense throughout the Magdalen Shallows in winter.

[3] Follows depths with temperatures ranging from 0ºC to 5ºC.

[4] Based on observations made in Northern Atlantic. Rare or to null potential presence of species in study area.

[5] Spends a greater portion of their time near the bottom during winter months. Remains offshore late summer to early spring.

[6] Dark green zones represent months were the specie is present at greater abundance.

Table 2.7 ***Potential Presence and Occupation Period of Marine Mammals in the Gulf of St. Lawrence that Could be Encountered in the Study Area***

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mysticetes cetaceans												
Blue whale (Gulf of St. Lawrence)[2]												
Fin whale[2]												
North Atlantic Right whale[2]												
Minke Whale												
Odontocete cetaceans												
Harbour Porpoise												
Dolphin												
Pinnipeds												
Grey seals[3]												
Harbour seals[4]												
Harp seals												
Hooded seals												

Sources: COSEWIC; Leatherwood et al., 1976; Lesage et al., 2007

[1] Species in pink present an "at-risk" status and are discussed below

[2] Yellow shading indicates low potential for presence of species in study area.

[3] Dark green zones represent months were the specie is present at greater abundance.

[4] Harbour seal remain in the vicinity of their haul-out sites during summer and is believed to be relatively sedentary through the year.

Blue Whale

Recent blue whale sightings have come predominantly from the Gulf of St. Lawrence, along the southwest and eastern coasts of Newfoundland during winter and early spring, where ice-related stranding's and entrapments have occurred, and in shelf waters off Nova Scotia. Based on the literature reviewed as part of the EIS and baseline studies completed for the BHRP, Blue Whales have not been observed in the Project RSA and the species is considered to have a low potential for occurrence in the vicinity of the Site (see WSP report *Desktop Study: Aquatic Species at Risk, Marine Mammals and Sea Turtles* dated January 2020 and included in Appendix BB of the EIS document).

Blue whale photo-identification research from eastern Canada has focused on the whales found in the Gulf of St. Lawrence in spring through fall, where 382 individual whales have been cataloged since 1979. Blue whales enter the Gulf of St. Lawrence through Cabot Strait by the end of March - early April, when the ice breaks up and are commonly seen in the St. Lawrence from late May to December. Though blue whales can be found along the North Shore of the Gulf of St. Lawrence by early April, they are first regularly sighted off the eastern tip of the Gaspé Peninsula in late April and peak there in June. By late July they are found up into the St. Lawrence Estuary. Photo identification data shows that blue whales disperse from the Gaspé region to the Estuary and North Shore during June, July, and August. Blue whale sightings in the St. Lawrence Estuary peak in August, with some individuals remaining in the Estuary for 2-3 months. Although sightings in the Estuary are still regular during September and October, some blue whales seen there in August travel back to the east along the North Shore to the Sep-Iles and Mingan Island regions, where blue whales are regularly found at that time. Blue whales are also observed, though more rarely, in the northeast Gulf from June to November. Blue whales have been observed in the St. Lawrence as late as December and into January, with occasional sightings in February. Blue whales are not uncommon off the eastern end of the Gaspé Peninsula in December. These observations indicate that in years where ice cover is light, some blue whales may stay in the St. Lawrence much of the winter.

COSEWIC 2002. COSEWIC assessment and update status report on the Blue Whale Balaenoptera musculus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 32 pp.

Fin Whale

Fin whales along the Canadian east coast can occur in coastal, on-shelf, and off-shelf waters. Passive acoustic monitoring showed annual residency of fin whales in the Gulf of St. Lawrence, although they were absent from seasonally ice-covered areas, such as the Estuary. Based on the literature reviewed as part of the EIS and baseline studies completed for the BHRP, Fin Whales have not been observed in the Project RSA and the species is considered to have a low potential for occurrence in the vicinity of the Site (see WSP report *Desktop Study: Aquatic Species at Risk, Marine Mammals and Sea Turtles* dated January 2020 and included in Appendix BB of the EIS document).

A 7-year acoustic study (2010–2017) in the Gulf of St. Lawrence recorded fin whales in January to April in every year at one station north of the Magdalen Islands, while they did not record fin whales in the ice-covered Estuary in the same time span. However, fin whales have been observed in winter months in the Estuary during aerial surveys. Fin whale occurrence in winter in the Gulf of St. Lawrence is most likely determined by ice coverage, which has declined in the last 30 years with considerable annual variations. With the prospect of further sea ice declines and increasing water temperatures, fin whales in the Gulf of St. Lawrence could remain there year-round. Another recent acoustic monitoring effort found little change in acoustic occurrence of fin whales off Canada's east coast from fall to spring beyond what can be attributed to seasonal changes in calling rates. These data indicate that an unknown but possibly significant proportion of fin whales summering in eastern Canadian waters remain there in winter, possibly adjusting their distribution to respond to changes in prey distribution and the presence of sea ice in the northern areas. The presence of fin whales off Nova Scotia in winter may correspond to Gulf of St. Lawrence fin whales forced out of the Gulf by sea ice. Both historical and recent lines of evidence suggest that fin whales are present year-round off eastern Canada.

COSEWIC. 2019. COSEWIC assessment and status report on the Fin Whale Balaenoptera physalus, Atlantic population and Pacific population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 72 pp. (**https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html**).

North Atlantic Right Whale

About two-thirds of the population typically congregates in the lower Bay of Fundy and on the Scotian Shelf during summer and fall, and small numbers occur in two areas of the Gulf of St. Lawrence, one north and east of the Gaspé Peninsula, and the other southeast of the Gaspé Peninsula in the mouth of Chaleur Bay (Baie-des-Chaleurs). Based on the literature reviewed as part of the EIS and baseline studies completed for the BH project, North Atlantic Right Whales have not been observed in the Project Regional Study Area and the species is considered to have a low potential for occurrence in the vicinity of the Site (see WSP report *Desktop Study: Aquatic Species at Risk, Marine Mammals and Sea Turtles* dated January 2020 and included in Appendix BB of the EIS document).

COSEWIC. 2013. COSEWIC assessment and status report on the North Atlantic Right Whale Eubalaena glacialis in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 58 pp. (**https://www.registrelep-sararegistry.gc.ca/default_e.cfm**).

Harbour Porpoise

During summer, harbour porpoises are found throughout the Gulf of St. Lawrence, reaching upstream as far as the mouth of the Saguenay River. Porpoises are common along the north shore of the Gulf of St. Lawrence, along the Gaspé coast, and in the Baie des Chaleurs. Densities of porpoises are lower in the southern Gulf of St. Lawrence.

There is reason to believe that porpoises in the Gulf are migratory and that most of them move out of the Gulf in winter to avoid ice entrapment. Very little is known of the winter distribution of the porpoises from Labrador, Newfoundland, and the Gulf of St. Lawrence. None were observed as part of baseline studies completed for the BH project.

COSEWIC 2006. COSEWIC assessment and update status report on the harbour porpoise Phocoena (Northwest Atlantic population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 32 pp. (**https://www.sararegistry.gc.ca/status/status_e.cfm**).

Smooth Skate

COSEWIC, 2012 does not discuss temporal area of occupancy for the smooth skate. DFO demersal research trawl surveys form the basis for determining where smooth skate occur. Approximately 80 percent of the global population of smooth skate occurs in Canadian waters. It is distributed primarily in the troughs separating shallower banks, from the Hopedale Channel on the Labrador Shelf to the Gulf of Maine and outer Georges Bank. The Laurentian-Scotian design a table unit represents the largest percent area of the species global range. Mark-recapture studies of skates (primarily other species) show average movements of about 100 km, with a small proportion moving up to 440 km. This suggests limited dispersal or migration, as is typical of skates. None were observed as part of baseline studies completed for the BH project.

COSEWIC. 2012. COSEWIC assessment and status report on the Smooth Skate Malacoraja senta in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xix + 77 pp. (**https://www.registrelep-sararegistry.gc.ca/default_e.cfm**).

Winter Skate

In the Southern Gulf, they occupy very shallow inshore areas in late summer/early fall and disperse throughout the Magdalen Shallows in winter. They are present inshore regularly during summer in Nova Scotian waters and around Prince Edward Island. None were observed as part of baseline studies completed for the BH project.

COSEWIC. 2015. COSEWIC assessment and status report on the Winter Skate Leucoraja ocellata, Gulf of St. Lawrence population, Eastern Scotian Shelf - Newfoundland population and Western Scotian Shelf - Georges Bank population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xviii + 46 pp. (**https://www.registrelep-sararegistry.gc.ca/default_e.cfm**).

Thorny Skate

COSEWIC, 2012 does not discuss temporal area of occupancy for the thorny skate. Thorny Skate is among the most widespread and abundant demersal fish species in Canadian waters. It occurs on most of the continental shelf, from Baffin Bay as far north as Lat. 68o N, Davis Strait, Hudson Strait and Ungava Bay, south along the Labrador Shelf, northeast Newfoundland Shelf, the Grand Banks, Gulf of St. Lawrence, Scotian Shelf, Bay of Fundy, and Gulf of Maine. Average movements were observed to be about 100 km, with a small proportion moving up to 440 km, suggesting limited dispersal or migration. None were observed as part of baseline studies completed for the BHRP.

COSEWIC. 2012. COSEWIC assessment and status report on the Thorny Skate Amblyraja radiata in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 75 pp. (**https://www.registrelep-sararegistry.gc.ca/default_e.cfm**).

White Shark

Off Atlantic Canada, the white shark has been recorded from the northeast Newfoundland Shelf, Strait of Belle Isle, St. Pierre Bank, Sable Island Bank, Forchu Misaine Bank, in St. Margaret's Bay, off Cape La Have, in Passamaquoddy Bay, in the Bay of Fundy, in the Northumberland Strait, and in the Laurentian Channel. Of 30 Atlantic Canada white shark records for which the month is known, 20 occurred during the month of August, the remainder occurred during June, July, or September with an additional record in November and one in December. Clustering of white shark records in Atlantic Canada during late summer months suggests they may be correlated with the seasonal shift of the warm Gulf Stream toward the coast. None were observed as part of baseline studies completed for the BHRP.

COSEWIC 2006. COSEWIC assessment and status report on the White Shark Carcharodon carcharias (Atlantic and Pacific populations) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 31 pp. (**https://www.sararegistry.gc.ca/status/status_e.cfm**).

Lumpfish

In the Northwest Atlantic, lumpfish have been occasionally caught in Davis Strait, but are more common off Newfoundland and Labrador, New Brunswick, and Nova Scotia. Although captured in the southern Gulf of St. Lawrence and on the Scotian Shelf/Bay of Fundy, percent occurrence and abundance there is low. Larval records from the Bay of Fundy, Scotian Shelf, Gulf of St. Lawrence, and Grand Banks indicate that they are widely distributed in those areas near the surface in spring. Where pelagic sampling was undertaken in the summer/fall, young of the year lumpfish were caught in the southern Gulf of St. Lawrence. None were observed as part of baseline studies completed for the BH project.

COSEWIC. 2017. COSEWIC assessment and status report on the Lumpfish Cyclopterus lumpus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 78 pp. (**http://www.registrelepsararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1**).

Atlantic Wolffish

In the Gulf of St. Lawrence, Atlantic wolffish occurs primarily in coastal areas and on the edge of deep channels. Adult Atlantic wolffish do not move far. In the results of a tagging study conducted between 1962 and 1966, 398 Atlantic wolffish were tagged and 20 individuals were recaptured. Most individuals were recaptured within a short distance of the original tagging site (approximately 8 km on average, all wolffish species combined). Short migrations have also been observed in the eastern Atlantic and off West Greenland. However, migrations of several 100 km have been observed in the studies reported. None were observed as part of baseline studies completed for the BHRP.

COSEWIC. 2012. COSEWIC assessment and status report on the Atlantic Wolffish Anarhichas lupus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 56 pp. (**http://www.registrelep-sararegistry.gc.ca/default_e.cfm**).

Atlantic Salmon

Fifteen rivers on the shore of the Northumberland Strait support Atlantic salmon stocks, including rivers in Pictou County. The Atlantic salmon stocks of the Northumberland Strait area typically enter rivers in late fall, usually after September 15 (O'Neil, Longard, & Harvie, n.d.). Collectively over its entire range in North America, adult Atlantic salmon return to rivers from feeding and staging areas in the sea mainly between May and November, but some runs can begin as early as March and April (COSEWIC, 2010). None were observed as part of baseline studies completed for the BHRP.

O'Neil, S. F., Longard, D. A. and Harvie, C. J. Atlantic salmon (Salmo salar L.) stock status on rivers in the Northumberland Strait, Nova Scotia area, in 1996. Department of Fisheries and Oceans Canadian Stock Assessment Secretariat Research Document 97/22.

COSEWIC. 2010. COSEWIC assessment and status report on the Atlantic Salmon Salmo salar (Nunavik population, Labrador population, Northeast Newfoundland population, South Newfoundland population, Southwest Newfoundland population, Northwest Newfoundland population, Quebec Eastern North Shore population, Quebec Western North Shore population, Anticosti Island population, Inner St. Lawrence population, Lake Ontario population, Gaspé-Southern Gulf of St. Lawrence population, Eastern Cape Breton population, Nova Scotia Southern Upland population, Inner Bay of Fundy population, Outer Bay of Fundy population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xlvii + 136 pp. (**www.sararegistry.gc.ca/status/status_e.cfm**).

Leatherback Sea Turtle

Leatherback sea turtles are widely distributed in Atlantic Canada, inhabiting both shelf and offshore waters and the Gulf of St. Lawrence. Satellite telemetry studies and sightings indicate leatherbacks are present in Canadian waters between April and December with highest densities from July to September. Shelf waters off Cape Breton Island, the south coast of Newfoundland, and the southern Gulf of St. Lawrence, as well as offshore waters including the Northeast Channel, constitute high-use habitat during late summer and early fall. None were observed as part of baseline studies completed for the BH project.

COSEWIC. 2012. COSEWIC assessment and status report on the Leatherback Sea Turtle Dermochelys coriacea in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 58 pp. (**www.registrelep-sararegistry.gc.ca/default_e.cfm**).

2.25 IAAC-25

The assessment methodology for accidents and malfunctions is described in Section 7.4.1.1 of the EIS, and a new table (Table 2.8) has been established that provides the ranking levels to determine the likelihood of the interactions between this scenario (*Release of off-specification effluent from the Temporary Leachate Treatment Facility [TLTF]*) and the VCs. This table is consistent with analysis of other accidents and malfunctions described in Section 7.4.1 of the EIS.

Table 2.8 Credible Accidents and Malfunctions

Valued Component (VC)	Release of off-specification effluent from the Temporary Leachate Treatment Facility (TLTF)
Air Quality and Odour	N/L
Greenhouse Gases	N/L
Noise	N/L
Light	N/L
Geology, Geochemistry and Soil	N/L
Groundwater	N/L
Surface Water	M
Terrestrial Habitat and Vegetation	N/L
Wetlands	M
Mammals and Wildlife	N/L
Marine Environment	M
Fish and Aquatic Habitat	M
Migratory Birds	N/L
SAR	M
Mi'kmaq of Nova Scotia	M
Economic and Social	N/L
Archaeological/Cultural Heritage Resources	N/L
Human Health	M

Notes:

Interactions between Accidents/Scenarios and the respective VCs were classified as follows:

N/L No substantive interaction. The environmental effects are rated not significant and are not considered further in this report.

M Interaction may occur. However, based on experience and professional judgment, the interaction would not result in a significant environmental effect, even without mitigation, or the interaction would clearly not be significant due to application of BMPs.

H Interaction may, even with BMPs, result in a potentially significant environmental effect and/or is important to regulatory and/or public interest. Potential environmental effects are considered further and in more detail in the EIS.

2.26 IAAC-26

Response provided in Section 1, Table of Concordance (Table 1.1).

2.27 IAAC-27

Response provided in Section 1, Table of Concordance (Table 1.1).

2.28 IAAC-28

Dioxins/furans (D/F) have low water solubility and high affinity for adsorbing to particulates and are more likely to be associated with the sediments rather than dissolved in surface water (CCME, 2001). Given the low water solubility of D/F, CCME and the Province of Nova Scotia do not have screening values for D/F in surface water. In addition, the Freshwater Wetlands have not received effluent associated with the Mill operations since the late 1970s which is considered to be the primary source of D/F to the wetlands. Based on the above rationale, D/F are unlikely to be present in surface water of the Freshwater Wetlands at concentrations that would be a concern for aquatic life. In addition, sediment pore water samples were collected from the Freshwater Wetlands and Estuary as part of the HHERA evaluation as this data provides a quantitative estimate of the chemical constituents dissolved in water in the interstitial spaces of sediments which are considered to be bioavailable for uptake by invertebrate organisms. The concentrations of D/F in all sediment pore water samples collected from the Site were below the Final Chronic Criterion toxicity values adopted from the USEPA (1986) for the protection of aquatic life. It is further noted that surface water sampling for D/F analysis was conducted at the Estuary, where sediment concentrations of D/F were also elevated, and the concentrations of D/F in surface water were well below the Final Chronic Criterion protective of aquatic life. Based on the above rationale, D/F are not anticipated to be present in surface water of the Freshwater Wetlands at concentrations that pose an unacceptable risk to aquatic life.

CCME, 2001. Canadian Council of Ministers of the Environment, Polychlorinated Dioxins and Furans – Canadian Sediment Quality Guidelines for the Protection of Aquatic Life.

USEPA. 1986. National Recommended Water Quality Criteria: 1986. U.S. EPA, Office of Water, Office of Science and Technology (4304T).

2.29 IAAC-29

Response provided in Section 1, Table of Concordance (Table 1.1).

2.30 IAAC-30

Wetland Baseline Review completed by WSP in 2018 (Appendix AA of the EIS) presents functional assessments for each wetland identified and assessed within the Site Study Area (SSA) using the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC Version 1.2.1, October 2017). WESP-AC is a method combining desktop and field evaluation to assess the condition and function of Nova Scotia's wetlands. WESP-AC generates scores (0 to 10) and ratings (Lower, Moderate, and Higher) for each of a wetland's functions and benefits. The wetlands functions and their benefits that are measured by the WESP-AC are presented in Section 2 of Appendix AA of the EIS. The hydrologic functions scored by WESP-AC taken from Table 2.1 in the Wetland Baseline Review are summarized below in Table 2.9.

Table 2.9 Benefits of Wetland Functions Scored by WESP-AC

FUNCTION	DEFINITIONS	POTENTIAL BENEFITS
Hydrologic Function		
Water Storage & Delay	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods.	Flood control, maintain ecological systems.
Stream Flow Support	The effectiveness for contributing water to streams especially during the driest part of growing season.	Support fish and other aquatic life.

A site is considered to show a positive indicator for wetland hydrology when one primary indicator (i.e., surface water, high water table, saturation, water mark on trees, sediment deposits, water-stained leaves, drift deposits) or two secondary indicators (i.e., drainage patterns, stunted or stressed plants, dry season water table) are observed. Surface water and high-water table were the primary wetland hydrology indicators observed at WL-16. The Wetland Baseline Review indicated that WL-16 was previously used as a settling pond for effluent, which could have potentially affected the wetland's function. The hydrologic functions of the wetlands identified and assessed in the SSA were rated as lower in accordance with the WESP-AC. The WESP-AC ratings for WL-16 hydrologic group function and benefits is rated as lower. Table 2.3 of Appendix AA of the EIS displaying the WESP-AC summary of the Hydrologic Group is presented below in Table 2.10.

Table 2.10 WESP -AC summary Ratings for Grouped Functions, Wetland Condition and Wetland Risk of Non-Tidal Wetlands (Continued)

Wetland Functions or Other Attributes	WL-13abc		WL-14		WL-15		WL-16	
	Function Rating	Benefit Rating	Function Rating	Benefit Rating	Function Rating	Benefit Rating	Function Rating	Benefit Rating
Hydrologic Group	Lower	Lower	Higher	Lower	Moderate	Lower	Lower	Lower

Many of the wetlands assessed as part of the WSP Wetland Baseline Review are associated with a watercourse, therefore the generalized score for aquatic habitat was assessed rated as moderate or higher as per the WESP-AC summary. In their current state, all wetlands on-site have low potential for anadromous fish habitat and, because of the existing dam associated with the BHSL, anadromous fish cannot access the existing freshwater wetland habitats. In addition, baseline fish and fish habitat evaluations completed for the Project indicated none of the watercourses surrounding the BHSL contained significant spawning habitat. At best, streams were classified as Type II, good salmonid rearing habitat with minimal spawning habitat (WSP, 2018; Hoover et al., 2020). Similarly, the Freshwater Wetlands located upgradient of the BHSL and ASB have ponded water areas that formed as a result of the construction of the berms associated with the ASB and BHSL but do not currently support a substantial fish population (Hoover et al., 2020; GHD, 2020). As described in the EIS, sediment of WL-16 and WL-13 (also referred to as the north and south Freshwater Wetlands) contain elevated concentrations of contaminants such as D/F which will be removed (dredged) as part of the Project. Following the dredging activities, the wetland will be reconnected to BH through removal of the ASB berms to allow for reconnection to Estuary-type habitat and potential anadromous fish utilization. It should be understood that some wetland areas associated with the BHETF such as WL-16 and WL-13 rely on the artificial hydrology imposed by the berms associated with the ASB and the existing BHSL dam. Once reconnected to the Strait and natural tidal flow, the hydrology of these wetlands are expected to revert to historical conditions associated with a tidal Estuary. Although this will alter the current hydrologic conditions of these wetlands, it should also be noted that the ultimate goal of this Project is to increase water and sediment quality and increase fish access to BH. The sediment removal activities may cause short-term impacts on fish and fish habitat but the Project will have a long-term net-positive impact on fish and fish habitat as well as improving life-cycle opportunities (specifically rearing and nursery) for various aquatic or semi-aquatic organisms.

As indicated above and in the EIS, the former wetland areas along the southern shoreline of BH that were historically used as effluent settling ponds (WL-16 and WL-13) will be dredged to remove contaminated surficial sediments. The

Freshwater Wetland remediation activities area scheduled to occur in year 2, with WL-16 (referred to as Risk Management Area [RMA] 4 or the Northern Wetlands) proposed as the first area to be dredged during remedial activities (Figure 4). Figure 7.3-22 in Section 3 of the EIS indicates the proposed remediation area boundaries for WL-16; while the extent of the areas to be remediated will be refined with the aim of minimizing the footprint of wetland disturbance and will be based on the results of confirmation sediment sampling. The sediment remediation activities are anticipated to occur in Year 2 of the Project. Following the sediment remediation activities, the wetland areas will be allowed to re-vegetate naturally with limited shoreline vegetation enhancement in selected areas as presented above in the response to IAAC-07.

Following the sediment remediation activities being proposed for the Freshwater Wetlands, sediment remediation (dredging) activities will proceed to the ASB area (year 3) followed by the BHSL (years 3 to 5). Following completion of the ASB and BHSL remediation activities, the dykes and berms associated with the ASB will be removed. The channel between WL-16 and the current ASB area will then be re-instated to allow for hydrologic connection and re-naturalization of the wetland areas with BH. Following BHETF berm removals anticipated to occur in Years 4 or 5, there will be changes in the hydrologic conditions of WL-16 as it will be reconnected with the remediated ASB and BHSL. Following removal of the BHSL dam in Year 7, further hydrologic changes are anticipated as the entire BHETF will be hydrologically reconnected with the Northumberland Strait as a natural tidal Estuary consistent with historical conditions (prior to the dam and berm construction). Figure 4 presented below shows current conditions of WL-16 along with historical aerial photographs of WL 16 that are anticipated to be reinstated following the BHETF berm and dam removal activities. Figure 7.3-26 in Section 3 of the EIS shows the location of the berm/dyke material between WL-16 and the ASB that will be removed to restore historical hydrologic conditions associated with WL-16 and the ASB.

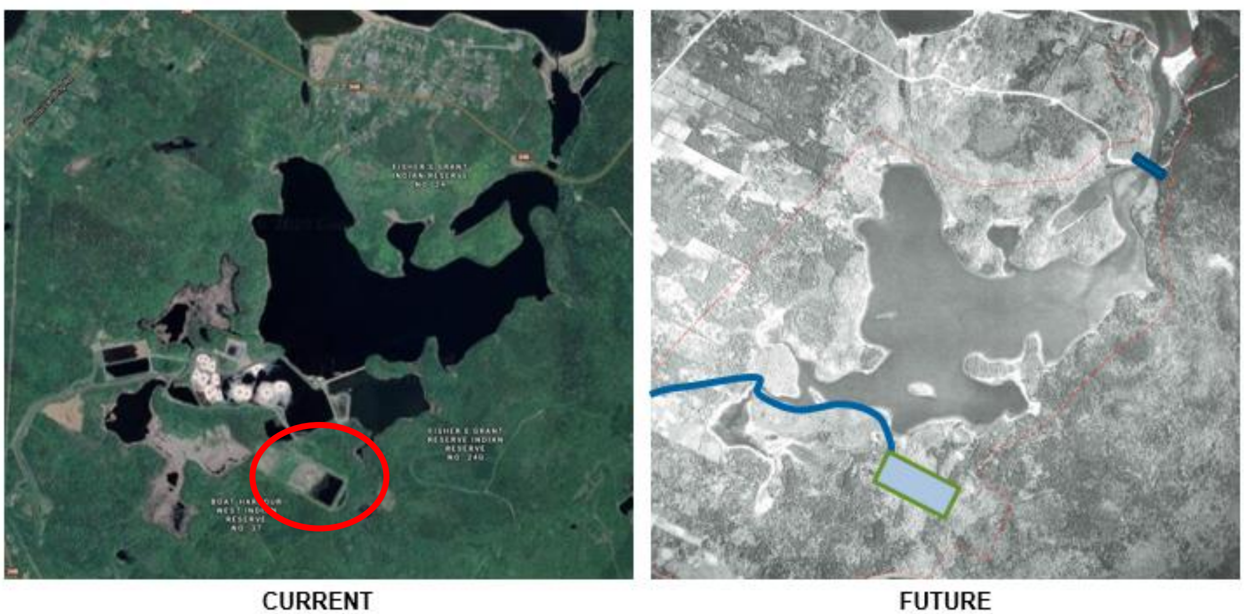


Figure 4 WL-16 Current and Future (Based on Historical) Conditions

GHD. 2020. Quantitative Human Health and Ecological Risk Assessment. Boat Harbour Effluent Treatment Facility. Boat Harbour Remediation Planning and Design. Pictou Landing, Nova Scotia. Final Draft for Review.

Hoover, Z., Panneerselvam, E., Adesida, A., Carrier, A.J., Francis, L., Hoover, J., Pham, M.N., Nicholson, A., Williams, J., Zhang, X., Oakes, K. (2020). Boat Harbour Fish Population Assessment. Cape Breton University.

WSP. 2018. Boat Harbour Remediation Planning and Design. Fish and Fish Habitat Baseline Review.

2.31 IAAC-31

Response provided in Section 1, Table of Concordance (Table 1.1).

2.32 IAAC-32

Responses to IRs focused on or having aspects related to Human Health (IAAC-33 through IAAC-65) have adequately addressed specific questions/information requested as part of IAAC-32. A review of significance in the context of impact assessment and the EIS Guidelines was completed with no increases in significance identified, and in some cases reduced significance based on additional mitigations measures implemented. Each of these significance assessments and the associated rationale have been provided in the specific IRR and reviewers associated with IAAC-32 are directed to the Responses for IAAC-33 through IAAC-65. For example, the use of silt curtains used during dam removal to control/reduce sediment transport, as described in IAAC-41 below. Each of Responses for the Human Health related IRs (IAAC-33 through IAAC-65) associated with IAAC-32 also provide additional information on analysis, mitigation and supporting conclusions to address the specific requests within IAAC-32.

<u>Considering the number of Human Health IRs and their inter-connected nature it is important for reviewers associated with IAAC-32 to read all of the Human Health IRs for their specific concerns and understand the breadth of work completed associated with the HHRA.</u>

2.33 IAAC-33

The calculation of the estimated daily intake (EDI) for vanadium is appended to this response document (Table 1 following text). The EDI includes background exposure to vanadium for the typical Canadian population, with the inclusion of Site-specific inputs when available. The EDI calculation includes exposure to soil through ingestion exposure, exposure to vanadium in particulates/dust in air (indoor and ambient), exposure to drinking water through ingestion, exposure through consumption of food/beverages, and exposure through the use of consumer products. For consumer products, the primary exposure to vanadium is expected to be through cigarette smoke (second hand smoke) and consumption of vitamins/supplements. Exposure was calculated for toddler receptors (0.5 to 4.5 years), who are expected to have the highest intake levels of the various life stages given the high ingestion rates per body weight. Exposure is assumed to occur 365 days per year. Ingestion and inhalation rates and body weight are taken from HC’s Preliminary Quantitative Risk Assessment (PQRA) guidance document. The background soil concentration is taken form the Public Works and Government Services Canada (PWGSC) Review of Environment Canada's Background Soil Database (2004-2009) and is based on summary statistics for the Nova Scotia Highlands Zone (PWGSC, March 2011). The background drinking water concentration is based on the measured potable water well results for the well network used to supply potable water to the Pictou Landing First Nation (PLFN) community (latest results based on 2010 data). Vanadium was not detected in the most recent of the results provided to GHD and hence, the detection limit of 2 µg/L was applied in the EDI calculation. The background air concentration is based on the maximum vanadium concentration of 59.5 nanograms/cubic metre (ng/m^3) in ambient air $PM_{2.5}$ fraction, as presented in the Screening Assessment for the Challenge, Vanadium Oxide (Vanadium Pentoxide), prepared by Environment Canada and HC, September 2010. The study consisted of eight samples across Canada, and the maximum value detected in Montreal, Quebec was applied in the EDI calculation. Given this, the ambient air concentration is the same as the indoor air concentration in the EDI calculation. The EDI for food/beverages was taken from Appendix D of the DFO Surface Soil Criteria (SSC) Report prepared by AMEC Foster Wheeler Environment & Infrastructure (March 2015). The EDI for food is calculated as a weighted average of the highest intakes (male) within each age group - Canadian Total Diet Study (HC, 1999). The EDI for food (0.62 micrograms/kilogram [µg/kg]-day) applied in the EDI calculation is higher but within a similar magnitude as the range (0.26 - 0.41 µg/kg-day) presented in Environment Canada and HC (2010) for 0.5 to 4 year old's. This value is similar to the value (6.5 µg/day divided by body weight of 16.5 kg = 0.39 µg/kg-day) presented in the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile for Vanadium, September 2012 for 2 year old's. The EDI for food applied in the EDI calculation is conservative in comparison to other values presented in the literature. For cigarette smoke, ATSDR's Toxicological Profile for Vanadium indicates that the concentration of vanadium in cigarette smoke is 0.33 µg per cigarette. It was assumed that the toddler would inhale second hand smoke in the presence of an adult smoking 40 cigarettes per day (two packs of cigarettes per day, each pack containing 20 cigarettes). ATSDR's Toxicological Profile for Vanadium indicates that the daily intake of vanadium from consuming vitamins/supplements is approximately 9 µg/day. The total EDI (sum of background exposure to soil, air, water, food, and consumer products) is 2.3 µg/kg-day for toddler receptors. Consistent with HC risk assessment guidance, a Hazard Quotient (HQ) of 1.0 can be applied when background exposures have been accounted for in the determination of risks. The background exposure and HQ of 1.0 were applied in the calculation of the Site-specific target levels (SSTLs) for vanadium. The tables presenting the calculation of the SSTLs for the various scenarios (sandy beach; intertidal mudflats; reed gathering; in-water activities) are appended to this response document in Tables 2 to 5 following text. These tables were updated in November 2021 and the updated tables are included in Appendix D of this document (see Section 2.33.1 below).

Using site-specific background exposure (represented by the EDI) and an HQ of 1, the SSTL developed for the most conservative scenario (intertidal mudflats) increases from 49 milligrams/kilograms (mg/kg) in the HHERA (Appendix A of the EIS) report to 70 mg/kg for vanadium using the above noted inputs. The vanadium EPCs for the Freshwater Wetlands and the Estuary (including the BHSL and Associated Basins) are 45 and 50 mg/kg, respectively, and below the revised SSTL of 70 mg/kg as noted above. Based on the above rationale, remediation of sediment associated with the BHETF for protection of human health through exposure to vanadium from the direct contact/ingestion pathway is **not** considered warranted which is consistent with the findings of the HHERA (Appendix A of the EIS).

2.33.1 Additional Information to Support IAAC-33 (Originally submitted as GHD Memorandum-93, November 2021)

Tables 2 to 5 that were previously provided in response to IAAC-33 (GHD Report 41, September 2021, response provided above) have been revised to include the soil allocation factor (SAF). An SAF of 1 was applied for vanadium, since background exposures (i.e., estimated daily intake or EDI) were included in the evaluation of risk for this contaminant. Since the EDI associated with background exposure to D/F is greater than the tolerable daily intake (TDI), theoretically, residents/PLFN cannot be safely subjected to any increased exposure. As a result, the HC and CCME default SAF of 0.2 was assumed for D/F. The revised Tables 2 to 5 previously included in response to IAAC-33 are provided in Appendix D of this document.

2.34 IAAC-34

Figure 2 of the HHERA report (Appendix A of the EIS) provides a site plan showing the boundaries of the various areas assessed as part of the HHERA. The upland areas are considered to be the terrestrial areas of the Study Area where soil and groundwater samples were collected. Figures 2 and 3 of the HHERA (Appendix A of the EIS) provide the locations of the soil and groundwater samples collected from the upland areas.

All samples collected from the BHSL and associated BHETF Basins were included in the HHERA. These areas of the site were combined with the data collected from the Estuary given that these two areas would be re-connected post remediation. Several operable exposure pathways were included in the HHERA associated with the Estuary and include potentially operable pathways associated with the BHSL and Associated Basins. Sediment and surface water quality data collected from the BHSL and associated BHETF Basins were included in the COPC screening. There were no COPCs carried through the HHERA for surface water, and exposure to surface water from the BHSL and associated BHETF Basins is **not** considered a human health concern. For sediment, direct contact exposure (ingestion and dermal contact) was assessed for a PLFN resident and recreational user. This exposure pathway was assessed for sediments collected from the BHSL and associated BHETF Basins. Country foods were collected in and around both the Estuary and the BHSL (and associated basins) and have also been assessed in the HHERA for human consumption. Country foods pathways that were quantitatively assessed included consumption of plants, consumption of game organs, and consumption of waterfowl. The HHERA report is provided in Appendix A of the EIS.

2.35 IAAC-35

Section 6.3.1 of the HHERA report (Appendix A of the EIS) provides the rationale for using sub-chronic Toxicity Reference Values (TRVs) for direct contact exposure to sediment. The direct contact exposure to sediment is based on a recreational use scenario, where exposure is expected to be intermittent and only occurring during the summer months. Chronic TRVs are typically used where exposure occurs continuously, such as a residential use scenario. Sub-chronic TRVs were applied in the HHERA to better represent the exposure that would occur for a recreational use scenario.

The sub-chronic TRVs that were applied in the HHERA were obtained from a reputable agency (Agency of Toxic Substance and Disease Registry or ATSDR), which is identified by HC as a preferred source of alternative TRVs. The sub-chronic TRVs are based on ATSDR's Minimal Risk Levels (MRLs), which are derived by ATSDR only when sufficient and reliable data exist, and undergo rigorous peer review. The MRLs are based on the no observed adverse effect level (NOAEL) for the most sensitive target organ for the most sensitive species. The MRLs are calculated by dividing the NOAEL values by an uncertainty factor. The sub-chronic TRVs are based on the intermediate-duration MRL, which ATSDR identifies as exposure occurring for 15 to 364 days. Recreational user exposure within the Study Area is expected to occur for 210 days (assumed to be 7 days per week for 30 weeks; no dose averaging was used in the calculation of intake/dose [i.e., exposure factor of 1 was applied]), which is within the range of intermediate exposure assumed by ATSDR where by the use of the sub-chronic TRVs in the HHERA is supported.

It is further noted that GHD discussed the use of the ATSDR intermediate MRLs in a meeting held on December 16, 2019 between representatives of PLFN, NSLI, IAAC, GHD, and HC. A copy of the meeting minutes is provided in Appendix E of this document. During that meeting, HC was in general agreement with the use of the ATSDR intermediate MRLs in the HHERA, and GHD revised the HHERA accordingly.

In the HHERA report, chronic TRVs were used to assess consumption of country foods and sub-chronic TRVs were used to assess direct contact with sediment. As HC indicates, the target organs/effects are different for chronic versus sub-chronic TRVs for the same COPC assessed in the HHERA. HC has indicated that this approach may underestimate risks for the exposure scenarios. In the HHERA, the target organ/endpoint was identified for each TRV applied for each COPC, and the non-cancer HQs were summed for COPCs having a similar target organ/endpoint. This approach is discussed in Section 6.4.4 of the HHERA (Appendix A of the EIS). This approach follows HC's risk assessment guidance and therefore is supported. In addition, it is highly unlikely that foods obtained from the Study Area would be consumed every day of the year, as there are limited resources in the Study Area to sustain this type of consumption pattern. Rather, the country foods obtained from the Study Area would be used to supplement other sources of food. The use of the chronic TRVs for calculating risks for the consumption of country foods pathway is an overly conservative approach. As such, the exposure frequency used to develop the sub-chronic TRVs is a better representation of the consumption patterns of country foods obtained from the Study Area. As recommended by HC in their comment, the same sub-chronic TRVs were applied for direct contact to sediment and consumption of country foods pathways for vanadium and D/F.

A summary of the calculated HQs for vanadium and D/F is presented in the tables appended to this response document (Table 6 for Freshwater Wetland and Table 7 for the Estuary including the BHSL and Associated Basins following text). For both vanadium and D/F, the sub-chronic TRVs were applied for all exposure pathways, as recommended by HC in IAAC-34 comment, and the risks summed for all exposure pathways as discussed below. The Site Intake levels presented in Tables 6 and 7 (Appendix D of this document) for the exposure pathways assessed in the HHRA were taken directly from the HHERA report (Appendix A of the EIS).

For vanadium, the risk to human health was summed for all exposure pathways assessed in the HHRA (direct contact with sediment; ingestion of game organs; and ingestion of waterfowl), as well as the background exposure (represented as the EDI – see response to IAAC-33 comment for derivation and Table 6 and 7 following text). The total exposure for vanadium was divided by the sub-chronic TRV to obtain the cumulative HQ for vanadium exposure. The cumulative HQ for vanadium was compared to the target HQ of 1 given that background exposure was included, consistent with HC risk assessment guidance. For all four scenarios assessed (sandy beach; intertidal mudflats; reed gathering; and in-water activities) at both the Freshwater Wetland and Estuary (including BHSL and Associated

Basins), the cumulative HQs for vanadium are equal to or less than the target HQ of 1. Given this information, there are no unacceptable risks to human health for exposure to vanadium associated with the Site. Therefore, vanadium does not require further assessment, remediation, and/or risk management consistent with the findings of the HHERA.

For D/F, the risk to human health was summed for all exposure pathways assessed in the HHRA (direct contact with sediment; ingestion of game organs; and ingestion of waterfowl) (see Tables 6 and 7 following text). The total exposure for D/F was divided by the sub-chronic TRV to obtain the cumulative HQ for D/F exposure. As indicated in CCME guidelines, the TRVs for /DF are lower than typical background exposure levels for the Canadian population. Under this condition, HC and CCME expect that further incremental exposure, above background levels, to Site-related D/F be minimized to the extent practical. As such, background exposure should not be used to adjust the HQ for D/F, and hence, the cumulative HQ for D/F was compared to the target HQ of 0.2. Likewise, the SSTLs for D/F need to be calculated using the target HQ of 0.2. For the reed gathering and in-water activities scenarios at both the Freshwater Wetland and Estuary (including BHSL and associated basins), the cumulative HQs for D/F are less than the target HQ of 0.2. Given this information, there are no unacceptable risks for exposure to D/F during reed gathering and in-water activities. For the sandy beach and intertidal mudflats scenarios at both the Freshwater Wetland and Estuary (including BHSL and associated basins), the cumulative HQs are greater than the target HQ of 0.2. As indicated in the risk summary tables following the text (Tables 6 and 7), between 96 and 99 percent of the exposure to D/F is based on the direct contact to sediment exposure pathway. It is further noted that the combined HQs for D/F considering only the consumption of country foods is less than 0.2. This indicates that there are no unacceptable risks for exposure to D/F through consumption of country foods.

Based on the above discussion, SSTLs were only developed for the direct contact exposure to sediment pathway, as this is the primary contributing exposure pathway to the calculated HQs. The updated tables presenting the calculation of the SSTLs for the various scenarios (sandy beach; intertidal mudflats; reed gathering; in-water activities) are included in Appendix D of this response document (see Tables 2 to 5). It is noted that the SSTLs have increased for vanadium, as indicated in the response to IAAC-33 comment. The SSTLs previously calculated for D/F in the HHERA report (Appendix A of the EIS) remain the same and are protective of human health from exposure to D/F associated with the BHETF.

2.36 IAAC-36

GHD collected berries and herbaceous plants from the upland areas as well as aquatic plants from the wetland areas and the data was included in the HHERA (Appendix A of the EIS). Section 4.1.5.2 of the HHERA provides a summary of the plant samples collected from the Study Area. Section 6.1.1.7 of the HHERA presents the chemical screening of the plant/berry tissue analytical results. Section 6.1.1.13 of the HHERA summarizes the COPCs identified for plant/berry tissue that were carried through the HHERA for quantitative assessment. Table 6.6 of the HHERA presents the exposure assumptions that were used to calculate dose/intake for consumption of plants. Table H-2-16 of Appendix H-2 of the HHERA (Appendix A of the EIS) presents the calculated dose/intake and risks for consumption of plants. These risks were summarized and discussed in Section 6.4.3.5 of the HHERA. The HHERA is presented in Appendix A of the EIS.

2.36.1 Additional Information to Support IAAC-36 (Originally submitted as GHD Memorandum-93, November 2021)

Section 4.2.5.2 of the HHERA provides a summary of the plant samples collected from the Study Area. The following plant samples were collected: cattails (*Typha*), bugleweed (*Lycopus uniflorus*), sensitive fern (*Onoclea sensibilis*), nightshade berries (*Solanum dulcamara*), holly berries (*Ilex verticillate*), curled dock (*Rumex crispus*), marsh hedge nettle (*Stachys palustris*), raspberries (*Rubus idaeus*), and bayberries (*Myrica pensylvanica*). Section 6.1.1.7 of the HHERA presents the chemical screening of the plant/berry tissue analytical results. Section 6.1.1.13 of the HHERA summarizes the COPCs identified for plant/berry tissue that were carried through the HHERA for quantitative assessment and include: 1-Chloronaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, perylene, phenanthrene, pyrene, benzo(a)pyrene total potency equivalents [B(a)P TPE], nickel, tin, and uranium. These COPCs were identified to have concentrations greater than the background concentrations and therefore were carried through the HHERA for consumption of plants. Table 6.9 of the HHERA presents the exposure assumptions that were used to calculate dose/intake for consumption of plants. Table H-2-16 of Appendix H-2 of the HHERA presents the calculated dose/intake and risks for consumption of plants. These risks were summarized and discussed in Section 6.4.3.5 of the HHERA. The calculated cancer risks and hazard quotients (HQs) for all COPCs in plants are less than or equal to the HC target cancer risk of 1E-05 and HQ value of 0.2. This indicates that there are currently no unacceptable health risks associated with the PLFN resident consuming vegetation from the Study Area.

It is noted that consumption of plants (from soils) was incorrectly identified as an inoperable exposure pathway in the human health Conceptual Site Model (CSM) that was provided in the HHERA report (Appendix A of the EIS). This human health CSM has been updated to show that the consumption of plants from upland areas is an operable exposure pathway (Appendix F of this document). Relevant tables (Table H-2.9 and Table H-2.16) that were included in the HHERA report for the operable consumption of plants are provided in Appendix F of this document for reference purposes. These tables indicate that consumption of plants from upland areas was considered an operable exposure pathway and assessed in the HHERA. As indicated in Table H-2.16, HQ values for all COPCs were equal to or less than 0.2 for plant consumption, and therefore, there are no current unacceptable health risks associated with the PLFN resident consuming plants from the Study Area.

The above assessment of plant consumption provided in the HHERA assumed exposure to current conditions. Please review the response below to IAAC-39, which provides an assessment of plant consumption as a result of soil disturbance and deposition to nearby residences and uptake into vegetable gardens – this pathway was assessed in the Project Related Activities– Human Health Risk Assessment (PRA-HHRA), which assessed potential human health risks to residences outside the Study Area during remediation of the BHSL. It is noted that this exposure pathway was identified as not operable in the PRA-HHRA as predicted concentrations in plants were below human health screening guidelines and/or background concentrations. <u>Concentrations of COPCs that are less than applicable screening guidelines and/or background levels are not typically identified as COPCs and, therefore, do not require further assessment and typically are not carried through to the next step of the risk assessment.</u> This initial COPC identification step is common industry practice for completing risk assessments in Canada and the United States. However, for the purposes of the conformity review, this pathway was carried forward specific to iron and manganese from the deposition of dust during remediation. As indicated in the response below to IAAC-39, the predicted concentrations of iron and manganese in plant tissue as a result of deposition to soils at nearby residences and uptake in garden vegetables do not pose an unacceptable risk through the consumption pathway and/or are consistent with the background concentrations in plants collected from areas outside the Study Area.

The revised human health CSM and the tables that present the exposure assumptions and calculated risks for consumption of plants for a resident/PLFN are presented in Appendix F of this document.

2.37 IAAC-37

Ingestion rates for a heavy consumer (using a 95 percent Upper Confidence Level of the Mean [UCLM] ingestion rate) were used in the risk calculations of exposure through consumption of game organs, as indicated in Table 6.6 of the HHERA report (Appendix A of the EIS). For context and interpretation purposes, a qualitative discussion of the calculated risks for the consumption of game organs is presented in Section 6.4.3.6 of the HHERA report (Appendix A of the EIS) to validate exposure risks meet HC's target HQ of 0.2 for an average consumer (using a mean ingestion rate).

Terrestrial game animals were not included in the HHERA since there were no soil COPCs carried through the HHERA. Further, concentrations of the primary contaminants within the Study Area (i.e., D/F) in soils at the Site are less than CCME background levels for soils across Canada. Concentrations in terrestrial game animals are expected to be consistent with background levels and much lower compared to aquatic wildlife that are directly exposed to the elevated concentrations of D/F in the sediment and the aquatic food items that have bio-accumulated contaminants from the sediments. Therefore, consumption of terrestrial game was considered inoperable (see Table 6.1 of the HHERA, Appendix A of the EIS).

Section 6.6 of the HHERA (Appendix A of the EIS) provides a discussion of uncertainty associated with calculating potential risks based on a single beaver sample. This discussion is reproduced below:

> *Only one beaver was captured from the Study Area. Therefore, it was assumed in the HHRA that the concentrations in this single beaver sample would be representative of this and other species of game present within the Study Area. Results for beaver and muskrat collected from reference locations indicate that the COPC concentrations in the meat tissues were similar to background levels, and the concentrations in the organ tissues were only slightly higher than background levels. Beaver and muskrat from the Study Area were also captured as part of the Castleden et al. (2016) study. In this study, beaver and muskrat meat and organ tissues were analyzed for D/F. Mean concentrations of D/F were 0.11 pg/g and 0.47 pg/g in the beaver and muskrat muscle tissue, respectively, and 0.60 pg/g and 0.63 pg/g in the beaver and muskrat liver tissue, respectively. The concentrations of D/F in the meat and liver tissue from the beaver captured as part of this study and applied in the HHRA were higher at 0.25 pg/g and 1.80 pg/g, respectively. Therefore, there is the possibility that the concentrations in the single beaver sample collected as part of this study and applied in the HHRA could be upper bound concentrations. However, additional tissue sampling would be required to confirm.*

It is further noted that a monitoring plan will be in place upon completion of remediation activities to ensure that country foods are acceptable for human consumption.

2.38 IAAC-38

Data that has been provided by Dalhousie University was presented and accepted in peer-reviewed journal articles (see references below). Multiple samples of several shellfish tissue types (crab, lobster, and mussels) were collected from Northumberland Strait in the area where the Estuary discharges to Northumberland Strait (i.e., within Study Area of the HHERA) and in areas outside of the Study Area to provide an overall characterization of the concentrations of COPCs in shellfish. Invertebrate community and tissue data collected from the Freshwater Wetlands and Estuary were also used to evaluate risk to the benthic invertebrate community and upper trophic level receptors that may feed on invertebrates exposed COPCs in sediment in the Study Area.

Chaudhary, M., Walker, R., Willis, R., Oakes, K. (2020). Baseline characterization of sediments and marine biota near industrial effluent discharge in Northumberland Strait, Nova Scotia, Canada. Marine Pollution Bulletin 157 (2020) 111372.

Quanz, M., Walker, Oakes, K., Willis, R. (2021). Effects of industrial effluent on wetland macroinvertebrate community structures near a wastewater treatment facility. Ecological Indicators (In Prep).

2.39 IAAC-39

Section 3.1.5 and Tables 3.6 to 3.9 of the PRA-HHRA (Appendix A of the EIS) provides detailed discussions regarding the operability of each potential exposure pathway considered in the PRA-HHRA. These sections of the report must be read in conjunction with the CSM Figures 3.2 to 3.5 of the PRA-HHRA.

As indicated in the PRA-HHRA, operable exposure pathways were limited to those shown in the table below:

Table 2.11 Operable Exposure Pathway for the PR-HHRA

Source Media	Exposure Pathway	COPC	Potential Receptor	BHRP Related Activity
Soil	Not Carried Forward as concentrations of COPCs below screening levels or background			
Sediment	Direct Contact (ingestion, dermal contact, inhalation)	Cadmium Hydrogen Sulfide	Construction Worker	Dredging Waste Management
Groundwater	Not Carried Forward as concentrations of COPCs generally below screening levels or background.			
Surface Water				

Table 2.11 Operable Exposure Pathway for the PR-HHRA

Source Media	Exposure Pathway	COPC	Potential Receptor	BHRP Related Activity
	Exposure to surface water and groundwater were considered to be inoperable given that there were limited COPCs identified in these media, access to the Site will be restricted during active remediation activities and groundwater at the Site is not used as a potable water supply. In addition, the sediment remediation activities will improve surface water quality in the future. Surface water monitoring will be conducted during and following the completion of the remediation activities to ensure that surface water quality meets human health and environmental guidelines.			
Air	Inhalation of Particulates	Total Suspended Particulates PM_{10} Iron Manganese	Resident PLFN	Construction
	Inhalation of Vapours/Emissions/ Particulates	Total Suspended Particulates Hydrogen Sulfide	Construction Worker	Construction Dredging Waste Management Dam Removal
Country Foods	Dust deposition and uptake into country foods evaluated but no COPCs identified. Potential harvesting of country foods from the BHETF is limited to post-remediation. Current concentrations of COPCs in country foods do not pose unacceptable risk to human health. Furthermore, concentrations of COPCs in sediment will be substantially lower following sediment dredging activities. It is logical to assume that future concentrations of COPCs in country foods would be equal to or less than current concentrations which were identified to pose a low risk to human health. As outlined in the EIS, NSLI has committed to carry out follow up monitoring of country foods upon completion of remediation activities.			
Note: (1) Additional COPCs in ambient air for worker exposure carried forward for qualitative evaluation and identification of risk mitigation measures.				

2.39.1 Additional Information to Support IAAC-39 (Originally submitted as GHD Memorandum-93, November 2021)

In response to the conformity review related to IAAC-39, further assessment of human health risks was conducted for the COPCs that were identified in the PRA-HHRA (Appendix A of the EIS). Further details of this additional assessment of human health risks are provided below.

As indicated in the original response to IAAC-39, concentrations of COPCs in soil, groundwater, surface water, and country foods were below screening guidelines or similar to background concentrations and therefore, COPCs were not identified for these specific pathways consistent with standard industry practices. In particular, COPCs such as manganese in potable groundwater are known to be naturally elevated in Nova Scotia, specifically in the Pictou area (Province of Nova Scotia Department of Lands and Forestry website accessed November 2021, "Manganese in Well Water"). The Nova Scotia Energy and Mines Open File Report ME 2021-002 specific to manganese (Kennedy, 2021[1]) indicates that bedrock mapped as the Pictou and Cumberland Groups along the Northumberland Strait have naturally elevated manganese in groundwater with concentrations exceeding the Canadian Drinking Water Quality Maximum Acceptable Concentration (MAC) of 0.12 mg/L in 15 to 35 percent of the wells sampled, respectively. Consideration of local background conditions is, therefore, an important factor in the evaluation of potentially operable pathways and the potential for incremental risk. In addition, direct contact/ingestion with sediment and surface water at the Site, specifically within the BHSL, was considered not operable for residents or PLFN as access to the BHSL (including the wetland areas and portions of the Estuary) will be restricted during active remediation activities. Exposure to sediment and surface water post-remediation could potentially occur but this exposure scenario was evaluated as part of the

[1] Kennedy, G.W., 2021. A Manganese in Well Water Risk Map for Nova Scotia, Nova Scotia Energy and Mines, Geological Survey Division, Halifax, Nova Scotia, March 2021.

HHERA completed for the BHRP (Appendix A of the EIS). In addition, post-remediation monitoring to evaluate the effectiveness of the remediation activities is planned as outlined in the EIS.

HC's Human Health Risk Assessment (HHRA) process includes four primary steps:

1. Problem formulation.
2. Exposure assessment.
3. Toxicity assessment.
4. Risk characterization.

The problem formulation is the first step of the HHRA and includes a screening of analytical data to identify COPCs in various media. COPCs, in the various media, are identified through a comparison of the media concentrations to the applicable screening guidelines. If the concentrations of COPCs in a specific medium are above the applicable screening criteria, then they are identified as COPCs that require further assessment and are carried through to the next step of the HHRA (i.e., exposure assessment). Concentrations of COPCs that are less than applicable screening guidelines and/or background levels are not typically identified as COPCs and, therefore, do not require further assessment and typically are not carried through to the next step of the HHRA. This initial COPC identification step is common industry practice for completing risk assessments in Canada and the United States. At the completion of the problem formulation, a human health CSM is developed that links the COPCs to their media sources along with release mechanisms, transport pathways, and exposure routes to identified receptors. The absence of COPCs indicates a break in this link, resulting in exposure pathways that are not complete and, therefore, not typically carried through the HHRA for further assessment. The above noted process is consistent with the following information presented in HC's HHRA guidance (Section 7.1.2) [2]:

> *All chemicals that may be elevated in environmental media as a result of project activities may be initially considered as COPCs. However, if the modelled concentrations plus the baseline concentrations are calculated to be below guidelines/standards/criteria for the impacted media, the problem formulation phase of the risk assessment may conclude that the chemicals do not need to be carried forward as COPCs in a quantitative risk assessment.*

This process was followed during the completion of the HHERA and the PRA-HHRA (Appendix A of the EIS). If there are no COPCs identified in a particular environmental medium, then no further assessment of this medium is required or evaluated in the quantitative risk assessment.

For the purposes of the conformity review, COPCs identified to exceed screening values in one or more media as part of the PRA-HHRA have now been carried forward for other potentially operable exposure pathways to evaluate the potential for risk to residents and PLFN. The COPCs that were identified in the PRA-HHRA for the resident/PLFN included total suspended particulate matter (TSP), particulate matter with aerodynamic diameters less than or equal to 10 microns (PM_{10}), iron, and manganese in ambient air dusts while BHRP related activities are occurring. The activities that result in the generation of dusts involve construction-related activities resulting in truck traffic, the movement of imported material, and the disturbance of soils located within the remediation area. It is noted that TSP and PM_{10} are strictly ambient air related COPCs associated with residential inhalation exposure and not applicable to other media. As such, TSP and PM_{10} were not carried through this additional assessment. The COPCs carried through this assessment include the following: iron and manganese.

Exposure Pathway Analysis

– Figure 1 that follows this response in Appendix G includes an updated human health CSM for the potentially operable exposure pathways associated with the PRA-HHRA that require further assessment for iron and manganese.
– Operable Exposure Pathways:

[2] Health Canada, 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment, June.

- Incidental ingestion and dermal contact with soil (noted that iron and manganese concentrations are below applicable human health screening guidelines).
- Household use of potable groundwater (limited to off-Site potable water wells or PLFN community water supply as groundwater wells for potable water usage are currently not located on the Site).
- Inhalation of soil particulates in ambient air.
- Incidental ingestion and dermal contact with surface water (this would be generally limited to surface water of the Estuary or Northumberland Strait as access to the BHSL or Freshwater Wetlands will be restricted during active remediation).
- Incidental ingestion and dermal contact with sediment (this would be generally limited to sediment in areas of the Estuary or Northumberland Strait as access to the BHSL, Freshwater Wetlands and areas of the Estuary will be restricted during active remediation).
- Consumption of plants.
- Consumption of shellfish.

– Inoperable Exposure Pathways:
  - Inhalation of soil vapours in ambient air – COPCs are not volatile and therefore not present in vapour form.
  - Inhalation of soil vapours in indoor air – COPCs are not volatile and therefore not present in vapour form.

Exposure Assessment

– Table 1 (Appendix G of this document) summarizes the EPCs that were used to calculate daily intake/dose levels for soil, groundwater, air, surface water, sediment, plants, and shellfish.
  - *Soil* - predicted concentrations in soil as a result of soil disturbance and deposition to nearby residences – these predicted soil concentrations were presented in the PRA-HHRA (Table 1b) and are the sum of baseline soil concentrations (i.e., background soil concentrations for outside the Study Area) and concentrations associated with dust deposition from BHRP related activities.
  - *Groundwater* - measured groundwater concentrations obtained from Pictou Landing Production Wells #1, #3, and #8 used for drinking water supply[3] (Pictou Landing IR24, 2010). The groundwater concentrations represent the maximum detected concentrations for groundwater samples collected between 2004 and 2010. As indicated above, COPCs such as manganese are known to be naturally elevated in potable water supplies of Nova Scotia (Province of Nova Scotia website, "Manganese in Well Water", accessed November 2021). In particular, bedrock units along the Northumberland Strait have been identified as having concentrations of manganese in groundwater exceeding the Canadian Drinking Water Quality MAC in 15 to 35 percent of the wells sampled (Kennedy, 2021).
  - *Air* – predicted concentrations in air as a result of soil disturbance and deposition to nearby residences – these predicted air concentrations (24-hour) were presented in the PRA-HHRA (Table 7b) and are the sum of baseline air concentrations (i.e., background air concentrations for outside the Study Area) and concentrations associated with soil disturbance from BHRP related activities.
  - *Surface Water* - predicted concentrations in surface water discharged from the BHSL during the first 5 years of active remediation[4]. The surface water concentrations represent the maximum concentrations over the 5-year period.
  - *Sediment* – measured concentrations in sediment collected from the Estuary and BHSL – these measured sediment concentrations were presented in the HHERA (Appendix G) and are representative of the 95th percent upper confidence limit of the mean (95UCLM). Although nearby residents would not be directly exposed to these sediments, it was conservatively assumed that these sediments could be released to the

[3] Pictou Landing IR24, 2010 Groundwater Monitoring Program - Final Report, August 2011, prepared by Dillon Consulting Ltd.
[4] GHD, 2021. Memorandum – Update to Memorandum 057, Establishment of Water Treatment Compliance Criteria, Boat Harbour Remediation Planning and Design, November 2021.

Northumberland Strait following remediation activities and available for direct contact/ingestion during recreational use of the Northumberland Strait.

- *Plants* – predicted concentrations in plants as a result of soil disturbance and deposition to nearby residences and uptake into vegetable gardens – these predicted plant concentrations were presented in the PRA-HHRA (Table 5b) and are the sum of baseline plant concentrations (i.e., background plant concentrations for outside the Study Area) and concentrations associated with deposition from BHRP related activities.
- *Shellfish* - measured concentrations in mussels, clams, lobster, and crab collected from Northumberland Strait – these measured shellfish concentrations were presented in the HHERA (provided as Appendix C of the HHERA) and are representative of the 95UCLM. Note that the 95UCLM concentrations for combined shellfish samples were not provided in the HHERA, however, the USEPA ProUCL software output for 95UCLM calculations is presented in the supporting information provided following this response (Appendix G).

– Tables 2 to 7 of Appendix G of this document presents the exposure assumptions that were used to calculate daily intake/dose levels for the resident/PLFN. Given that iron and manganese are non-carcinogenic COPCs, the daily intake/dose levels were calculated for toddler receptors, which are considered to be the most sensitive of the life stages. All exposure assumptions that were applied in this assessment are HC default assumptions for a resident receptor (HC, 2021a), with the exception of the following assumptions:

- For dermal contact with groundwater, an exposure time (ET) of 0.54 hours per day was assumed based on the weighted average of 90th percentile time spent bathing for child (birth to 6 years) and adult (21 to 78) presented in USEPA (2014)[5].
- For exposure to surface water and sediment, resident exposure to surface water and sediment during recreational activities was assumed to occur for 4 hours per day, 7 days per week during the months between April and October (30 weeks). However, as this is considered less than chronic exposure, consistent with HC (2021), no dose averaging was assumed (i.e., D3 was set to 30 weeks/30 weeks=1, rather than averaging over 52 weeks per year).
- For dermal contact with surface water, skin permeability constants (PDerm) were obtained from USEPA's Regional Screening Levels (RSLs).
- For exposure to sediment, the sediment ingestion rates, skin surface areas, and sediment loading rates for the most conservative dermal exposure scenarios (child playing along shoreline, out of water, within mud) from HC (2017) were assumed.
- Ingestion rates for plants and shellfish were obtained for the First Nations in the Atlantic (FNFNES, 2017) and are based on an adult heavy consumer (95th percentile, unless otherwise noted). Since these ingestion rates are based on adult receptors, they were adjusted using child to adult ratios for plant ingestion rates presented in HC (2012) (HC PQRA guidance, Version 2.0) and shellfish ingestion rates presented in HC (2007).

Toxicity Assessment

– As indicated above, iron and manganese are both non-carcinogenic compounds. Therefore, chronic oral/dermal non-carcinogenic reference dose (RfD) toxicity values (Table 8 of Appendix G) and chronic inhalation non-carcinogenic reference concentration (RfC) toxicity values (Table 9 of Appendix G) were identified, where available.

– Iron – HC (2021a) does not provide toxicity values for iron. Therefore, the oral Provisional Peer Reviewed Toxicity Value (PPRTV)[6] for iron (0.7 milligrams/kilogram-day [mg/kg-day]) was applied as the oral/dermal RfD in the assessment.

[5] USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors, OSWER 9200.1-120, February 6, 2014.

[6] Provisional Peer Reviewed Toxicity Values (PPRTVs) for Iron and Compounds. Derivation of Subchronic and Chronic Oral RfDs, USEPA Superfund Technical Support Center, September 2006.

– Manganese – HC (2021) provides an oral toxicity value (0.025 mg/kg-day) for manganese, which was applied as the oral/dermal RfD in the assessment.

– HC (2021) does not provide inhalation toxicity values for iron or manganese. Therefore, the inhalation toxicity values were based on the Ontario Ambient Air Quality Criteria (Ontario MOE, 2019).

Risk Characterization

– The potential for non-carcinogenic health effects from exposure to a COPC is evaluated by comparing the intake/dose to the RfD/RfC. This ratio, termed the hazard quotient (HQ), is calculated according to the following general equations:

  - Oral/Dermal Exposure: HQ = Dose (mg/kg-day)/RfD (mg/kg-day)
  - Inhalation Exposure: HQ = Dose (mg/m^3)/RfC (mg/m^3)

– Calculated HQ values equal to or less than the HC target HQ of 0.2 are considered protective of human health.

– Table 10 of Appendix G presents the HQ values for iron and manganese for each operable exposure pathway as well as the cumulative HQ. A summary of the results is provided below:

  - Iron - inhalation exposure to air (2.4), direct contact with sediment (160), and consumption of shellfish (0.34) resulted in HQ values greater than 0.2. All other operable exposure pathways had HQ values less than 0.2. Direct contact with sediment contributed 98 percent of the cumulative HQ (160).
  - Manganese - inhalation exposure to air (1.1), direct contact with sediment (260), consumption of plants (3.6), and consumption of shellfish (1.3) resulted in HQ values greater than 0.2. All other operable exposure pathways had HQ values less than 0.2. Direct contact with sediment contributed 98 percent of the cumulative HQ (270).

– Inhalation of soil particulates in ambient air during BHRP related activities was also identified as a potential concern to nearby residences in the PRA-HHRA. The elevated concentrations of iron and manganese are primarily related to truck traffic on the Site access road during final capping of the containment cell with the area of concern generally confined to the access area of Simpson's Road from Highway 348. Current land use in the area of predicted elevated dust concentrations is generally undeveloped forested areas but residential properties are located in close proximity to the area of impingement. Real time air quality monitoring has been recommended during BHRP activities, specifically during increased truck traffic on Simpson's Road during final containment cell capping. Air monitoring along with Site-specific mitigative measure such as paving of access roads, additional watering, reduced daily truck traffic, and reduced speeds will be used to ensure protection of residential receptors in the area. No additional measures are required for iron and manganese based on this assessment.

– As indicated above, sediment exposure was the primary contributor to the cumulative HQ for iron and manganese. However, it was conservatively assumed that the receptor would be exposed to sediment from the Estuary/BSHL. This is an overly conservative assumption as access to the BHSL including areas of the Estuary will be restricted during active remediation activities which limits direct contact with sediment by residents and PLFN. Furthermore, current concentrations of iron and manganese in sediment within the Study Area were compared to background levels using the USEPA's ProUCL Wilcoxon two-sample test. There were two comparisons completed: (1) concentrations of iron and manganese within sediments collected from the Estuary/BHSL were compared to concentrations of iron and manganese within sediments collected from a nearby reference lake (Chance Harbour Lake); and (2) concentrations of iron and manganese within sediments near the outfall to Northumberland Strait were compared to concentrations of iron and manganese within sediments collected from a reference area of Northumberland Strait (near Fergusons Pond located approximately 2 km east of the Study Area). The reference lake and reference area of the Northumberland Strait used in this evaluation are also the reference locations and data used in the HHERA (Figures 8A and 8B of the HHERA, Appendix A of the EIS). The ProUCL outputs for these statistical comparisons are provided in Appendix G of this document.

  Results of the statistical analysis indicate that the concentrations of iron and manganese in sediments collected from the BHSL and Estuary are statistically similar to (or lower than) the concentrations of iron and manganese from Chance Harbour Lake. Similarly, concentrations of iron and manganese in sediment of the Northumberland

Strait are statistically similar to concentrations of iron and manganese in other areas of the Northumberland Strait. As the concentrations of iron and manganese in sediments from the BHSL and Estuary are similar to or lower than background concentrations, additional risk management or remediation specific to iron and manganese in sediment is not considered warranted.

– The concentration of manganese predicted in plants (150 mg/kg) through soil deposition resulting from soil disturbance during BHRP related activities is within the range of background plant concentrations collected outside the Study Area (21 – 315 mg/kg; 95UCLM = 156 mg/kg). These background plant concentrations were based on plant samples (cattail and bugleweed) collected from a reference location that was also used in the HHERA (Figure 8A of the HHERA, Appendix A of the EIS). As the concentrations of manganese predicted in plants are consistent with background plant concentrations, additional risk management or remediation specific to manganese in plants is not considered warranted.

– The majority of the risks due to consumption of shellfish are a result of elevated concentrations of iron and manganese measured in clams collected near the outfall of Northumberland Strait. As indicated above, iron and manganese are not present within the Study Area sediments at concentrations that are statistically higher than background levels. As such, the concentrations of iron and manganese in the clams are likely consistent with background levels. Furthermore, the clams analyzed as part of the HHERA were not depurated prior to analysis and therefore, the metals concentrations associated with the clam tissue has the potential to be biased high dependent on the mineral content within the clam gut. Additional discussion on concentrations of COPCs in clam tissue is provided in Sections 2.62 and 2.63 below.

– Several shellfish tissues (crab, lobster, and mussels) were also collected from Northumberland Strait by representatives of Dalhousie University in 2019 (Chaudhary et al., 2020). These shellfish samples were collected from the Northumberland Strait shoreline near the Estuary, but also several kilometres away from the Study Area. Based on the analytical results for these shellfish samples, the concentrations of iron and manganese were similar to or lower in the shellfish samples (crab, lobster, and mussels) collected near the Study Area versus those collected several kilometres away. The locations of these shellfish samples were shown on Figure 7C of the HHERA and the analytical results are presented in Appendix C of the HHERA (Appendix A of the EIS). As the concentrations of iron and manganese are similar in the various shellfish samples collected from Northumberland Strait in the vicinity of the Study Area as well as several kilometres away from the Study Area, additional risk management or remediation specific to iron and manganese in shellfish is not considered warranted. As indicated previously, NSLI has committed to monitoring country foods following completion of the remediation activities which will include shellfish in the marine environment to confirm project related activities have not negatively impacted country foods compared to current conditions.

Supporting information that was referenced in this response is provided in Appendix G of this document.

FNFNES, 2017: Laurie Chan, Olivier Receveur, Malek Batal, William David, Harold Schwartz, Amy Ing, Karen Fediuk and Constantine Tikhonov. First Nations Food, Nutrition and Environment Study (FNFNES): Results from the Atlantic. Ottawa: University of Ottawa, 2017. Print. Ingestion rates are based on combined male and female heavy consumer (consumers only).

GHD, 2021. Memorandum – Update to Memorandum 057, Establishment of Water Treatment Compliance Criteria, Boat Harbour Remediation Planning and Design, November 2021.

Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption, Bureau of Chemical Safety Food Directorate, Health Products and Food Branch, March 2007.

Health Canada, 2017: Federal Contaminated Site Risk Assessment in Canada, Supplemental Guidance on Human Health Risk Assessment of Contaminated Sediments: Direct Contact Pathway, March 2017.

Health Canada, 2019. Guidance for Evaluating Human Health Impacts in Environmental Assessments: Human Health Risk Assessment, June.

Health Canada, 2021a. Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.

Health Canada. 2021. Federal Contaminated Site Risk Assessment in Canada. Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0. March.

Kennedy, G.W., 2021. A Manganese in Well Water Risk Map for Nova Scotia, Nova Scotia Energy and Mines, Geological Survey Division, Halifax, Nova Scotia, March 2021.

Ontario MOE, 2019: Ministry of the Environment, Ontario Regulation 419/05, Schedule 3: Standards with Variable Averaging Periods, 2019. (**https://www.ontario.ca/laws/regulation/050419**).

Pictou Landing IR24, 2010 Groundwater Monitoring Program - Final Report, August 2011, prepared by Dillon Consulting Ltd.

Provisional Peer Reviewed Toxicity Values (PPRTVs) for Iron and Compounds. Derivation of Subchronic and Chronic Oral RfDs, USEPA Superfund Technical Support Center, September 2006.

USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors, OSWER 9200.1-120, February 6, 2014.

USEPA, 2021: Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table, May.

2.40 IAAC-40 (Originally submitted as GHD Memorandum-90, October 2021)

IAAC-40 requested the PRA-HHRA to expand the spatial boundaries and include potential impacts and potentially impacted receptors for the release of sediment into the Northumberland Strait and evaluate the potential impacts of sediment release and associated exposure on human health. Alternatively, provide rationale as to why the release of sediment is not expected to impact human health (i.e., country food and recreational water use). Similar to IAAC-14, the findings of the supplemental modelling together with results of the quantitative HHERA completed for the Project in 2019 (Appendix A of the EIS) were used to provide rationale on the significance of the potential sediment released to the Northumberland Strait with respect to human health following dam removal activities.

In its present condition, with the dam in place, there is no tidal forces driving sediment transport and sediment resuspension. This is shown by the relatively low TSS concentrations previously measured onsite (generally less than 20 mg/L at the time of sampling: WSP, 2020). Following dam removal, the reintroduction of tidal action to BH immediately increases the flow through the inlet and Estuary channels. The resulting flow velocities trigger scour and sediment resuspension mostly in the inlet channel and the channel in the northern sections of BH. This suspended sediment could be transported by tidal action throughout BH and into the nearshore embayment area of the Northumberland Strait.

Remediation activities downstream of the causeway are scheduled to begin in year 5, after the remediation of the upstream work is completed and before removal of the dam. Dredging of the Estuary is scheduled for year 5, removal of the causeway and construction of the bridge is planned for year 6, and removal of the dam and dredging (enlarging) of the inlet channel are scheduled for year 7. According to the schedule, the removal of the dam will be the last of the remediation activities conducted at the site. Sediments in the upstream areas of the BHETF will be remediated and confirmation sampling completed to ensure that residual concentrations of COPCs in sediment, specifically D/F, are below remedial targets prior to removing the dam. Thus, sediments that may be transported to the Northumberland Strait following removal of the dam will be below remedial targets that were developed based on protection of human health and the environment for future recreational and traditional uses. These remedial targets were developed as part of the HHERA completed in 2019 (GHD, 2020) and are protective of direct contact exposure (ingestion/dermal contact) under the most conservative exposure scenarios (recreational user direct contact with sediment for 8 hours per day, 7 days/week, and 30 weeks per year over a lifetime). In addition, the highest TSS levels are expected to occur immediately following dam removal; however, it can be expected that TSS levels will be significantly reduced and within typical seasonal background conditions shortly after dam removal during transport due to settling, dilution, and dispersion (see below as well as response to IAAC-14 above and revised modelling results in Appendix B of this document). Therefore, there are unlikely to be unacceptable health risks to recreational users of Northumberland Strait through direct contact exposure to sediment following dam removal.

<u>The HHERA indicated that the current concentrations of COPCs in country foods collected from the BHETF do not result in unacceptable health risks to human and ecological health through the consumption pathway. In addition, concentrations of COPCs in sediment of the BHETF, including the Freshwater Wetlands and Estuary areas, will be substantially lower following sediment remediation activities (removal and disposal in the containment cell).</u> It is reasonable to conclude future concentrations of COPCs in country foods including marine biota would be equal to or less than current COPC concentrations and will not pose unacceptable risks to human health. As outlined in the EIS, NSLI has committed to completing follow up monitoring of country foods upon completion of remediation activities which will include marine biota. In the response to IAAC-14, baseline sampling for COPCs in benthic invertebrate tissue (lobster, crab, and mussels) was completed in the Northumberland Strait in 2019 (Chaudhary et al., 2020) and the results of the study indicated that current concentrations of COPCs in marine biota are within acceptable guidelines for human consumption or background conditions (Chaudhary et al., 2020). These results provide information on current concentrations of COPCs in marine biota directly adjacent to the BHETF that can be used as a baseline for comparison to biota collected during future sampling programs completed during and post completion of the remediation project.

Notwithstanding the above discussion, which clearly indicates that there are unlikely to be unacceptable health risks to users of Northumberland Strait from sediment exposure following the removal of the dam, the following enhanced measures will be considered (if required) to further reduce potential adverse effects related to elevated TSS in the embayment area of the Northumberland Strait:

1. Dam removal activities to be conducted in late fall or early winter at a time when natural background TSS levels in the Northumberland Strait are elevated due to tidal currents and storm events which also coincides with a period of reduced biological activity and is outside the commercial and recreational fishing periods in the Northumberland Strait (including other recreational usage). As indicated above, the peak TSS levels will be present in the days immediately following dam removal and will reduce significantly within the first 20 to 140 days post dam removal using bed scour protection measures. Based on GHD's Supplemental Coastal Modelling (see Appendix B of this document) and information presented above in IAAC-14, TSS levels are predicted to be reduced by over 90 percent 50 days post dam removal and be within the expected seasonal background conditions within 20 days post dam removal. Based on the revised Coastal Modelling report (Appendix A), TSS levels will be within the nominal concentration of 25 mg/L within 140 days post dam removal using bed scour protection as a mitigative measure. Therefore, it is expected concentrations of TSS would be within acceptable levels and background conditions during increased recreational use of Northumberland Strait in the following spring/summer months.
2. GHD's Supplemental Coastal Modelling report also indicates that scour protection measures if required, will substantially reduce the volume of sediment mobilized and discharged into the Northumberland Strait post dam removal. The modelling predicts that approximately 43,000 tonnes of silt and marine clay material will be mobilized with the majority of the sediment deposited in the embayment area of the Northumberland Strait. However, as indicated above, the sediment mobilized following dam removal and deposited in the embayment area would have concentrations of COPCs below SSTLs developed for direct contact and would be subject to further natural attenuation process as part of the transport and deposition process (dispersion and sorting/mixing). As such, it is reasonable to conclude that sediment deposited in the Northumberland Strait, specifically the embayment area, will have concentrations of COPCs well below target levels developed for the protection of human health through the direct contact pathway and country food consumption pathway. In addition to collection of marine biota samples post dam removal, post-remediation monitoring programs will include collection of marine sediment from the Northumberland Strait (including the embayment area) for chemical analysis to ensure protection of human health through the direct contact and ingestion pathway.

Chaudhary, M., Quanz, M., Williams, J., Maltby, E., Oakes, K., Spooner, I., Walker, T. R. 2020. Assessment of metal(loid) concentrations using diffusive gradient thin (DGT) films in marine, freshwater and wetland aquatic ecosystems impacted by industrial effluents. *Case Studies in Chemical and Environmental Engineering, 2,* 100041.

GHD Limited (GHD). 2020. Quantitative Human Health and Ecological Risk Assessment. Boat Harbour Effluent Treatment Facility. Boat Harbour Remediation Planning and Design. Pictou Landing, Nova Scotia. Final Draft for Review.

WSP Canada Inc. (WSP). 2020. Boat Harbour Remediation Project. Coastal Hydraulic Modelling. Nova Scotia Lands Inc. Revision 3. Project #: 171-10478-00.

2.41 IAAC-41

The operability of this exposure pathway (suspended sediments in surface water for direct exposure and consumption of country foods) was discussed in Tables 3.7 and 3.9 of the PRA-HHRA (Potential for sediment to be released during and post dam removal). COPCs in sediment currently exceed direct contact/ingestion but impacted sediments will be dredged prior to dam removal. Sediment mobilization and exposure during dredging activities will be mitigated by establishing exclusion areas and installation of silt curtains will be implemented to reduce sediment transport during dam removal. Access to BHETF will also be restricted during dam removal activities. Sediments potentially mobilized following dam removal will have concentrations of COPCs below remedial targets based on protection of human health through the direct ingestion/dermal contact pathway.

Section 5.1 of the HHERA (Appendix A of the EIS) provides a discussion regarding the calculation of the EPCs (95 percent UCLM). The EPC (95 percent UCLM) approach is representative of an upper bound estimate of the potential for human health risks given that assessing potential risks at the maximum concentration is unrealistic given human mobility patterns. While there may be some elevated concentrations of contaminants above the SSTLs remaining, exposure to these elevated concentrations over extended periods of time would be unlikely and exposure is better characterized based on an average concentration characterized by the 95 percent UCLM.

2.42 IAAC-42

Section 3.1.4.3.2 as well as Appendix G of the PRA-HHRA report (Appendix A of the EIS) describe the predicted concentrations of various COPCs in surface water associated with the sediment dewatering activities. Surface water sampling was conducted in the BHSL post Mill effluent discharge along with mass balance modelling to estimate the bulk water concentrations in the BHSL prior to, during and post dredging and leachate discharge period. The mass balance predictions are based on current water quality, Geotube® or Temporary Leachate Treatment Facility (TLTF) effluent water quality/quantity and the quality/quantity of water flowing into the BHSL from natural water sources (surface water drainage and groundwater infiltration). As indicated in the PRA-HHRA report, the predicted surface water concentrations of the BHSL by Year 1 (prior to start of BHRP activities) will meet the human health guidelines protective of recreational exposure and will remain constant or marginally decrease during the BHRP activities. Based on the mass balance projections developed by GHD (Appendix G of the PRA-HHRA report) using measured concentrations and volumes of input waters as well as established leachate discharge criteria, surface water discharging from the BHSL to the Estuary and Northumberland Strait during BHRP related activities will meet guidelines protective of the environment as well as human health for direct contact in incidental ingestion.

In addition to direct ingestion of surface water, the predicted surface water concentration of bio accumulative substances such as mercury (total) in Years 1 to 5 of the remediation period are below the CCME Water Quality Guidelines and NSE EQS for both freshwater and marine waters. As such, it is considered reasonable to assume that the potential for uptake of mercury into country foods through surface water associated with the Site is low. Further, mercury and methylmercury have not been identified as a COPC associated with sediment, surface water or biological tissue at the Site (GHD, 2020; Chaudhary, 2020). Similarly, concentrations of other bio accumulative substances such D/F in surface water are anticipated to be approximately equal to or below method detection limits and well below guidelines for the protection of aquatic life (Appendix G of the PRA-HHRA report, Appendix A of the EIS). <u>As the predicted concentrations of various COPCs in surface water (including bio accumulative substances) during project related activities are below guidelines for the protection of human health as well as ecological receptors, COPCs in surface water do not pose a risk to human health through direct ingestion or accumulation in country foods.</u> In addition, a monitoring program will be implemented during and post remediation activities to confirm surface water quality, as well as the concentrations of potentially bio accumulative substances in country foods.

Chaudhary, M., Quanz, M., Williams, J., Maltby, E., Oakes, K., Spooner, I., Walker, T. (2020). Assessment of metal(loid) concentrations using diffusive gradient thin (DGT) films in marine, freshwater and wetland aquatic ecosystems impacted by industrial effluents. Case Studies in Chemical and Environmental Engineering 2 (2020) 100041.

GHD. 2020. Quantitative Human Health and Ecological Risk Assessment. Boat Harbour Effluent Treatment Facility. Boat Harbour Remediation Planning and Design. Pictou Landing, Nova Scotia. Final Draft for Review.

2.43 IAAC-43

The pilot testing was designed and completed in a manner intended to represent the most probable remediation means and methods for full scale remediation. The sampling and results obtained during pilot testing are considered to be strongly representative of anticipated future dewatering effluent data because the "in the wet" approach utilized during pilot testing is representative of the means and methods for planned full-scale remediation conditions, means, and methods.

Geotube® effluent water quality pilot data is documented in EIS Reference Document 17 (GHD Limited. December 23, 2019. Pilot Scale Testing Construction Report. Pictou Landing, Nova Scotia). The Pilot Scale Testing Report, Wastewater Treatment Facility Findings memorandum, prepared by GHD (Feb 2020) is provided in Appendix F of reference Document 17.

In order to understand the efficiency and effectiveness of the pilot Wastewater Treatment Facility (WWTF), grab samples were collected on a daily basis for analysis. Collected samples were sent for analysis off-Site at an accredited laboratory (Maxxam Analytics referred to as Maxxam) or analyzed using on Site instrumentation.

Samples sent to Maxxam were collected in laboratory supplied containers. All samples were stored in a fridge (<4˚C) before being shipped to the laboratory for analysis. Samples were shipped in coolers with ice to maintain the temperature below 10˚C. All samples were shipped to the laboratory under chain of custody protocols within their allowable holding time. Samples were analyzed for risk based corrective action (RBCA) extractable, total extractable hydrocarbons in the water, RBCA volatiles including benzene toluene, ethylbenzene, xylene (BTEX), volatile petroleum hydrocarbons (VPH) in water, metals (including mercury, methylmercury, and chromium VI), cyanide, and D/F.

The summary of laboratory analytical results for WWTF grab samples collected during the pilot study is presented in the referenced Pilot Scale Testing Memorandum, with summary of overall average and maximum values presented in Table 2.1 (Forecasted Leachate Quality, also referenced in IAAC-13 IR).

As the turnaround time of off-Site analytical results was relatively long, grab samples were analyzed on-Site using powder pillow and photo spectroscopy methods to understand the concentration of COCs and avoid any delay in the WWTF operation. The detection limits of on-Site analysis techniques were higher than off-Site analysis detection limits; thus, analytical results from Maxxam were utilized to confirm on-Site results. The results of the on-Site analysis allowed for a quick response to any exceeding parameters and were used to make adjustments to the WWTF operation, such as changes to the sequence of treatment units or to operational parameters. Zinc, copper, chromium, cyanide, pH, conductivity, TDS, salinity, colour and TOC were among the parameters measured on-Site. A DR 3900 spectrophotometer was used for reading all sample results.

In accordance with Condition 15 of IA # 2018 2469402 02, weekly composite samples of the effluent from the WWTF were collected. Eleven composite weekly effluent samples were submitted for analysis: five for removal in the wet, four for bulk water treatment, and two for removal in the dry. Furthermore, three untreated water samples which represent the raw water influent during each of removal in the wet, removal in the dry, and bulk water were submitted to Maxxam in the fulfillment of Condition 15 of the IA.

Composite samples were made from collecting approximately 5 L of final effluent from the containerized WWTF on a daily basis. These samples were kept in the fridge until the end of each operation week, when the samples were mixed together to make one weekly composite sample.

All samples were submitted to Maxxam for the following parameters: metals (including chromium VI, total mercury, and methylmercury), cyanide, D/F, PAHs, TPHs, VOCs, pH, and fish toxicity (rainbow trout acute lethality [pass/fail]). All samples were stored in a fridge (<4˚C), as needed, and shipped in coolers with ice to maintain the temperature below 10˚C. All samples were shipped to the laboratory under chain of custody protocols within their allowed holding time.

Several other parameters such as BOD, COD, nitrite, nitrate, DOC, dissolved chlorate, dissolved chlorite, hardness, and color were added to the list of analysis. These parameters are among the elements in the Pulp and Paper Effluent Regulation (PPER) criteria and the existing IA of Northern Pulp. The data for these parameters could be assessed if any of the aforementioned criteria are imposed as limits for the full-scale BHRP. The summary of composite sampling laboratory analytical results for WWTF collected during the pilot study is presented in the referenced Memorandum, with summary of overall average and maximum values presented in Table 2.1 (Forecasted Leachate Quality, referenced in IAAC-13 IR).

The final results and supporting quality assurance/quality control (QA/QC) data from the laboratory were assessed by a qualified chemist. Evaluation of the data was based on information obtained from the chain of custody forms, finished report forms, method blank data, recovery data from surrogate spikes, laboratory control samples (LCS), matrix spikes (MS), and laboratory duplicates.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods and applicable guidance from the documents entitled:

– USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", October 1999, USEPA 540/R 99/008.
– USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", USEPA 540/R 94 013, February 1994.

The Analytical Data Verification Memorandum Wastewater Sampling Events (GHD Memorandum-2) summarizes the QA/QC methods, and evaluates the wastewater analytical results.

Please note Section 5.3 of Appendix G, PRA-HHRA (Appendix A in the EIS) states "A summary of the pilot water treatment composite effluent samples is provided in Table 4 (attached)". The table in the original submission was mis-titled as Table 7.1, but the data is correct and representative. This table referenced in Appendix G has the treated effluent criteria from the pilot treatment plant that relates more to the TLTS processes. The summary of laboratory analytical results for Geotube® effluent samples collected during the pilot study is presented in the referenced Pilot Scale Testing Memorandum, with summary of overall average and maximum values presented in Table 2.1 of this report (Forecasted Leachate Quality, also referenced in IAAC-13 ECCC IR).

GHD. 2020. Technical Memorandum: Pilot Scale Testing, Wastewater Treatment Facility Findings, Boat Harbour Remediation Planning and Design.

GHD. 2019. Technical Memorandum: Analytical Data Verification, GSC Boat Harbour Remediation – Wastewater Sampling Events. Province of Nova Scotia – NS Lands, Pictou Landing, Nova Scotia, November 2018 – June 2019.

2.44 IAAC-44

GHD has reviewed the 2017 baseline noise monitoring data conducted by WSP and obtained the raw dataset for each of the five stations which was reviewed and updated as required to document the sound level (Ld) (16 hour daytime average) and the sound level (Ln) (8 hour nighttime average) based on weather conditions with wind conditions less than 14 km/hr. GHD has also confirmed with WSP that the baseline noise monitoring program was completed according to the methods outlined in the NSE and Labour Publication "Guidelines for Environmental Noise

Measurement and Assessment" and industry best practices for acoustic measurement. WSP utilized a type 1 noise monitoring system equipped with a windscreen attached to the microphone and preamp which allows any changes in air pressure due to noise to pass through while reducing the turbulence that wind can create during the baseline monitoring program.

The original WSP baseline report did mention wildlife noises; these are not able to be removed as they are a part of the existing ambient acoustic environment and as such the reason for conducting the baseline assessment to document the sounds in the study area. It would be highly unusual for larger wildlife to influence the sound at the monitoring station every hour of every day for a month straight such that it would affect the assessment and therefore not a practical justification for filtering and removal.

GHD is also of the opinion that the baseline monitoring inclusive of BHETF system and Northern Pulp's Mill are representative of pre-project baseline at that time and the mill may be active again in the future so the baseline is always moving depending on project start timing. Additionally, as the Mill is 3.3 km away this would not significantly alter the baseline results and the BHETF aerators, which are the dominant source of noise, are still active today as they were during the baseline work (particularly aeration equipment in the ASB directly south of Station 2). This is further supported by the updated baseline data which shows consistent lower sound levels in the day and night periods which would not be reflective of industrial impacts but rather typical diurnal rural/semi urban areas.

Please see attached Table 8 at the end of this document for the updated baseline noise monitoring summary.

These updated baseline levels were considered for the updated impact calculations for the determination of the change in percent highly annoyed (%HA). The HC guideline titled Guideline for Evaluating Human Health Impacts in Environmental Assessment: Noise (January 2017) recommends that noise from construction operations lasting longer than 1 year be assessed as operational noise, using an evaluation of the increase in %HA. %HA is calculated based on the 16-hour daytime equivalent Ld and the 8-hour night-time equivalent Ln, using an equation defined in the guideline. HC suggests that mitigation be implemented when noise levels during long-term construction result in greater than 6.5 percent increase in %HA (Δ%HA) at receptors.

Please refer to the updated impact assessment and %HA analysis as part of IAAC-48 for further details.

2.45 IAAC-45

The structure located at 6792 Pictou Landing Road is a SCADA monitoring station with perimeter fence, not a residential house or sensitive receptor and as such has been excluded from the assessment.

GHD has updated the effects assessment to include a summary of predicted nighttime noise levels based on nighttime operations for each phase of project completion further detailed in IAAC-48.

Monitoring and regular checks of the noise levels in the area will be completed as part of PEPP for the purposes of noise evaluations in which detailed timing of these checks will occur based on monthly or quarterly events as required. Specifics of the monitoring program would follow NSE IA conditions, and this will be applied for following the successful EA approval.

2.46 IAAC-46

The only impulsive noise source will be daytime only pile driving of the Bridge on Highway 348.

Pile driving is expected to occur at the two bridge abutments and piers as well as at the many smaller piers/columns that will support the bridge approaches and ramps. Because of the proximity of some of the north approach span piers to residential areas a more rigorous noise prediction method has been taken in relation to pile driving noise. Sound emission data for a diesel impact hammer driving steel pipe piles has been entered into the CadnaA model for the areas encompassing the bridge. Pile driving noise levels have been expressed in terms of their equivalent sound levels, or Leq, (i.e., the energy-based average noise levels during periods of active pile driving). Pile driving would not occur at night (i.e., between 22:00 and 07:00-hours), so that the relevant metric is then the Ld.

Even if this activity is extremely short in duration (estimated to be <10 strikes/pile drives per day) it has been included in the HC %HA analysis to be conservative. This impact pile driving activity has been evaluated cumulatively with the active construction scenario based on an acoustical usage factor of 20 percent (or 12 mins per hour) as detailed in the Federal Highway Administration (FHWA) Roadway Construction Noise Model User's Guide, 2006. GHD has also applied ISO 1996-1:2003 +12 dBA adjustment to the pile driving source due the potential to be a highly impulsive noise source. The construction noise evaluation has been updated to reflect the addition of this pile driving noise source relative to the baseline noise levels and NSL.

<u>The noise levels due to the impulsive pile driving are 60 dBA/dBAI at the worst-case receptor (POR6) which is below the daytime 65 dBA NSL criteria and <6.5 percent HA and as such no mitigation measures are required.</u>

Please refer to the updated impact assessment and %HA analysis as part of IAAC-48 for further detail.

2.47 IAAC-47

Low frequency noise (LFN) was evaluated but deemed not applicable due to the nature of the project noise sources as they are not typical LFN equipment (large vibratory equipment other than pile driving, large CFM fans, large cooling equipment, wind turbines, electrical utility equipment/power plants, large industrial compressors, low bass emitting sources etc.). Per HC's recommendations, GHD also evaluated the difference between the C-weighted and A-weighted levels of the Project noise sources that may have LFN components such as construction pile driving and determined that a low-frequency noise adjustment is not warranted as the difference between the C-weighted and A-weighted level is not > 10 dB and not >65 dBC overall at each receptor.

2.48 IAAC-48

Equipment and activities associated with the site preparation, construction, operation, and decommissioning and abandonment phases for the proposed Project have the potential to produce noise emissions in the vicinity of the Project above the documented baseline. Changes to ambient noise levels and vibrations have the potential to impact existing sensitive receptors (i.e., PLFN). The construction phase of any project is typically considered temporary or short-term relative to the entire life cycle of a project and mostly limited to daytime construction hours. It is anticipated that any construction or operational noise will be at or below either the baseline levels or the NSE noise limits at the worst-case receptor locations. This will be achieved by controlling noise with attenuation (the distance between a noise source and a receptor), vertical separation/blocked line of sight, best practices for construction/demolition and equipment design where feasible.

The following section details an updated analysis, parameters or assumptions used in the noise evaluation of the EIS.

Acoustical Modelling Inputs and Assumptions Update

Through this assessment, the Project team has quantified the proposed noise levels in the Study area by using the appropriate CadnaA Acoustical Modelling Software (CadnaA) to model the potential impacts of the significant noise sources based on assumptions of typical construction equipment number and locations. CadnaA calculates sound level emissions based on the ISO 9613-2 standard "Acoustics – Attenuation of Sound during Propagation Outdoors". The worst-case cumulative site-wide sound levels estimated at the receptor(s) included attenuation effects due to geometric divergence, atmospheric attenuation, barriers/berms, ground absorption and directivity, as applicable significant noise sources at off-site buildings were input into the model as intervening structures.

CadnaA modelling assumptions applied include the following:

– Noise Sources | All sources were modelled using the 1/1 octave band data from manufacturer's sound level data or reference materials.
– Noise Source Elevation | The heights of the noise sources were modelled at the tallest point to represent the worst-case line of sight and emission of noise.

– Ground Absorption | The model included water (G=0), soft/porous ground (G=1), and gravel/hard ground (G=0.25).
– Receptor elevation | POR receptor heights were modelled appropriately to represent the worst-case elevation based on one or two-storey residences.
– Time-weighted Adjustment | All noise sources associated with the different phases of the project operate during day/evening hours only with the exception of the dredging equipment which will operating continuously day/evening/night.
– Tonality | No tonal adjustment was applied for noise sources.
– Building Surfaces | The buildings are modelled as reflective surfaces.
– Foliage | Foliage attenuation was not considered in our analysis as a conservative assumption.

The following table outlines the acoustic modelling parameters used:

Table 2.12 Acoustic Modelling Parameters

Item	Model Parameters	Model Setting
1	Temperature	10°C
2	Relative humidity	70%
3	Wind speed	Downwind condition; wind speed of 3 m/s
4	Max. Search Radius (m)	2500 m
5	Noise propagation model	CadnaA (DataKustik 2021)
6	Standard	ISO 9613
7	Terrain parameters	Flat topography was assumed
8	Reflection parameters	1 orders of reflection

The Cadna A acoustical model output used in the assessment has been provided as Appendix H of this document.

Noise Source Operating Parameters/Assumptions Update

In order to predict the future worst-case noise impacts from the Project activities, representative octave band noise data was used, measured from construction/processing equipment similar to what is noted to be required for the Project. This data was obtained from the United Kingdom's Department of Environment Food and Rural Affairs (DEFRA) Update of Noise Database for Prediction of Noise on Construction and Open Sites, 2005 and 2006 (common source used globally). The United States Department of Transportation, FHWA document FHWA Roadway Construction Noise Model User's Guide, 2006 was used as a supplemental document to obtain sound level data for equipment not listed by DEFRA.

The environmentally significant noise sources or activities occurring on Site include:

Construction Activity

– Three Bulldozer (114.2 dBA per vehicle) – Continuous Day Operation
– Three Excavators (103.5 dBA per vehicle) – Continuous Day Operation
– Three Dredging Barges (113.3 dBA per barge) – Continuous Day/Night Operation
– Haul Route Truck Route 1 (109.9 dBA per vehicle) - assumed two trucks per hour travelling at 25 km/hr during daytime periods only
– Haul Route Truck Route 2 (109.9 dBA per vehicle) - assumed eight trucks per hour travelling at 25 km/hr during daytime periods only
– Bridge/Dam Pile Driving Rig – 129.5 dBAI (+12 dBA adjustment) with an acoustical use factor of 20 percent (12 mins per hour)

Remediation Activities

- Three Bulldozer (114.2 dBA per vehicle) – Continuous Day Operation
- Three Excavators (103.5 dBA per vehicle) – Continuous Day Operation
- Three Dredging Barges (113.3 dBA per barge) – Continuous Day/Night Operation
- Haul Route Truck Route 1 (109.9 dBA per vehicle) - assumed two trucks per hour travelling at 25 km/hr during daytime periods only
- Haul Route Truck Route 2 (109.9 dBA per vehicle) - assumed eight trucks per hour travelling at 25 km/hr during daytime periods only

Operational Scenario

- Three Bulldozer (114.2 dBA per vehicle) – Continuous Day Operation
- Three Excavators (103.5 dBA per vehicle) – Continuous Day Operation
- Three Dredging Barges (113.3 dBA per barge) – Continuous Day/Night Operation
- Haul Route Truck Route 1 (109.9 dBA per vehicle) - assumed two trucks per hour travelling at 25 km/hr during daytime periods only

Demolition Activities

- Three Bulldozer (114.2 dBA per vehicle) – Continuous Day Operation
- Three Excavators (103.5 dBA per vehicle) – Continuous Day Operation
- Three Dredging Barges (113.3 dBA per barge) – Continuous Day/Night Operation
- Haul Route Truck Route 1 (109.9 dBA per vehicle) - assumed two trucks per hour travelling at 25 km/hr during daytime periods only
- Haul Route Truck Route 2 (109.9 dBA per vehicle) - assumed eight trucks per hour travelling at 25 km/hr during daytime periods only

There are no other significant noise generating activities or equipment. All noise generating activities were assumed to operate for the full hour/100 percent load with no time weighting or other reductions which is considered conservative. Night-time construction is not anticipated, however, dredging, and associated activities such as Geotube® or equivalent technology operations and dewatering effluent management will occur throughout the night.

Truck Activity Volumes Update

In determining the hourly number of trucks per hour on the main haul route a review was conducted of the various construction tasks for each year of the project and modeled the worst-case trip count to simply the evaluation and be conservative in assumptions. These updated assumptions were cross-referenced with other disciplines to ensure assumptions are appropriate updated as required. Construction of access roads and vegetation clearing were not considered in the noise assessment as the project preparation and construction will only include upgrades to existing road networks which would not require any new roads.

The following assumptions were used to calculate trucks trips per hour:

- Construction Activity **|** Worst-case construction evaluation will have 112 trucks per day over 16-hours for Geosynthetic Clay Liner (GCL), High Density Polyethylene (HDPE), Sand Layers removal which will have an estimated volume of 70,000 m^3 of material over 5 months utilizing 15 yard trucks. GHD has conservatively used a trips/hour count of **10 trucks per daytime hour which includes two trips per hour to support the bridge construction**.
- Remediation Activities **|** Worst-case evaluation will have 15 trucks per day over 16-hours for dredging/berm removal which will have an estimated volume of 25,365 m^3 of material over 75 days utilizing 15 yard trucks. GHD has conservatively used a trips/hour count of **two trucks per daytime hour**.

– Demolition Activities **|** Worst-case evaluation will have 36 trucks per day over 16-hours for dredging/berm removal which will have an estimated volume of 1,800-5,500 m^3 of material over 45 days utilizing 15-yard trucks. GHD has conservatively used a trips/hour count of **two trucks per daytime hour**.
– Operational Activities **|** Worst-case evaluation will have two trucks per day over 16-hours for sludge basin material removal during daytime hours only.

Based on these anticipated trips per hour for each activity it is assumed Haul Route Trucks will be 10 trucks per hour travelling at 25 km/hr during daytime periods for construction, remediation, and demolition and two per hour during the operational phase.

Figure 7.3-5 and Figure 7.3-6 (following text) have been created to show the updated POR9 location, the noise source locations and the main haul truck route which will utilize a section of Highway 348 as the trucks exit the site and continue south along Highway 348. A small portion of trucks supporting the Highway 348 Bridge/Dam traffic (2/hour) will pass through PLFN community to the north of the site on as they continue through Highway 348 to the south egress route.

Based on the updated Haul Route assessment POR9 has been relocated to the closest residence in the PLFN community to the north next to the Haul Route that will support the removal of materials from the Bridge construction.

Construction Noise Assessment and HC %HA Evaluation Update

An assessment of predicted construction noise has been included in accordance with HC's "Guideline for Evaluating Human Health Impacts in Environmental Assessment: Noise" (HC, 2017). The primary metric which HC employs in assessing potential noise impacts is the change in the percentage of residents expected to be Highly Annoyed (%HA) by project-related effects on the ongoing noise environment in their community. The following italicized text is extracted from the HC noise guidelines: The HC onset for health effects of noise commences when the change in the percent highly annoyed exceeds %HA 6.5%. The change in %HA or noise impact is the difference between the %HA with and without project noise. The %HA with or without project noise is derived from the average annual day-night rating level (LRdn or representative value with or without project noise.

The HC guideline follows ISO 1996-1:2003(E) in utilizing the industry standard LRdn 24-hour metric. The calculation of the baseline %HA, Construction, Remediation and Demolition Impacts %HA was based on the following formula's and methodology as detailed in Appendix F of HC's noise guidance document:

The rating level used to calculate %HA is the day-night rating level (LRdn):

– Daytime rating level - LRdn = 10 log10 [∑ 10(0.1LRdi)]

As all baseline monitoring data was >35 dBA at night and as such no quiet rural area adjustment was warranted.

To calculate the relevant change in %HA values due to the project noise, LRdn values for the baseline, construction, and operation phases were calculated based on the energy summation of baseline and construction LRdn values (LRdn[baseline and construction]) for the construction phase and baseline and operation LRdn values (LRdn[baseline and operation]) for the operation phase.

LRdn is a 24-hour energy averaged rating level in which the contribution from the night-time rating level is artificially increased by 10 dB and is calculated using the following equation:

LRdn = 10 log10 [((15 × 10(0.1 × L) + (9 x 10 (0.1 × (LRn + 10))/24]

LRdn(baseline and construction) = 10 log10 (10 (0.1 × construction LRdn) + 10 (0.1 × baseline LRdn))

LRdn(baseline and operation) = 10 log10 (10 (0.1 × operation LRdn) + 10 (0.1 × baseline LRdn))

The %HA is calculated using the following equation:

%HA = 100 / [1 + e(10.4 - 0.132 LRdn)]*

The %HA (baseline), %HA (baseline and construction), %HA (construction), %HA (baseline and operation) and %HA (operation) were obtained by substituting the appropriate LRdn into the equation.

The change in %HA for project construction is calculated by subtracting %HA (baseline) from %HA (baseline and construction). The change in %HA for project operation is calculated by subtracting %HA (baseline) from %HA (baseline and operation).

GHD has evaluated the site construction, remediation and demolition impacts phases based on the updated baseline noise levels (as summarized in Table 2.13 below), the calculated baseline %HA is up to approximately 1.4 percent at some receptor locations which are provided in Table 2.14 below.

In accordance with the referenced HC guideline, mitigation would be suggested where the %HA is greater than 6.5 percent at any of the identified receptors after being corrected for baseline HA% (6.5% Δ%HA).

Table 2.13 Construction, Remediation and Demolition Noise Impact and %HA Analysis (Table 7.3-56 in EIS)

Receptor ID	Receptor Description	Baseline Day/Night (dBA)			Baseline %HA	Construction, Remediation, Demolition Impacts (dBA)			Construction, Remediation, Demolition Impacts + Baseline	Construction, Remediation, Demolition Impacts + Baseline	Delta of Baseline-Baseline/ Construction Δ%HA	Δ%HA Criteria	Compliance?
		(Ld)	(Ln)	(LRdn)	(%HA)	(Ld)	(Ln)	(LRdn)	(LRdn)	(%HA)	(%HA)	(%HA)	(Yes/No)
POR1	Residential Property	48	44	47	1.4%	54	41	52	53	3.2%	1.8%	6.5%	Yes
POR2	Residential Property	48	44	47	1.4%	48	41	41	48	1.6%	0.2%	6.5%	Yes
POR3	Residential Property	48	44	47	1.4%	43	38	42	48	1.6%	0.3%	6.5%	Yes
POR4	Residential Property	37	40	38	0.5%	42	41	42	43	0.9%	0.4%	6.5%	Yes
POR5	Residential Property	37	40	38	0.5%	52	46	51	51	2.4%	2.0%	6.5%	Yes
POR6	Residential Property	45	41	44	1.0%	60	40	58	58	6.4%	5.4%	6.5%	Yes
POR7	Residential Property	40	37	39	0.5%	46	31	44	45	1.2%	0.6%	6.5%	Yes
POR8	Residential Property	40	37	39	0.5%	51	38	49	49	1.9%	1.4%	6.5%	Yes
POR9	Residential Property	37	40	38	0.5%	55	41	53	53	3.2%	2.7%	6.5%	Yes

Table 2.14 Operational Noise Impacts and %HA Analysis (Table 7.3-57 in EIS)

Receptor ID	Receptor Description	Baseline Day/Night (dBA)			Baseline %HA	Operational Noise Impacts (dBA)			Operation Noise Impacts + Baseline	Operation Noise Impacts + Baseline	Delta of Baseline-Baseline/Operation Δ%HA	Δ%HA Criteria	Compliance?
		(Ld)	(Ln)	(LRdn)	(%HA)	(Ld)	(Ln)	(LRdn)	(LRdn)	(%HA)	(%HA)	(%HA)	(Yes/No)
POR1	Residential Property	48	44	47	1.4%	48	47	48	50	2.3%	0.9%	6.5%	Yes
POR2	Residential Property	48	44	47	1.4%	45	42	41	48	1.6%	0.2%	6.5%	Yes
POR3	Residential Property	48	44	47	1.4%	42	38	41	48	1.6%	0.2%	6.5%	Yes
POR4	Residential Property	37	40	38	0.5%	40	38	40	42	0.8%	0.3%	6.5%	Yes
POR5	Residential Property	37	40	38	0.5%	46	46	46	47	1.4%	1.0%	6.5%	Yes
POR6	Residential Property	45	41	44	1.0%	40	40	40	45	1.2%	0.2%	6.5%	Yes
POR7	Residential Property	40	37	39	0.5%	31	31	31	40	0.6%	0.0%	6.5%	Yes
POR8	Residential Property	40	37	39	0.5%	46	46	46	47	1.4%	0.9%	6.5%	Yes
POR9	Residential Property	0	0	0	0.0%	41	41	41	41	0.7%	0.7%	6.5%	Yes

As seen above, during the worst-case scenarios, noise effects from the construction, remediation, demolition, and operation phase activities are within the Δ%HA criteria. These worst-case effects are predicted at the start of each phase and will diminish significantly as the project phases progresses to later stages.

General guidance has been provided by GHD to help ensure that construction noise levels are acceptable, including a specification that construction activities would be restricted to the day and evening time periods.

Noise Significance of Effects

Effects on residential areas from the remediation of the BHETF are projected to be low in magnitude, and short-term in nature. There were no exceedances with NSE noise limits identified within BHETF. Effects pertain to the demolition and construction of infrastructure, and the associated trucking activities on haul roads adjacent to existing residences. The residual effects are temporary in nature and are only anticipated during construction/demolition. After the application of the noise reduction Best Management Practices (BMPs) listed in Table 7.3-1 of the EIS and included in the draft PEPP, along with the Project specific mitigation measures listed above, the effects are not considered significant.

We have evaluated the site preparation and construction phase based on the measured baseline noise levels, the calculated baseline %HA is up to approximately 5.4 percent at some receptor locations but still within HC guidance criteria.

2.49 IAAC-49

Response provided in Section 1, Table of Concordance (Table 1.1).

2.50 IAAC-50

Appendix K of the HHERA (provided as Appendix A of the EIS) presents the RMP and discusses the remediation approach for the Freshwater Wetland and Estuary, including a discussion of the existing conditions of these areas and any impediments to the remediation. It is assumed that RMAs in the Freshwater Wetlands and Estuary will be physically remediated using hydraulic dredging (or similar removal approach) for disposal in the containment cell. This is similar to the approach proposed for the BHSL and associated basins.

The HHERA presents a widely used and relatively simplistic statistical method to calculate EPCs from available Site data. EPCs are used to characterize chemical concentrations to which receptors may be exposed. According to HC's guidance on Detailed Quantitative Risk Assessment (HC, 2010),

> *"For deterministic exposure assessments, chemical concentrations are represented by point estimates. These point estimates may be based on the arithmetic mean, upper 95 percent confidence interval of the mean, 95th percentile of the data distribution, or some other statistic depending on the quality and quantity of data available. Adequate data permitting, Health Canada prefers use of the mean or upper 95 percent confidence interval of the mean. However, for PQRAs where data are more limited, the 95th percentile of the data distribution or the maximum measured concentration will more likely be employed."*

The 95 percent UCLM was chosen as the statistical representation of the reasonable maximum exposure or EPC for the risk and hazard calculations in the HHERA. The same statistical methods were used in the RMP included in the HHERA. To determine the extent of remediation or risk management required to achieve the SSTL, sediment samples with the highest D/F TEQ concentrations were sequentially removed from the datasets for the Freshwater Wetlands and Estuary (evaluated separately), replaced with the SSTL concentration (29 pg/g D/F TEQ), and EPC re-calculated. This process was repeated until an EPC equal to or below the SSTL was achieved. The EPC calculation for the Estuary included data from the BHSL (and associated basins) as this area is anticipated to form a continuous tidal mudflat post-remediation. The SSTL of 29 pg/g D/F TEQ was used as the remedial objective for the BHSL and associated basins in the Estuary calculation.

As indicated in the EIS, the remediation program will be completed in multiple phases over multiple years starting with the Freshwater Wetlands and then moving to the BHSL and associated basins followed by the Estuary. As such, the methodology applied in the RMP for identifying areas requiring remediation based EPC values for specific RMAs is the same approach to be implemented as part of the remediation activities. This method will ensure the post-remediation EPCs for each RMA (as well as sub-areas within each RMA) are below the applicable SSTL. To ensure the remediation activities have adequately achieved the remedial targets, confirmation sampling will be completed in each RMA and a revised EPC calculated prior to the contractor mobilizing to the next RMA. Multiple sampling programs have been conducted in the Study Area between 2018 and 2019, and through these sampling programs, the presence of COPCs has been sufficiently characterized and significant data gaps are not present. QA/QC programs were implemented during the sampling programs, and the quality assessment and validation of the data collected demonstrate that the analytical results are consistent, of high quality, and suitable for the development of EPCs and associated SSTLs. The same or similar confirmatory sampling methods will be utilized to collect confirmatory sediment samples post remediation and used to re-calculate EPC values for specific RMAs and associated sub-areas.

Section 6.6 of the HHERA (Appendix A of the EIS) presents a discussion of the uncertainties associated with the exposure concentrations applied in the HHERA.

2.51 IAAC-51

The RMP included in Appendix K of the HHERA (Appendix A of the EIS) for RMA's 3 and 5 provided two potential alternatives to mitigate direct contact to sediment by humans: 1) monitor and maintain the existing vegetative cover, and 2) in the case where vegetative cover is absent or its future presence is affected by the BHETF Remediation Project (e.g., change in water levels), removal of the sediment was the preferred option. The use of the existing vegetation cover was identified as a potential option in the risk management plan as the cattail mat currently covers the underlying impacted sediment creating a physical barrier to direct contact with the sediment. Using the existing vegetation and cattail mat as cover versus hydraulic dredging of the sediment also reduces physical disturbances to the existing wetland ecosystem.

Given the uncertainties of the future hydraulic conditions of the wetlands following the dam removal and re-connection of BH to the Northumberland Strait (return to a tidal Estuary), the current remediation plan is to remove the cattails to allow for hydraulic dredging of the underlying sediment and disposal of the sediment in the containment cell consistent with the remediation plan for other areas of the BHETF.

The current remediation plan included in the EIS does not include using the cattail mat as a protective cover given the uncertainties associated with the vegetation community that will present in the wetlands post-remediation (after returning the system to tidal). To ensure protection of human health, the same mitigation measures and remedial target levels will be utilized for sediment dredging in the wetland areas as proposed for the other BHETF areas requiring remediation. These mitigation measures will ensure protection of human health through the direct contact pathway during and post-remediation.

The primary difference between hydraulic dredging in the wetlands versus other areas of the BHETF is the removal of the cattail mat prior to completing the dredging activities. As indicated in the EIS, the cattails in this area of the Site were previously characterized and current concentrations of COPCs were determined not to pose an unacceptable health risks to human or ecological receptors. As such, the cattails harvested as part of the remedial activities will be segregated and used as mulch or soil amendments post-remediation. Results of the previous cattail sampling program are provided in HHERA (Appendix A of the EIS). Given that access to the area will be restricted during remediation and that the cattails will be removed during the remediation and allowed to naturally biodegrade consistent with current conditions, there is limited potential for collection and consumption of cattails at the Site during the remediation activities. Potential harvesting of country foods from aquatic areas within the BHETF is generally limited to post-remediation. Current concentrations of COPCs in plants do not result in unacceptable health risks to human and ecological health through the consumption pathway and concentrations of COPCs in sediment of the BHETF, including the wetland areas, will be substantially lower following sediment remediation activities (removal and disposal in the containment cell). As such, future concentrations of COPCs in country foods, including cattails, would be equal to or less than current COPC concentrations and will not pose an unacceptable risks to human health. Post remediation monitoring of country foods will be undertaken as part of the EIS to ensure COPCs in food items post-remediation are consistent with background conditions in the area.

The cattails at the BHETF were collected and analyzed to support the completion of the HHERA. Based on the results of the HHERA, current concentrations of COPCs in plants do not result in unacceptable health risks to human and ecological health. The cattails are considered suitable for mulch/soil amendment and are not expected to require disposal in the containment cell.

Retesting will occur prior to use using similar testing procedures. Since the containment cell will be remain under interim cover for a period of one to two years. There is ample time to re-test the cattail and other organic matter for reuse. If they are unacceptable for reuse they will be placed in the containment cell prior to the placement of final cover.

2.52 IAAC-52

Response provided in Section 1, Table of Concordance (Table 1.1).

2.53 IAAC-53

Section 6.1.1.4 of the HHERA (Appendix A of the EIS) provides a detailed discussion of the use of groundwater within the Study Area, as well as a discussion of groundwater use within the PLFN community. As indicated in the HHERA (Appendix A of the EIS), the only locations with metals at concentrations exceeding the potable drinking water guidelines were ASB-EXISTING-MW1, ASB-MW-1, and FSP3-MW 1, which are located between and directly adjacent to the Former Settling Pond 3 and the ASB. Aluminum, arsenic, cobalt, lead, manganese, or chloride were the only metals identified to marginally exceeding drinking water guidelines in these wells. These metals exceedances in groundwater are delineated by several other monitoring wells in the area and it is unlikely that a potable drinking water well would be installed in such close proximity to the adjacent water bodies. Although manganese was also identified to exceed potable water guidelines in other wells in the Study Area, manganese has previously been identified to exceed potable water guidelines in groundwater samples collected from peninsula and off-peninsula wells associated with the PLFN potable water supplies between 2007 and 2010 (Dillon, 2011). Concentrations of manganese in wellfield groundwater samples collected over this four-year period generally ranged from 5 to 1000 microgram per litre (ug/L) with a maximum of 6300 ug/L which are consistent with the manganese concentrations identified in the groundwater samples collected from the Study Area. As such, manganese is considered to be naturally elevated in groundwater in the area (JEHMC, 2005) and not further evaluated as part of the HHERA.

Although there is an existing water well for the administrative treatment building associated with the BHETF (building located near the settling basins), this water well is not currently used for potable purposes, only as facility water. As such, potable wells were not currently considered to be located within the Study Area and considered an incomplete exposure pathway under current conditions. In addition, the potable water supply for PLFN is located over 500 m east of the Study Area and water quality will not be influenced by Project related activities. Potable exposure to groundwater is indicated in Table 6.1 of the HHERA (Appendix A of the EIS) as an inoperable exposure pathway and not carried through for quantitative assessment.

Section 6.1.1.4 of the HHERA (Appendix A of the EIS) also indicates that it is unlikely that potable wells will be installed within the Study Area with the availability of a water supply system currently servicing PLFN in close proximity. Should future landowners wish to develop water supplies, water would be sampled and analyzed to confirm compliance with HC's Guidelines for Canadian Drinking Water Quality, as indicated in Section 6.1.1.4 of the HHERA (Appendix A of the EIS). In addition, monitoring of groundwater quality in the Study Area will be completed during and following completion of the proposed BHETF remediation activities. If the marginally elevated concentrations of metals persist in the groundwater wells immediately adjacent to the ASB post-remediation, a potable water exclusion zone could be established around the ASB for review and approval by NSE as part of the Contaminated Sites Regulation and Ministerial Protocol framework.

Figure 3 of the HHERA (Appendix A of the EIS) presents a figure showing the locations of the groundwater monitoring wells. Table C-1.2 of Appendix C-1 of the HHERA (Appendix A of the EIS) summarizes the groundwater analytical results.

Dillon, 2011. Pictou Landing IR24, 2010 Groundwater Monitoring Program – Final Report, August 2011, Dillon Consulting prepared for Confederation of Mainland Mikmaq.

JEHMC, 2005. Canada and Pictou Landing First Nation, Third Report on Activities April 1998 March 2004, Joint Environmental and Health Monitoring Committee (JEHMC), March 2005.

2.54 IAAC-54

The impact area modelled in this air quality assessment was a 5 km x 5 km grid centered on the BH facility. All the sources evaluated in the air quality assessment were low elevation (< 5 m above ground level) or ground level sources. The maximum air quality impacts for these types of sources usually occurs within 1.0 km of the source. The maximum estimated concentrations of each pollutant evaluated were compared to the appropriate air quality standards, where available, and used to evaluate inhalation risk.

Section 3.1.4.1, BHRP Related Activities Scenario of the PRA-HHRA (Appendix A of the EIS) provides predicted soil concentrations as a result of deposition due to soil and sediment disturbance. Section 3.1.4.5, BHRP Related Activities Scenario of the PRA-HHRA (Appendix A of the EIS) provides predicted plant concentrations as a result of deposition due to soil and sediment disturbance.

The above-noted predicted soil concentrations were compared to screening levels based on direct contact exposure (ingestion, dermal contact, and inhalation) for residential land use. The above-noted predicted plant concentrations were compared to the background plant concentrations collected from outside the Study Area. As indicated in the above-noted sections of the PRA-HHRA (Appendix A of the EIS), the predicted soil and plant tissue concentrations were below applicable screening guidelines or background conditions and there were no COPCs carried through for further assessment of these exposure pathways. As such, these exposure pathways do not represent an unacceptable risk to human health.

2.55 IAAC-55

Background air quality data used for this impact assessment was from two sources, a project site located on Cemetery Road in Pictou Landing and two National Pollutant Surveillance Network (NAPS) sites. Posted NAPS data is only available up to the end of 2019 while the mill ceased their operations in 2020.

The air quality assessment predicted the impacts of site activities on the existing conditions in the area. Background data from the BH monitoring site was added to the contribution from project activities to provide an estimate of the air quality conditions during the project. The mill was not and is not operating. <u>Using the local data for the period without the contribution of the mill is appropriate.</u>

The BH monitoring station data is limited and does not include NO_2, SO_2, and CO. For this reason, it was necessary to use NAPS data. These data are only available for the period while the mill was operating and by adding these values to the modeled results the predicted impacts are greater (more conservative) than expected. The NO_2, SO_2 and CO impacts from this project will be temporary (during remedial activities only) and there will be no emissions of these contaminants when the project is completed.

The air quality impacts of the past or potential future operations of the mill were not considered in this air quality impact assessment. As described in Section 7.4.3.3.3.2 and 7.4.3.3.3.3 of the EIS, as of January 2020, Northern Pulp announced the plan for the orderly shutdown leading to a long-term of indefinite hibernation of the Mill until a new effluent treatment facility is approved and constructed. With this in mind, interaction between the BH Project from a cumulative effects assessment was reviewed based on the potential approval and operation for a new effluent treatment facility at the Mill. In December 2019, the Nova Scotia Minister of Environment determined that the work completed to date for the Northern Pulp New Effluent Treatment Facility was not sufficient to properly assess the effects of the proposed project. As of May 5, 2021 the project described was withdrawn from the provincial environmental assessment process by Northern Pulp. The proponent is now required to complete a Class 2 EA Report. If the Mill were to resume operation, the proponent would need to go through an IA process after successful completion of the environmental assessment process with the NSE and should be required to consider the operations of the BH remediation in their air quality analyses, including cumulative effects.

2.56 IAAC-56

The air quality impact assessment compared predicted pollutant concentrations (including $PM_{2.5}$ and NO_2) to regulatory ambient air quality standards (AAQS). Standards are not provided for all pollutants, standards from several agencies were used: Nova Scotia AAQS, Ontario AAQC, and Canadian AAQS. These standards were developed considering the health impacts and exposure periods for each pollutant. The most stringent value was selected for each pollutant and averaging time.

If the predicted air quality impact of a pollutant was below the published standard there was no additional analyses for inhalation impacts. The standards have averaging times from 1-hour through annual to account for short-term (acute) and long-term (chronic) exposures considered in their promulgation.

Diesel particulate matter (DPM) is a different case, there are no regulatory ambient air quality limits for this contaminant in North America. This pollutant is unique in that it is comprised of carbon particles with an aerodynamic diameter less than 2.5 um. Adsorbed to these carbon particles are chemical constituents including PAH and VOCs. An assessment of the short-term exposures of DPM was part of the project HHRA. In the HHRA, the modeled concentrations of were found to be less than the human health screening guidelines protective of residential inhalation exposure. Inhalation of vehicle and/or equipment emissions by residential receptors in the RSA created during the BHRP related activities is considered to pose a low risk to human health.

The health effects data published for DPM include the range of organic species (including PAH and VOCs) that make up DPM. For this reason, additional analyses of the inhalation impact of the individual compounds contained in DPM was not warranted.

2.57 IAAC-57

Dredged material described in Scenario 4 (Shoreline Dredging) will not be transported by trucks but pumped by the hydraulic dredges to the CC. Diesel emissions from the dredges and booster pumps (when required) have been evaluated in this scenario.

There is no provision for dry shoreline excavation, as this is not possible with the hydraulic dredges proposed. The water level in BH can be adjusted if necessary, to facilitate dredging.

The BHRP consists of many similar activities (excavating, hauling, construction, etc.). The scenarios that were selected for analyses considered the worst-case activities (most material moved, most trucks/day, etc.) activities with lower potential impacts were not evaluated. Infrastructure decommissioning activities for example had an estimated maximum 36 trucks/day and a total of 5,500 m^3 of material moved. The scenario we chose to model was containment cell capping with 113 trucks/day and a total of 75,000 m^3 of material moved.

2.58 IAAC-58

DPM was considered an inhalation risk and evaluated as such. While PAHs do make up a significant portion of DPM, the uptake of PAHs by plants is limited and not considered a viable exposure pathway.

For the air quality impact assessment, only fresh potable water was considered for dust suppression. Unpaved road dust emissions were estimated using the emission factors published in the USEPA's *Compilation of Air Pollutant Emission Factors*, AP-42, Section 13.2.2-Unpaved Roads. This section provides for estimating emissions after the application of dust suppressants. Control efficiencies of up to 95 percent are provided. We selected 80 percent control as a reasonably achievable goal given the conditions at the site and the short-term nature of the maximum vehicle traffic conditions.

This remediation program includes air quality monitoring for worker safety and to minimize off-Site impacts. If conditions at the Site indicate excessive dust from traffic that cannot be controlled by watering, Site operations can be curtailed, or additional measures such as paving portions of the road will be considered at that time.

2.59 IAAC-59

Response provided in Section 1, Table of Concordance (Table 1.1).

2.60 IAAC-60

Response provided in Section 1, Table of Concordance (Table 1.1).

2.61 IAAC-61

As described in IAAC-56, the air quality impact assessment compared predicted pollutant concentrations to regulatory AAQS. Standards are not provided for all pollutants, and to be as thorough as possible, standards from several agencies were used, including Nova Scotia AAQS, Ontario AAQC, and CAAQS. These standards were developed considering the health impacts and exposure periods for each pollutant. The most stringent value was selected for each pollutant and averaging time. If the predicted air quality impact of a pollutant was below the published standard there was no additional analyses for inhalation impacts.

We utilized this information, took a comprehensive approach comparing predicted pollutant concentrations to standards from several agencies, and selected the most stringent value for each pollutant in determining significance criterion and assigning a "low magnitude" of significance. Activities that generate impacts have been described in the EIS and an indication of when the activities will cease was provided (Section 7 of the EIS). With air related impacts the time for return to baseline is minimal and is not further evaluated relative to residual impacts. As with all predictions, a comprehensive monitoring program will assist with further evaluating any possible residual impacts.

Based on this approach, no further analysis of significance criterion is required.

2.62 IAAC-62

The shellfish tissue (clams) were collected from the Northumberland Strait. Based on the sediment and surface water quality data collected from Northumberland Strait, this location within the Study Area is not considered impacted with contaminants associated with the BHETF (e.g., metals and D/F). Although an attempt was made to collect shellfish samples from the areas of primary concern (i.e., Freshwater Wetland and Estuary), shellfish samples from these areas were not available. In the shellfish (clams) collected from the Northumberland Strait as part of the 2019 supplemental assessment program, aluminum, lead, and manganese were detected at concentrations greater than background observed in shellfish samples collected from other areas of the Strait (Chaudhary, 2020). Aluminum, lead, and manganese were not identified as COPCs in sediment within the Study Area (Freshwater Wetland Areas, the BHSL and Associated Basins, the Estuary, or the Northumberland Strait) as the concentrations of these metals were below applicable screening guidelines. In particular, the maximum concentrations of these three metals in sediment samples collected from the Northumberland Strait in the vicinity of the shellfish sample locations were below human health screening values for direct contact (aluminum - 3100 mg/kg; lead – 3.7 mg/kg; and manganese – 440 mg/kg). In addition, the maximum concentrations of these metals were approximately equal to the maximum concentrations in sediment samples collected from reference areas of the Northumberland Strait (aluminum - 2500 mg/kg; lead – 3.1 mg/kg; and manganese – 180 mg/kg) and well below the 95 percent UCLM concentration for aluminum, lead and manganese from background wetlands and estuaries in the area (9105, 16.9 and 1365 mg/kg, respectively; Appendix G-1 of the HHERA included as Appendix A of the EIS). These metals are not associated with the historical activities of the BHETF and are not considered drivers of sediment remediation requirements or a COPC with respect to human health. It is further noted that these metals are not considered to be bio-accumulative COPCs. For example, the TCEQ document, *Conducting Ecological Risk Assessments at Remediation Sites in Texas* (TCEQ, 2018) indicates that lead is not bio-accumulative in sediments. Based on the above noted rationale and aluminum, lead and manganese not being a COPC associated with the BHETF (in surface water or sediment), further consideration of these metals in clam tissue for the purpose of the HHERA is not considered warranted.

In addition to the above noted rationale, clams are a burrowing bivalve mollusks, sediment, or granular material along with undigested food typically accumulates within the gut of the clam which causes a "gritty" texture if the clam is not allowed to depurate or "flush out" prior to consumption. As a result, it is common practice to place clams in cold water for several hours or overnight so that this sediment material is "flushed" or depurated from the clam prior to cooking and subsequent consumption. In addition, even if clams are not depurated by soaking in water prior to consumption, it is common during the during the cooking process, particularly during steaming or boiling, for "grit" or sediment material to be released from the clam gut and not consumed. As such, the analysis of an un-depurated sample are based on the metals present within the sediment or "grit" material within the gut and not specific to the actual metal concentration of the clam tissue. The analysis of an un-depurated sample are based on the metals present within the sediment or "grit" material within the gut and not specific to the actual metal concentration of the clam tissue. It is acknowledged that depuration of the clams prior to analysis would more accurately predict concentrations of metals in clam tissue that would be typically consumed as depuration is known to significantly reduce the concentrations of metals in bivalve molluscs (Anacleto et al., 2015). As such, it is considered reasonable to assume that the concentrations of these metals (aluminum, lead, and manganese) within the clams are likely biased high given that the clams were not depurated prior to analysis.

The Canadian Food Inspection Agency (CFIA) guidelines are appropriate screening levels for fish and shellfish. They have been used previously at hundreds of Small Craft Harbour sites throughout Atlantic Canada owned by the federal government where fish and shellfish tissue have been collected for the purposes of assessing human health risks from consumption. Further assessment of the metals and D/F concentrations measured in fish and shellfish from the Study Area and background locations is presented below. In addition to the discussion presented below, response to Comment IAAC-63 which provides additional support that the concentrations of metals and D/F are not a human health concern based on country food consumption should also be reviewed.

– Arsenic was not detected in the fish and shellfish samples collected from the Study Area, and the detection limits from these samples were the same detection limits as the background samples; therefore, arsenic is assumed to be equivalent to background and does not require further quantitative assessment for consumption of fish and shellfish.
– Vanadium was detected in only one of the 18 whole fish samples at a concentration (2 mg/kg) within the background levels (2-4 mg/kg). Vanadium was also detected in only one of the 10 fish fillet tissue samples collected at a concentration (3 mg/kg) slightly higher than the laboratory detection limit (2 mg/kg), but less than the background concentrations of vanadium in the whole fish tissues (2-4 mg/kg). In shellfish, vanadium was detected in six of the 10 clam tissue samples at a concentration (2 mg/kg), which is equivalent to the detection limit (2 mg/kg) for the clam tissue samples and the detection limit for the background samples. Based on this information, the concentrations of vanadium measured in whole fish samples, fish fillet samples, and shellfish (clams) are equivalent to the detection limit in tissues and overall, less than the levels measured in background samples.
– Mercury was not detected in the whole fish samples or the shellfish (clams) samples (detection limits for the Study Area and background samples were the same and less than the CFIA guideline). Mercury was also not detected in any of the shellfish samples (crab, lobster, and mussels) collected by Dalhousie University from the Northumberland Strait. This provides support that mercury is not present at concentrations that would be a human health concern in country foods (fish and shellfish) collected from the Study Area and does not require further assessment.
– Lead was only detected in one of the 18 whole fish samples; however, lead was not detected in the fillets of an edible-sized fish species (striped bass) known to be consumed by the PLFN community (see Section 6.1.1.9 and Table H-1.11 of the HHERA, Appendix A of the EIS). This information was provided in Section 6.1.1.8 of the HHERA (Appendix A of the EIS). In shellfish (clams) collected from Northumberland Strait, lead was detected at

concentrations marginally greater than the background shellfish samples (crab, lobster, and mussels). Lead was not identified as a COPC in sediment within the Study Area, lead is not associated with the historical activities of the BHETF, and lead is not considered bio-accumulative in sediment. As such, lead in clam tissue was not considered further as part of the HHERA specific to the BHRP.

– The concentrations of D/Fs measured in fish and shellfish were determined to be statistically similar to background levels and less than the human health guideline (see Tables H-1-10, H-1-11, and H-1-15 of the HHERA, Appendix A of the EIS). This provides support that D/Fs are not present at concentrations that would be considered a human health concern in country foods (fish and shellfish) collected from the Study Area and does not require further assessment.

Chaudhary, M., Walker, R., Willis, R., Oakes, K. (2020). Baseline characterization of sediments and marine biota near industrial effluent discharge in Northumberland Strait, Nova Scotia, Canada. Marine Pollution Bulletin 157 (2020) 111372. Panneerselvam, E., Adesida, A., Carrier, A.J., Francis, L., Hoover, J., Pham, M.N., Nicholson, A., Williams, J., Zhang, X., Oakes, K. (2020). Boat Harbour Fish Population Assessment. Cape Breton University.

Anacleto, Patrícia, Maulvault, Ana Luísa, Nunes, Maria Leonor, Carvalho, Maria Luísa, Rosa, Rui, Marques, Antonio. Effects of depuration on metal levels and health status of bivalve molluscs. Food Control 47: 493-501.

2.62.1 Additional Information to Support IAAC-62 (Originally submitted as GHD Memorandum-93, November 2021)

As indicated in the original response to IAAC-62, the clam tissue included in the HHERA (Appendix A of the EIS) were collected from the Northumberland Strait shoreline directly adjacent to the Estuary in 2019. The clams collected were observed to be moving with the tide and deposited on the shoreline surface at the high tide waterline. In an effort to collect background clam samples, the Northumberland Strait shoreline area near Ferguson's Pond which was used for reference sediment and surface water samples was also inspected for the presence of clams, but none were identified at this time. Given the absence of reference clam tissue for comparison to clams collected in the Study Area, a desktop literature review was completed to evaluate potential reference concentrations of metals (and other COPCs) in clam tissue of the Northumberland Strait. Limited information on potential background concentrations of COPCs in clam tissue was available in the literature reviewed. In particular, DFO monitoring of toxins in shellfish (including clams) is primarily focused on marine biotoxins related to paralytic shellfish poisoning (PSP). In addition, Stewart et al. (2019) prepared a review of environmental contaminants in various marine habitats in the Maritimes on behalf of DFO. Findings of this review determined limited recent information is available on inorganic contaminants in clams of the Maritimes region. Although a variety of metals influence marine organisms and have been the subject of studies, mercury and its organic form as methyl mercury has been a particular focus of research in the bioregion in response to concentrations which have been increasing in the environment from various sources (Engel et al., 2006).

Although there was limited information available for COPC in clam tissue specific to the Northumberland Strait, the review completed by Stewart et al. (2019) did identify concentrations of inorganic parameters are available for mussels and lobster from various marine habitats of the Maritimes. In particular, the study noted that blue mussels are commonly used as a bio-indicator to monitor metal levels in the environment because of their common occurrence and relatively easy access for sampling (Stewart et al., 2019). These findings are consistent with the evaluation completed by Chaudhary et al. (2020) which used American lobster, rock crab and mussels to evaluate chemical concentrations in invertebrates along the coastline of Pictou Harbour to a maximum distance of 7.5 km from BH. Results of the study indicated there was no significant impact on marine biota, except for exceedances of arsenic in lobster and rock crabs which is naturally elevated in water and sediments across Nova Scotia (Chaudhary et al., 2020). Considering the economic importance of fishing in the Northumberland Strait and the known human consumption of these invertebrates, it was suggested that the sediment and shellfish samples collected as part of this study could be used as a baseline for future sediment and biota monitoring (using the same species as this study) following completion of the BHETF remediation project.

Given the absence of reference clam tissue from the Northumberland Strait for comparison to Study Area samples, other shellfish that are known to be harvested from the Northumberland Strait for human consumption, specifically American lobster, crab, and mussels, were used as a surrogate for background clam tissue. The purpose of utilizing this surrogate reference shellfish data was to determine if concentrations of COPCs in the clam tissue collected was similar to other shellfish in the Northumberland Strait that are known to be consumed by humans. As indicated in the original response to IAAC-62, the concentrations of COPCs in the clam tissue collected in 2019 was statistically similar to concentrations of COPCs in other shellfish collected from the Northumberland Strait (Chaudhary et al., 2020), and therefore, additional evaluation of risk related to potential consumption of clam tissue was not considered warranted. The exception was aluminium, lead, and manganese in the clam tissue which were identified at concentrations greater than the background shellfish samples. As indicated in the original response to IAAC-62, these three metals in clam tissue were not further evaluated in the HHERA as the concentrations of these metals in surface water and sediment associated with the BHETF (including the Estuary and adjacent Northumberland Strait area) are below applicable screening values and/or statistically similar to background conditions in the area (see statistical comparison provided in Section 5 for manganese in sediment).

Following completion of the HHERA and previous correspondence related to IAAC-62, reference concentrations of metals in softshell clams in the Northumberland Strait area were identified through correspondence with a graduate student from Dalhousie University (Ms. Megan Fraser, Master of Environmental Studies Candidate). In 2018, Ms. Fraser was involved with research related to metal concentrations of invertebrates in the Northumberland Strait. As part of this work, a total of 10 soft shell clams were collected from the Northumberland Strait in the vicinity of Pomquet (approximately 65 km east of the BHETF). The clams collected were composited and analysed for metals on an "as collected" basis (not depurated) consistent with the data used in the HHERA. Laboratory results obtained from the composited soft shell clam sample had concentrations of aluminium, lead and manganese of 197, 2.6 and 86 mg/kg, respectively (data publication in preparation and available upon request). A statistical comparison of this reference sample data to the site data could not be completed given the limited number of reference tissue samples (one composite sample). However, the concentrations of aluminium, lead and manganese in the reference sample are approximately equal to or less than the 95UCLM of the site clam tissue data for these same metals (109, 1.6 and 115 mg/kg, respectively). Although the 95UCLM for manganese was higher than the reference sample, 8 of the 10 clam samples collected from the site had a manganese concentration less than the reference sample. This reference soft shell clam data provides an additional line of evidence that concentrations of metals in the clam tissue collected from the Study Area are consistent with background concentrations of metals in shellfish in the Northumberland Strait, including aluminium, lead, and manganese.

As indicated by Stewart et al. (2019), metals are natural and ubiquitous in the marine environment of coastal and offshore waters reflecting principally the local geology and sediment composition. Contaminant metals reach the marine environment in freshwater runoff and atmospheric transport of particulate matter (e.g., dust) and are accumulated by organisms at various levels in the food chain. As there are a number of potential anthropogenic influences of metals in the coastal environment near Pictou Landing such as wastewater treatment outfall(s), long range transport of atmospheric pollutants, and industrial outfalls in the Pictou River (amongst others), the scope of the HHERA did not include additional evaluation of potential COPCs in biota, specifically clam tissue, that are not associated with the BHETF. Given the uncertainties associated with metal concentrations in clam tissue and the potential influence of undigested granular material within the gut of the clam (depurated versus undepurated samples) as well as limited background or reference data, it is recommended future monitoring of shellfish associated with the BHRP and evaluation of risk from consumption of country foods focus on American lobster, crab, and mussels.

Chaudhary, M., Walker, R., Willis, R., Oakes, K. 2020. Baseline characterization of sediments and marine biota near industrial effluent discharge in Northumberland Strait, Nova Scotia, Canada. Marine Pollution Bulletin 157 (2020) 111372. Panneerselvam, E.

Stewart, P., Kendall, V., Breeze, H. 2019. Marine Environmental Contaminants in the Scotian Shelf Bioregion: Scotian Shelf, Bay of Fundy and Adjacent Coastal and Offshore Waters – 1995 to Present. Canadian Technical Report of Fisheries and Aquatic Sciences 3291.

Engel, M., Kim, K., St. Jean, S., Gagne, F., Burnison, K. and Losier, R. 2006. Contaminant concentrations and biomarker activity in wild mussels near point sources of contaminants in the Lower Bay of Fundy. Environment Canada, EPS Surveillance Report, EPS-5-AR-06-03. August 2006. 46 p.

2.63 IAAC-63

Arsenic and cadmium were not detected in the fish and shellfish samples collected from the Study Area, and the detection limits from these samples were the same detection limits as the background samples; therefore, arsenic and cadmium are assumed to be equivalent to background. Arsenic and cadmium were also not detected in plants/berries, amphibians, game meat, and waterfowl collected from the Study Area. Therefore, it is reasonable to assume arsenic and cadmium are not present within country foods within the Study Area and do not require further assessment.

Lead was only detected in one of the 18 whole fish samples; however, the EPC (based on the 95 percent UCLM concentration) (0.51) is equivalent to the screening guideline (0.5 mg/kg). Furthermore, lead was not detected in the fillets of an edible-sized fish species (striped bass) known to be consumed by the PLFN community (see Section 6.1.1.9 and Table H-1.11 of the HHERA, Appendix A of the EIS). This information was provided in Section 6.1.1.8 of the HHERA (Appendix A of the EIS). In shellfish (clams) collected from Northumberland Strait, lead was detected at concentrations marginally greater than the human health guideline and background. Lead was not identified as COPC in sediment within the Study Area, lead is not associated with the historical activities of the BHETF, and lead is not considered bio-accumulative in sediment. As such, lead in shellfish tissue collected from the Northumberland Strait was not carried forward in the HHERA (Appendix A of the EIS). The concentrations of lead within the sediments collected from Northumberland Strait (2.7 to 3.7 mg/kg) are well below the range of background lead concentrations measured in sediments from the background locations (1.5 to 50 mg/kg). It is further noted that lead was not identified as a sediment COPC for Freshwater Wetlands or the Estuary. The concentrations of lead within plants/berries collected from the Freshwater Wetlands and Estuary were determined to be statistically similar to the concentrations in the background plants. Furthermore, lead was not detected in amphibians, game meat, and waterfowl collected from the Freshwater Wetlands and Estuary. This provides support that lead is not present at concentrations that would be a human health concern in sediments or country foods collected from the Freshwater Wetlands and Estuary and does not require further assessment.

Mercury was not detected in the whole fish samples or the shellfish (clams) samples. Mercury was also not detected in any of the shellfish samples (crab, lobster, and mussels) collected by Dalhousie University from the Northumberland Strait. Mercury was not identified as a sediment COPC for the Study Area. Mercury was also not detected in the plants/berries, amphibians, and game meat collected from the Study Area. Mercury was detected in only one of the eight waterfowl (duck) samples at a concentration (0.08 mg/kg) marginally above the detection limit (0.05 mg/kg). Given this detection, mercury was carried through the HHERA for quantitative assessment of consumption of waterfowl. As indicated in Table H-2-16 of Appendix H-2 of the HHERA (Appendix A of the EIS), the calculated hazard for exposure to mercury from consuming waterfowl (0.008) is well below HC's target HQ of 0.2 using very conservative assumptions. This provides support that mercury is not present at concentrations that would be a human health concern in sediments or country foods collected from the Freshwater Wetlands and Estuary and does not require further assessment.

D/F were analyzed in all country foods sampled from the Study Area, and was carried through the HHERA for further quantitative assessment if it was detected above human health screening guidelines and/or background levels. This information was discussed in Section 6.1.1 of the HHERA (Appendix A of the EIS). The concentrations of D/F measured in fish and shellfish were determined to be statistically similar to background levels and less than the human health guideline (see Tables H-1-10, H-1-11, and H-1-15 of the HHERA, Appendix A of the EIS). In addition, the concentrations of D/F were determined to be statistically similar to background levels in plants/berries and game meat (see Tables H-1-9 and H-1-12). As indicated in Section 6.1.1.13 of the HHERA (Appendix A of the EIS), D/F was identified as a COPC for sediment (Freshwater Wetlands and Estuary), game organs, and waterfowl, and therefore a quantitative assessment of human health risks were assessed for direct contact exposure in sediment and consumption of country foods (game organs and waterfowl). As indicated in Table H-2-16 of Appendix H-2 of the HHERA (Appendix A of the EIS), the calculated hazard for exposure to D/F from consuming game organs (0.2) and waterfowl (0.01) are equivalent to or less than HC's target HQ of 0.2 using very conservative assumptions. This provides support that D/F are not present at concentrations that would be a human health concern in country foods collected from the Study Area and does not require further assessment. Exposure to D/Fs in sediment exceed acceptable risk levels and the remediation program will address potential direct contact exposure.

2.64 IAAC-64

The risk calculations for all pathways involving consumption of country foods assumed 100 percent absorption (see Table 6.6 of the HHERA report, Appendix A of the EIS). The discussion of the alternative absorption factors in Section 6.4.3.6 of the HHERA (Appendix A of the EIS) provides support that assuming 100 percent absorption of the COPCs is an overly conservative approach given that the available absorption factors published in the literature indicate a lower absorption from oral exposure. These alternative absorption factors were simply used to provide some context and interpretation for the calculated risks.

2.65 IAAC-65

For those COPCs/exposure pathways requiring a quantitative assessment, the calculated risks were summed for direct contact and consumption of country foods (see Section 6.4.4 of the HHERA, Appendix A of the EIS) for COPCs having similar target tissues and mechanisms of action, consistent with HC's risk assessment guidance.

Mercury was not detected in the 18 whole fish samples collected from the Study Area (see Table H-1-10 of the HHERA, Appendix A of the EIS); and it was assumed that mercury would not be present in the fillets. Mercury was not analyzed in the shellfish (clams) collected from Northumberland Strait; mercury was not detected in the sediments from this location, and not likely to be present in the clams. Mercury was also not detected in any of the shellfish samples (crab, lobster, and mussels) collected by Dalhousie University from Northumberland Strait. Please refer to the responses to IRs IAAC-62 and IAAC-63 for further detailed information regarding mercury in country foods within the Study Area. Based on this information, mercury is not present at concentrations that would be a human health concern in sediments or country foods collected from the Freshwater Wetland and Estuary and does not require further assessment.

2.66 IAAC-66

The following description of the Hydrologic Evaluation of Landfill Performance (HELP) model, taken directly from Schroeder et al., (1994a), provides an overview of both the landfill design parameters and hydrologic processes that can be simulated by the model:

The HELP computer program is a quasi-two-dimensional hydrologic model of water movement across, into, through and out of landfills. The model accepts weather, soil and design data and uses solution techniques that account for the effects of surface storage, snowmelt, runoff, infiltration, evapotranspiration, vegetative growth, soil moisture storage, lateral subsurface drainage, leachate recirculation, unsaturated vertical drainage, and leakage through soil, geomembrane, or composite liners. Landfill systems including various combinations of vegetation, cover soils, waste cells, lateral drain layers, low permeability barrier soils, and synthetic geomembrane liners may be modeled. The program was developed to conduct water balance analyses of landfills, cover systems, and solid waste disposal and containment facilities. As such, the model facilitates rapid estimation of the amounts of runoff, evapotranspiration, drainage, leachate collection, and liner leakage that may be expected to result from the operation of a wide variety of landfill designs. The primary purpose of the model is to assist in the comparison of design alternatives as judged by their water balances. The model, applicable to open, partially closed, and fully closed sites, is a tool for both designers and permit writers.

For the input parameters for weather/climatic data and soil/design data, Site-specific data was used. HELP models were created using annual average precipitation of 1,247 millimeter (mm) based on historical average precipitation data from the Lyons Brook weather station available from Environment Canada. The Trenton Airport weather station was also used for the historical average relative humidity and wind speed. Lyons Brook is located approximately 10 km west of the site and Trenton Airport is located approximately 5.5 km southeast of the site.

The waste layer parameters with the highest effect on the HELP model results include porosity and field capacity. The default porosity was altered based on geotechnical results from Geotube® pilot testing that showed an average porosity of 0.73, which is higher than the 0.67 default MSW porosity. The field capacity would be expected to increase along with the increase in porosity. As an accurate field capacity could not be determined from the testing completed to date, the default MSW value of 0.292 was used to be conservative.

The purpose of the HELP model was to predict long term leachate quantities to manage, as well as to verify the expected leachate head on the liner to ensure no concerns with long term cell stability.

The HELP model also indicated minimal leachate generation following final cover placement and very low leakage. A long term monitoring program will be in place to sample for all Site leachate indicator parameters to ensure no negative environmental impacts.

The forecasted leachate quality was generated separately from the HELP model, and is based on results from Geotube® dewatering effluent testing and Geotube® SPLP results from Pilot Scale Testing, as this is considered to be most representative of the anticipated conservative field conditions.

2.67 IAAC-67

Evaluate the PLFN off-peninsula wellfield source capture zone

The purpose of evaluating the PLFN off-peninsula wellfield capture zone is to determine if the changes in groundwater conditions during construction of and after completion of the remedy will impact the PLFN off-peninsula wellfield.

<u>There is a distinct disconnect between the shallow groundwater (less than 10 m) that interacts with surface water and the deeper groundwater (25+ m) that supplies the PLFN off-peninsula wellfield.</u>

Shallow groundwater adjacent to BH currently discharges into BH. The surface water elevation in BH is controlled at the outlet structure. Once the outlet structure is removed the surface water elevation in BH will return to "natural" conditions and be connected to the Northumberland Strait. With the return to natural tidal fluctuations, the surface water elevation will be lower than when controlled by the outfall structure. It is possible lowering surface water elevation in BH will result in a slight reduction in the groundwater elevations immediately adjacent to BH, however, the relatively low hydraulic conductivity of the silty sand till (10-4 centimetre per second [cm\sec.]) will limit this effect to the immediate vicinity of BH. There is also a confining layer in the Bedrock which limits the vertical extent of impact of changes in surface water levels.

There are several methods to evaluate the extent of the PLFN off-peninsula wellfield capture zone including:

- Groundwater elevation measurements and groundwater elevations maps
- Pumping test(s)
- A one-dimensional equation
- A numerical groundwater flow model

The monitoring well network is not extensive enough to accurately map the extent of the PLFN off-peninsula wellfield capture zone and the limited number of measurements further limits its utility. Pumping tests have been completed at the PLFN off-peninsula wellfield. They were used to determine aquifer characteristics and information on hydraulic connections, but they were not designed to determine the capture zone extent. A one-dimensional equation can be used to estimate capture zone but the assumptions that underlie the equation do not generally apply to the fracture bedrock aquifers like the one at the PLFN off-peninsula wellfield and as such make it unreliable.

The best available tool to evaluate the PLFN off-peninsula wellfield capture zone is the numerical groundwater flow model developed by AMEC (2016). Capture zones were simulated for the active groundwater extraction wells (PW9 and PW10 total pumping rate = 168 cubic metres/day [m^3/day]). The capture zones were illustrated as up to 300 m wide and extending eastward from the well head toward the watershed boundary. The capture zones do not extend west of the PLFN well field and do not underlie BH.

GHD completed a review of the numerical groundwater flow model results and agree that the model predictions are compatible with the known hydrogeologic conditions and with the pumping test results. There is no known potential for the planned remedial activities to interfere with the quantity or quality of groundwater at the PLFN off peninsula well field. There is an existing long term monitoring program for water levels and water quality at the PLFN wellfield that would continue through the Project and be supplemented by Project specific groundwater and surface water monitoring in the area between BH and the PLFN Wellfield as part of the PEPP and EMP.

Describe model layer infiltration, vertical and horizontal conductivity, and flow

The principal hydrogeologic units beneath the Study Area are, in descending order:

– Overburden
– Shallow Bedrock
– Deep Bedrock

Infiltration typically refers to surface water percolating downward through the vadose zone to the water table. This occurs throughout the Study Area in the overburden, or in some cases where overburden is thin or absent, in the shallow bedrock.

The typical hydraulic conductivity of glacial till ranges from 10^{-10} to 10^{-4} centimetre per second (cm/sec). JWEL (1995) completed single well response tests in two shallow monitoring wells completed in till overburden and estimated the hydraulic conductivity as 10^{-4} cm/sec.

The hydraulic conductivity of fractured bedrock typically ranges from 10^{-6} to 10^{-2} cm/sec. Single well response tests results from monitoring wells completed in the shallow fractured bedrock indicate the hydraulic conductivity is in the lower end of the typical range, estimated at 10^{-5} to 10^{-4} cm/sec.

The hydraulic conductivity of sandstone in the deep bedrock, which supplies the groundwater for the PLFN well field, typically ranges from 10^{-6} to 10^{-2} cm/sec. Analysis of pumping test data collected at the PLFN well filed suggest the hydraulic conductivity of the deep bedrock sandstone is in the upper end of the typical range at 10^{-2} cm/sec.

AMEC constructed a 6-layer numeric groundwater flow model of the PLFN well field. The vertical and horizontal conductivity values they assigned to each model layer were as follows:

Table 2.15 Conductivity Values

Layer	Layer Description	Kxy (m/s)	Kz (m/s)
1	Overburden	8.0 E-6	8.0 E-7
2	Weathered Bedrock	2.0 E-5	2.0 E-6
3	Moderately Fractured Bedrock	2.0 E-6	2.0 E-7
4	Mildly Fractured Bedrock	4.0 E-7	4.0 E-8
5/6	Poorly Fractured Bedrock	8.0 E-8	8.0 E-9

Horizontal groundwater flow in the overburden and shallow bedrock is from the highlands around the study area towards BH. All the groundwater elevations in the overburden monitoring wells adjacent to BH are higher than the surface water elevation of BH, indicating that shallow groundwater discharges into BH. A component of this flow is directed downward into the deeper bedrock. Horizonal groundwater flow in the deep bedrock follows a similar pattern, except where it is intercepted by the PLFN well field pumping wells.

Describe the confining layer for the deeper groundwater zone

Deep Bedrock is present at depths greater than approximately 25 metres below ground surface (mbgs). The deep bedrock consists primarily of sandstone. There is a confining layer of finer grained rock near the top of the bedrock sequence that is described on the stratigraphic logs as either siltstone, mudstone, or shale. This is underlain by a sandstone dominated sequence with inter beds of shale and siltstone. Pumping wells PW9 and PW10 are completed in the sandstone beneath the bedrock confining layer.

There are no direct measurements of hydraulic conductivity of the finer grained bedrock layer. It has a lower hydraulic conductivity due to less primary porosity and the siltstone, mudstone or shale may be less brittle and susceptible to fracturing than the deeper sandstone.

Three of the bedrock monitoring wells (MW-4, MW-5 and MW-6) are completed in the mudstone/shale layer that overlays the deeper sandstone the pumping wells. They did not show distinct fluctuations in response to routine groundwater extraction or changes during the May 2018 pumping test that are evident in the deep (> 50 m) bedrock monitoring wells completed in the underlying sandstone. This indicates there is a disconnect from the deep groundwater encountered in wells that are deeper than 50 m and the shallower wells.

Describe the potential for the Project to lower groundwater levels; and update the effects assessment, as required

The only anticipated lowering of groundwater level is in the vicinity of any de-watering activities. Given the low hydraulic conductivity of the overburden and the shallow nature of any dewatering, any resultant drawdown of groundwater will be local, small in magnitude and temporary.

Describe the locations where the groundwater interacts with the surface water and any temperature changes in the surface water that may result. Update the effects assessment for surface and ground water quality and quantity and fish and fish habitat, if required.

Several natural springs exist in the highlands around the Study Area and they supply water to small shallow ephemeral streams. Given the distance from these springs to the remedy they will not be significantly impacted.

Groundwater adjacent to BH currently discharges into BH. With the return to natural tidal fluctuations following the remedy, the surface water elevation will be lower than current levels. Groundwater recharge will not be affected so in general groundwater elevations will remain within the current range of elevations. It is possible lowering surface water elevation in BH will result in a slight reduction in the groundwater elevations immediately adjacent BH, and the relatively low hydraulic conductivity of the overburden till (10^{-4} cm/s) will limit this effect to the immediate vicinity of BH.

Given these minimal changes in groundwater surface water interaction, significant surface water temperature changes will not occur.

2.68 IAAC-68

Provide details of the stakeholder input and discussions around the waste management options, including how the selected design requirements and evaluation criteria adequately accommodated stakeholder input.

Section 4 of the EIS details the public and agency participation and concerns raised during the EIS. Comments raised by the public and the responses by NSLI are provided in Table 4.4-1 and Table 4.4-2 of the EIS. Comments raised by the public relative to the containment cell are generally related to, impact to groundwater below Pictou Landing (Moodie Cove); movement of waste off-Site to other location in the Province; containment cell construction and water management.

To resolve these concerns, permitted facilities in the Province were reviewed by NSE for potential acceptance of the waste, it was concluded that no facilities within the Province of Nova Scotia are approved to accept the dioxin and furan impacted waste. (See Appendix I to this document for further details). NSLI provided technical information to address the remainder of the concerns.

Section 5 of the EIS details engagement with the Mi'kmaw of Nova Scotia and concerns raised during the EIS. Actions taken for Right Holder/Stakeholder input are summarized in Table 5.1-1 of the EIS. As noted in Table 5.1-1 concerns were raised about the waste management approach, specifically expansion and continued use of the containment cell on provincial lands adjacent to BH. Many PLFN community members expressed that they do not want waste to remain on-Site and continuing to use the containment cell falls short of returning A'se'k to its original pre-industrial state.

NSLI and GHD held six information sessions in 2018 on waste management, including the containment cell. In the initial Remedial Options Decision Document (RODD) presented to PLFN in 2018, and in a document responding to community questions following an open house in August 2019, NSLI presented the rationale for why the existing containment cell is the best option and the significant risks and potential delays posed by alternatives. NSLI has acted to secure ownership of several parcels of provincial lands which comprise most of the shoreline boundary of both the east and west sides of the Estuary outside the existing causeway and dam structure. This has been done to gain access to these lands and to conduct remediation activities on or adjacent to these lands. Once these lands are no longer required for remediation and have been remediated where necessary, it is the intention to transfer these lands to PLFN. These land transfers provide some accommodation to PLFN relative to any diminished use of lands used by PLFN due to the continued existence of the containment cell.

Some community members accept that the on-Site cell is the best option; many still insist it will be detrimental to the community to continue to use the existing cell. NSLI will continue to work with community on developing the future Site plan and other possible mitigations to offset the use of the containment cell that will remain post-remediation.

Provide the full list of initial waste management alternatives considered at the workshops and include details on why they were not carried forward to Step 1 of the alternatives analysis.

Alternatives for management of waste considered are provided in Table 2.16 below along with a summary of why they were not carried to Step 1.

Table 2.16 Initial Waste Management Alternatives

Approach	Components	Alternative Means	Carried to Step 1	Basis for not carrying forward
Use Existing Cell	Configuration	Existing footprint	YES	
		Expanded footprint	YES	
	Acceptable Materials	Wet sludge, dewatered sludge, demolition debris, contaminated soil, domestic waste, and industrial waste generated from remedial activities	YES	
Develop New Cell	Acceptable Materials	Wet sludge, dewatered sludge, demolition debris, contaminated soil, domestic waste, and industrial waste generated from remedial activities	YES	
	Location	Repurpose settling basins (as is)	YES	
		Other Location	YES	

Table 2.16 Initial Waste Management Alternatives

Approach	Components	Alternative Means	Carried to Step 1	Basis for not carrying forward
Use Existing and New Cell			YES	
Off-Site Disposal	Distance	Less than 175 km	YES	
		Greater than 175 km	NO	Not carried due to cost, social and environmental factors
	Disposal	Non-hazardous waste	YES	
		Hazardous waste	YES	
	Transport	On-site using trucks, barges, and pipelines	YES	
		Off-site using trucks	YES	
		Off-site using trains and barges	NO	Not carried due to access limitations
Thermal	Destruction	Temperature greater than 300 C	NO	Did not meet project criteria with respect to ease of regulatory approval within the Province of Nova Scotia
		Temperature less than 300ºC	NO	Did not meet project criteria and ability to reduce dioxins and furans to permit off-Site disposal at a facility in the Province of Nova Scotia
Soil Washing	Physical separation		NO	Not effective in treatment of fine-grained material based on laboratory testing and high energy output required for dewatering
Stabilization	Mixing and evaporation		NO	Encapsulates contaminants but does not destroy them. Mixing alone increased volume required to be disposed of
Do Nothing	Leave in place	Managed Site	NO	Did not meet project criteria of return to tidal and would not likely meet the desires of PLFN
		Cap in place	NO	Cap in place does not align with community input provided via PLFN Focus Groups held in 2015 (See Appendix J of this document). PLFN expressed during the Focus Groups that the community vision is a return of A'se'k to a tidal Estuary, therefore cap in place as an alternative means for waste management was not carried forward.

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.

Please refer to Section 4 of the Remedial Options Decision Document (RODD) provided as Reference Document 15 of the EIS.

2.69 IAAC-69

Response provided in Section 1, Table of Concordance (Table 1.1).

2.70 IAAC-70

The primary purpose of pilot scale testing was to validate the Feasible Concepts and Alternative Means that were developed as part of the RODD, as well as to refine design assumptions to carry forward into detailed design. For example, while sludge removal in the wet and sludge removal in the dry were both passing Alternative Means (AM), as discussed in the RODD (Reference Document 15) it was anticipated that removal in the wet would be the primary AM, with removal using mechanical excavation limited to shallow edges. Pilot scale testing validated this approach since removal using mechanical excavation was demonstrated to not be technically feasible beyond the shorelines. This was carried forward into the EIS assessment.

The Geotube® or equivalent technology dewatering provided a better understanding of the expected volume reduction for full-scale. Similarly, the HHERA results were able to provide a more accurate delineation of the areas of impact within the Estuary and wetland requiring active remediation.

After the development of the RODD, further review of regulations and discussions with regulators determined the classification of portions of sludge as hazardous (based on dioxins and furans). It was determined that there are no landfills within Nova Scotia permitted to accept the dioxin and furan impacted sediment. <u>The on-Site disposal option was selected since the off-site disposal option would require trucking the large volume of waste out of province or permitting a new landfill, which rendered it technically, environmentally, economically, socially, and regulatorily less feasible.</u> This was captured in the EIS assessment.

2.71 IAAC-71

Response provided in Section 1, Table of Concordance (Table 1.1).

2.72 IAAC-72

The Evaluation Criteria and Weighting Matrix (EC&WM) was developed through a Workshop approach held on September 20, 2017. The workshop participants included NSLI, Nova Scotia Transportation, and Infrastructure Renewal and GHD representatives. The objectives of the Workshop were to identify and define the EC, which may include both qualitative and quantitative components for the various design requirements (DR) and to gain consensus on the WM, which was then used to confirm established project priorities during the evaluation of Feasible Concepts.

The Workshop included:

– Assigning weighting to the five Indicator Categories | Regulatory, Technical, Environmental, Social, and Economic.
– Determination of Pre-screening requirements to confirm if the feasible concept meet the mandatory Functional Requirements identified in the DR | Public Acceptability, Return to Tidal, Intended End Use, Approvability, Landowner Requirements.
– Determination of the sub-category questions and scoring criteria.
– Sensitivity analysis.

The results of the workshop are presented in the RODD (EIS Reference Document 15).

The scoring for the Economic Indicators considered two components capital cost and long-term operation and maintenance costs both weighted equally. When reviewing the waste management Feasible Concept the Economic Indicators for both on-Site and off-Site disposal, it was determined that both were the same when considering capital and operation and maintenance costs as detailed in Appendix H of the RODD. If capital costs only were considered as an Economic Indicator, on-Site disposal would have been more favourable.

Typical for preliminary design costing, the costing was completed a as a Class D cost estimate with an accuracy range of -20 to Plus 50 percent.

2.73 IAAC-73

While there is some uncertainty with both the estimated waste volume and achievable volume reduction, the design has been based on the available data with appropriate conservative measures applied.

The volume of sludge within BH (largest source of waste) has been refined/detailed through a sludge mapping program completed by WSP. To avoid excessive over-dredging of sludge and uncertainty in volumes, the 95 percent remediation design for dredging has been framed that provides disincentives for the contractor to dredge beyond the allowable tolerances and exceed the containment cell capacity. During remediation sludge removal activities will be closely monitored through detailed data collection (i.e., continuous real time horizontal and vertical position tracking, regular visual samples during dredging, bathymetric surveys, confirmatory sampling) to minimize the potential for over-dredging/excavating.

The waste volumes assumed 0.15 m of underlying clean sediment would be removed across the entire site, which is a conservative assumption, considering this is greater than the allowable dredging tolerances in the 95 percent remedial design as noted above.

Although the sludge volume reduction through Geotube® dewatering observed during pilot scale testing was lower than previously expected (during the RODD stage), this was taken into account and the estimated reduction carried forward for disposal volume estimates was based on pilot scale testing. While the surveyed Geotube® volume decrease four months after pilot scale testing was 30 percent, this included both the first and second layers of Geotube®. The first Geotube® layer is not considered representative of full-scale remediation conditions since dredging accuracy was poor and the material was primarily underlying sediment, not sludge. When looking at the breakdown, the second layer volume reduction was approximately 50 percent. This value was carried forward as the anticipated volume reduction, which is believed to be reasonable considering the full-scale remediation dredging will be more efficient and optimized and will be carried out by a highly qualified dredger with appropriate equipment. The stacking of Geotube® or its equivalent will further increase volume reduction. While the sludge was assumed to reduce by 50 percent, the sediment volume was not assumed to consolidate.

There is no concern with regards to the non-dredged "loose" sludge blinding of the Geotube® or its equivalent as most of the dewatering occurs immediately. The proposed sequencing is such that the loose material would be placed last, and as the bulk of the dewatering would already be complete.

The total estimated disposal volume, including contaminated soil, is 922,400 m^3, based on the 95 percent detailed design. The 3:1 containment cell side slope scenario provides for 15 percent contingency capacity above the anticipated volume. If the cell were to reach capacity, the excess contaminated soil, deemed non-hazardous, would be disposed off-site. The remedial sequencing is planned to remove all material that may be potentially hazardous prior to the removal of non-hazardous contaminated soil.

2.74 IAAC-74

The staging plan for Geotube® or its equivalent dewatering takes place over multiple seasons. The dredging season as laid out in the conceptual schedule assumes seven working months per year, with 20 active days per month. It is anticipated that a well-run program will be capable of exceeding the "up" time assumptions, so the dredging work can likely be completed faster than planned. The conceptual fill plan typically allows a full season for a Geotube® or equivalent technology to be in place before a subsequent layer is placed on top. The productivity rates are based on pilot-scale results, which would be considered conservative since the full-scale operation will have better flexibility with respect to active number of Geotube®, or its equivalent.

2.75 IAAC-75

The material that is described as being end-dumped in Section 3.2.2.1 of the EIS is anticipated to be material that is mechanically excavated from the influent ditches, berms, causeway, or the temporary treatment pad. This material will be in a solid form and or permitted to dry out prior to placement in the containment cell. At no point is it anticipated that any material that is not dewatered (dredgeate or slurried material) would be directly placed in the containment cell without prior dewatering or drying. Once dried, the material (particularly the causeway and berm material) is anticipated to be reasonable quality to permit compaction.

2.76 IAAC-76

A global slope stability analysis has been prepared as part of the 95 percent detailed design by Hassan Gilani, P. Eng., dated June 23, 2020, and is included as Appendix C of the Draft Design Basis Report for the BH Containment Cell. The Design Basis Report will be finalized as part of the 100 percent complete design and will be submitted in support of the Industrial Approval Application.

The global slope stability analysis concluded that the Geotube® stacks with side slopes of either 4H:1V or 3H:1V are stable provided the leachate level managed/maintained below 16 metres above sea level (mASL), which is well within design criteria.

The designed system has a relatively small settlement magnitude due to the self-consolidation of the 12 layer high Geotube® stack. The estimation of these settlements/distortions due to Geotube® consolidation was undertaken through consultation with TenCate™, who has indicated that the consolidation settlement will be complete in approximately 3 years. The construction schedule allows for a consolidation period between final placement of dredged material and placement of permanent cover system.

The geomembrane being used for the final cover system (linear low density polyethylene [LLDPE]) is typically used for landfill covers due to its flexible material properties. The waste within the BH CC (i.e., sludge within Geotube®) is expected to experience less settlement than typical municipal solid waste due to the early rapid dewatering/reduction, as well as the lack of organic matter within the waste.

Following final cover placement, the long-term care plan for the containment cell will include regular inspections that will include observation of the final cover system; if any damage to the liner system were observed, this could be repaired with a patch as needed.

2.77 IAAC-77

The parameters listed on page 3-41 of the EIS includes all contaminants that have shown elevated concentrations amongst the historical site and recent leachate/effluent data; and these parameters are considered for site monitoring during and post remediation and in the design of the containment cell.

As a conservative measure when designing the CC liner system, the worst-case results from bench/pilot scale testing were evaluated against the NSE Tier 2 Table 3 Groundwater Discharge to Surface Water (Greater than 10 m from Surface Water Body, Marine). Through this comparison, only lead, zinc, and TPH (Lube) exceeded the groundwater criteria. The presence of TPH (Lube) was attributed to the highly adsorptive TPH fractions that are not considered to mobilize into liquid phase long term.

The forecasted leachate quality was projected based on the pilot scale testing results and reflects the maximum concentrations from Geotube® dewatering effluent grab samples, Geotube® dewatering effluent composite samples, and dewatered sludge SPLP. Bench scale testing results were not used in the forecasted leachate quality as some of the methods and additives used in bench scale testing were not selected for pilot scale testing nor full scale remediation. The forecasted leachate quality is presented in Table 2.1 for IAAC-13, meets NSE groundwater criteria with the exception of TPH (Lube) and will be included in the supporting documentation for the IA application.

The HELP model indicated minimal leachate generation following final cover placement (i.e., 1.45 cubic metre/year [m^3/year]). The costing for operation and maintenance for leachate management in the RODD leachate generation was considered to be 2,500 m^3, which is significantly conservative. A long-term monitoring program will be in place to sample for all Site leachate indicator parameters to ensure no negative environmental impacts.

To build contingency and redundancy, the collection system materials are selected to be robust and chemically resistant, and the collection system is designed as a batch-operated system that only draws collected leachate from the base of the cell for a small fraction of the day. Inherently this design has an excellent capability to increase flow capacity well beyond even the peak anticipated rates by increasing the frequency of the batching.

The proposed temporary leachate treatment system is modular with the ability to add identical trains in parallel to manage anticipated changes in flow or concentration. The design has included space and infrastructure for expansion or adjustment to accommodate variation from the predicted influent conditions.

The leachate treatment system design has multiple unit-processes in series (chemically assisted flocculation and settling steps, followed by clarification and then tertiary filtration as indicated on Drawing CC-P-03a) to treat a wide range of concentrations in the collected leachate. The tertiary filtration step utilizes a multi-media filter, followed by an organo-clay media, followed finally by a granular carbon adsorption filter. The size and configuration of any individual tertiary treatment step (media tank or filter) can also be adjusted to increase residence time or reduce flow per unit area as required to address changes in concentrations of specific constituents.

2.78 IAAC-78

Response provided in Section 1, Table of Concordance (Table 1.1).

2.79 IAAC-79

The NSE EQS were used in the HHERA to screen COPCs in soil, groundwater, sediment, and surface water. The EQS provide values for various parameters in environmental media based on specific land uses as well as exposure scenarios for human health and ecological receptors. As such, these NSE EQS values were used in the screening evaluation to determine which COPCs could be eliminated from the risk assessment and which parameters required further evaluation with respect to potential risk to human health or ecological receptors. For parameters that do not have a NSE EQS or for COPCs in biological tissue, then screening guidelines from other jurisdictions were applied using a hierarchy in the following order of preference:

1. Canadian Federal guidelines from the CCME, HC or CFIA.
2. Guidelines from other provincial agencies such as Alberta, Ontario or British Columbia Ministries of the Environment and Atlantic Risk Based Corrective Action (Atlantic RBCA) guidance.
3. Guidelines from the USEPA or similar United States Agency.

The specific approach to the selection of the screening guidelines for each analysed parameter in the various environmental media was as follows:

1. Review NSE EQS to determine if a screening value was available.
2. Select the NSE EQS as the screening guideline specific to applicable land use (e.g., recreational, or residential) and exposure scenario (human health or ecological).
3. If a NSE EQS value was not available, then CCME, Health Canada, or CFIA reference documents/databases were reviewed to determine if these source documents have available screening guidelines.
4. Select the CCME, HC, or CFIA guideline as the screening guideline if available for applicable land use and/or receptors.

5. If a screening guideline from Canadian Federal Agencies was not available, then guidance documents from other Provincial jurisdictions (Alberta, Ontario, British Columbia, and Atlantic RBCA) were reviewed to determine if these source documents have applicable guidelines.
6. Select the Alberta, Ontario, British Columbia or Atlantic RBCA guideline if available for applicable land use and/or receptors.
7. If a guideline from other Provincial jurisdictions was not available, then various USEPA source documents were reviewed to determine if international agencies have screening values that could be applied at the site in the absence of Canadian guidelines.
8. A USEPA guideline was adopted in the absence of an applicable Canadian guidelines.
9. If a guideline from any of the above noted Canadian or USEPA sources was not available, then alternative source documents were reviewed on a case-by-case basis, or it was determined that no guideline was available for that specific parameter.

The above noted approach was applied for each COPC within each environmental medium as outlined in Section 3 of the HHERA (Appendix A of the EIS). In addition, the specific screening values used to evaluate COPCs in specific media with respect to human health are detailed in Section 6.1 and associated screening tables of Appendix H in the HHERA report (Appendix A of the EIS). Similarly, the specific screening values used to evaluate COPCs in specific media with respect to ecological receptors are detailed in Section 7.2 and associated screening tables in Appendix I of the HHERA report (Appendix A of the EIS).

With respect to the text in Section 4.4.2.4 of the HHERA, this text was included to provide some context pertaining to exceedances of the sediment screening guidelines. In particular, available sediment screening values are based on potential adverse effects to benthic invertebrates but do not consider potential effects (or lack of effects) to other flora or fauna potentially exposed to sediment. The objective of the screening stage of the HHERA is to eliminate COPCs that are unlikely to pose a risk to human health or ecological receptors and focus the evaluation on COPCs that have the potential to pose a higher level of risks. The screening guidelines developed by various jurisdictions are generally developed using very conservative assumptions. Therefore, there is high confidence that COPCs present at concentrations below these screening guidelines do not result in unacceptable health risks and therefore can be excluded from further assessment in the HHERA. Those chemicals with concentrations exceeding the screening guidelines do not necessarily indicate that there are unacceptable health risks, rather, these chemicals require further assessment using exposure assumptions that are specific to the site conditions being evaluated and this approach was taken as part of the HHERA.

2.80 IAAC-80

Response provided in Section 1, Table of Concordance (Table 1.1).

2.81 IAAC-81

Response provided in Section 1, Table of Concordance (Table 1.1).

Tables

Table 1

Estimated Daily Intakes for Human Health
(Non-carcinogenic Substances)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Total EDI = $EDI_{soil} + EDI_{air} + EDI_{water} + EDI_{food} + EDI_{cigarettes} + EDI_{vitamins}$

$EDI_{soil} = \frac{BSC \times SIR}{BW}$ $EDI_{air} = \frac{BAC \times INR}{BW}$ $EDI_{water} = \frac{BWC \times WIR}{BW}$

$EDI_{cigarette\ smoke} = \frac{BCS \times CSR}{BW}$ $EDI_{vitamins} = \frac{BVIT}{BW}$

Parameter	**Parameter**	**Value**	**Units**	**EDI_{soil}**	**EDI_{air}**	**EDI_{water}**	**EDI_{food} (1)**	**$EDI_{cigarette\ smoke}$**	**$EDI_{vitamins}$**	**Total EDI**
VANADIUM										
Resident - Toddler										
Estimated Daily Intake	EDI_{soil}	calculated	µg/kg-day	0.21	0.030	0.073	0.62	0.80	0.55	2.3
Exposure Frequency	EF	365	days/year				(1-4 yrs old)			
Background Soil Concentration (2)	BSC	42.4	µg/g							
Background Air (Outdoor/Indoor) Concentration (3)	BAC	0.0595	µg/m^3							
Background Water Concentration (4)	BWC	2	µg/L							
Background Cigarette Smoke Concentration (5)	BCS	0.33	µg/cigarette							
Daily Vitamins Consumed (6)	BVIT	9	µg/day							
Soil Ingestion Rate (7)	SIR	0.08	g/day							
Inhalation Rate (7)	INR	8.3	m^3/day							
Water Ingestion Rate (7)	WIR	0.6	L/day							
Cigarette Smoking Rate (8)	CSR	40	cigarettes/day							
Body Weight (7)	BW	16.5	kg							

Notes:

(1) As presented in Appendix D of DFO Surface Soil Criteria (SSC) Report prepared by AMEC Foster Wheeler Environment & Infrastructure (March 2015).
Calculated as a weighted avg. of highest intakes (male) within each age group - Canadian Total Diet Study (Health Canada, 1999).
The EDI_{food} (0.62 µg/kg-day) is higher than the range (0.26 - 0.41 µg/kg-day) presented in Environment Canada and Health Canada (2010) for 0.5 to 4 year olds.
The EDI_{food} (0.62 µg/kg-day) is higher than the value (6.5 µg/day divided by body weight of 16.5 kg = 0.39 µg/kg-day) presented in ATSDR's Toxicological Profile for Vanadium (ATSDR, 2012) for 2 year olds.

(2) PWGSC, Review of Environment Canada's Background Soil Database (2004-2009) Report, Table 10: Summary Statistics Highlands Zone, March 2011.

(3) Maximum vanadium concentration of 59.5 ng/m3 in ambient air PM2.5 fraction, as presented in Environment Canada and Health Canada (2010).
The study consisted of eight samples across Canada, and the maximum value was detected in Montreal, Quebec

(4) Concentrations measured in the well network used to supply potable water to the PLFN community.
Vanadium was not detected in the most recent sampling conducted from the potable water well network, and therefore a detection limit of 2 µg/L was assumed.

(5) Concentration of vanadium measured in cigarette smoke, as presented in ATSDR's Toxicological Profile for Vanadium (ATSDR, 2012).

(6) Intake of vanadium through consuming vitamins and supplements obtained from ATSDR's Toxicological Profile for Vanadium (ATSDR, 2012).

(7) Obtained from Health Canada (2021) - toddler.

(8) Assumes resident smokes 2 packs per day, with each pack containing 20 cigarettes. Toddler would be exposed to second hand smoke.

Sources:

Environment Canada and Health Canada, 2010. Screening Assessment for the Challenge, Vanadium Oxide (Vanadium Pentoxide), September 2010.
Agency for Toxic Substances and Disease Registry (ATSDR), 2012. Toxicological Profile for Vanadium, September 2012.
Public Works and Government Services Canada (PWGSC), 2011. Review of Environment Canada's Background Soil Database (2004-2009), Version No. 1, March 2011.
Health Canada, 2021. Federal Contaminated Site Risk Assessment in Canada. Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0. March 2021.
Amec Foster Wheeler Environment & Infrastructure (AFWEI), 2015. Surface Soil Criteria, Volume 2, Fisheries and Oceans Canada Maritimes and Gulf Region, dated March 23, 2015.

Table 2

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Toddler (Sandy Beach Scenario)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia
Receptor: Pictou Landing First Nations Resident/Recreational User - Toddler
Exposure Scenario: Sandy Beach
Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	THQ	BSC	RAF_{oral}	RAF_{lung}	RAF_{derm}	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	1.6E+02	160
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	7.5E-05	75

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
THQ =	target hazard quotient (unitless)	chemical specific	Health Canada (2021a); CCME (2006)
BW =	body weight (kg)	16.5	Health Canada (2021a) - Toddler
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF_{oral} =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF_{lung} =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF_{derm} =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	72	Health Canada (2017; 2021a)
SA_{hands} =	surface area of hands (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SA_{arms} =	surface area of lower arms (cm^2)	890	Health Canada (2017; 2021a) - Toddler
SA_{legs} =	surface area of lower legs (cm^2)	1690	Health Canada (2017; 2021a) - Toddler
SA_{feet} =	surface area of feet (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SL_{hands} =	sediment loading rate to exposed skin of hands (kg/cm^2-event)	0.49	Health Canada (2017)
SL_{arms} =	sediment loading rate to exposed skin of lower arms (kg/cm^2-event)	0.17	Health Canada (2017)
SL_{legs} =	sediment loading rate to exposed skin of lower legs (kg/cm^2-event)	0.70	Health Canada (2017)
SL_{feet} =	sediment loading rate to exposed skin of feet (kg/cm^2-event)	21	Health Canada (2017)
D1 =	hours per day	8	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
$D3_{SUB-CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times THQ \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3) + ((SA_{hands} \times SL_{hands}) + (SA_{arms} \times SL_{arms}) + (SA_{legs} \times SL_{legs}) + (SA_{feet} \times SL_{feet})) \times RAF_{derm} \times D2 \times D3} + BSC$$

Table 3

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Toddler (Intertidal Mudflats Scenario)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia
Receptor: Pictou Landing First Nations Resident/Recreational User - Toddler
Exposure Scenario: Intertidal Mudflats
Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	THQ	BSC	RAF_{oral}	RAF_{lung}	RAF_{derm}	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	7.0E+01	70
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	2.9E-05	29

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
THQ =	target hazard quotient (unitless)	chemical specific	Health Canada (2021a); CCME (2006)
BW =	body weight (kg)	16.5	Health Canada (2021a) - Toddler
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF_{oral} =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF_{lung} =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF_{derm} =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	72	Health Canada (2017; 2021a)
SA_{hands} =	surface area of hands (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SA_{arms} =	surface area of lower arms (cm^2)	450	Health Canada (2017; 2021a) - Toddler
SA_{legs} =	surface area of lower legs (cm^2)	845	Health Canada (2017; 2021a) - Toddler
SA_{feet} =	surface area of feet (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SL_{hands} =	sediment loading rate to exposed skin of hands (kg/cm^2-event)	58	Health Canada (2017)
SL_{arms} =	sediment loading rate to exposed skin of lower arms (kg/cm^2-event)	11	Health Canada (2017)
SL_{legs} =	sediment loading rate to exposed skin of lower legs (kg/cm^2-event)	36	Health Canada (2017)
SL_{feet} =	sediment loading rate to exposed skin of feet (kg/cm^2-event)	24	Health Canada (2017)
D1 =	hours per day	4	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
$D3_{SUB-CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times THQ \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3) + (((SA_{hands} \times SL_{hands}) + (SA_{arms} \times SL_{arms}) + (SA_{legs} \times SL_{legs}) + (SA_{feet} \times SL_{feet})) \times RAF_{derm} \times D2 \times D3)} + BSC$$

Table 4

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Child (Reed Gathering Scenario)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia
Receptor: Pictou Landing First Nations Resident/Recreational User - Child
Exposure Scenario: Reed Gathering
Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	THQ	BSC	RAF_{oral}	RAF_{lung}	RAF_{derm}	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	1.0E+03	999
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	5.0E-04	505

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
THQ =	target hazard quotient (unitless)	chemical specific	Health Canada (2021a); CCME (2006)
BW =	body weight (kg)	32.9	Health Canada (2021a) - Child
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF_{oral} =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF_{lung} =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF_{derm} =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	57	Health Canada (2017; 2021a)
SA_{hands} =	surface area of hands (cm^2)	590	Health Canada (2017; 2021a) - Child
SA_{arms} =	surface area of lower arms (cm^2)	740	Health Canada (2017; 2021a) - Child
SA_{legs} =	surface area of lower legs (cm^2)	1535	Health Canada (2017; 2021a) - Child
SA_{feet} =	surface area of feet (cm^2)	720	Health Canada (2017; 2021a) - Child
SL_{hands} =	sediment loading rate to exposed skin of hands (kg/cm^2-event)	0.66	Health Canada (2017)
SL_{arms} =	sediment loading rate to exposed skin of lower arms (kg/cm^2-event)	0.036	Health Canada (2017)
SL_{legs} =	sediment loading rate to exposed skin of lower legs (kg/cm^2-event)	0.16	Health Canada (2017)
SL_{feet} =	sediment loading rate to exposed skin of feet (kg/cm^2-event)	0.63	Health Canada (2017)
D1 =	hours per day	4	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
$D3_{SUB-CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times THQ \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3) + (((SA_{hands} \times SL_{hands}) + (SA_{arms} \times SL_{arms}) + (SA_{legs} \times SL_{legs}) + (SA_{feet} \times SL_{feet})) \times RAF_{derm} \times D2 \times D3)} + BSC$$

Table 5

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Toddler (In-Water Activities Scenario)
Boat Harbou Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia

Receptor: Pictou Landing First Nations Resident/Recreational User - Toddler

Exposure Scenario: In-Water Activities

Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	THQ	BSC	RAF_{oral}	RAF_{lung}	RAF_{derm}	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	2.1E+03	2080
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	1.1E-03	1073

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
THQ =	target hazard quotient (unitless)	chemical specific	Health Canada (2021); CCME (2006)
BW =	body weight (kg)	16.5	Health Canada (2021a) - Toddler
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF_{oral} =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF_{lung} =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF_{derm} =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	7.7	Health Canada (2017; 2021a)
D1 =	hours per day	8	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
$D3_{SUB-CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times THQ \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3)} + BSC$$

Table 6

Summary of Calculated Hazard Quotients for Freshwater Wetland
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Parameter	Site Intake Levels (mg/kg-day)		
	Ingestion/Dermal Contact with Sediment	Consumption of Game Organs	Consumption of Waterfowl
Sandy Beach Scenario			
Vanadium	2.30E-03	1.60E-03	7.52E-05
Dioxins/Furans TEQ	1.93E-08	4.80E-10	2.44E-11
Intertidal Mudflats Scenario			
Vanadium	5.74E-03	1.60E-03	7.52E-05
Dioxins/Furans TEQ	5.20E-08	4.80E-10	2.44E-11
Reed Gathering Scenario			
Vanadium	3.48E-04	1.60E-03	7.52E-05
Dioxins/Furans TEQ	2.83E-09	4.80E-10	2.44E-11
In-Water Activities Scenario			
Vanadium	1.66E-04	1.60E-03	7.52E-05
Dioxins/Furans TEQ	1.33E-09	4.80E-10	2.44E-11

Table 6

Summary of Calculated Hazard Quotients for Freshwater Wetland
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Parameter	Background Exposure (EDI) mg/kg-day	Total Exposure (Site + Background) (mg/kg-day)	Sub-Chronic TRV (mg/kg-day)	Hazard Quotient	Comments	Primary Contributing Pathway
Sandy Beach Scenario						
Vanadium	2.27E-03	6.25E-03	1.00E-02	0.62	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	1.98E-08	2.00E-08	0.99	**HQ>0.2**	Direct Contact with Sediment (97%)
Intertidal Mudflats Scenario						
Vanadium	2.27E-03	9.69E-03	1.00E-02	0.97	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	5.25E-08	2.00E-08	2.6	**HQ>0.2**	Direct Contact with Sediment (99%)
Reed Gathering Scenario						
Vanadium	2.27E-03	4.30E-03	1.00E-02	0.43	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	3.34E-09	2.00E-08	0.17	HQ<0.2	Not Applicable
In-Water Activities Scenario						
Vanadium	2.27E-03	4.12E-03	1.00E-02	0.41	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	1.84E-09	2.00E-08	0.092	HQ<0.2	Not Applicable

Table 7

Summary of Calculated Hazard Quotients for the Estuary
(Including BHSL and Associated Basins)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Parameter	Site Intake Levels (mg/kg-day)		
	Ingestion/Dermal Contact with Sediment	Consumption of Game Organs	Consumption of Waterfowl
Sandy Beach Scenario			
Vanadium	2.57E-03	1.60E-03	7.52E-05
Dioxins/Furans TEQ	1.09E-08	4.80E-10	2.44E-11
Intertidal Mudflats Scenario			
Vanadium	6.41E-03	1.60E-03	7.52E-05
Dioxins/Furans TEQ	2.95E-08	4.80E-10	2.44E-11
Reed Gathering Scenario			
Vanadium	3.89E-04	1.60E-03	7.52E-05
Dioxins/Furans TEQ	1.61E-09	4.80E-10	2.44E-11
In-Water Activities Scenario			
Vanadium	1.86E-04	1.60E-03	7.52E-05
Dioxins/Furans TEQ	7.55E-10	4.80E-10	2.44E-11

Table 7

Summary of Calculated Hazard Quotients for the Estuary
(Including BHSL and Associated Basins)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Parameter	Background Exposure (EDI) mg/kg-day	Total Exposure (Site + Background) (mg/kg-day)	Sub-Chronic TRV (mg/kg-day)	Hazard Quotient	Comments	Primary Contributing Pathway
Sandy Beach Scenario						
Vanadium	2.27E-03	6.52E-03	1.00E-02	0.65	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	1.14E-08	2.00E-08	0.57	**HQ>0.2**	Direct Contact with Sediment (96%)
Intertidal Mudflats Scenario						
Vanadium	2.27E-03	1.04E-02	1.00E-02	1.0	HQ=1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	3.00E-08	2.00E-08	1.5	**HQ>0.2**	Direct Contact with Sediment (98%)
Reed Gathering Scenario						
Vanadium	2.27E-03	4.34E-03	1.00E-02	0.43	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	2.11E-09	2.00E-08	0.11	HQ<0.2	Not Applicable
In-Water Activities Scenario						
Vanadium	2.27E-03	4.13E-03	1.00E-02	0.41	HQ<1	Not Applicable
Dioxins/Furans TEQ	Not Applicable	1.26E-09	2.00E-08	0.063	HQ<0.2	Not Applicable

Table 8

Baseline Noise Monitoring Summary
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Date	Time	Leq (dBA) (2), (3) Station 1	Station 2	Station 3	Station 4	Station 5	Wind Spd (km/h) (1)	Temperature (°C)	Weather
2017-11-22	13:00:00	45	52	33	36	48	11	13.8	
2017-11-22	14:00:00	40	52	31	35	47	9	14.2	
2017-11-22	15:00:00	46	50	33	36	46	1	14.1	
2017-11-22	16:00:00	44	53	36	40	46	15	8.8	Wind Speed >= 14 km/hr
2017-11-22	17:00:00	44	52	36	42	45	16	9.9	Wind Speed >= 14 km/hr
2017-11-22	18:00:00	45	51	37	40	43	18	10.8	Wind Speed >= 14 km/hr
2017-11-22	19:00:00	44	51	36	39	44	28	11.5	Wind Speed >= 14 km/hr
2017-11-22	20:00:00	44	52	39	44	46	32	11.6	Wind Speed >= 14 km/hr
2017-11-22	21:00:00	45	52	46	54	47	32	12.5	Wind Speed >= 14 km/hr
2017-11-22	22:00:00	44	52	43	49	44	26	12	Wind Speed >= 14 km/hr
2017-11-22	23:00:00	46	52	46	51	48	24	11.7	Wind Speed >= 14 km/hr
2017-11-23	00:00:00	51	56	51	56	52	33	12	Wind Speed >= 14 km/hr
2017-11-23	01:00:00	53	59	55	60	56	36	12.3	Wind Speed >= 14 km/hr
2017-11-23	02:00:00	51	53	52	56	51	48	12.5	Wind Speed >= 14 km/hr
2017-11-23	03:00:00	49	54	49	53	49	36	10	Wind Speed >= 14 km/hr
2017-11-23	04:00:00	54	60	52	57	54	29	12.8	Wind Speed >= 14 km/hr
2017-11-23	05:00:00	60	63	59	60	56	37	6.8	Wind Speed >= 14 km/hr
2017-11-23	06:00:00	62	66	59	61	57	85	5.5	Wind Speed >= 14 km/hr
2017-11-23	07:00:00	58	62	55	56	53	61	2.5	Wind Speed >= 14 km/hr
2017-11-23	08:00:00	53	56	52	52	51	61	2.8	Wind Speed >= 14 km/hr
2017-11-23	09:00:00	51	56	52	50	49	63	3.7	Wind Speed >= 14 km/hr
2017-11-23	10:00:00	49	55	48	46	47	61	3.5	Wind Speed >= 14 km/hr
2017-11-23	11:00:00	48	53	45	43	45	37	2.8	Wind Speed >= 14 km/hr
2017-11-23	12:00:00	47	53	44	43	45	39	3.6	Wind Speed >= 14 km/hr
2017-11-23	13:00:00	45	53	41	38	43	42	3.9	Wind Speed >= 14 km/hr
2017-11-23	14:00:00	46	52	39	38	44	43	3.8	Wind Speed >= 14 km/hr
2017-11-23	15:00:00	39	52	38	38	45	39	3.7	Wind Speed >= 14 km/hr
2017-11-23	16:00:00	39	53	36	35	44	42	3.3	Wind Speed >= 14 km/hr
2017-11-23	17:00:00	41	54	36	36	45	38	3	Wind Speed >= 14 km/hr
2017-11-23	18:00:00	39	53	37	36	43	26	2.1	Wind Speed >= 14 km/hr
2017-11-23	19:00:00	38	54	38	36	42	18	0.6	Wind Speed >= 14 km/hr
2017-11-23	20:00:00	38	53	37	35	42	18	-0.1	Wind Speed >= 14 km/hr
2017-11-23	21:00:00	37	53	35	33	42	19	-0.5	Wind Speed >= 14 km/hr
2017-11-23	22:00:00	36	52	35	34	41	18	-0.8	Wind Speed >= 14 km/hr
2017-11-23	23:00:00	37	52	34	33	39	15	-1.6	Wind Speed >= 14 km/hr
2017-11-24	00:00:00	37	53	33	33	34	15	-2.1	Wind Speed >= 14 km/hr
2017-11-24	01:00:00	35	51	28	32	33	15	-1.9	Wind Speed >= 14 km/hr
2017-11-24	02:00:00	36	49	25	32	34	13	-2.1	
2017-11-24	03:00:00	36	50	29	33	33	11	-2.2	
2017-11-24	04:00:00	36	51	31	33	33	15	-2	Wind Speed >= 14 km/hr
2017-11-28	13:00:00	51	51	53	34	42	27	-1.3	Wind Speed >= 14 km/hr
2017-11-28	14:00:00	48	51	38	35	44	25	-1.1	Wind Speed >= 14 km/hr
2017-11-28	15:00:00	39	51	35	34	43	23	-1.2	Wind Speed >= 14 km/hr
2017-11-28	16:00:00	38	51	32	33	45	17	-2.2	Wind Speed >= 14 km/hr
2017-11-28	17:00:00	37	51	35	32	44	12	-2.7	
2017-11-28	18:00:00	39	52	29	30	44	8	-3.3	
2017-11-28	19:00:00	40	49	29	33	43	6	-3.3	
2017-11-28	20:00:00	39	48	30	34	44	14	-3	Wind Speed >= 14 km/hr
2017-11-28	21:00:00	41	48	36	35	39	14	-3.1	Wind Speed >= 14 km/hr
2017-11-28	22:00:00	42	48	36	35	42	17	-3	Wind Speed >= 14 km/hr
2017-11-28	23:00:00	42	49	38	40	41	17	-2.7	Wind Speed >= 14 km/hr
2017-11-29	00:00:00	43	51	38	43	45	16	-2.1	Wind Speed >= 14 km/hr
2017-11-29	01:00:00	44	53	40	45	46	13	-0.7	
2017-11-29	02:00:00	44	51	37	41	43	13	0.5	
2017-11-29	03:00:00	40	51	37	40	41	9	0.6	
2017-11-29	04:00:00	46	55	42	46	47	12	2.4	
2017-11-29	05:00:00	50	56	47	47	49	16	4	Wind Speed >= 14 km/hr
2017-11-29	06:00:00	50	60	48	52	53	18	4.6	Wind Speed >= 14 km/hr
2017-11-29	07:00:00	52	58	46	52	55	22	5.4	Wind Speed >= 14 km/hr
2017-11-29	08:00:00	53	59	48	53	56	23	6.5	Wind Speed >= 14 km/hr
2017-11-29	09:00:00	49	56	45	46	49	26	7.3	Wind Speed >= 14 km/hr
2017-11-29	10:00:00	47	56	44	44	47	24	8	Wind Speed >= 14 km/hr
2017-11-29	11:00:00	48	55	43	43	48	19	9.3	Wind Speed >= 14 km/hr
2017-11-29	12:00:00	45	54	38	45	46	22	9	Wind Speed >= 14 km/hr
2017-11-29	13:00:00	45	53	38	41	46	13	8.4	
2017-11-29	14:00:00	44	53	37	40	47	10	8.3	
2017-11-29	15:00:00	41	53	39	42	47	11	8.8	
2017-11-29	16:00:00	40		38	37	45	11	6.8	
2017-11-29	17:00:00	40		39	38	45	24	6.5	Wind Speed >= 14 km/hr
2017-11-29	18:00:00	39		39	36	44	35	6.1	Wind Speed >= 14 km/hr
2017-11-29	19:00:00	40		38	36	45	28	5.9	Wind Speed >= 14 km/hr
2017-11-29	20:00:00	41		43	42	43	33	5.9	Wind Speed >= 14 km/hr
2017-11-29	21:00:00	42		46	47	45	38	4.7	Wind Speed >= 14 km/hr
2017-11-29	22:00:00	45		48	49	47	49	3.1	Wind Speed >= 14 km/hr
2017-11-29	23:00:00	44		50	52	47	44	2.1	Wind Speed >= 14 km/hr
2017-11-30	00:00:00	45		49	50	48	49	1.8	Wind Speed >= 14 km/hr
2017-11-30	01:00:00	42		44	44	44	51	1.5	Wind Speed >= 14 km/hr
2017-11-30	02:00:00	40					45	1.4	Wind Speed >= 14 km/hr
2017-11-30	03:00:00	39					41	1.3	Wind Speed >= 14 km/hr
2017-11-30	04:00:00	39					38	1.1	Wind Speed >= 14 km/hr

Table 8

Baseline Noise Monitoring Summary
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Date	Time	Leq (dBA) [(2), (3)] Station 1	Station 2	Station 3	Station 4	Station 5	Wind Spd (km/h) [(1)]	Temperature (°C)	Weather
2017-12-07	13:00:00		59		38	45	13	6.3	
2017-12-07	14:00:00	52	51	56	34	42	12	5.9	
2017-12-07	15:00:00	45	50	34	35	45	18	5.6	Wind Speed >= 14 km/hr
2017-12-07	16:00:00	40	51	34	36	44	6	4.2	
2017-12-07	17:00:00	41	50	36	38	42	5	2.9	
2017-12-07	18:00:00	40	50	34	35	42	6	3	
2017-12-07	19:00:00	40	50	36	37	41	8	2.9	
2017-12-07	20:00:00	41	50	34	36	42	13	3.2	
2017-12-07	21:00:00	40	50	35	36	40	11	2.8	
2017-12-07	22:00:00	38	49	32	36	40	10	2.7	
2017-12-07	23:00:00	38	49	32	33	39	10	2.4	
2017-12-08	00:00:00	38	49	29	33	34	9	2.1	
2017-12-08	01:00:00	39	50	31	35	36	6	2	
2017-12-08	02:00:00	39	49	31	35	39	7	1.7	
2017-12-08	03:00:00	39	49	31	35	33	6	1.6	
2017-12-08	04:00:00	39	50	32	35	31	7	1.3	
2017-12-08	05:00:00	38	49	32	35	31	9	1.2	
2017-12-08	06:00:00	41	49	32	34	34	11	1.1	
2017-12-08	07:00:00	44	49	37	36	40	11	0.6	
2017-12-08	08:00:00	43	49	36	37	41	11	0.2	
2017-12-08	09:00:00	44	50	34	36	44	11	1.6	
2017-12-08	10:00:00	43	51	36	36	43	15	2.8	Wind Speed >= 14 km/hr
2017-12-08	11:00:00	50	51	32	35	44	24	3.3	Wind Speed >= 14 km/hr
2017-12-08	12:00:00	46	52	35	34	43	22	3.5	Wind Speed >= 14 km/hr
2017-12-08	13:00:00	46	52	35	37	45	18	2.7	Wind Speed >= 14 km/hr
2017-12-08	14:00:00	43	52	33	35	44	6	3.4	
2017-12-08	15:00:00	46	51	34	37	44	4	3.1	
2017-12-08	16:00:00	53	51	33	34	40	8	3.4	
2017-12-08	17:00:00	39	51	33	35	41	9	2.9	
2017-12-08	18:00:00	45	51	35	36	44	8	3	
2017-12-08	19:00:00	65	50	35	36	44	6	2.9	
2017-12-08	20:00:00	39	51	33	35	42	9	2.4	
2017-12-08	21:00:00	39	50	31	33	43	6	2.4	
2017-12-08	22:00:00	45	49	38	33	40	7	2.5	
2017-12-08	23:00:00	39	52	30	32	37	8	2.3	
2017-12-09	00:00:00	52	53	35	31	41	13	2.3	
2017-12-09	01:00:00	47	51	33	31	40	11	2.6	
2017-12-09	02:00:00			34	29	37	2	1.7	
2017-12-09	03:00:00			34	23	32	3	1.4	
2017-12-09	04:00:00			34	26	29	10	2.3	
2017-12-14	13:00:00	54	58	56	49	50	26	-0.1	Wind Speed >= 14 km/hr
2017-12-14	14:00:00	44	54	37	41	48	21	-0.8	Wind Speed >= 14 km/hr
2017-12-14	15:00:00	46	52	34	38	46	23	-1.1	Wind Speed >= 14 km/hr
2017-12-14	16:00:00	43	51	31	37	48	20	-1.6	Wind Speed >= 14 km/hr
2017-12-14	17:00:00	40	52	29	36	44	13	-1.9	
2017-12-14	18:00:00	39	51	28	35	43	18	-1.8	Wind Speed >= 14 km/hr
2017-12-14	19:00:00	39	51	32	37	40	19	-3.4	Wind Speed >= 14 km/hr
2017-12-14	20:00:00	44	52	37	42	46	19	-5	Wind Speed >= 14 km/hr
2017-12-14	21:00:00	43	51	38	41	41	21	-6.7	Wind Speed >= 14 km/hr
2017-12-14	22:00:00	43	53	37	42	42	22	-7.6	Wind Speed >= 14 km/hr
2017-12-14	23:00:00	41	53	32	40	42	22	-8.4	Wind Speed >= 14 km/hr
2017-12-15	00:00:00	43	53	32	41	41	22	-8.3	Wind Speed >= 14 km/hr
2017-12-15	01:00:00	43	53	30	41	41	29	-8.7	Wind Speed >= 14 km/hr
2017-12-15	02:00:00	44	54	33	42	41	26	-9.3	Wind Speed >= 14 km/hr
2017-12-15	03:00:00	45	53	34	39	40	20	-9	Wind Speed >= 14 km/hr
2017-12-15	04:00:00	42	53	32	38	41	23	-8.7	Wind Speed >= 14 km/hr
2017-12-15	05:00:00	45	55	36	43	44	18	-8.7	Wind Speed >= 14 km/hr
2017-12-15	06:00:00	49	57	38	47	47	19	-8.9	Wind Speed >= 14 km/hr
2017-12-15	07:00:00	49	57	36	47	49	23	-8	Wind Speed >= 14 km/hr
2017-12-15	08:00:00	51	58	38	49	49	21	-7.5	Wind Speed >= 14 km/hr
2017-12-15	09:00:00	49	57	37	47	51	24	-6.8	Wind Speed >= 14 km/hr
2017-12-15	10:00:00	51	59	42	50	56	26	-6.5	Wind Speed >= 14 km/hr
2017-12-15	11:00:00	51	59	41	51	51	33	-5.1	Wind Speed >= 14 km/hr
2017-12-15	12:00:00	54	60	43	50	50	31	-4.2	Wind Speed >= 14 km/hr
2017-12-15	13:00:00	53	60	43	51	51	32	-4.3	Wind Speed >= 14 km/hr
2017-12-15	14:00:00	51	58	39	47	48	30	-3.9	Wind Speed >= 14 km/hr
2017-12-15	15:00:00	49	55	35	47	48	26	-3.6	Wind Speed >= 14 km/hr
2017-12-15	16:00:00	45	52	33	39	46	23	-4.1	Wind Speed >= 14 km/hr
2017-12-15	17:00:00	42	51	33	41	45	13	-4.4	
2017-12-15	18:00:00	40	50	28	35	45	16	-4	Wind Speed >= 14 km/hr
2017-12-15	19:00:00	39	49	29	35	45	12	-4.4	
2017-12-15	20:00:00	40	49	29	35	45	4	-5.6	
2017-12-15	21:00:00	39	49	28	34	41	4	-7	
2017-12-15	22:00:00	39	48	26	33	43	7	-6.9	
2017-12-15	23:00:00	39	47	25	33	33	9	-6.9	

Table 8

Baseline Noise Monitoring Summary
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

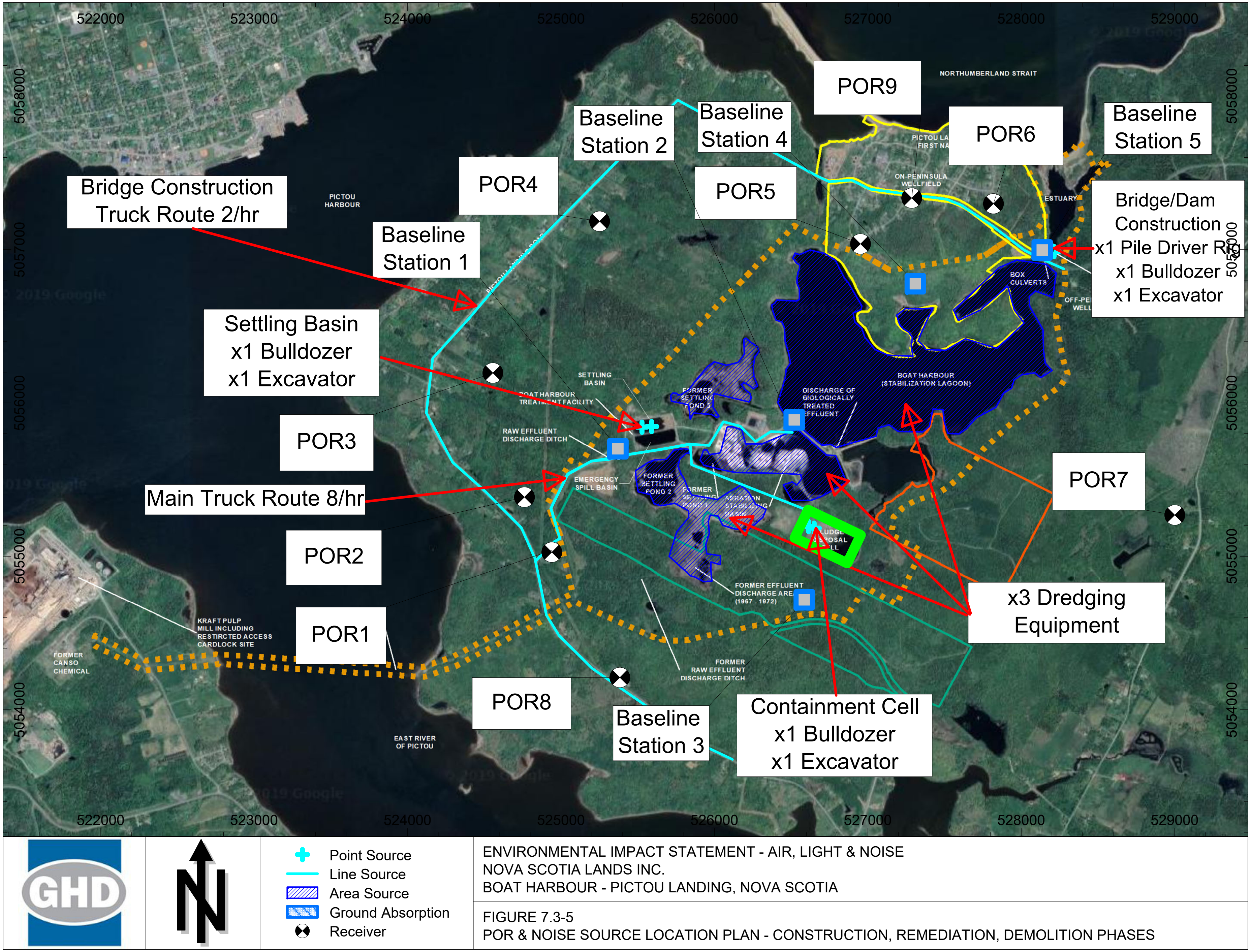
Date	Time	Leq (dBA) [2], [3] Station 1	Station 2	Station 3	Station 4	Station 5	Wind Spd (km/h) [1]	Temperature (°C)	Weather
2017-12-16	00:00:00	39	49	26	33	37	6	-7.7	
2017-12-16	01:00:00	39	48	26	32	30	8	-6.8	
2017-12-16	02:00:00	38	48	28	32	36	3	-7.1	
2017-12-16	03:00:00	37	50	25	29	30	3	-7.4	
2017-12-16	04:00:00	36	49	22	28	30	11	-7.3	

		Station 1 (POR1,2,3)	Station 2	Station 3 (POR7,8)	Station 4 (POR4&5,9)	Station 5 (POR6)
16 hour daytime LD	2017-11-22	44.1	51.1	32.5	36.0	47.0
	2017-11-28	38.8	50.7	32.1	31.6	43.9
	2017-11-29	43.1	53.1	37.9	40.6	46.4
	2017-12-07	44.6	52.8	47.2	36.4	42.4
	2017-12-08	54.8	50.5	34.7	35.4	42.4
	2017-12-14	39.9	51.6	28.7	36.3	43.6
	2017-12-15	40.2	49.2	29.5	36.8	44.0
Total LD Log Average		47.7	51.5	39.8	36.8	44.6
8 hour nighttime LN	2017-11-23	36.0	49.4	27.7	32.3	33.3
	2017-11-28	44.1	54.7	43.1	45.9	47.5
	2017-12-07	39.0	49.4	31.4	34.3	35.7
	2017-12-08	48.3	52.1	33.5	29.7	37.8
	2017-12-15	38.1	48.7	25.6	31.3	33.7
Total LN Log Average		43.5	51.5	37.0	39.6	41.5

Notes:

(1) Weather data provided by Environment Canada's Caibou Point and Debert, Nova Scotia Climate Stations.
(2) Measurements recorded during inclement weather (winds speeds greater than 14 km/h and/or rain) were disregarded.
(3) Bolded data represents the lowest measured Leq during the respective monitoring time period.
(4)
Day Time Hours
Evening Time Hours
Night Time Hours
Missing Data

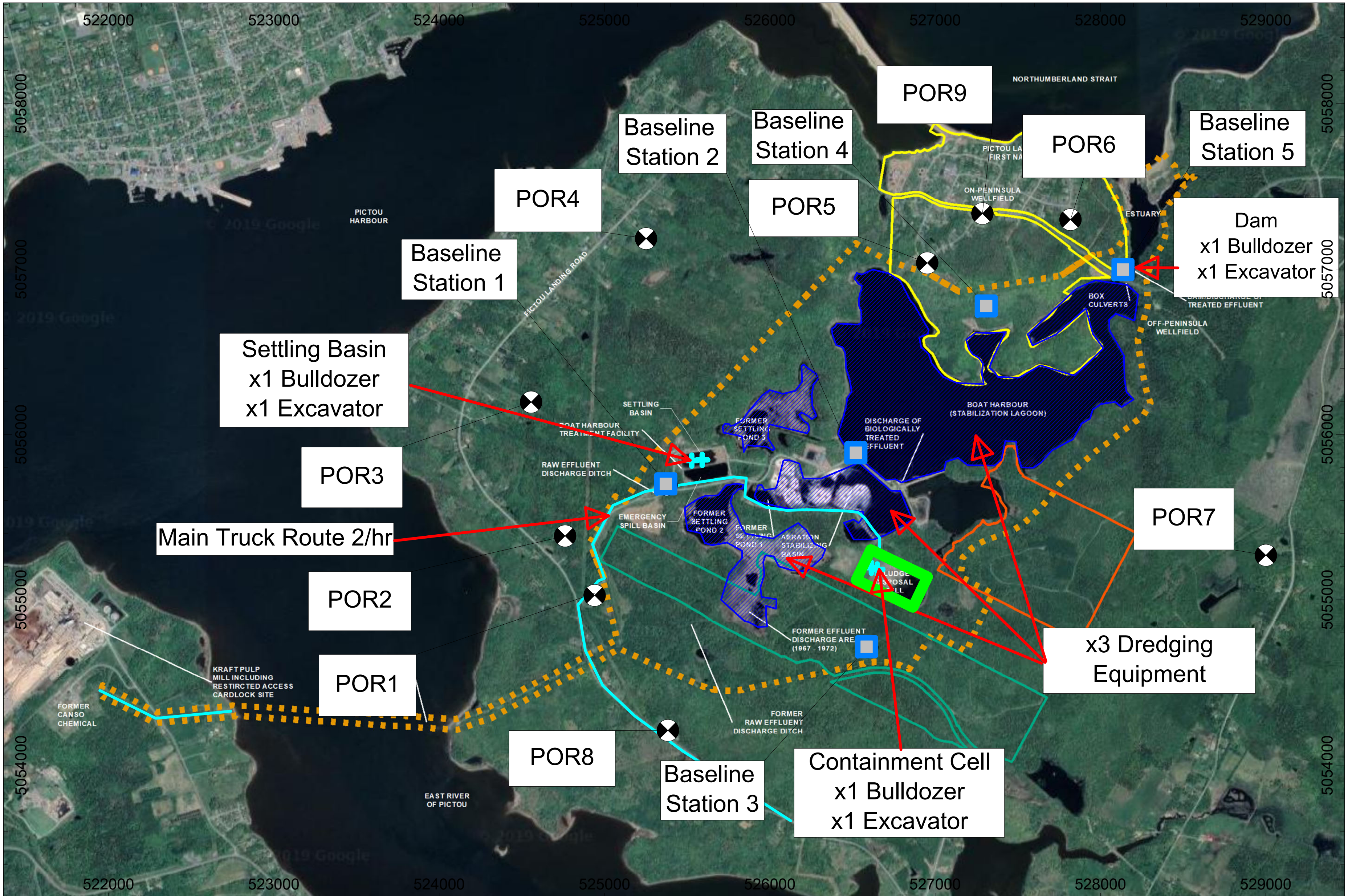
Figures



GHD

ENVIRONMENTAL IMPACT STATEMENT - AIR, LIGHT & NOISE
NOVA SCOTIA LANDS INC.
BOAT HARBOUR - PICTOU LANDING, NOVA SCOTIA

FIGURE 7.3-5
POR & NOISE SOURCE LOCATION PLAN - CONSTRUCTION, REMEDIATION, DEMOLITION PHASES



Point Source
Line Source
Area Source
Ground Absorption
Receiver

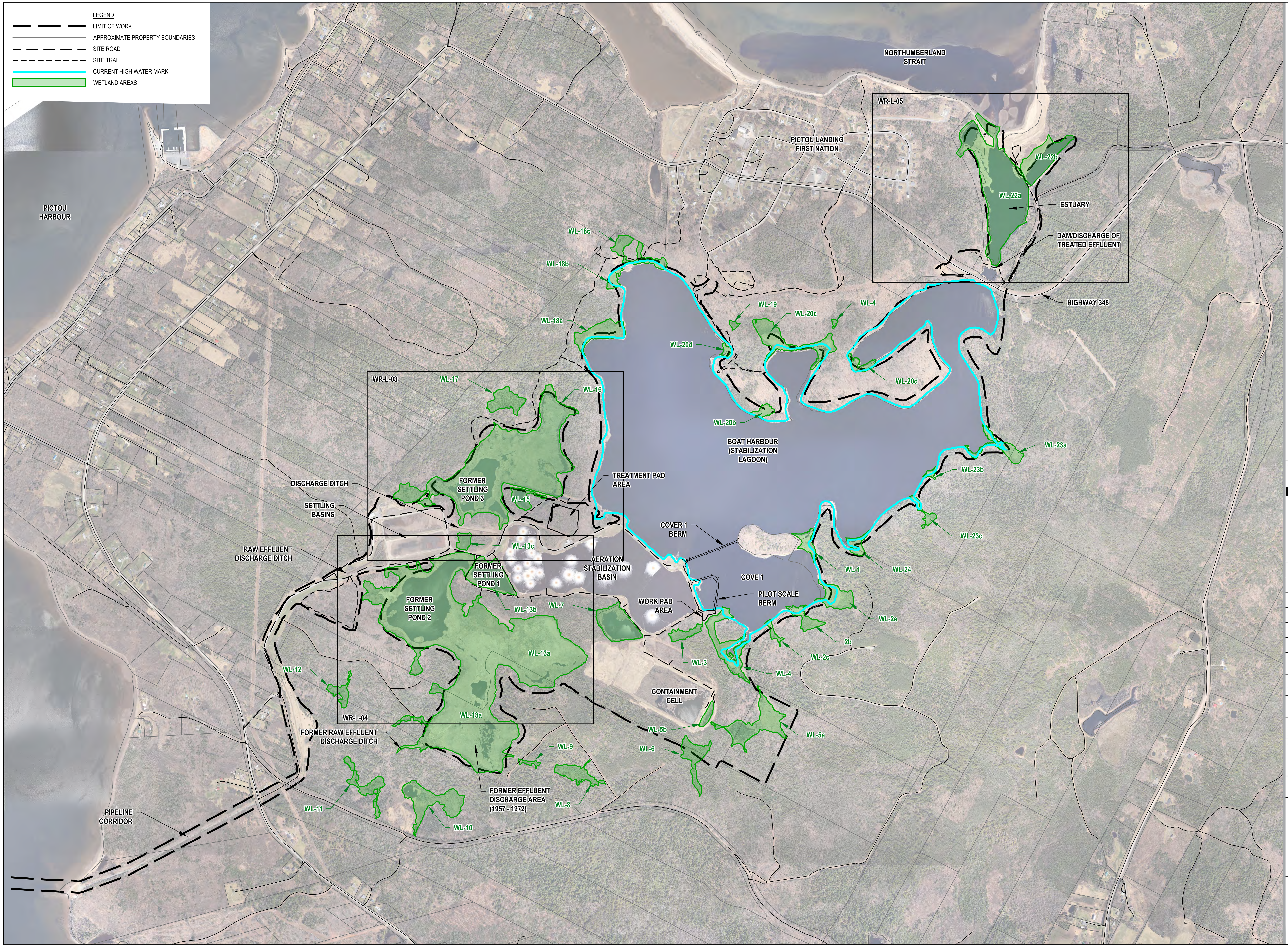
ENVIRONMENTAL IMPACT STATEMENT - AIR, LIGHT & NOISE
NOVA SCOTIA LANDS INC.
BOAT HARBOUR - PICTOU LANDING, NOVA SCOTIA

FIGURE 7.3-6
POR & NOISE SOURCE LOCATION PLAN - OPERATION PHASE

Appendices

Appendix A

Reference Drawings



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N

0 75 150 225m

SOURCE:
AERIAL PHOTO - NS LANDS, MAY 15, 2015

Client

NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project

BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
3	PRE-TENDER DELIVERABLE	DC	BS	05-21-2020
2	95% DESIGN REVIEW	DC	BS	03-12-2020
1	50% DESIGN REVIEW	DC	BS	12-20-2019

Drawn	D. CORKILL	Designer	D. CORKILL
Drafting Check	B. SAMUELL	Design Check	B. SAMUELL
Project Manager	C. SKIRTH	Date	May 21, 2020
This document shall not be used for construction unless signed and sealed for construction.		Scale	1:7500

Original Size

ANSI D

Bar is 20mm on original size drawing
0 20mm

Project No. **11148275**

Title

WETLAND RESTORATION AND PLANTING KEY PLAN

Sheet No.

WR-L-01

Sheet of

Plot Date: 20 May 2020 - 10:43 AM   Plotted By: Konstantin Perunov   CAD File: N:\CA\Ottawa\Legacy\CAD\8-chars\11------\1114----\111482--\11148275\11148275-REPORTS\11148275-18(024)\11148275-18(024)LA\11148275-18(024)LA-OT001.dwg

Uplands with Shrub						
Trees						
Species (Common Name)	**Species (Scientific Name)**	**Species ID**	**Stock Type**	**Size (cm)**	**Spacing**	**Quantity**
Paper Birch	*Betula papyrifera*	BP	Bareroot Seedling	20-40	5x5 m	TBD
American Beech	*Fagus grandifolia*	FG	Bareroot Seedling	20-40	5x5 m	TBD
White Spruce	*Picea glauca*	PG	Seedling Plug	20-40	5x5 m	TBD
Red Oak	*Quercus rubra*	QR	Seedling Plug	20-40	5x5 m	TBD
Total						**TBD**
Shrubs						
Species (Common Name)	**Species (Scientific Name)**	**Species ID**	**Stock Type**	**Size**	**Spacing**	**Quantity**
Bearberry	*Arctostaphylos uva-ursi*	Au	Shrub	1 gal	1x1 m	TBD
Black Chokeberry	*Aronia melanocarpa*	Am	Shrub	1 gal	1x1 m	TBD
Beaked Hazelnut	*Corylus cornuta*	Cc	Shrub	1 gal	1x1 m	TBD
Downy Hawthorn	*Crataegus mollis*	Cm	Shrub	1 gal	1x1 m	TBD
Bayberry	*Myrica pensylvanica*	Mp	Shrub	1 gal	1x1 m	TBD
Ninebark	*Physocarpus opulifolius*	Po	Shrub	1 gal	1x1 m	TBD
Staghorn Sumac	*Rhus typhina*	Rt	Shrub	1 gal	1x1 m	TBD
Virginia Rose	*Rosa carolina*	Rc	Shrub	1 gal	1x1 m	TBD
Flowering Raspberry	*Rubus odoratus*	Ro	Shrub	1 gal	1x1 m	TBD
Lowbush Blueberry	*Vaccinium angustifolium*	Va	Shrub	1 gal	1x1 m	TBD
American Highbush Cranberry	*Viburnum opulus var. americanum*	Vo	Shrub	1 gal	1x1 m	TBD
Total						**TBD**

Low-lying with Shrub						
Trees						
Species (Common Name)	**Species (Scientific Name)**	**Species ID**	**Stock Type**	**Size (cm)**	**Spacing**	**Quantity**
Balsam Fir	*Abies balsamea*	AB	Seedling plug	20-40	5x5 m	TBD
Native Red Maple	*Acer rubrum*	AR	Bareroot Seedling	20-40	5x5 m	TBD
Yellow Birch	*Betula alleghaniensis*	BA	Bareroot Seedling	20-40	5x5 m	TBD
Swamp White Oak	*Quercus bicolor*	QB	Bareroot Seedling	20-40	5x5 m	TBD
Total						**TBD**
Shrubs						
Species (Common Name)	**Species (Scientific Name)**	**Species ID**	**Stock Type**	**Size**	**Spacing**	**Quantity**
Canadian Serviceberry	*Amelanchier canadensis*	Ac	Shrub	1 gal	1x1 m	TBD
Black Chokeberry	*Aronia melanocarpa*	Am	Shrub	1 gal	1x1 m	TBD
Red Osier Dogwood	*Cornus sericea*	Cs	Live Stakes	1 gal	1x1 m	TBD
Winterberry Holly	*Ilex vercillata*	Iv	Shrub	1 gal	1x1 m	TBD
Sweet Gale/Bog Myrtle	*Myrica gale*	Mg	Shrub	1 gal	1x1 m	TBD
Bayberry	*Myrica pensylvanica*	Mp	Shrub	1 gal	1x1 m	TBD
American Pussy Willow	*Salix discolor*	Sd	Live Stakes	1 gal	1x1 m	TBD
Heart-Leaved Willow	*Salix eriocephala*	Se	Live Stakes	1 gal	1x1 m	TBD
American Elderberry	*Sambucus nigra ssp. canadensis*	Sn	Shrub	1 gal	1x1 m	TBD
Witherod/Wild Raisin	*Viburnum nudum var. cassinoides*	Vn	Shrub	1 gal	1x1 m	TBD
American Highbush Cranberry	*Viburnum opulus var. americanum*	Vo	Shrub	1 gal	1x1 m	TBD
Total						**TBD**

1 PLANTING TABLES

GENERAL PLANTING NOTES:

1. ALL TREES, SHRUBS OR BAREROOT/SEEDLING STOCK TO BE PLANTED IN ACCORDANCE WITH DESIGN DRAWINGS AND SPECIFICATIONS.
2. ALL PLANTING MATERIAL TO BE NO. 1 GRADE, GROWN IN ACCORDANCE WITH CANADIAN STANDARDS FOR NURSERY STOCK, AND TO THE APPROVAL OF THE CMOS CONSULTANT.
3. TREE, SHRUB OR BAREROOT/SEEDLING STOCK TO BE PLANTED EITHER MID-APRIL TO MID-MAY OR LATE-AUGUST TO LATE-SEPTEMBER.
4. ALL TREE, SHRUB AND BAREROOT/SEEDLING STOCK TO BE SOURCED LOCALLY.
5. CMOS CONSULTANT TO APPROVE STOCK PRIOR TO PLANTING.
6. STOCK SHALL NOT BE ROW PLANTED (UNLESS SPECIFIED IN DESIGN) WHEREVER POSSIBLE TO ACHIEVE A MORE NATURAL LANDSCAPE APPEARANCE (E.G. IN CLUSTERS OF 5, 7 OR 9).
7. STOCK TO BE PLANTED UPRIGHT AND NO MORE THAN 10% FROM VERTICAL.
8. STOCK SHALL BE PLANTED SUCH THAT ROOT COLLARS ARE AT GRADE AND ROOT SYSTEMS ARE FULLY BURIED.
9. DECIDUOUS TREES GREATER THAN 1M TALL WILL HAVE TRUNK PROTECTION INSTALLED.
10. IF SIGNIFICANT PONDING IS OBSERVED WITHIN AREAS SPECIFIED TO BE UPLAND, PONDED AREAS ARE TO BE PLANTED AND SEEDED AS LOW-LYING AT THE DISCRETION OF THE CMOS CONSULTANT.
11. DO NOT CUT OR DAMAGE LEADER OR TRUNK.
12. SOIL SURROUNDING ROOTS SHALL BE PACKED GENTLY BUT FIRMLY TO MITIGATE LARGE AIR POCKETS. NATIVE BACKFILL MATERIAL SHALL BE USED.
13. ON DAY OF PLANTING, ROOT SYSTEM OF STOCK SHALL BE KEPT MOIST PRIOR TO PLANTING AND AVOID EXPOSURE OF ROOT SYSTEM TO AIR FOR A LONG DURATION.
14. ALL PLANTING EFFORTS SHALL NOT DISRUPT OR NEGATIVELY IMPACT THE ROOT SYSTEMS OF OTHER ESTABLISHED TREES AND SHRUBS.
15. ALL STOCK PLANTINGS SHOULD BE WATERED THOROUGHLY AT TIME OF PLANTING.
16. ANY ALTERATIONS TO THE PLANTING MATERIALS, DESIGN OR TIMING BY THE CONTRACTOR SHOULD BE COMMUNICATED TO THE CMOS CONSULTANT FOR APPROVAL PRIOR TO UNDERTAKING PROPOSED ACTIVITIES.
17. ALL WORKMANSHIP, PLANT MATERIALS AND OTHER MATERIALS TO BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING THE INITIAL ACCEPTANCE OF THE PROJECT BY THE CMOS CONSULTANT.
18. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN THE PLANT MATERIALS IN GOOD CONDITIONS FROM THE DATE OF INITIAL PLANTING TO THE END OF THE WARRANTY PERIOD.
19. THE CMOS CONSULTANT RESERVES THE RIGHT TO EXTEND THE CONTRACTORS WARRANTY RESPONSIBILITIES FOR AN ADDITIONAL YEAR IF, AT THE END OF THE WARRANTY PERIOD, LEAF DEVELOPMENT AND GROWTH IS NOT SUFFICIENT TO ENSURE FUTURE SURVIVAL.
20. BAREROOT SEEDLINGS OR SEEDLING PLUGS MAY BE USED AS AN ALTERNATIVE FOLLOWING SAME SPECIES AND DENSITY, UPON APPROVAL BY CMOS CONSULTANT.

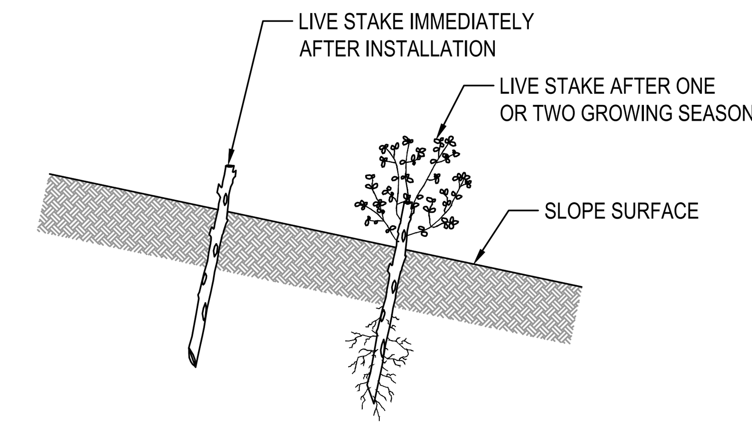
	Boat Harbour Upland Seed Mix		
	Sow rate: 25 kg/ha		
Seed Type 1	Woolly Yarrow	*Achillea borealis var. borealis*	7%
	Rough Bentgrass	*Agrostis scabra*	10%
	Devil's Beggarticks	*Bidens frondosa*	2%
	Virginia Wildrye	*Elymus virginicus var. virginicus*	35%
	Grass-Leaved Goldenrod	*Euthamia graminifolia*	5%
	White Avens	*Geum canadense*	7%
	Common Evening Primrose	*Oenothera biennis*	4%
	Canada Goldenrod	*Solidago canadensis*	23%
	Grey-Stemmed Goldenrod	*Solidago nemoralis var. nemoralis*	7%
	Sow with nurse crop of Annual Oats (*Avena sativa*) at rate of 25 kg/ha		

	Boat Harbour Low-lying Seed Mix		
	Sow rate: 40 kg/ha		
Seed Type 2	Devil's Beggarticks	*Bidens frondosa*	3%
	Bluejoint Reedgrass	*Calamagrostis canadensis var. canadensis*	5%
	Fringed Sedge	*Carex crinita*	5%
	Shallow Sedge	*Carex lurida*	20%
	Awl-Fruited Sedge	*Carex stipata*	5%
	Virginia Wildrye	*Elymus virginicus var. virginicus*	40%
	Spotted Joe Pye Weed	*Eutrochium maculatum*	3%
	Common Boneset	*Eupatorium perfoliatum*	2%
	Grass-Leaved Goldenrod	*Euthamia graminifolia*	3%
	Harlequin Blue Flag	*Iris versicolor*	2%
	Soft Rush	*Juncus effusus ssp. solutus*	3%
	Rice Cutgrass	*Leersia oryzoides*	5%
	Square-Stemmed Monkeyflower	*Mimulus ringens ssp. ringens*	2%
	Purple-Stemmed Aster	*Symphyotrichum puniceum*	2%
	Sow with nurse crop of Annual Oats (*Avena sativa*) at rate of 40 kg/ha		

2 SEED MIXES

SEEDING NOTES:

1. ALL AREAS DISTURBED DURING CONSTRUCTION TO BE RESTORED AND SEEDED UNLESS SHOWN OTHERWISE. AREAS TO BE SEEDED SHALL BE IN ACCORDANCE WITH DESIGN DRAWINGS AND SPECIFICATIONS.
2. MECHANICAL (DRILL) SEEDING IS RECOMMENDED FOR UPLAND PLANTING AREAS. HYRDAULIC SEEDING IS RECOMMENDED IN LOW-LYING AREAS WHERE MECHANICAL SEEDING MAY NOT BE FEASIBLE DUE TO SOIL CONDITIONS OR ACCESS. CONTRACTOR TO SPECIFY SEEDING METHODS AND SCHEDULE FOR CMOS CONSULTANT APPROVAL A MINIMUM OF 14 DAYS PRIOR TO SEEDING.
3. SEEDING OPERATIONS SHALL NOT COMMENCE UNTIL CONTRACT ADMINISTRATOR HAS INSPECTED AND APPROVED THE SURFACE PREPARATION INCLUDING VERIFICATION OF THE SEED MIXTURE BEING APPLIED AND THE LAYOUT OF PERMANENT SEED MIX LOCATIONS DEMARCATED IN THE FIELD BY THE CONTRACTOR.
4. SEEDING OPERATION SHALL NOT COMMENCE UNTIL THE CMOS CONSULTANT IS IN RECEIPT OF THE CERTIFICATE OF SEED ANALYSIS FOR THE SEED BEING APPLIED AND HAS APPROVED THE SEED TEST RESULTS. THE CONTRACTOR IS ALSO REQUIRED TO SUBMIT PROOF OF PURCHASE TO THE CMOS CONSULTANT THAT THE SPECIFIED SEED MIXTURE HAS BEEN ORDERED AND PURCHASED FROM THE SEED SUPPLIER SPECIFIED IN THIS CONTRACT.
5. THE CONTRACTOR SHALL SUPPLY THE SPECIFIED SEED MIXTURE AND ANY EROSION CONTROL PROTECTION IN QUANTITIES SUFFICIENT TO COMPLETE THE SEEDING WORKS AS SHOWN ON THESE DRAWINGS.
6. SEEDING SHALL OCCUR BETWEEN OCTOBER 15 AND NOVEMBER 30 AND BEFORE WINTER FREEZE UP. SEEDING MUST OCCUR WHERE SEED IS IN CONTACT WITH THE PREPARED SOIL SURFACE AND IN A SNOW-FREE CONDITION. SEEDING AT OTHER TIMES OF YEAR REQUIRES CMOS CONSULTANT APPROVAL.
7. ALL SURFACES TO BE SEEDED SHALL BE PREPARED NOT MORE THAN 5 DAYS BEFORE THE SEEDING OPERATION. THE SURFACE SHALL BE FREE OF WEEDS OR OTHER UNWANTED VEGETATION.
8. LOOSEN SOIL TO A DEPTH OF 25mm WITH A STIFF RAKE, CULTIVATE OR HOE PRIOR TO SEEDING. DO NOT OVER-COMPACT TOPSOIL.
9. IF RAINFALL PACKS THE SOIL SURFACE AFTER FINE GRADING, BUT BEFORE SEEDING, SURFACE PREPARATION SHALL BE RE-DONE PRIOR TO SEEDING OPERATION TO PROVIDE A LOOSE, FRIABLE AND UNIFORM SURFACE.
10. ALL PROPOSED TREE, SHRUB AND SEED SPECIES ARE NATIVE TO NOVA SCOTIA. IF ANY PROPOSED SPECIES CANNOT BE SOURCED, A SIMILAR NATIVE SPECIES IS TO BE SPECIFIED AT THE DISCRETION OF THE CMOS CONSULTANT.
11. REFER TO SEED TABLE (DETAIL 2) FOR SEED MIX AND SEEDING RATES.
12. WHERE SEED DRILL TRACTOR CANNOT ACCESS, SEED MIX AND NURSE CROP SHALL BE INSTALLED BY SEED DRILL OR BY HAND BROADCASTING SEED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LABOUR, MATERIALS AND EQUIPMENT NECESSARY TO SEED SPECIFIED SEED MIXTURE.
13. CONTRACTOR TO MOW SEEDED AREA TO A HEIGHT OF 200mm ONCE PER YEAR FOR 2 YEARS AFTER SEED HAS ESTABLISHED.
14. IF SPECIFIED SEEDING IS NOT SUCCESSFUL AND FAILS TO GERMINATE, THRIVE OR PREVENT EROSION THEN THE SUBJECT AREAS SHALL BE RE-SEEDED AND/OR ENHANCED WITH OTHER EROSION CONTROL MEASURES TO ENSURE ADEQUATE COVERAGE.
15. THE SITE AND EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL CONDITIONS PERMIT APPLICATION OR RE-APPLICATION OF SEEDS AND EROSION CONTROL PROTECTION MATERIAL.
16. ANY RE-SEEDING SHALL BE PERFORMED ONLY AFTER SPRING START UP OR MAY 31ST AND BEFORE WINTER FREEZE UP.



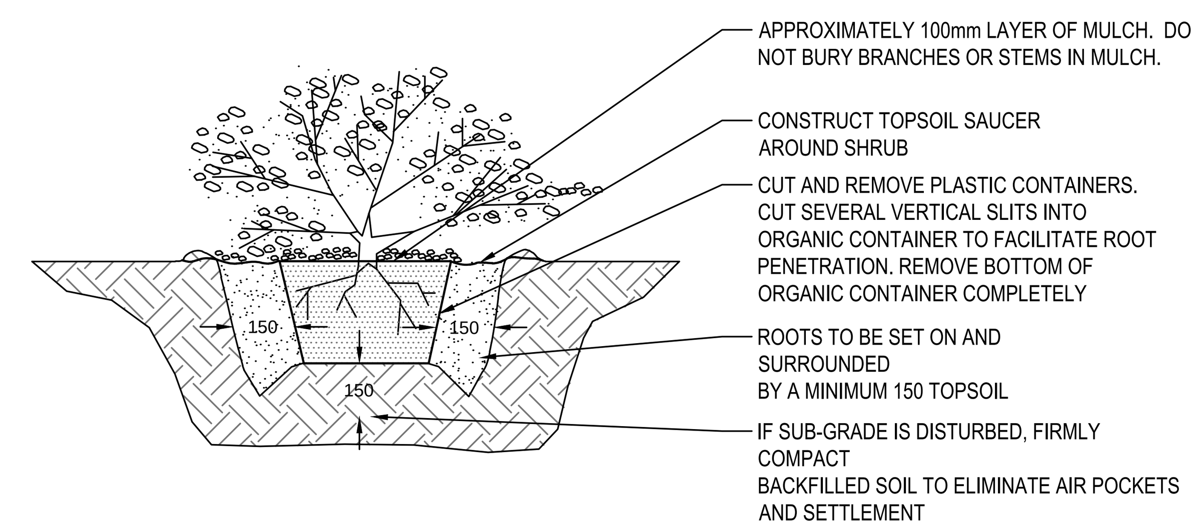
SPECIES AND QUANTITIES

COMMON NAME	BOTANICAL NAME	QUANTITY
AMERICAN PUSSY WILLOW	*Salix discolor*	TBD
HEART LEAVED WILLOW	*Salix eriocephala*	TBD
RED OSIER DOGWOOD	*Cornus sericea*	TBD

3 LIVE STAKE
N.T.S.

LIVE STAKE NOTES:

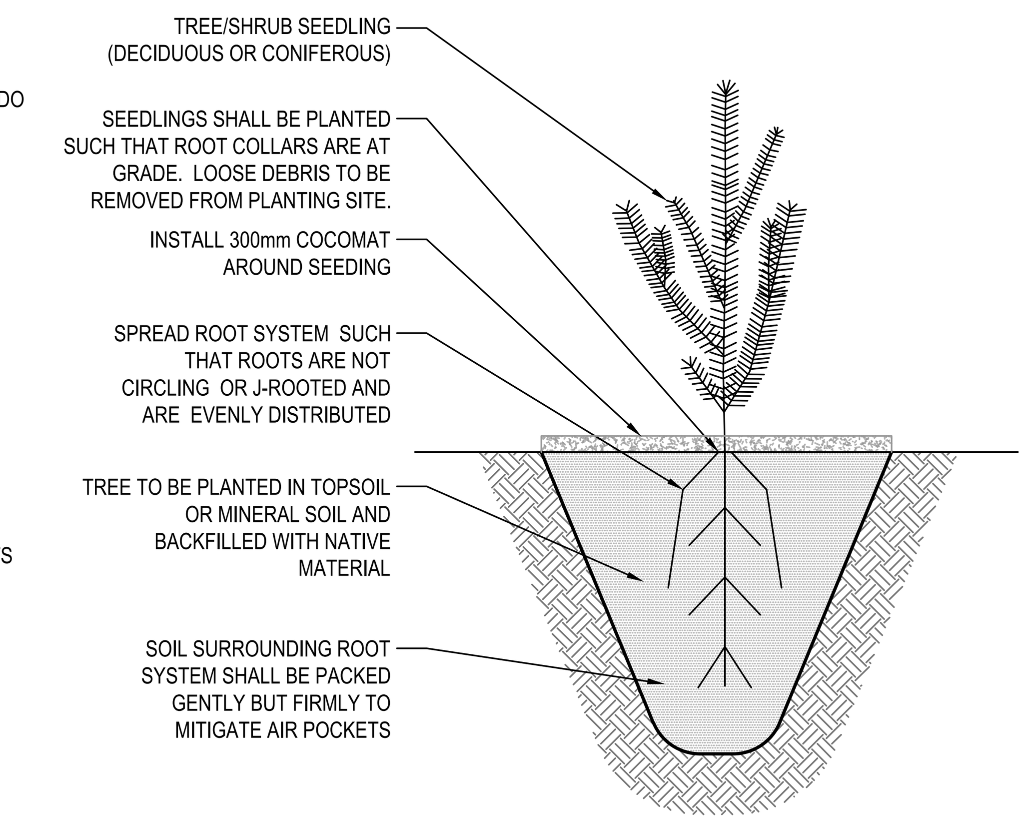
1. LIVE STAKES MUST BE CUT FROM DORMANT MATERIALS.
2. LIVE STAKES SHALL BE PLANTED THE SAME DAY AS HARVESTED, OR STORED FOR A PERIOD NO LONGER THAN TWO (2) DAYS.
3. THE CONTRACTOR SHALL PROTECT PLANT MATERIALS FROM DRYING AND OVERHEATING AT THE TIME OF HARVEST, DURING TRANSPORT AND DURING THE CONSTRUCTION PROCESS.
4. LIVE STAKES TO BE 2-4 cm DIAMETER AND CUT TO A LENGTH OF 1.0-1.5 m
5. MAKE AN ANGLE CUT AT THE BASAL END, OR BOTTOM OF THE STAKE.
6. TRIM ALL SIDE BRANCHES, TAKING CARE NOT TO DAMAGE THE BARK.
7. DO NOT PLANT UPSIDE DOWN.
8. LIVE STAKES SHOULD BE INSTALLED USING A DEADBLOW HAMMER (LARGE RUBBER MALLET WITH THE HEAD FILLED WITH LEAD PELLETS).
9. 80 PERCENT OF STAKE TO BE BELOW SURFACE.
10. GENTLY TAMP THE LIVE STAKE INTO THE GROUND AT RIGHT ANGLES TO THE SLOPE.
11. IF THE SOIL IS COMPACT A PILOT HOLE MADE WITH A STEEL BAR SHOULD BE USED.
12. IF USING A PILOT HOLE REPACK SOIL AROUND THE STAKE.
13. DENSITY OF LIVE STAKES TO BE 4 PER SQUARE METRE IN PLANTING AREAS.
14. SHRUB PLUGS MAY BE USED AS AN ALTERNATIVE FOLLOWING SAME SPECIES AND DENSITY, UPON APPROVAL BY CMOS CONSULTANT.



SHRUB PLANTING NOTES:

1. WATER THOROUGHLY AFTER PLANTING. PRUNE ONLY INJURED OR DEAD BRANCHES.
2. UNITS IN MILLIMETERS .

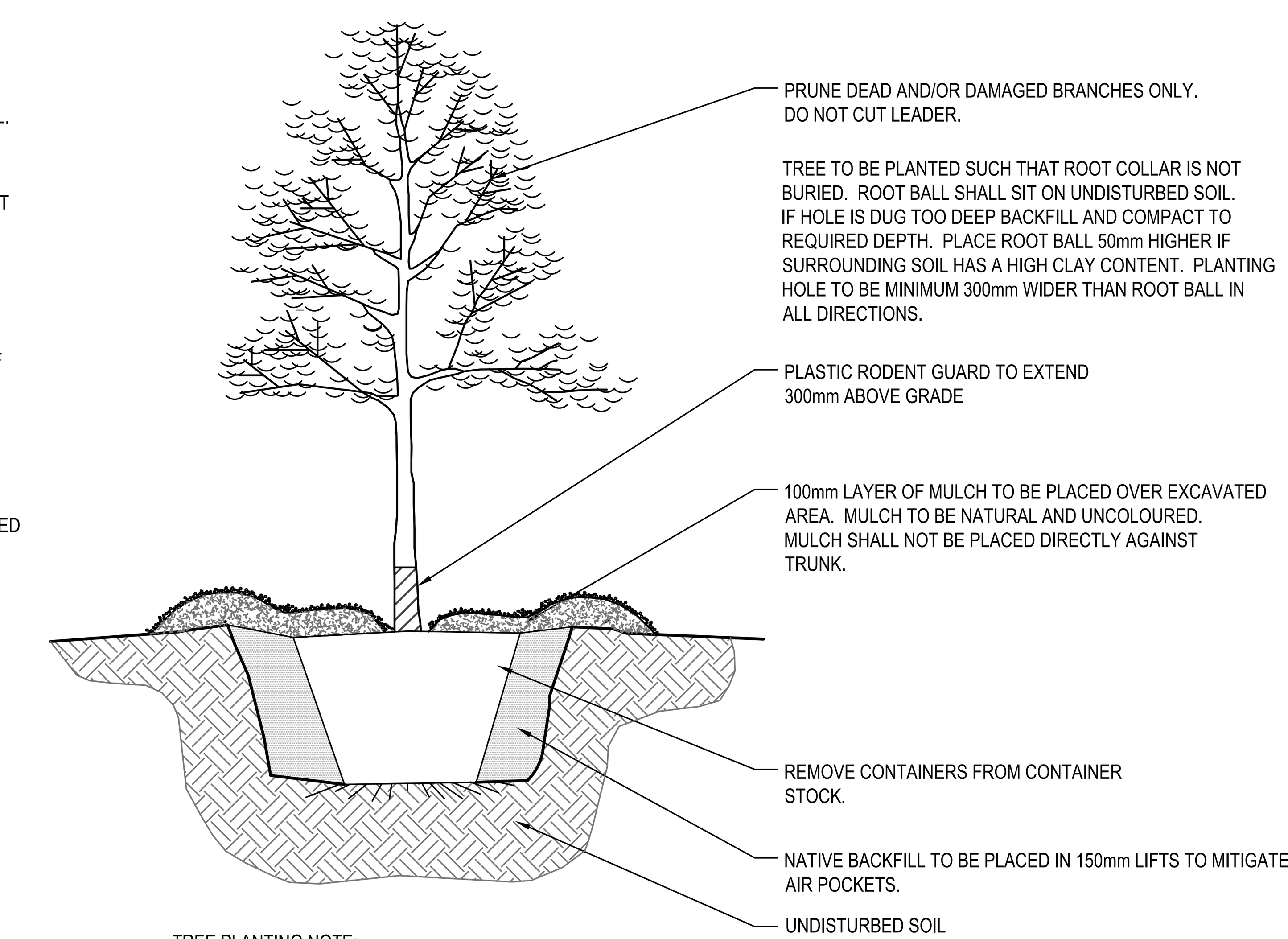
4 SHRUB PLANTING
N.T.S.



BAREROOT/SEEDLING NOTES:

1. DO NOT CUT OR DAMAGE LEADER, TRUNK, OR ROOTS.
2. PRUNE ONLY DEAD OR DAMAGED BRANCHES. RETAIN NATURAL SHAPE OF CROWN.
3. ALL STOCK TO BE KEPT MOIST AND NOT EXPOSED TO AIR FOR PROLONGED PERIODS OF TIME.
4. ALL STOCK TO BE PLANTED SUCH THAT THE ROOT COLLAR IS NOT BURIED OR COVERED BY MULCH.
5. ROOT MASS TO BE PLANTED SUCH THAT ROOTS ARE EVENLY SPREAD AND NOT CIRCLING OR TWISTING WITHIN THE PLANTING HOLE.
6. WATER ALL STOCK THOROUGHLY AFTER PLANTING

5 BAREROOT/SEEDLING PLANTING
N.T.S.



TREE PLANTING NOTE:

1. DECIDUOUS TREES WIILL HAVE TRUNK PROTECTION INSTALLED.

6 TREE PLANTING
N.T.S.

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Client
NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project
BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
3	PRE-TENDER DELIVERABLE	DC	BS	05-21-2020
2	95% DESIGN REVIEW	DC	BS	03-12-2020
1	50% DESIGN REVIEW	DC	BS	12-20-2019

Drawn	D. CORKILL	Designer	D. CORKILL
Drafting Check	B. SAMUELL	Design Check	B. SAMUELL
Project Manager	C. SKIRTH	Date	May 21, 2020
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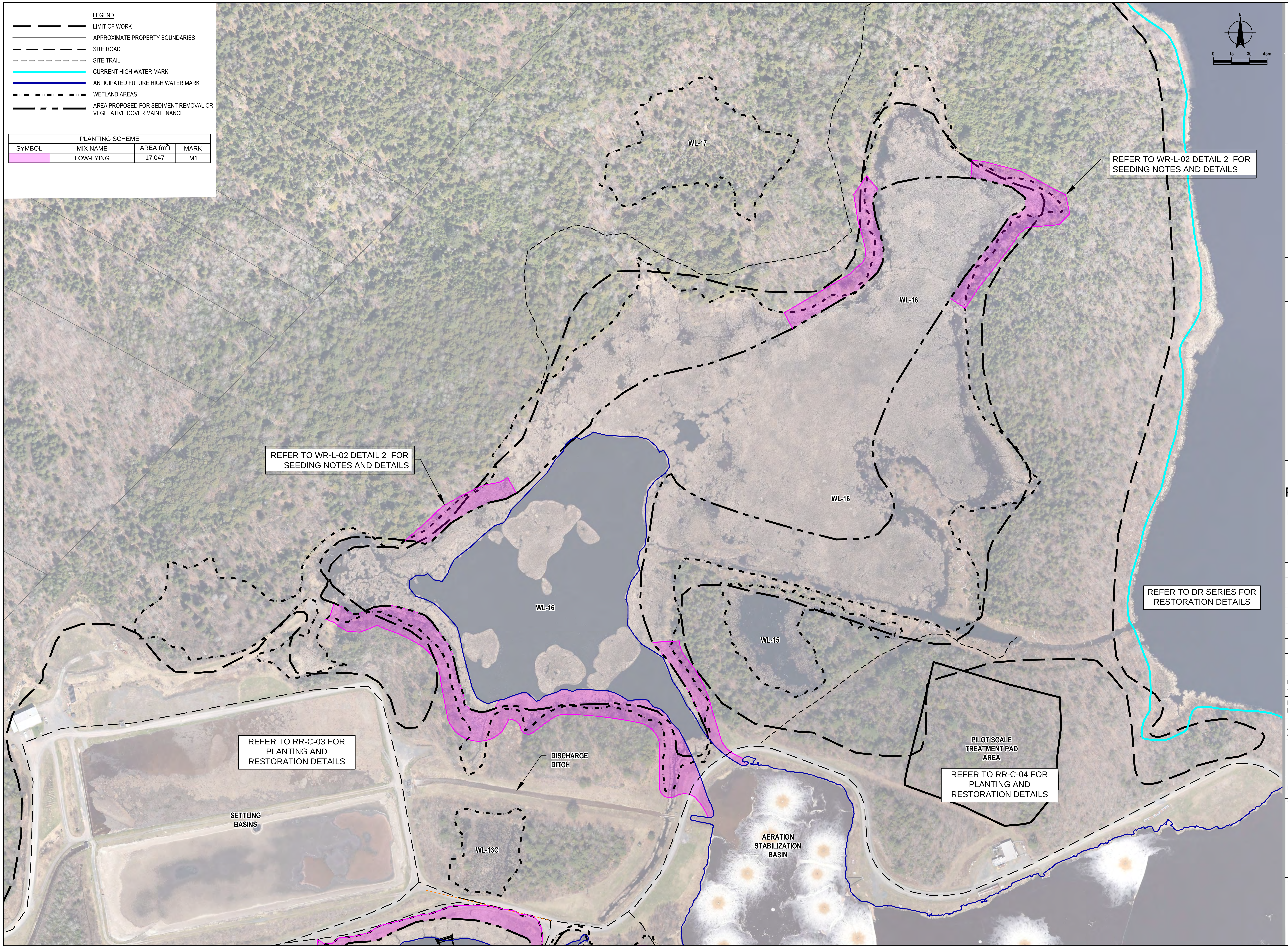
Original Size	ANSI D	Bar is 20mm on original size drawing	0 20mm

Project No. **11148275**

Title
PLANTING NOTES AND DETAILS

Sheet No.
WR-L-02

Sheet of



PLANTING SCHEME			
SYMBOL	MIX NAME	AREA (m^2)	MARK
	LOW-LYING	17,047	M1

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SOURCE:
AERIAL PHOTO - NS LANDS, MAY 15, 2015

Client
NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project
BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
3	PRE-TENDER DELIVERABLE	DC	BS	05-21-2020
2	95% DESIGN REVIEW	DC	BS	03-12-2020
1	50% DESIGN REVIEW	DC	BS	12-20-2019

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Drafting Check	B. SAMUELL	Design Check	B. SAMUELL
Project Manager	C. SKIRTH	Date	May 21, 2020
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Project No. 11148275

Title
AREA PLAN RESTORATION AND PLANTING 1 OF 3

Sheet No.
WR-L-03

Sheet of

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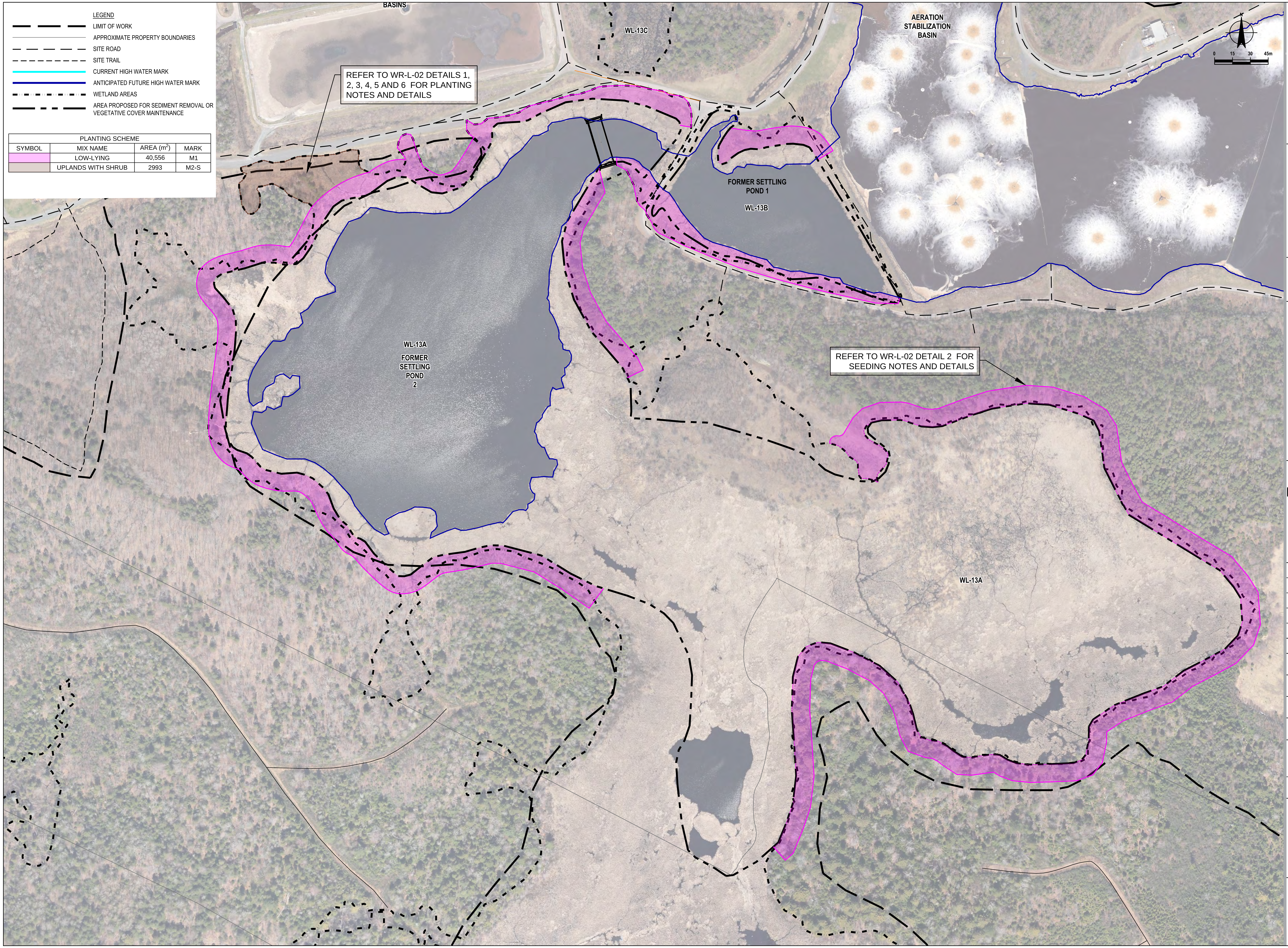

PLANTING SCHEME			
SYMBOL	MIX NAME	AREA (m^2)	MARK
	LOW-LYING	40,556	M1
	UPLANDS WITH SHRUB	2993	M2-S

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SOURCE:
AERIAL PHOTO - NS LANDS, MAY 15, 2015

Client
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Project
BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
2	PRE-TENDER DELIVERABLE	DC	BS	05-21-2020
1	95% DESIGN REVIEW	DC	BS	03-12-2020

Drawn	D. CORKILL	Designer	D. CORKILL
Drafting Check	B. SAMUELL	Design Check	B. SAMUELL
Project Manager	C. SKIRTH	Date	May 21, 2020
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Original Size
ANSI D

Bar is 20mm on original size drawing
0 20mm

Project No. **11148275**

Title
AREA PLAN RESTORATION AND PLANTING 2 OF 3

Sheet No.
WR-L-04

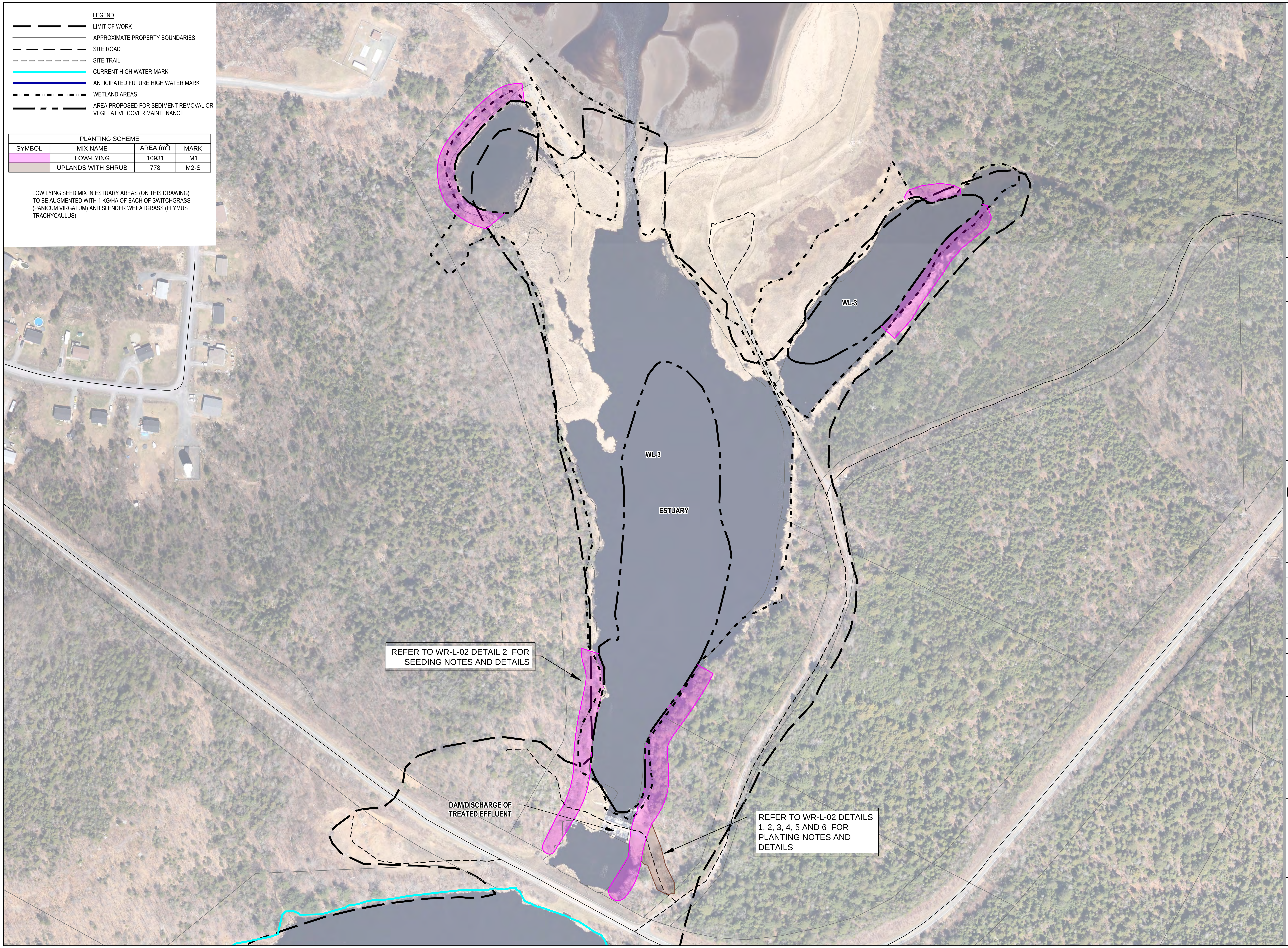
Sheet of

LEGEND

- LIMIT OF WORK
- APPROXIMATE PROPERTY BOUNDARIES
- SITE ROAD
- SITE TRAIL
- CURRENT HIGH WATER MARK
- ANTICIPATED FUTURE HIGH WATER MARK
- WETLAND AREAS
- AREA PROPOSED FOR SEDIMENT REMOVAL OR VEGETATIVE COVER MAINTENANCE

PLANTING SCHEME			
SYMBOL	MIX NAME	AREA (m^2)	MARK
	LOW-LYING	10931	M1
	UPLANDS WITH SHRUB	778	M2-S

LOW LYING SEED MIX IN ESTUARY AREAS (ON THIS DRAWING) TO BE AUGMENTED WITH 1 KG/HA OF EACH OF SWITCHGRASS (PANICUM VIRGATUM) AND SLENDER WHEATGRASS (ELYMUS TRACHYCAULUS)



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N

0 15 30 45m

SOURCE:
AERIAL PHOTO - NS LANDS, MAY 15, 2015

Client

NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project

BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
2	PRE-TENDER DELIVERABLE	DC	BS	05-21-2020
1	95% DESIGN REVIEW	DC	BS	03-12-2020

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Project Manager	C. SKIRTH	Date	May 21, 2020
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Project No. **11148275**

Title

AREA PLAN RESTORATION AND PLANTING 3 OF 3

Sheet No.

WR-L-05

Sheet of

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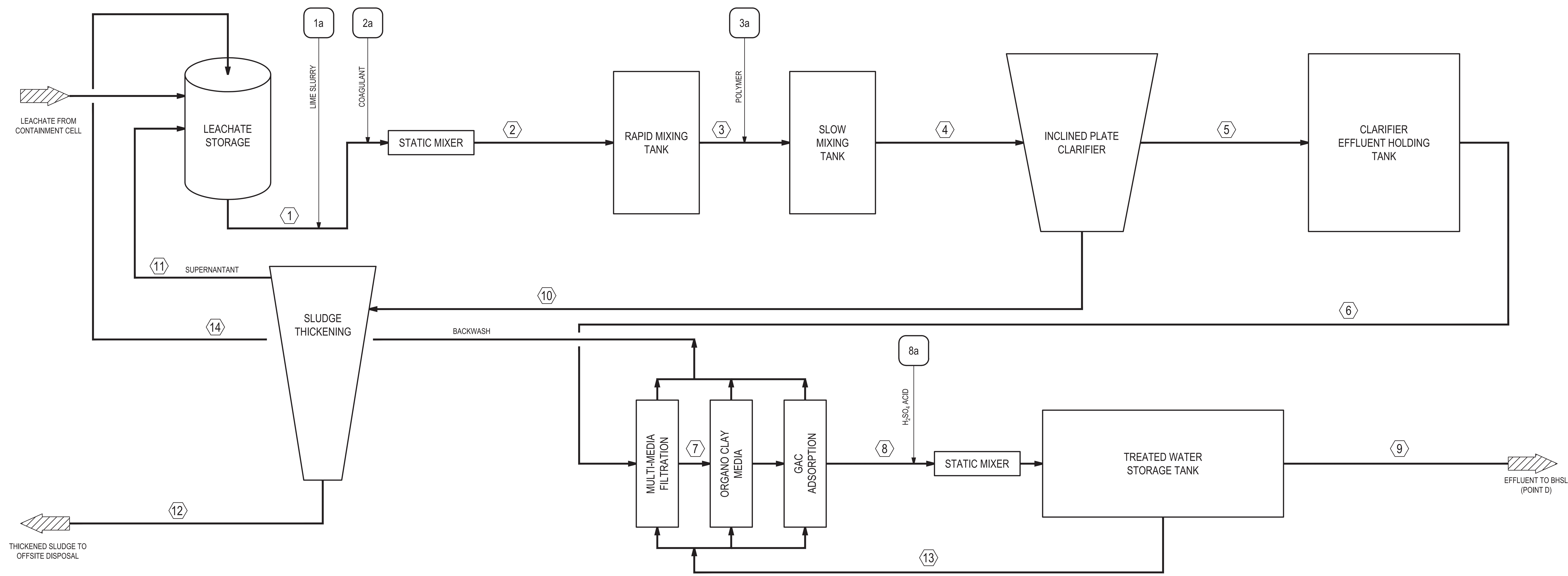

PROCESS STREAM TAG	Unit		1	2	3	4	5	6	7	8	9	10	11	12	13	14
DESCRIPTION		Raw Leachate (1)	Mixed Leachate and Backwash	Lime Treated Water	Coagulated Water	Polymer Treated Water	Clarified Water	Pre-Filtration	Media Filtered	GAC Adsorption	Final Effluent	Sludge	Thickener Supernatant	Thickened Sludge	Clean Backwash	Backwash
VOL FLOW	(m3/day)	1,000	1,190	1,214	1,215	1,225	1,195	1,195	1,195	1,195	1,195	30	20	10	170	170
MASS FLOW	(Tons/da	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids (TSS)	(mg/L)	-		-	-	-	-	-	-	-	-	-	-	15,000	-	-
BOD	(mg/L)	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-
pH		-	-	8.5	-	-	-	-	-	-	6 to 9	-	-	-		
TOTAL MERCURY (Hg)	µg/L	0.058	0.05276923	-	-	-	-	-	-	<0.013	<0.013	-	-	-	<0.013	0.022
TOTAL ALUMINUM (Al)	µg/L	4400	3844.95726	-	-	-	-	-	-	18	18	-	-	-	18	580
TOTAL CADMIUM (Cd)	µg/L	0.5	0.45059829	-	-	-	-	-	-	0.013	0.013	-	-	-	0.013	0.16
TOTAL CHROMIUM (Cr)	µg/L	3.8	3.43675213	-	-	-	-	-	-	<1.0	<1.0	-	-	-	<1.0	1.3
TOTAL COPPER (Cu)	µg/L	11	9.93931623	-	-	-	-	-	-	<2.0	<2.0	-	-	-	<2.0	3.7
TOTAL LEAD (Pb)	µg/L	2.9	2.69658119	-	-	-	-	-	-	<0.50	<0.50	-	-	-	<0.50	1.5
TOTAL ZINC (Zn)	µg/L	39	36.6752136	-	-	-	-	-	-	<5.0	<5.0	-	-	-	<5.0	23
>C10-C16 HYDROCARBONS-	mg/L	0.086	0.08774358	-	-	-	-	-	-	<0.050	<0.050	-	-	-	<0.050	0.098
>C16-C21 Hydrocarbons-	mg/L	0.18	0.17854700	-	-	-	-	-	-	0.087	0.087	-	-	-	0.087	0.17
>C21-<C32	mg/L	0.59	0.59581196	-	-	-	-	-	-	<0.10	<0.10	-	-	-	<0.10	0.63
MODIFIED TPH (TIER1)	mg/L	0.85	0.85726495	-	-	-	-	-	-	<0.10	<0.10	-	-	-	<0.10	0.90
OCTA CDD*	pg/L	7	-	-	-	-	-	-	-	<1.09	<1.09	-	-	-	<1.09	-
2,3,7,8-TETRA CDF**	pg/L	24.7	-	-	-	-	-	-	-	<0.878	<0.878	-	-	-	<0.878	-
TOTAL TOXIC EQUIVALENCY	pg/L	2.03	-	-	-	-	-	-	-	1.81	1.81	-	-	-	1.81	-

CHEMICAL INJECTION SYSTEM				
STREAMTAG	ADDITIVE	CONCENTRATION	SETTING	
1a	LIME	2 grams/liter	47.6	kg/day of dry powder
2a	COAGULANT	-	0.72828	M3/day of 100%
3a	POLYMER	0.5% v/v	0.054654	M3/day of 100%
8a	H2SO4	1% v/v	0.059773	M3/day of 93%

NOTE:
1. AVERAGE DAY SCENARIO ASSUMES ONE (1) TREATMENT TRAIN IN OPERATION.
2. CHEMICAL REQUIREMENTS SHOWN ARE NOMINAL AND MAY BE ADJUSTED BASED ON SITE JAR TESTING

95% DESIGN REVIEW

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Client
NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project
BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
3	95% DESIGN REVIEW	NQ	BS	03-12-2020
2	50% DESIGN REVIEW	NQ	BS	12-20-2019
1	30% DESIGN REVIEW	JS	BS	10-18-2019

Drawn	J. SPENLER	Designer	C. EVEREST
Drafting Check	B. PLETZ	Design Check	D. RIZZUTI
Project Manager	C. SKIRTH	Date	Mar 11, 2020
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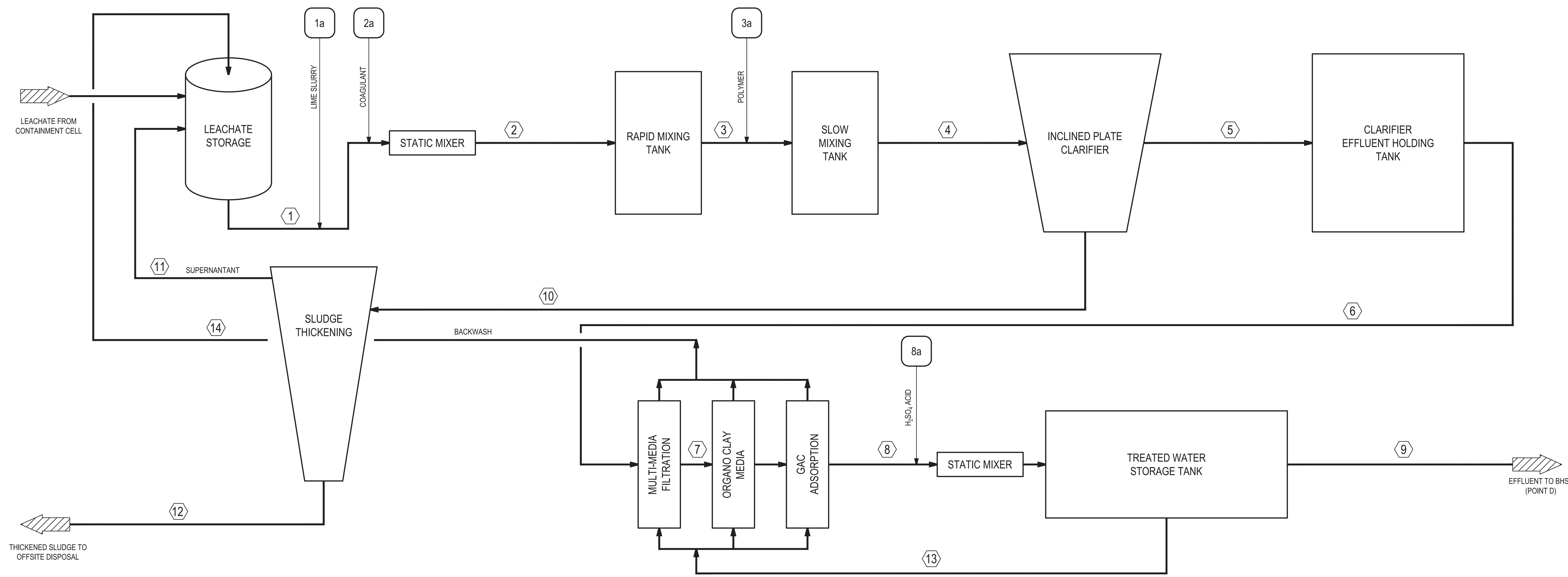
Project No. 11148275

Title
TLTS MASS BALANCE/ PROCESS FLOW DIAGRAM (PEAK FLOW)

Sheet No.
CC-P-03a

Sheet 5 of 12



PROCESS STREAM TAG	Unit		1	2	3	4	5	6	7	8	9	10	11	12	13	14
DESCRIPTION		Raw Leachate (1)	Mixed Leachate and Backwash	Lime Treated Water	Coagulated Water	Polymer Treated Water	Clarified Water	Pre-Filtration	Media Filtered	GAC Adsorption	Final Effluent	Sludge	Thickener Supernatant	Thickened Sludge	Clean Backwash	Backwash
VOL FLOW	(m3/day)	250	298	303	304	306	299	299	299	299	299	8	5	3	43	43
MASS FLOW	(Tons/da	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Suspended Solids (TSS)	(mg/L)	-		-	-	-	-	-	-	-	-	-	-	15,000	-	-
BOD	(mg/L)	<5	<5	-	-	-	-	-	-	-	-	-	-	-	-	-
pH		-	-	8.5	-	-	-	-	-	-	6 to 9	-	-	-		
TOTAL MERCURY (Hg)	µg/L	0.058	0.05276923	-	-	-	-	-	-	<0.013	<0.013	-	-	-	<0.013	0.022
TOTAL ALUMINUM (Al)	µg/L	4400	3844.95726	-	-	-	-	-	-	18	18	-	-	-	18	580
TOTAL CADMIUM (Cd)	µg/L	0.5	0.45059829	-	-	-	-	-	-	0.013	0.013	-	-	-	0.013	0.16
TOTAL CHROMIUM (Cr)	µg/L	3.8	3.43675213	-	-	-	-	-	-	<1.0	<1.0	-	-	-	<1.0	1.3
TOTAL COPPER (Cu)	µg/L	11	9.93931623	-	-	-	-	-	-	<2.0	<2.0	-	-	-	<2.0	3.7
TOTAL LEAD (Pb)	µg/L	2.9	2.69658119	-	-	-	-	-	-	<0.50	<0.50	-	-	-	<0.50	1.5
TOTAL ZINC (Zn)	µg/L	39	36.6752136	-	-	-	-	-	-	<5.0	<5.0	-	-	-	<5.0	23
>C10-C16 HYDROCARBONS-	mg/L	0.086	0.08774358	-	-	-	-	-	-	<0.050	<0.050	-	-	-	<0.050	0.098
>C16-C21 Hydrocarbons-	mg/L	0.18	0.17854700	-	-	-	-	-	-	0.087	0.087	-	-	-	0.087	0.17
>C21-<C32	mg/L	0.59	0.59581196	-	-	-	-	-	-	<0.10	<0.10	-	-	-	<0.10	0.63
MODIFIED TPH (TIER1)	mg/L	0.85	0.85726495	-	-	-	-	-	-	<0.10	<0.10	-	-	-	<0.10	0.90
OCTA CDD*	pg/L	7	-	-	-	-	-	-	-	<1.09	<1.09	-	-	-	<1.09	-
2,3,7,8-TETRA CDF**	pg/L	24.7	-	-	-	-	-	-	-	<0.878	<0.878	-	-	-	<0.878	-
TOTAL TOXIC EQUIVALENCY	pg/L	2.03	-	-	-	-	-	-	-	1.81	1.81	-	-	-	1.81	-

CHEMICAL INJECTION SYSTEM

STREAMTAG	ADDITIVE	CONCENTRATION	SETTING	
1a	LIME	2 grams/liter	11.9	kg/day of dry powder
2a	COAGULANT	-	0.18207	M3/day of 100%
3a	POLYMER	0.5% v/v	0.013663	M3/day of 100%
8a	H2SO4	1% v/v	0.014943	M3/day of 93%

NOTE:
1. AVERAGE DAY SCENARIO ASSUMES ONE (1) TREATMENT TRAIN IN OPERATION.
2. CHEMICAL REQUIREMENTS SHOWN ARE NOMINAL AND MAY BE ADJUSTED BASED ON SITE JAR TESTING

95% DESIGN REVIEW

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Client
NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project
BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
3	95% DESIGN REVIEW	NQ	BS	03-12-2020
2	50% DESIGN REVIEW	NQ	BS	12-20-2019
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Drawn	J. SPENLER	Designer	C. EVEREST
Drafting Check	B. PLETZ	Design Check	D. RIZZUTI
Project Manager	C. SKIRTH	Date	Mar 11, 2020
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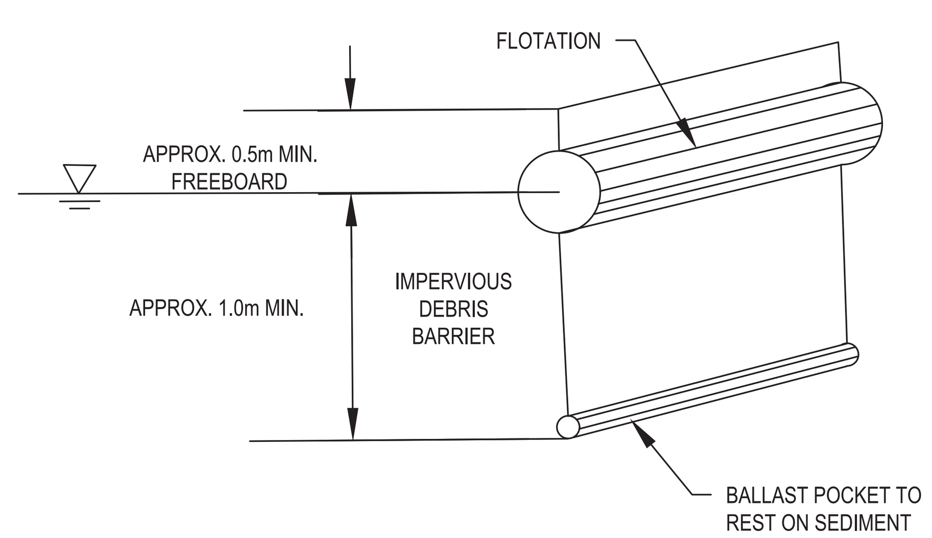
Project No. 11148275

Title
TLTS MASS BALANCE/ PROCESS FLOW DIAGRAM (AVERAGE FLOW)

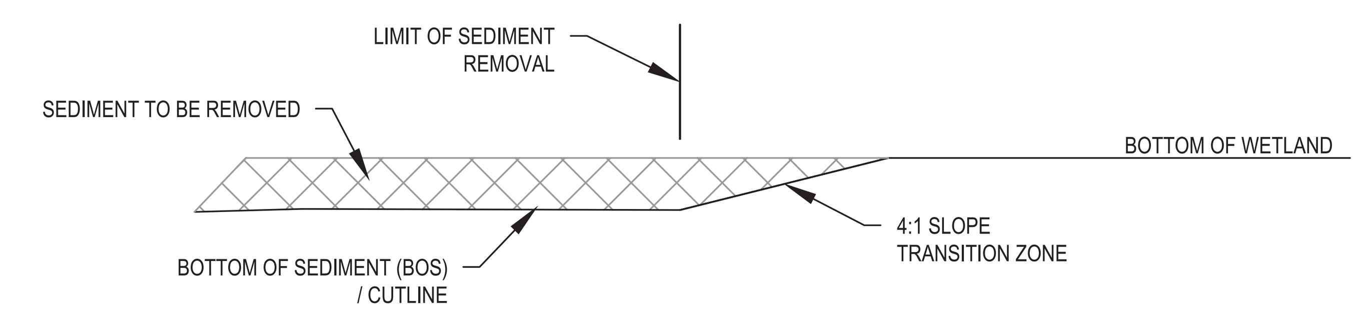
Sheet No.
CC-P-03b

Sheet 6 of 12

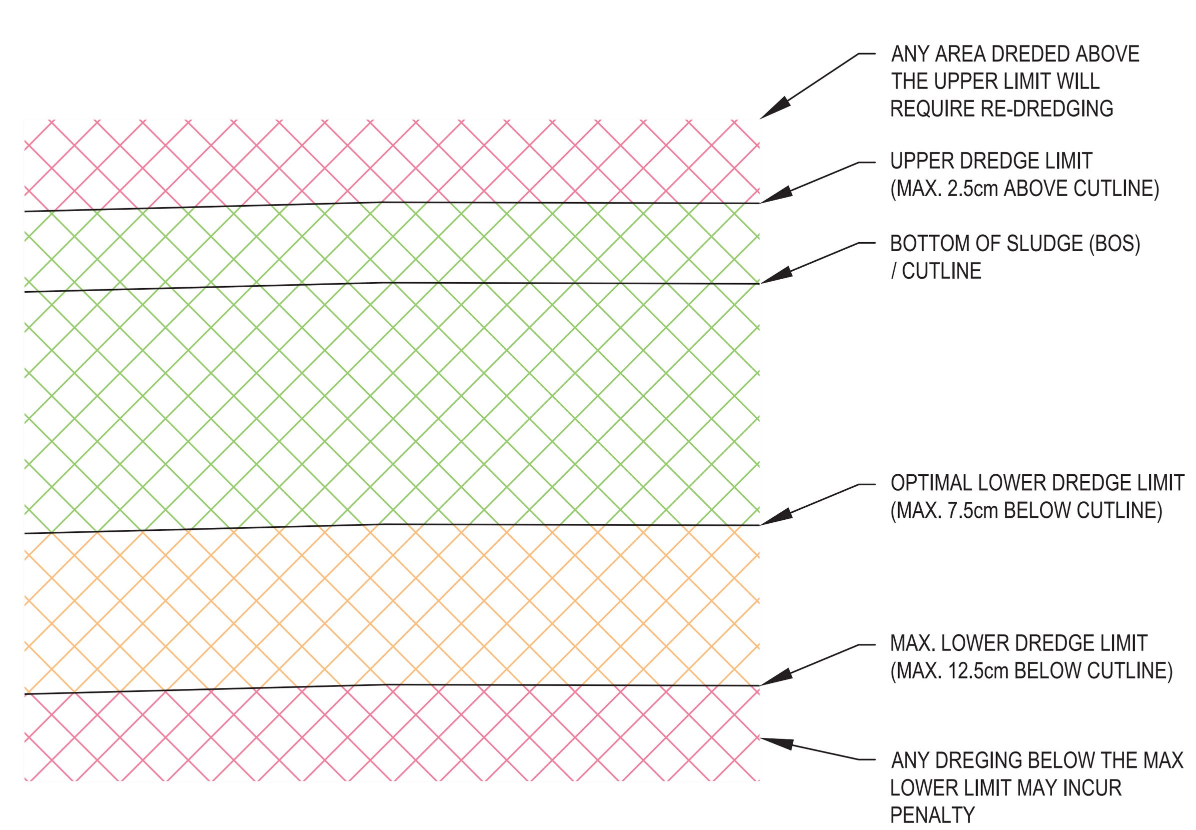
Plot Date: 11 March 2020 - 10:18 AM Plotted By: Nicholas Quehl CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11148000s\11148275\11148275-REPORT\11148275-17(024)\11148275-17(024)PR\11148275-17(024)PR-WA001.dwg



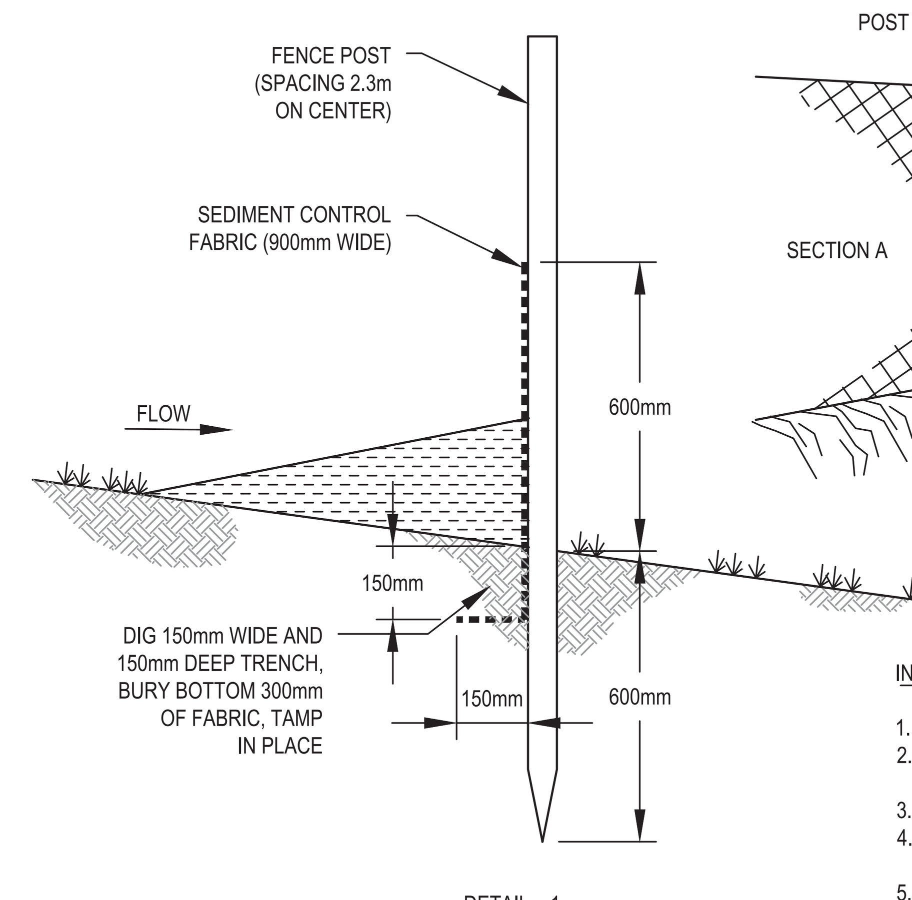
1 DEBRIS BOOM/SILT CURTAIN DETAIL
xx N.T.S.

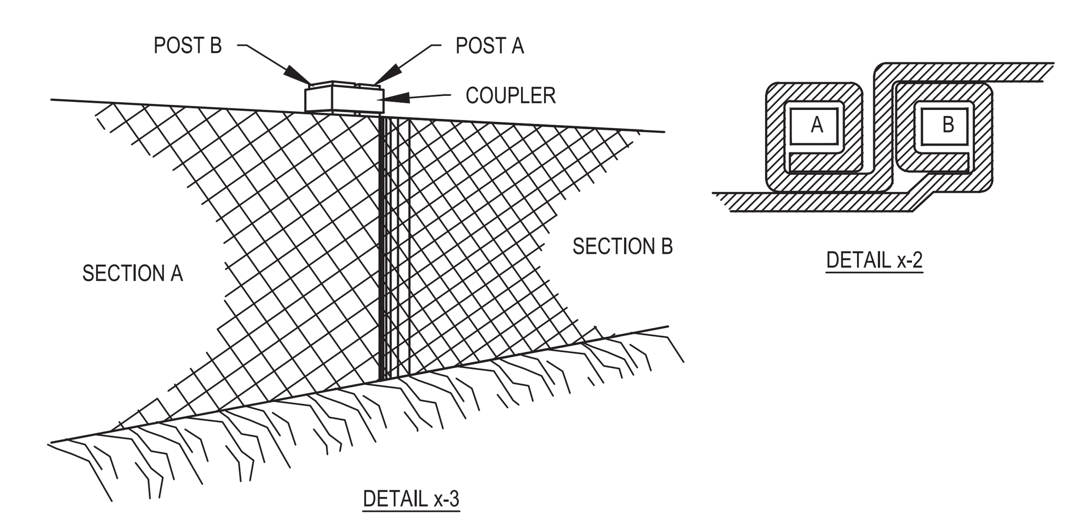


2 WETLAND SEDIMENT REMOVAL TRANSITION
xx N.T.S.



3 DREDGING CUTLINE LIMITS
xx N.T.S.





NOTES:

1. SILT FENCE HEIGHT TO BE 600mm ABOVE GROUND, CONSTRUCTED OF FABRIC WITH MINIMUM TENSILE STRENGTH OF APPROXIMATELY 54kg (MIRAFI ENVIROFENCE, TERRAFIX TERRAFENCE OR APPROVED EQUIVALENT).
2. SILT FENCE TO HAVE FACTORY ATTACHED FENCE POSTS.
3. REFER TO DRAWING FOR LOCATION OF SILT FENCE.

INSTALLATION SEQUENCE:

1. DIG A 150mm x 150mm TRENCH ALONG SILT FENCE LOCATIONS SHOWN
2. UNROLL SILT FENCE POSITIONING THE POSTS ON THE DOWNSTREAM SIDE.
3. DRIVE POSTS INTO THE GROUND AS SHOWN ON DETAIL x-1.
4. LAY THE BOTTOM 3.7m OF FABRIC FLAP IN THE BOTTOM OF THE TRENCH, BACKFILL AND COMPACT.
5. ADJACENT SECTIONS OF THE SILT FENCE ARE JOINED AS SHOWN IN DETAIL x-2. A COUPLER CAN BE USED TO SECURE ADJACENT POSTS AS SHOWN IN DETAIL x-3.

4 SILT FENCE
xx N.T.S.

95% DESIGN REVIEW

GHD Limited
120 Western Parkway Suite 110
Bedford Nova Scotia B4B 0V2 Canada
T 902 468 1248 **F** 902 468 2207 **W** www.ghd.com

Client
NS LANDS - BOAT HARBOUR PICTOU LANDING, NOVA SCOTIA

Project
BOAT HARBOUR REMEDIATION

No.	Issue	Drawn	Approved	Date
2	95% DESIGN REVIEW	DC	JP	3-12-2020
1	50% DESIGN REVIEW	DC	JP	12-20-2019

Drawn	D. CORKILL	Designer	D. CORKILL
Drafting Check	J. PENTON	Design Check	J. PENTON
Project Manager	C. SKIRTH	Date	Dec 3, 2019
This document shall not be used for construction unless signed and sealed for construction.		Scale	AS SHOWN
Original Size	ANSI D	Bar is 20mm on original size drawing	0 20mm

Project No. 11148275

Title
DREDGING DETAILS

Sheet No.
DR-C-34

Sheet of

Appendix B

Supplemental Coastal Modelling Memo

Memorandum

October 22, 2021

To	Angela Swaine, NS Lands		
Copy to	Troy Small		
From	Andrew Betts/Christine Skirth/vl/089	**Tel**	613-297-7687
Subject	Supplemental Coastal Hydraulic Modelling Application of Mitigation Measures to Reduce TSS Concentration in Water Entering the Northumberland Strait Boat Harbour Remediation Project	**Project no.**	11148275

1. Introduction

1.1 Background

Boat Harbour is located in Pictou Landing, Nova Scotia, along the southern shore of the Northumberland Strait (refer to Figure 1 below). In 1967, Boat Harbour was converted to the Boat Harbour Effluent Treatment Facility (BHETF) for the treatment of industrial effluent generated by the bleached Kraft Pulp Mill at Abercrombie Point. Prior to that, Boat Harbour consisted of a tidal estuary and wetland network connected to the Northumberland Strait via an inlet channel through a barrier beach system. Construction of the BHETF consisted of damming the Boat Harbour inlet channel north of the causeway, construction of the Highway 348 Causeway and constructing a treatment facility that has been expanded and modified over its years of operation.

The Industrial Approval for the operation of the Kraft Pulp Mill expired on January 31, 2020, and the province is completing the planning and design for the remediation of Boat Harbour and lands associated with the BHETF. As part of the remediation, the existing causeway along Highway 348 and the dam will be removed and replaced with a bridge to return Boat Harbour to tidal conditions.

Following remediation, tidal action will be reintroduced to Boat Harbour, causing increases in salinity levels, displacement of marine sediments, and morphological changes to Boat Harbour and its inlet channel. In September of 2020, WSP undertook a numerical modelling study to characterize the effect of tidal action following completion of remediation and removal of the BHETF dam (WSP Canada Inc., September 2020). WSP study objectives were to: a) assess the time required for salinity levels to reach equilibrium conditions; b) assess the magnitude of sediment resuspension and the time required for suspended sediment levels to reach equilibrium conditions and, c) assess the magnitude and duration of morphological changes induced in the Boat Harbour inlet channel.

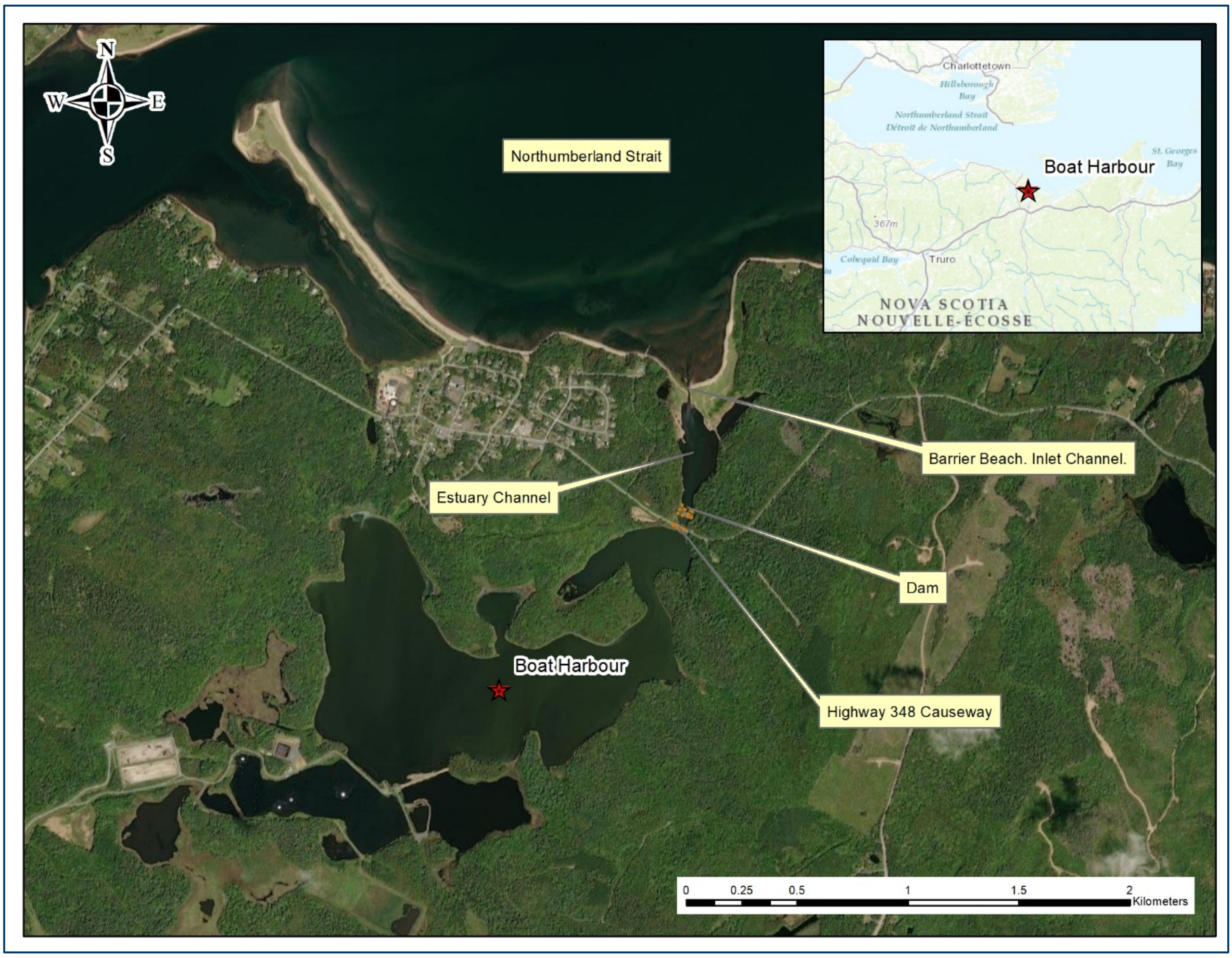


Figure 1 ***Boat Harbour site location and main features of interest.***

The main outcomes from the WSP study were (Appendix Z of EIS):

– Salinity levels inside Boat Harbour will reach an equilibrium of 24.5 ppt after 13 days post dam removal.
– Total suspended solids (TSS) concentrations in Boat Harbour and immediately offshore of the inlet channel will be in the order of 1,000 milligrams/Litre (mg/L) following dam removal and may remain elevated into the 100 mg/L levels for a period of several months. Equilibrium values are approached after approximately 42 weeks, with TSS concentrations continue to gradually decrease up to one year following dam removal. After one-year, TSS concentrations in Boat Harbour are modelled to range between 16 mg/L and 122 mg/L. At equilibrium, maximum TSS concentrations entering the Northumberland Strait are modelled to range from 7 mg/L to 52 mg/L. TSS concentrations in the Northumberland Strait adjacent to the inlet channel are modelled to range from 7 mg/L to 15 mg/L.
– Suspended sediment predominantly consists of clay throughout Boat Harbour with a minor (10 to 20 percent) silt content in the inlet channel.
– A portion of suspended silt and clay exits the model domain into the Northumberland Strait, whereas sand tends to remain nearby the inlet channel.
– The inlet channel through the Barrier Beach erodes post dam removal with the width increasing from 21 metres (m) to 34 m and a bed scouring depth of approximately 1 m.
– The wetland areas remain submerged with a Lower Low Water Large Tide (LLWLT) of 0.75 m CGVD2013.

The analyses carried out by WSP were done using the Delft3D version 4.04.01 software package (DELTARES, 2019). Parameterization of the BHETF remediation plan, the Boat Harbour and of the Marine Environment can be found in Sections 2 and 3 of the WSP Report. The model was calibrated using water levels, salinity and TSS measurements collected at different locations across the project site. Details about the model's calibration can be found in Section 4 of the WSP Report.

1.2 Scope of Present Work

The purpose of the supplemental modelling was to validate the previous modelling completed by WSP (2020) and to assess alternatives to the remediation configuration and application of mitigation measures to reduce the time to equilibrium and TSS concentrations in water entering the Northumberland Strait post remediation.

The native files of the Delft3D model – for the BHETF remediation scenario – were provided by WSP and reviewed to verify the results presented in the WSP Report and understand the tidal hydrodynamics in Boat Harbour following the dam removal, as well as the resulting changes in salinity concentrations, bed morphology, and TSS concentrations.

The Delft3D model from WSP was updated for the scenarios presented and described in Section 2 of this memorandum and the results of these simulations, presented in Section 4, were used to: a) establish parameters of interest for the design of embankment and bed erosion protection for the remediation alternatives considered herein; and b) compare the resulting changes in salinity levels and mainly in TSS concentrations with mitigation measure implemented to the original model scenarios presented in the WSP Report.

The objective is to identify the affects of the mitigation measures on TSS concentrations and determine if reductions can be attained with reasonable remedial mitigation measures. A TSS compliance threshold of 25 mg/L was assumed by WSP for potential suspended sediment releases into the marine environment and this threshold is also considered in the present analysis. It is noted that the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (marine) guideline is 25 mg/L above background conditions. As such, it is GHD's understanding Nova Scotia Lands Inc. (NSLI) has committed to conducting seasonal background TSS surveys, specifically late fall and early winter, in the Northumberland Strait adjacent to the estuary prior to dam removal as a confirmatory exercise to refine background TSS concentrations adjacent to the estuary during the late fall and early winter periods.

To understand if the mitigation measures will reduce TSS concentration, the simulations were initially based on 90 days of simulations. These 90-days simulations are considered sufficient to derive parameters of interest for the additional mitigation measures considered herein. Mitigation measures that indicated favourable results were simulated for 365 days to determine the time to equilibrium. As shown in WSP Report, a simulation period of up to 365 days post dam removal was run to more precisely indicate whether TSS concentrations would reach equilibrium. As indicated above, as part of the mitigative strategies, NSLI has committed to monitoring background conditions and as well as updating the model to include seasonal conditions such as storm events and ice scour as well as natural sediment transport.

2. Remediation Scenarios

The supplemental modelling completed by GHD assesses alternatives to the remediation configuration in the WSP Report. The alternatives assessed in this report include:

1. Widening the channel hydraulic opening at the location of the Dam to the original shorelines – and protecting the slopes and bed against scouring.
2. Dredging the inlet channel through the barrier beach to 34 m wide and an additional 1 m in depth and protecting the slopes and bed against scouring.
3. Protecting estuary channel bed against scouring.

Table 1 below synthetizes the description of each scenario assessed herein. The resulting parameters of interest for embankment and bed scouring protection and resulting changes in salinity concentrations, TSS concentrations, and bed morphology development are presented in Section 4. The description of the scenarios are provided below.

A. Scenario A

- Original Scenario in the WSP Report.

B. Scenarios B

- The hydraulic passage at the location of the Dam is widened to original shoreline position. Bed scouring protection is added.
- The inlet channel entrance through the Barrier Beach is kept at its original geometry. Two variants are considered: B1) No embankment and no bed scouring protection; B2) Adding embankment and bed scouring protection.

C. Scenarios C

- The hydraulic passage at the location of the Dam is widened to original shoreline position. Bed scouring protection is added (as per Scenarios B).
- The inlet channel entrance through the Barrier Beach is enlarged. Two variants are considered: C1) No embankment and no bed scouring protection to the enlarged channel; C2) Adding embankment and bed scouring protection to the enlarged channel.

D. Scenarios D

- The hydraulic passage at the location of the Dam is widened to original shoreline position. Bed scouring protection is added (as per Scenarios B and C).
- The Inlet channel through the Barrier Beach is enlarged and embankment and bed scouring protection is added (as per Scenario C).
- Bed scour protection is added to the estuary channel and into Boat Harbour.

Table 1 ***Remediation Scenarios.***

<table>
<tr><th rowspan="2">Scenario</th><th colspan="4">Locations</th></tr>
<tr><th>Highway 348 Causeway</th><th>Dam Removal</th><th>Inlet Channel Barrier Beach</th><th>Estuary Channel</th></tr>
<tr><td>WSP Original
A</td><td rowspan="6">Replaced with a bridge.
Scouring protection.</td><td>Dam section only.
Scouring protection.</td><td rowspan="2">Original channel.
No protection.</td><td rowspan="5">No Bed Protection</td></tr>
<tr><td>B1</td><td rowspan="5">Widening to shorelines.
Scouring protection.</td></tr>
<tr><td>B2</td><td>Original channel.
Scouring protection.</td></tr>
<tr><td>C1</td><td>Enlarged channel.
No protection.</td></tr>
<tr><td>C2</td><td rowspan="2">Enlarged channel.
Scouring protection.</td></tr>
<tr><td>D</td><td>Bed Scouring Protection in estuary channel and into Boat Harbour</td></tr>
</table>

3. Numerical Modelling

In order to attain the study's objectives outlined in subsection 1.2 of this document, numerical modelling was carried out by GHD using both the Delft3D software package and the 2-dimensional component of the HEC-RAS software version 5.0.7 (USACE, 2016). The Delft3D software package was used to assess changes in salinity concentrations, bed morphology, and TSS concentrations as well as to derive parameters of interest for the design of embankment and bed erosion protection. The 2D HEC-RAS model was used as a check for the tidal hydrodynamic results and to expedite the process of deriving parameters of interest for the design of embankment and bed erosion protection.

3.1 Delft-3D Model

Delft-3D (DELTARES, 2019) is a hydrodynamic model with wave, sediment transport, and water quality modules. It is a non-commercial open-source model developed by Delft Hydraulics in the Netherlands. It is widely considered to be one of the best available models for the prediction of flow, sediment transport, and water quality in estuarine conditions.

For the remediation scenarios listed in Table 1, the model includes the inlet channel through the Beach Barrier; Highway 348 Bridge; Post-dredged Boat Harbour and wetlands; post Dam removal and dredged wetland channel between wetland WL-16 and the former ASB. For the remediation scenarios listed in Table 1, the model includes the inlet channel through the Beach Barrier; Highway 348 Bridge; Post-dredged Boat Harbour and wetlands; post Dam removal and dredged wetland channel between wetland WL-16 and the former ASB.

The model's numerical terrain is based on a set of topographic and bathymetric datasets listed in subsection 3.3.1 of the WSP Report. Figure 2 and Figure 3 presents the Model Domain and Grid and Numerical Terrain Model respectively. Details about the model's grid can be found in subsection 3.3.2 of WSP Report. The model forcing consists of an ocean tidal boundary driven by a water level signal (refer to Figure 2 below) and by drainage from the adjacent sub-catchment areas. Details about the model's boundary conditions can be found in subsection 3.3.5 of the WSP Report.

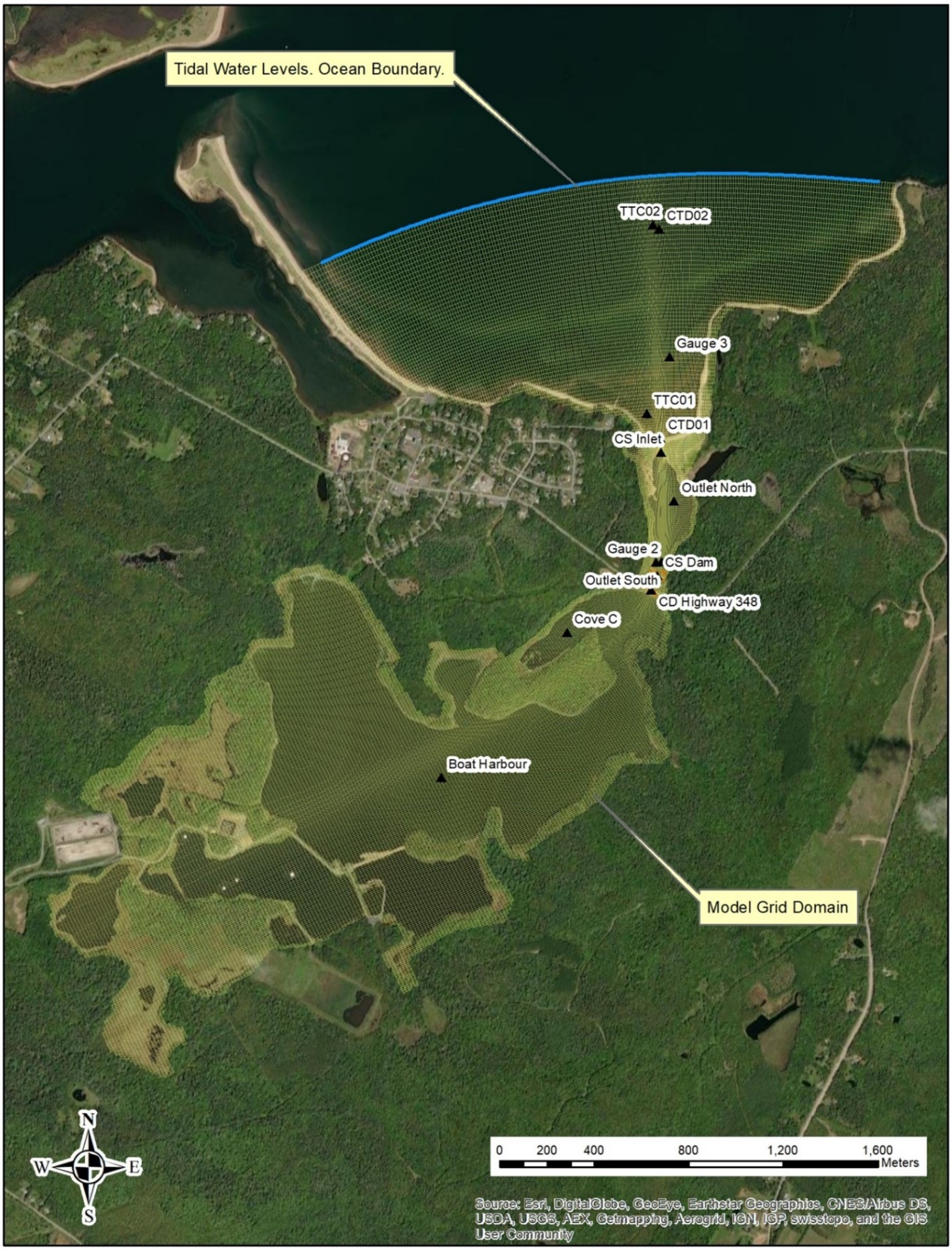


Figure 2 *Delft 3D Model. Grid Domain.*

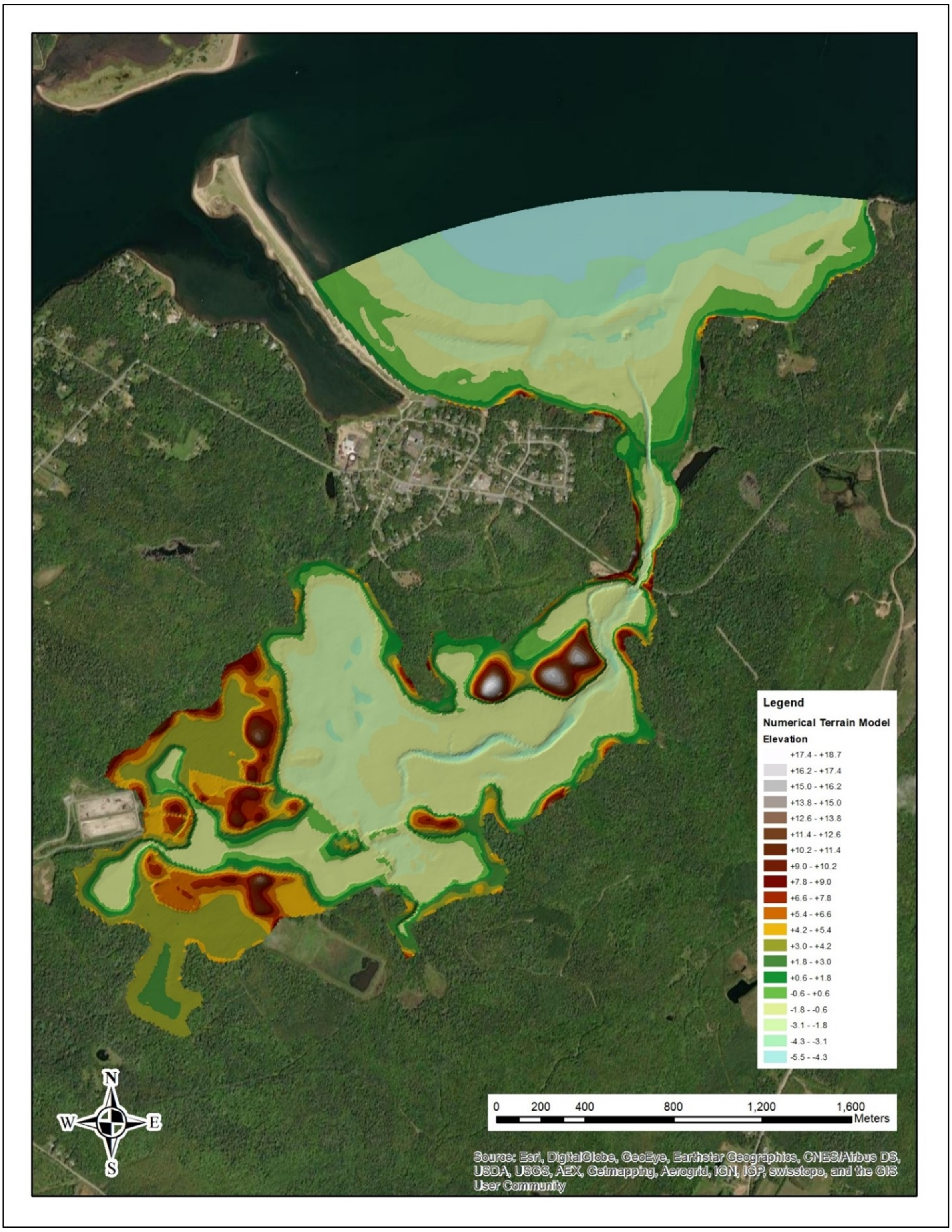


Figure 3 Numerical Terrain Model.

3.2 HEC-RAS 2D Model

The domain and boundary conditions applied to the HECRAS-2D model are the same as the ones for the Delft-3D model. The computational mesh developed for the 2D model has cell sizes that are appropriate for modelling both the terrain as well as the water flowing over the terrain. The mesh size varies throughout the domain of the model, according to the relevance of the studied areas, but is largely in line with the mesh sizes of the Delft-3D model. The hydraulic regime in the Boat Harbour area is tidally influenced, and as such the full momentum-based equation set was used. The tides are dynamic waves that propagate up into the estuary channel and dictates the regime in Boat Harbour. Due to typical shallow water tables and saturated soil conditions that are associated with estuary and wetland soils, the soil infiltration dynamics was not considered in the model. Simulation of water levels and other hydraulic variables of interested are therefore solely based on the interactions between tidal water levels at Northumberland Strait, water inputs from the adjacent drainage areas, and direct precipitation over the model domain.

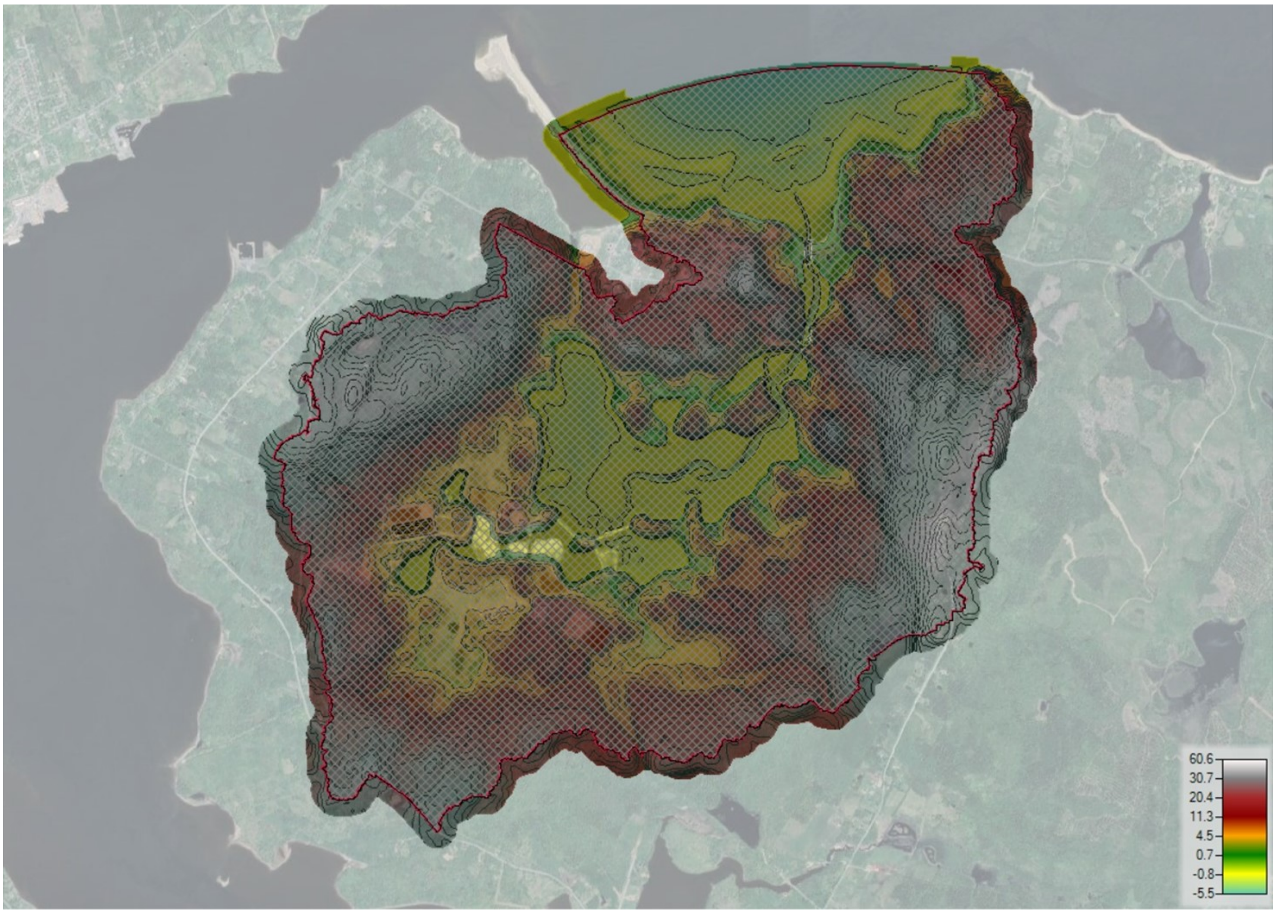


Figure 4 *HEC-RAS 2D model grid domain and numerical terrain.*

4. Results

This section presents and discusses the model results. Fluxes of water and sediment are calculated at the inlet channel through the Barrier Beach. Salinity and TSS concentrations are reported at output locations shown in Figure 2.

4.1 Tidal Hydrodynamics

Peak instantaneous ebb and flow discharges through the inlet channel for the remediation scenarios assessed herein are given in Table 2 below. Because scenarios C and D are based on a wider inlet channel, peak flood and ebb discharges are higher than those of scenarios A and B which are based on original channel geometry.

Figure 5 and Figure 6 present graphical results of peak ebb and flood discharges through the Highway 348 bridge and dam opening and Figure 7 and Figure 8 present graphical results of peak ebb and flood discharges through the inlet channel. The maximum simulated velocities through these hydraulic passages were used to derive parameters of interest for the design of embankment and bed scouring protection.

Table 2 Peak discharges through the inlet channel

Scenario	Peak Discharge (m³/s)	
	Flood	Ebb
WSP Original A	83.8	72.1
B1	84.6	72.9
B2	81.6	70.7
C1	88.1	74.7
C2	86.7	74.0
D	87.1	74.2

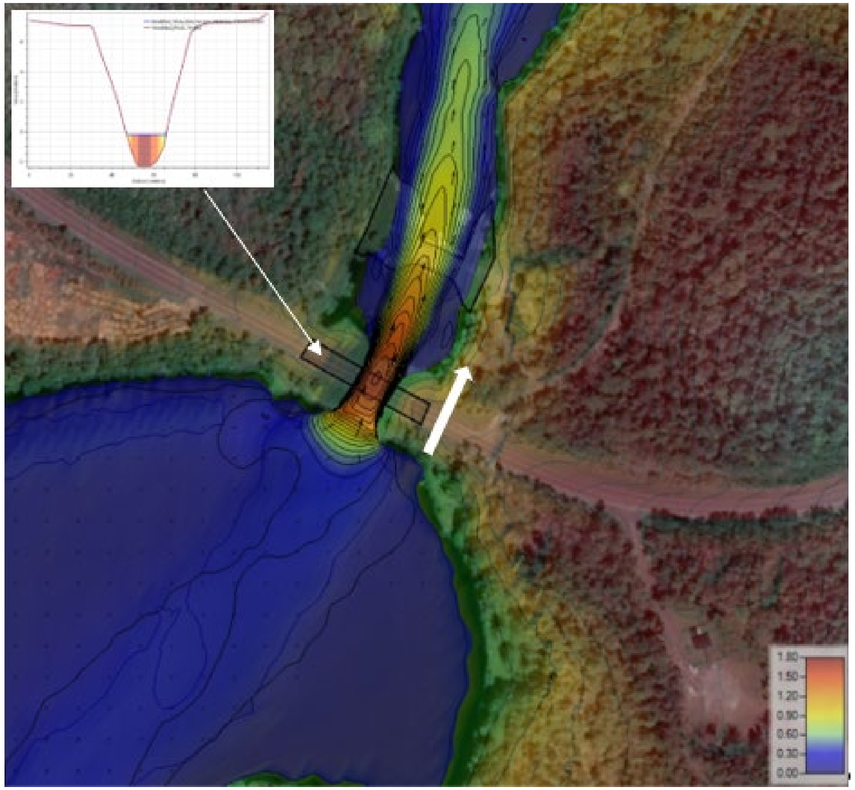


Figure 5 Ebb flow through Highway 348 causeway and dam opening. Velocity grid map

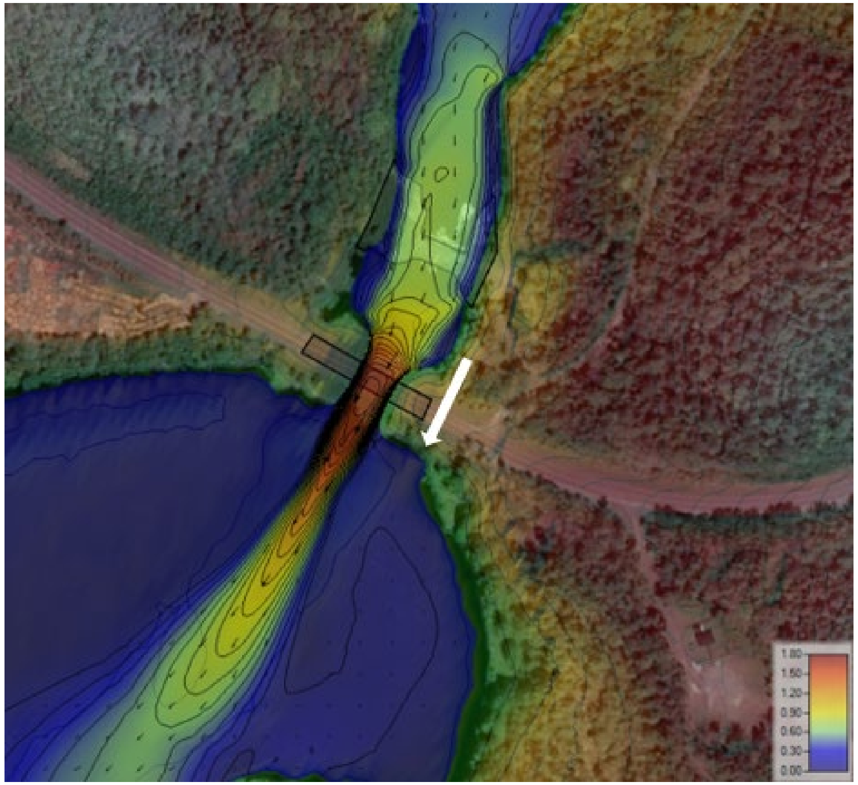


Figure 6 Discharge glow through Highway 348 causeway and dam opening. Velocity grid map.

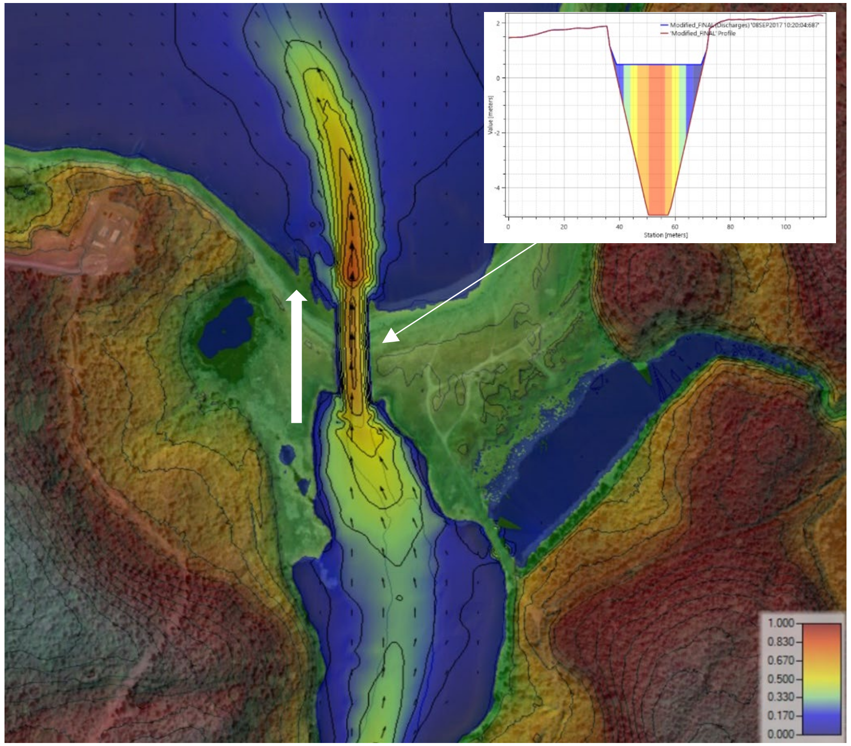


Figure 7 Ebb flow through the inlet channel of the barrier beach. 2-dimensional depth averaged velocity grid map.

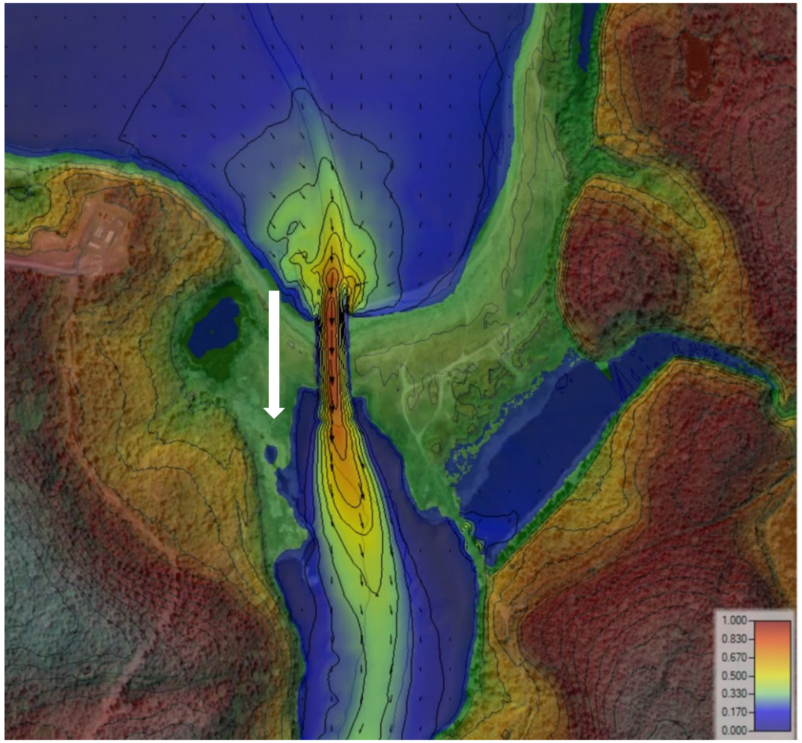


Figure 8 Discharge flow through the inlet channel of the barrier beach. 2-dimensional depth-averaged velocity grid map.

4.2 Flux of Sediment

The flux of sediment transport through the inlet has been plotted with a 12-hour moving average for all scenarios on figures in Attachment 1, accounting for both bed as well as suspended sediment transport. Table 3 presents, for all assessed scenarios, cumulative total transport of sediments after 50-day and 90-day dam removal.

Because scenarios C and D are based on a wider inlet channel, peak flood and ebb discharges are higher than those of scenarios A and B which are based on original channel geometry causing slightly more sediment to be transported out of Boat Harbour into the marine environment. For scenario D, cumulative sediment transport is about half of what is realized for the other assessed scenarios.

Table 3 Cumulative total transport of sediments after 50-day and 90-day dam removal

Scenario	Cumulative Sediment Transport (tonnes)	
	50-days	90-days
WSP Original A	75,191	87,637
B1	76,008	88,523
B2	74,778	86,488
C1	79,242	91,507
C2	78,868	91,940
D	37,221	43,078

4.3 Salinity Concentrations

As far as salinity levels are concerned, salinity concentrations for all assessed scenarios are virtually the same at the equilibrium stage (i.e., approximately 15 days after dam removal). Plots showing the development of salinity concentrations post dam removal can be found in Attachment 1.

4.4 TSS Concentrations

In its present condition, with the dam in place, there is little tidal forcing action capable of driving sediment transport and sediment resuspension. This is shown by the relatively low TSS concentrations (overall less than 20 mg/L at the time of sampling) measured on site as documented in the WSP Report. Following dam removal, the reintroduction of tidal action to Boat Harbour immediately increases the flow through the inlet and estuary channels. The resulting flow velocities trigger scour and sediment resuspension mostly in the inlet channel and the northern sections of Boat Harbour. This suspended sediment is transported by tidal action throughout Boat Harbour and offshore into the Northumberland Strait. As shown by the results presented in the WSP Report TSS concentrations in Boat Harbour gradually decline over a period of months due to settling within Boat Harbour, dilution with relatively clear water from the Northumberland Strait during flood tides, and dispersion in the Northumberland Strait on ebb tides. As suspended sediment concentrations in Boat Harbour decrease to an equilibrium condition, periods of elevated TSS concentration in the Northumberland Strait decrease in both magnitude and duration.

A TSS compliance threshold of 25 mg/L was assumed by WSP for potential suspended sediment releases into the marine environment and this threshold is also considered in the present analysis. As indicated in Section 1.2, NSLI has committed to conducting seasonal background TSS surveys in the Northumberland Strait adjacent to the estuary and the data used to refine the model and associated compliance thresholds.

Following dam removal, sediments are suspended as the estuary inlet channel and sections of Boat Harbour are scoured. Figure 9 shows where most of the scouring takes place, which is in the estuary channel and in the hydraulic passage near the Highway 348 causeway. This results in a large peak in TSS concentrations throughout Boat Harbour, the inlet channel, and near-shore in the Northumberland Strait. Timeseries of instantaneous TSS concentrations for various output locations are presented in figures in Attachment 1 for the first 90 days following dam removal. Peak instantaneous, mean and 50-days post dam removal TSS concentrations are provided in Table 4.

For all scenarios assessed herein, TSS concentrations and time of development are about the same values as for the BHETF scenario assessed by WSP. To bring TSS concentrations to a threshold limit within a reasonable timeline, a tentative scenario D was assessed. This scenario consists of protecting the entire estuary channel bed using medium to coarse gravel material (with particle diameters ranging from 10 millimetre [mm] to 30 mm). Simulations for this scenario indicated that TSS concentrations reached equilibrium values below the threshold limit of 25 mg/L in the marine environment after approximately 140 days following dam removal (refer to Figure A.8 and to TSS grid maps presented in Attachment 1).

Table 4 TSS concentrations (mg/L) after 50-day dam removal

Scenario	Outlet North			Gauge 3			Boat Harbour		
	Mean	Max.	50-day	Mean	Max.	50-day	Mean	Max.	50-day
A	383	5,482	105.8	78	1,520	22.5	610	4,297	193.7
B1	385	5,513	105.1	78	1,536	22.5	611	4,339	192.1
B2	379	5,501	105.5	76	1,529	22.1	604	4,332	191.2
C1	384	5,722	100.6	80	1,629	22.3	611	4,517	185.2
C2	388	5,716	100.7	80	1,624	22.1	618	4,514	185.2
D	196	2,243	57.9	46	575	16.4	438	2,360	142.4

4.5 Bed Level Development

Bed level changes are assumed to reach an equilibrium after about 1-year simulation period in the inlet channel and major erosional zones; and slowed to negligible rates elsewhere in the model domain. Bed level development between the post dredging and near-equilibrium condition of Boat Harbour is presented on Figure 9. Erosion is mapped as red and deposition in blue. The post-dredging and near-equilibrium bathymetry are presented in Figure 10 and Figure 11, respectively for the area near the Highway 348 causeway and for the area near the inlet channel/barrier beach.

The simulation results shows that erosion mostly occurs in the first 1.5 kilometre (km) of the inlet channel cross-section, with up to 2 m of erosion in the channel. The most severe erosion occurs just upstream and downstream of the Highway 348 Bridge. Sediment deposition occurs mostly in the cove just southwest of Highway 348 and adjacent to the dredged inlet channel north of the inlet. Almost no erosion or sedimentation occurs in the ASB or wetlands. In order to prevent erosion to occur, it is necessary to protect the entire estuary channel bed using medium to coarse gravel material (with particle diameters ranging from 10 millimetres [mm] to 30 mm).

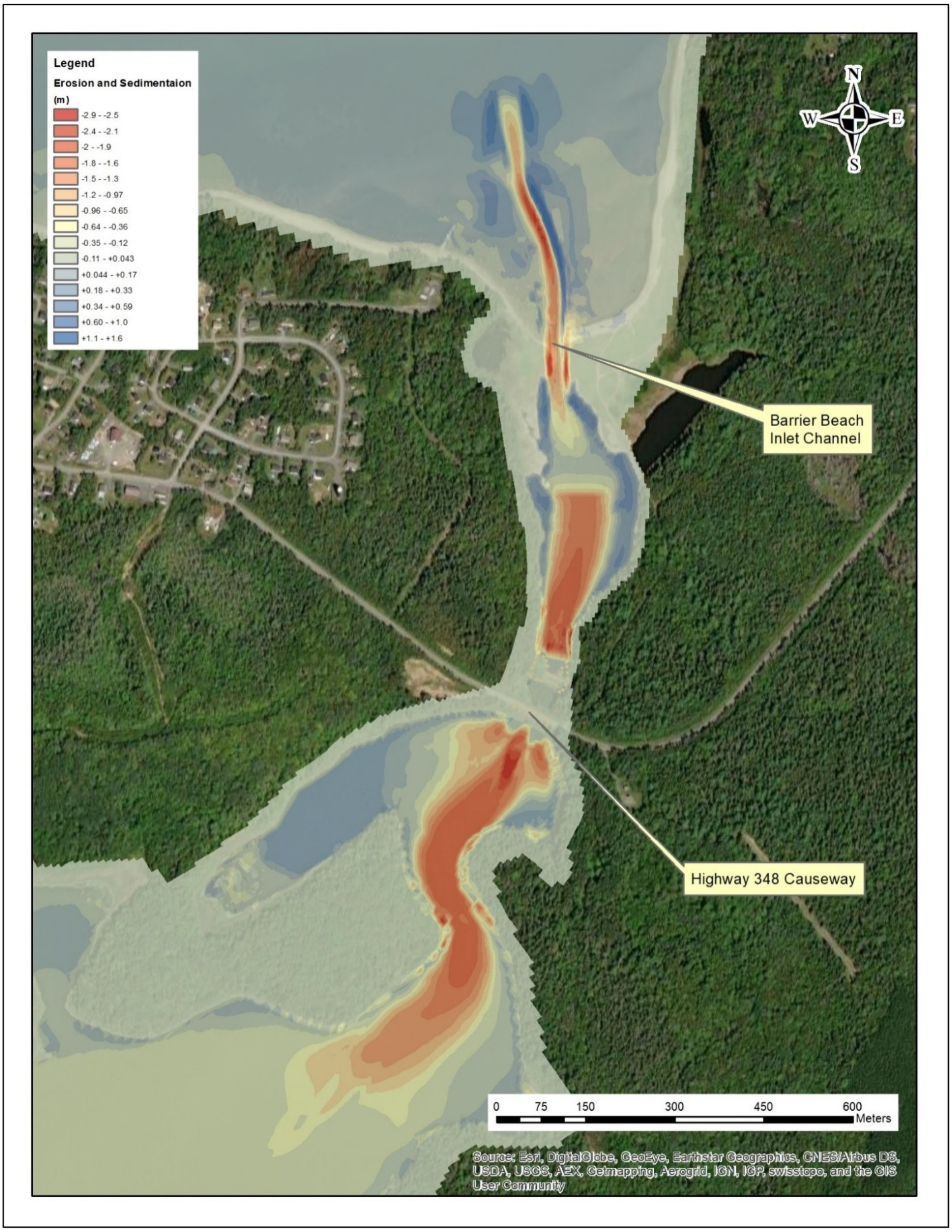


Figure 9 ***Cumulative erosion (red) and sedimentation (blue). Post dam removal.***

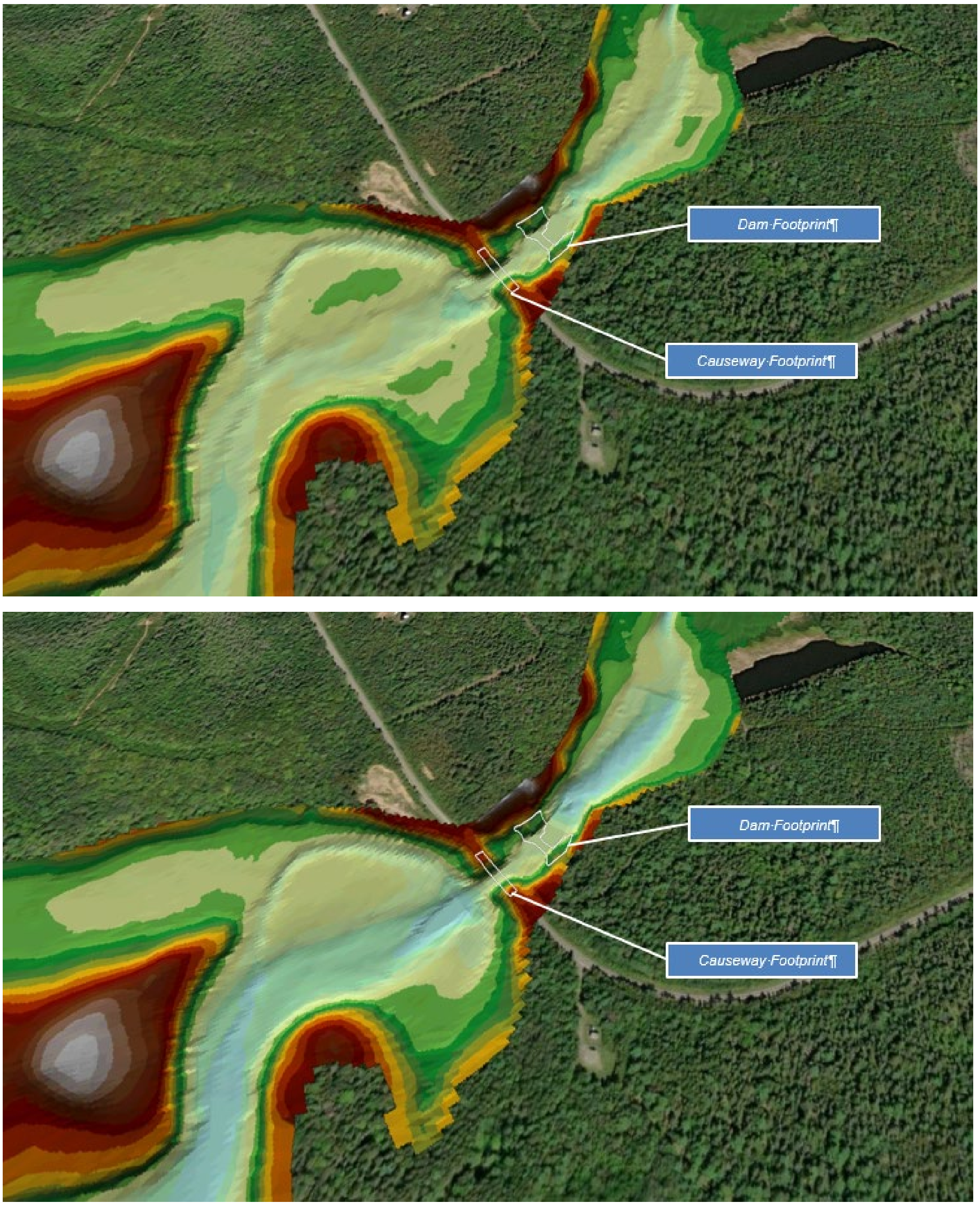


Figure 10 ***Perspective view of bed level change near the Highway 348 causeway. Initial Conditions (top). Post dam removal (bottom).***

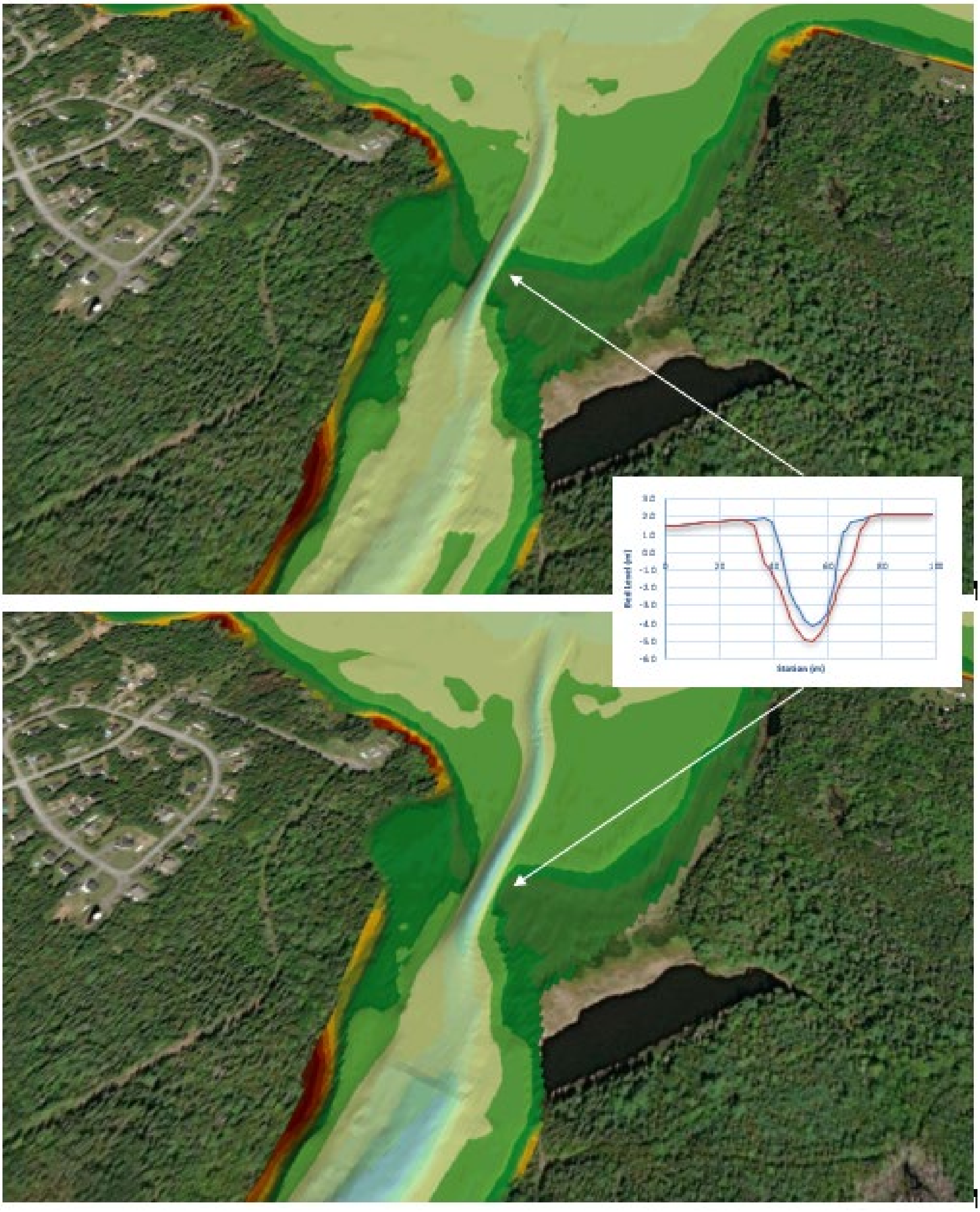


Figure 11 Perspective view of bed level change near the inlet channel/barrier beach. Initial conditions (top). Post dam removal (bottom).

4.6 Embankment and Bed Erosion Protection

The results of the hydrodynamic modelling were used to derive areas of interest for the design of embankment and bed erosion protection. These parameters are summarized in Table 6 below where riprap embankment protection and gravel material bed protection characteristics are also given.

The Isbach's equation for movement of stones in flowing water was used to size the riprap protection of the embankment slopes:

$$V = C \times \left\{2 \times g \times \frac{\gamma_s - \gamma_w}{\gamma_w}\right\}^{\frac{1}{2}} \times D_{50}^{\frac{1}{2}}$$

Where:

$V\ is\ the\ average\ velocity$

$C\ is\ the\ average\ velocity$

$g\ is\ the\ acceleration\ of\ gravity$

$\gamma_s\ is\ the\ specific\ weight\ of\ stone$

$\gamma_w\ is\ the\ specific\ weight\ of\ water$

$\gamma_w\ is\ the\ specific\ weight\ of\ water$

The Shields criterion and the equation for boundary shear stress given below were used to establish the diameter size of the material required to protect the bed against scouring. Range of particle diameters and critical bed shear stress are given in Table 5.

$$\tau_b = \rho \times C_d \times (u^2 + v^2)$$

Where:

$\tau_b\ is\ the\ boundary\ shear\ stress\ in\ Newton\ per\ square\ meter\ (N/m2)$

$\rho\ is\ the\ density\ of\ water\ in\ kilograms\ per\ cubic\ meter\ (kg/m3)$

$C_d\ is\ the\ drag\ coefficient\ (dimensionless)$

$u\ is\ the\ vertically\ averaged\ stream\ wise\ velocity\ (m/s)$

$v\ is\ the\ vertically\ averaged\ cross.stream\ velocity\ (m/s)$

Table 5 Range of particle diameters and critical bed shear stress

Particle Classification	Range of Particle Diameters (mm)		Critical Bed Shear Stress (N/m²)	
Coarse cobble	128	256	125.51	251.03
Fine cobble	64	128	62.76	125.51
Very coarse gravel	32	64	31.38	62.76
Coarse gravel	16	32	15.69	31.38
Medium gravel	8	16	7.84	15.69
Fine gravel	4	8	3.29	7.84
Very fine gravel	2	4	1.28	3.29
Very coarse sand	1	2	0.53	1.28

Table 6 Hydraulic parameters of interest for the design of embankment slope protection and bed scouring protection

Hydraulic Parameters	Highway 348 Causeway	Removed Dam	Inlet Channel/Barrier Beach.	
			Scenario B2. Original Channel.	Scenario C2. Dredged Channel.
Max. Depth-Averaged Velocity	2.21 m/s	1.42 m/s	1.40 m/s	1.00 m/s
Max. Depth	2.93 m	3.00 m	4.80 m	5.72 m (2)
Min. Depth	1.78 m	1.76 m	3.47 m	4.38 m (2)
Max. Boundary Shear Stress	63.3 N/m²	26.2 N/m²	20.3 N/m²	9.6 N/m²

Hydraulic Parameters	Highway 348 Causeway	Removed Dam	Inlet Channel/Barrier Beach.	
			Scenario B2. Original Channel.	Scenario C2. Dredged Channel.
Riprap protection on embankment slope:	D_{50} = 250 mm	D_{50} = 100 mm	D_{50} = 100 mm	D_{50} = 50 mm
Bed protection:	Fine to coarse cobbles 60 mm to 250 mm	Very coarse gravel 30 mm to 60 mm	Very coarse gravel 30 mm to 60 mm	Medium to coarse gravel 10 mm to 30 mm

5. References

DELTARES. (2019). *Simulation of multi-dimensional hydrodynamic flows and transport phenomena, including sediments. Version 3.15, SVN revision: 61637.* Deltares, Delft.

USACE. (2016). *HEC-RAS River Analysis System. 2D Modeling User's Manual.* US Army Corps of Engineers. Hydrologic Engineering Center.

WSP Canada Inc. (September 2020). *Boat Harbour Remediation Project. Coastal Hydraulic Modeling. Nova Scotia Lands Inc. Revision 3. Project #: 171-10478-00.*

Regards

Christine Skirth
Business Group Leader - Contaminated Sites

Andrew Betts
Business Group Leader

Attachment 1

Modelling Results

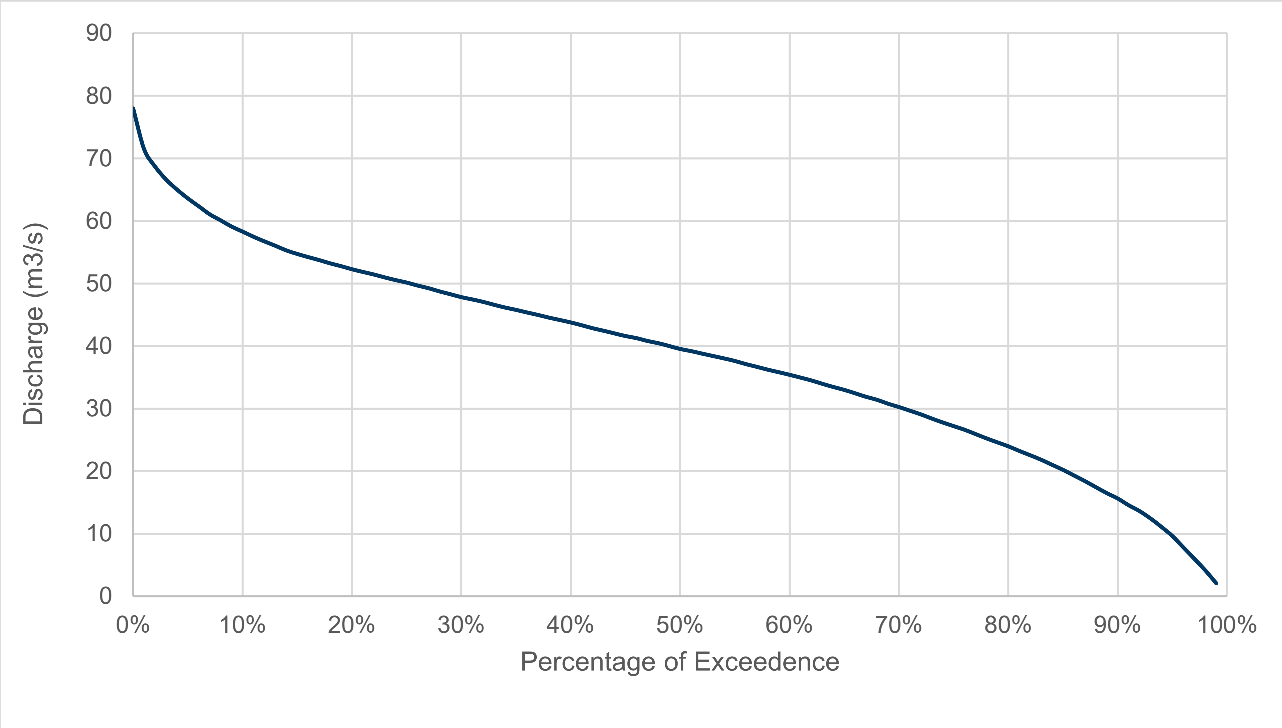


Figure 1.1 ***Flux of water through the inletinlet channel. Persistence curve. Scenario A.***

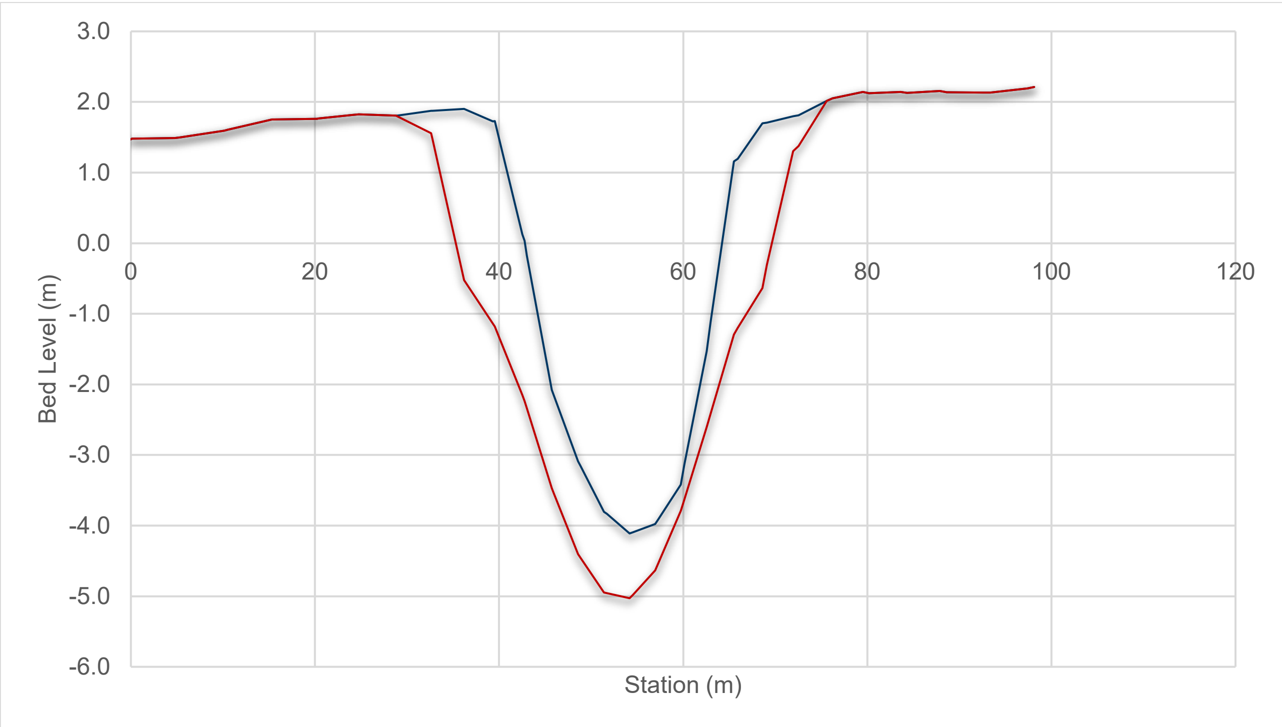


Figure 1.2 ***Bed level development after 242 days of tidal action,inlet inlet channel cross-section. Scenario A.***

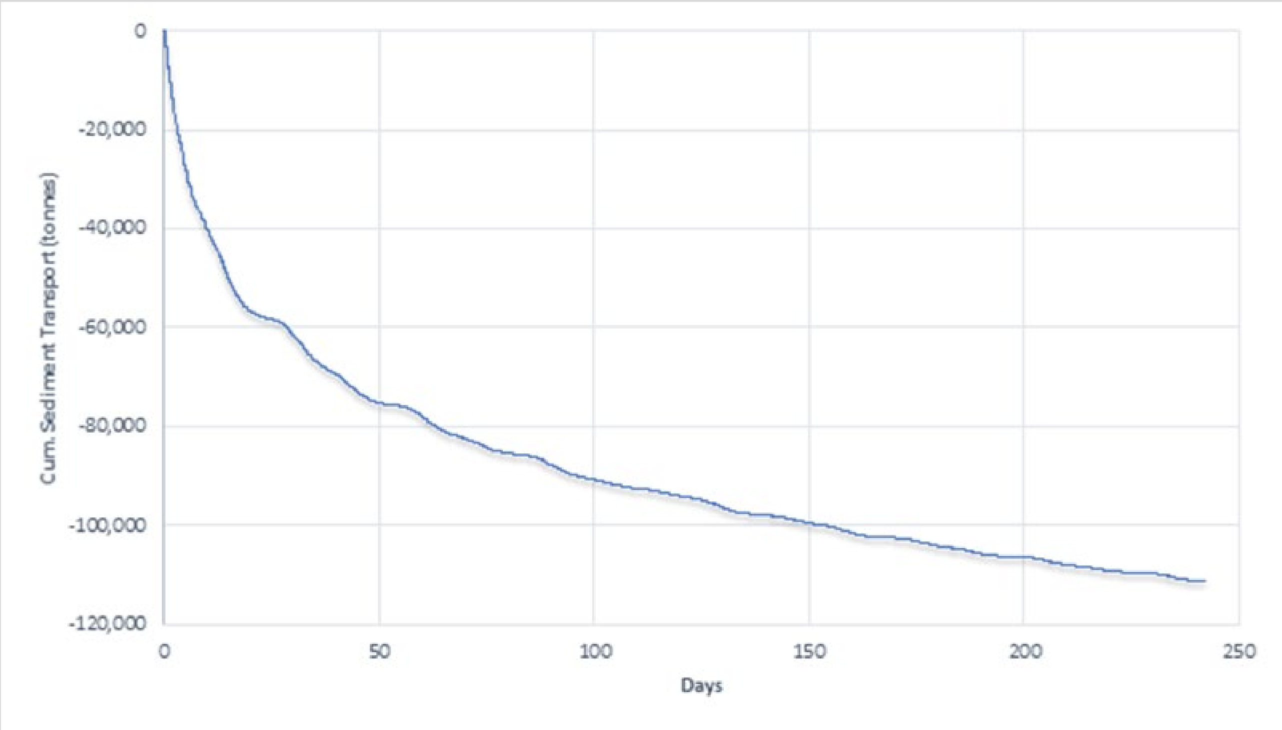


Figure 1.3 ***Cumulative sediment transport through the inlet of Boat Harbour. Scenario A. (Negative values represent sediment yield)***

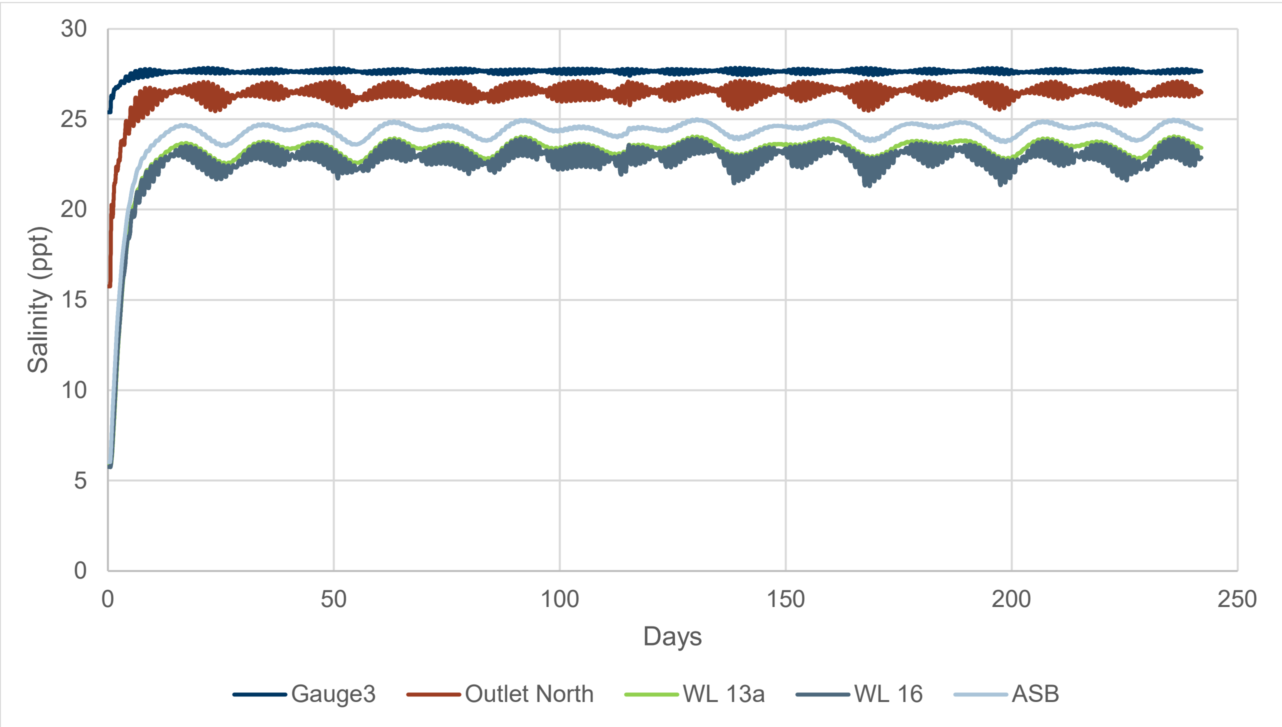


Figure 1.4 ***12-hours moving average of salinity concentrations. Scenario A.***

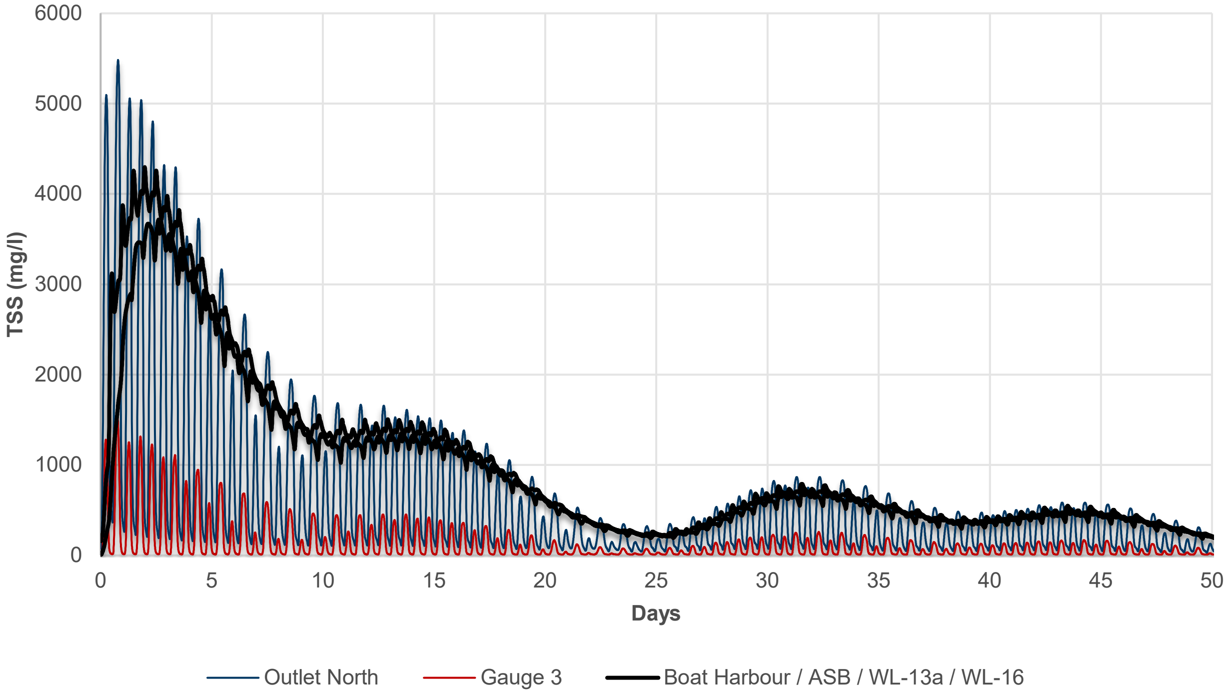


Figure 1.5 ***Time-series of hourly averaged TSS concentrations. First 50-days post dam removal. Scenario A.***

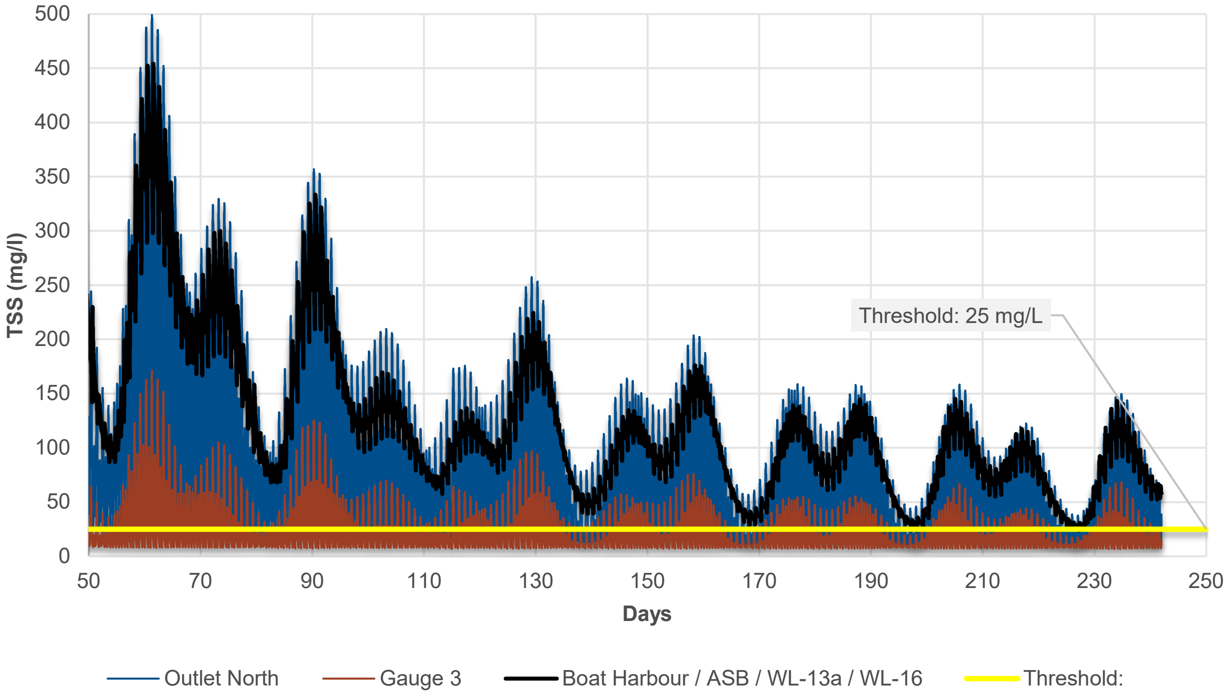


Figure 1.6 ***Time-series of hourly-averagd TSS concentrations. Long-term simulations to equilibrium condition Scenario A.***

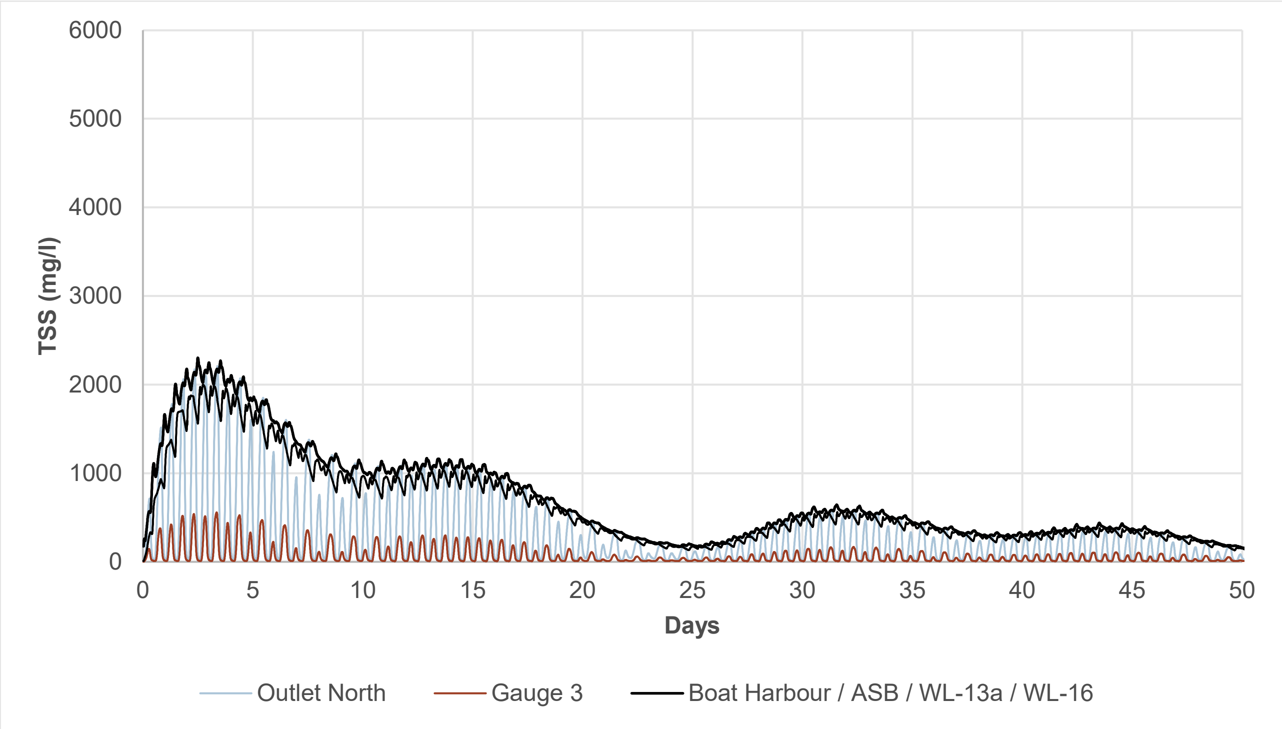


Figure 1.7 ***Time-Series of hourly-averaged TSS concentrations. First 50-days post dam removal. Scenario D.***

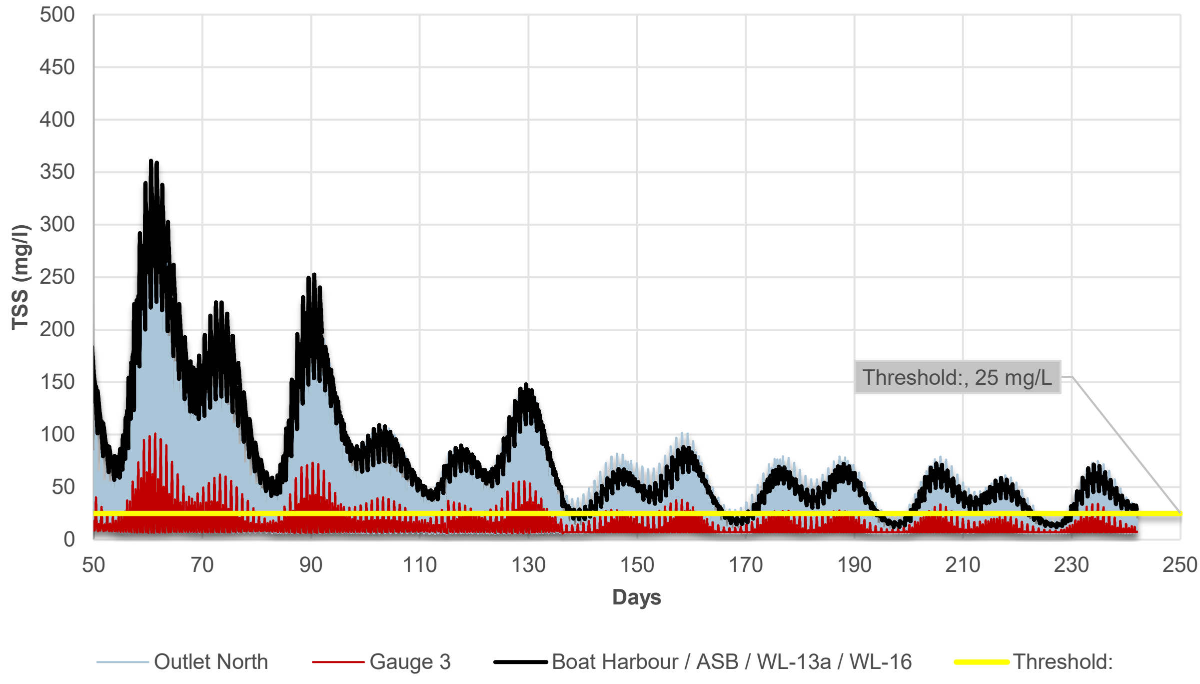


Figure 1.8 ***Time-series of hourly-averaged TSS concentrations. Long-term simulations to equilibrium conditions. Scenario D.***

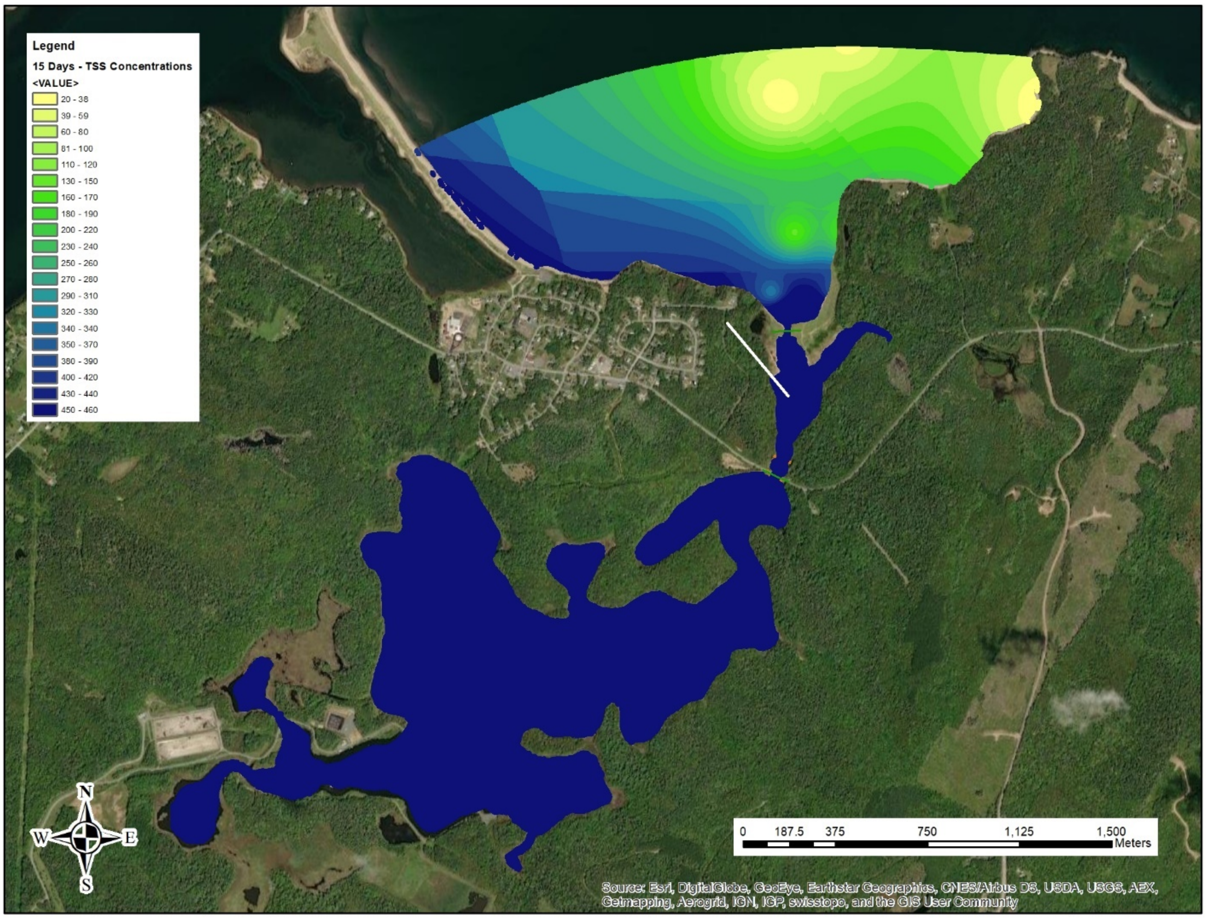


Figure 1.9 Grid map of TSS concentration. 15 days after dam removal.

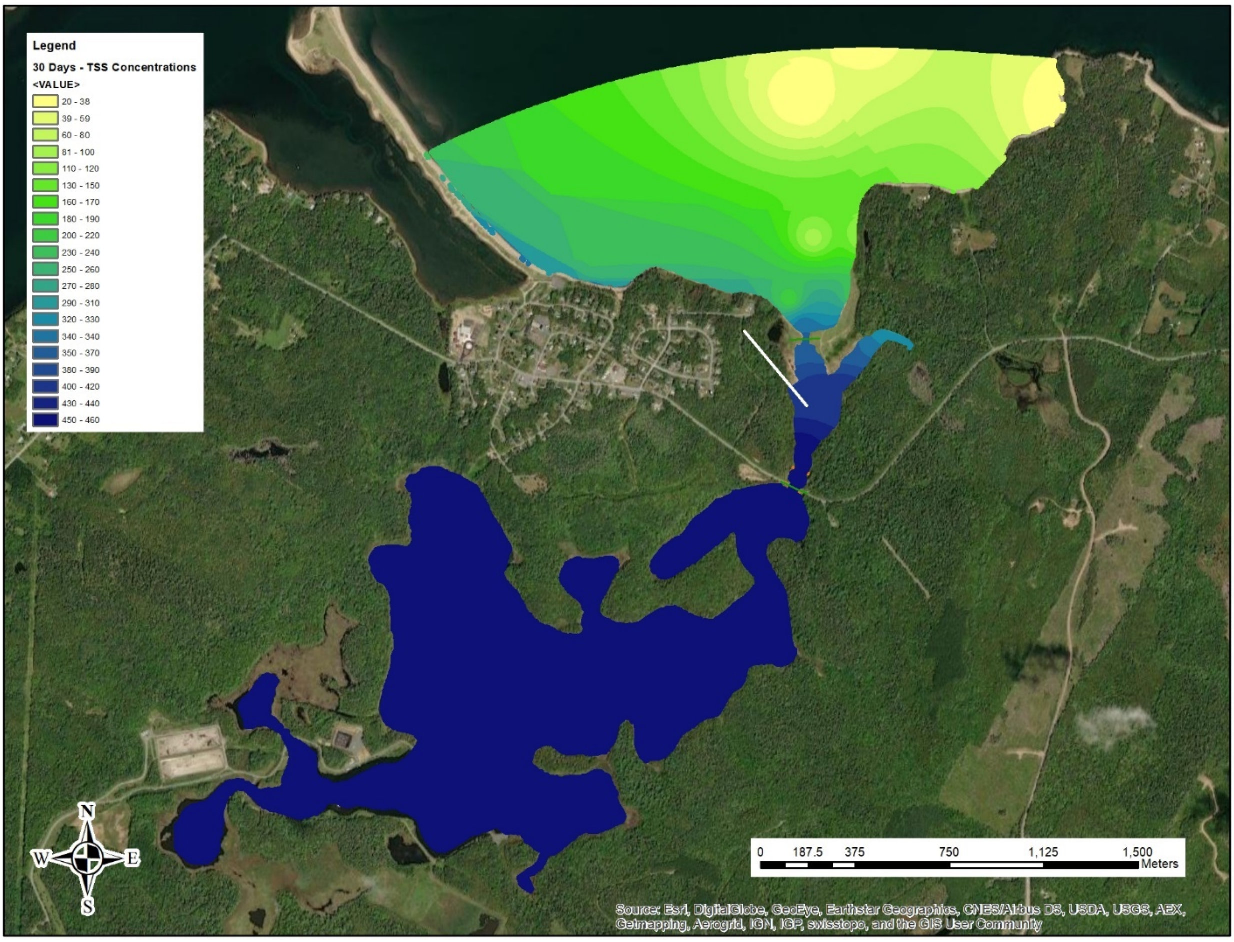


Figure 1.10 ***Grid map of TSS concentration. 30 days after dam removal.***

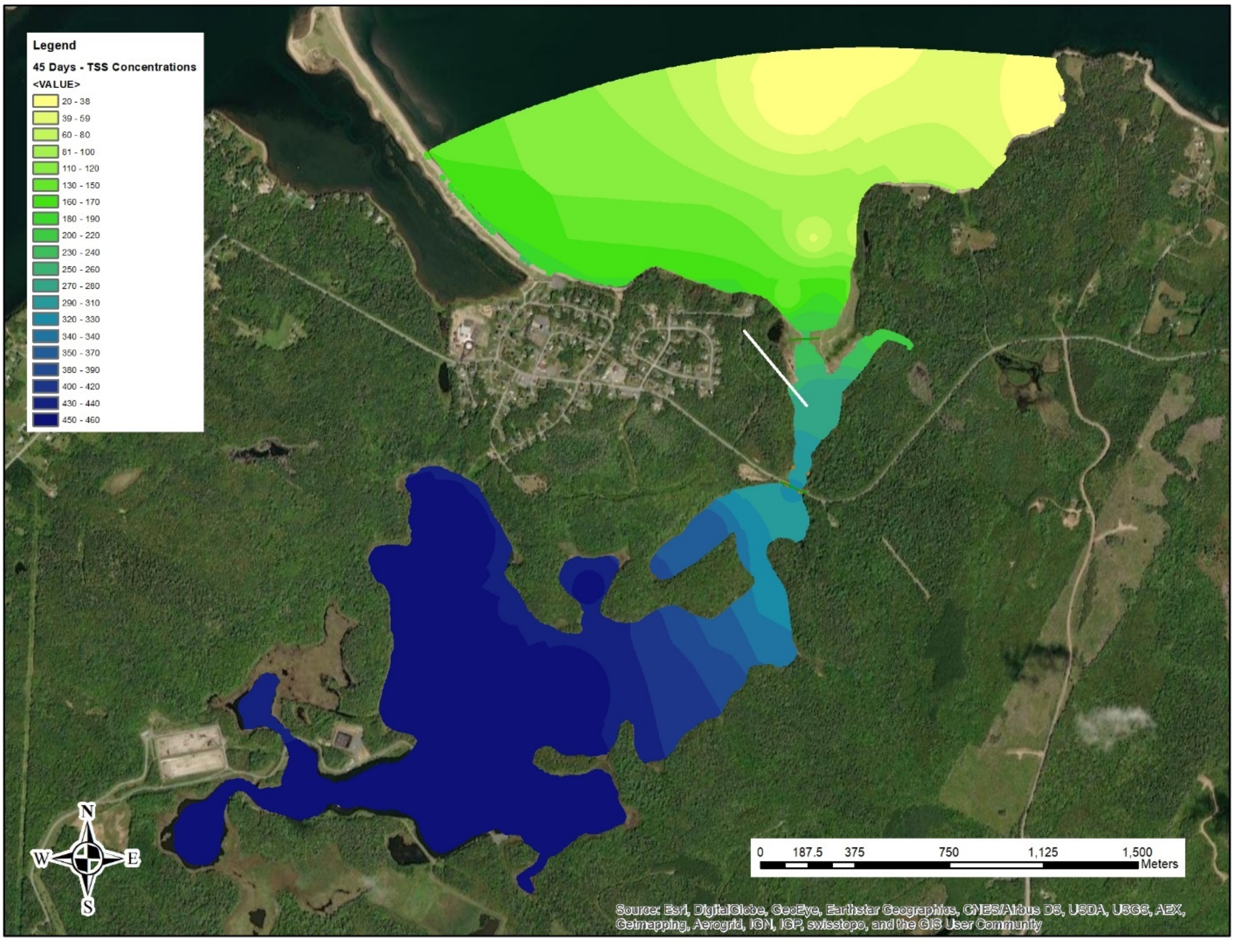


Figure 1.11 Grid map of TSS concentrations. 45 days after dam removal.

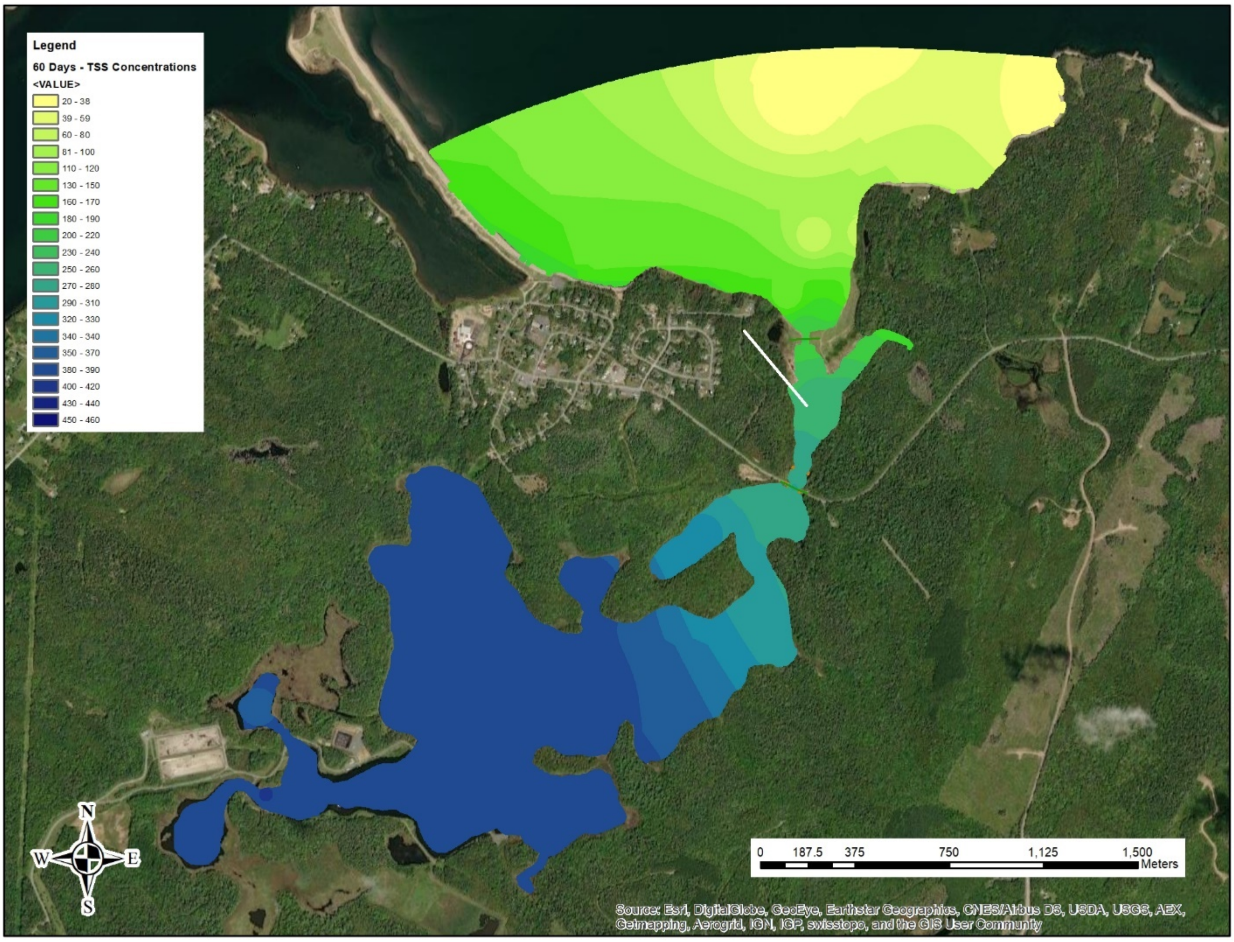


Figure 1.12 Grid map of TSS concentrations. 60 days after dam removal.

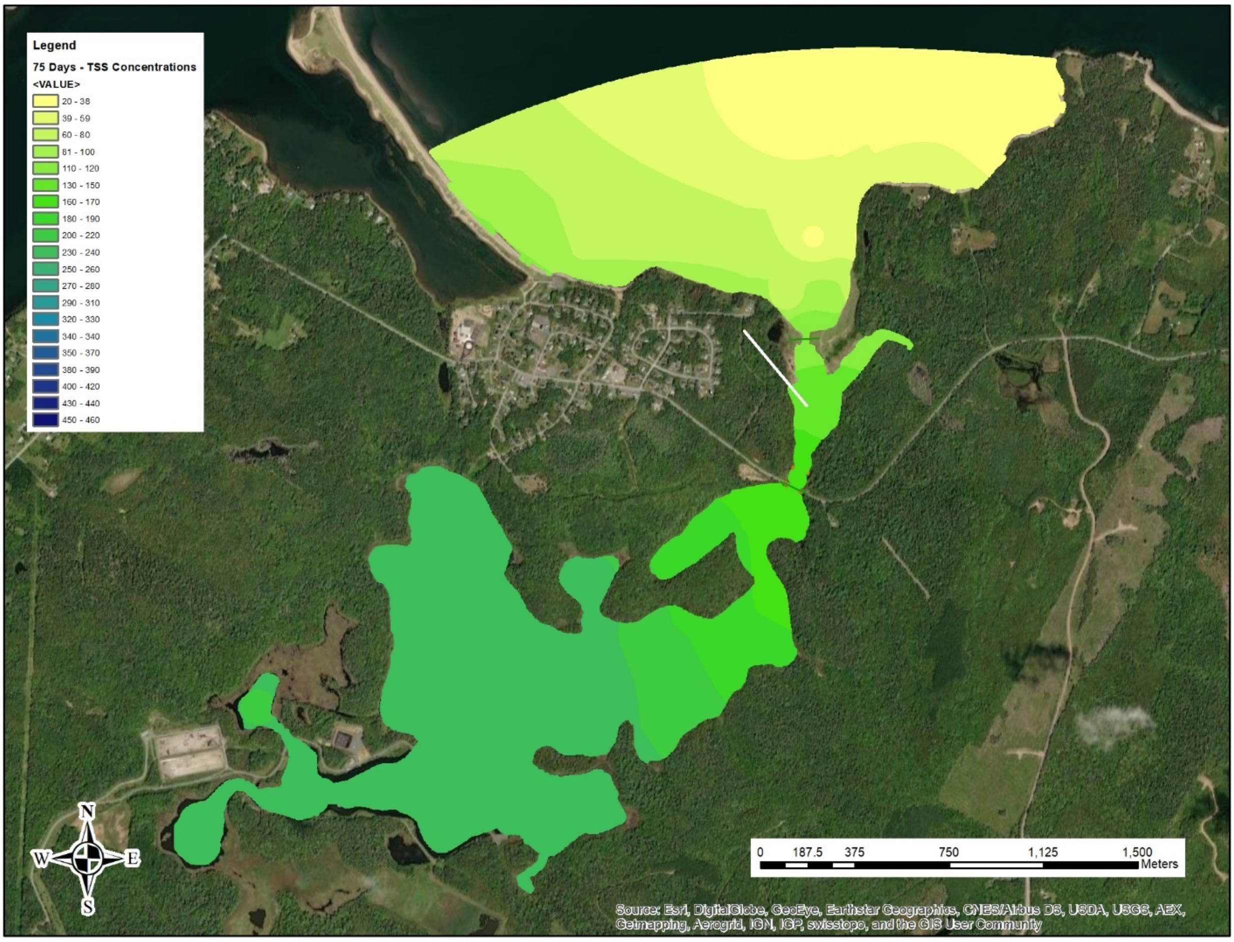


Figure 1.13 Grid map of TSS concentrations. 75 days after dam removal.

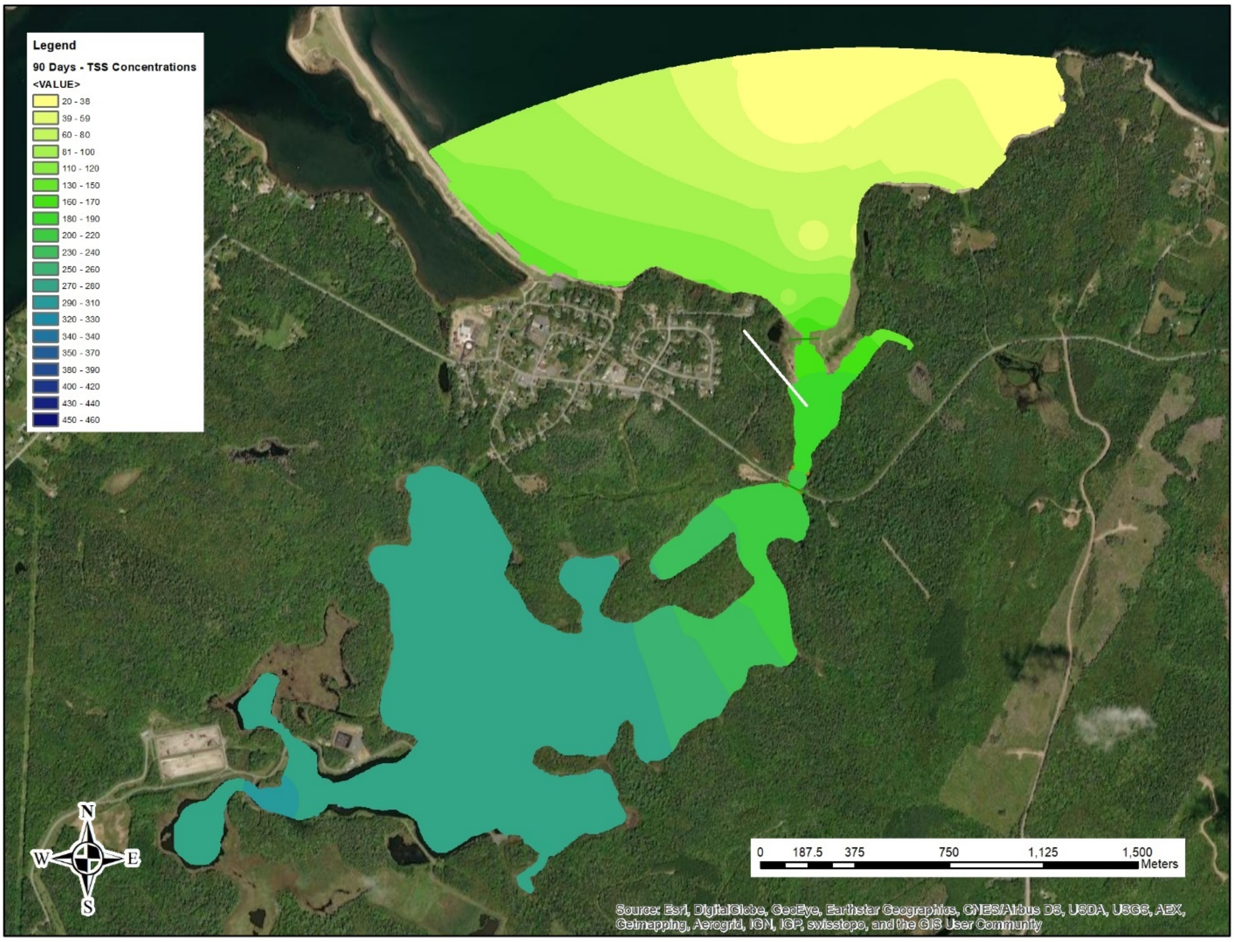


Figure 1.14 Grid map of TSS concentration. 90 days after dam removal.

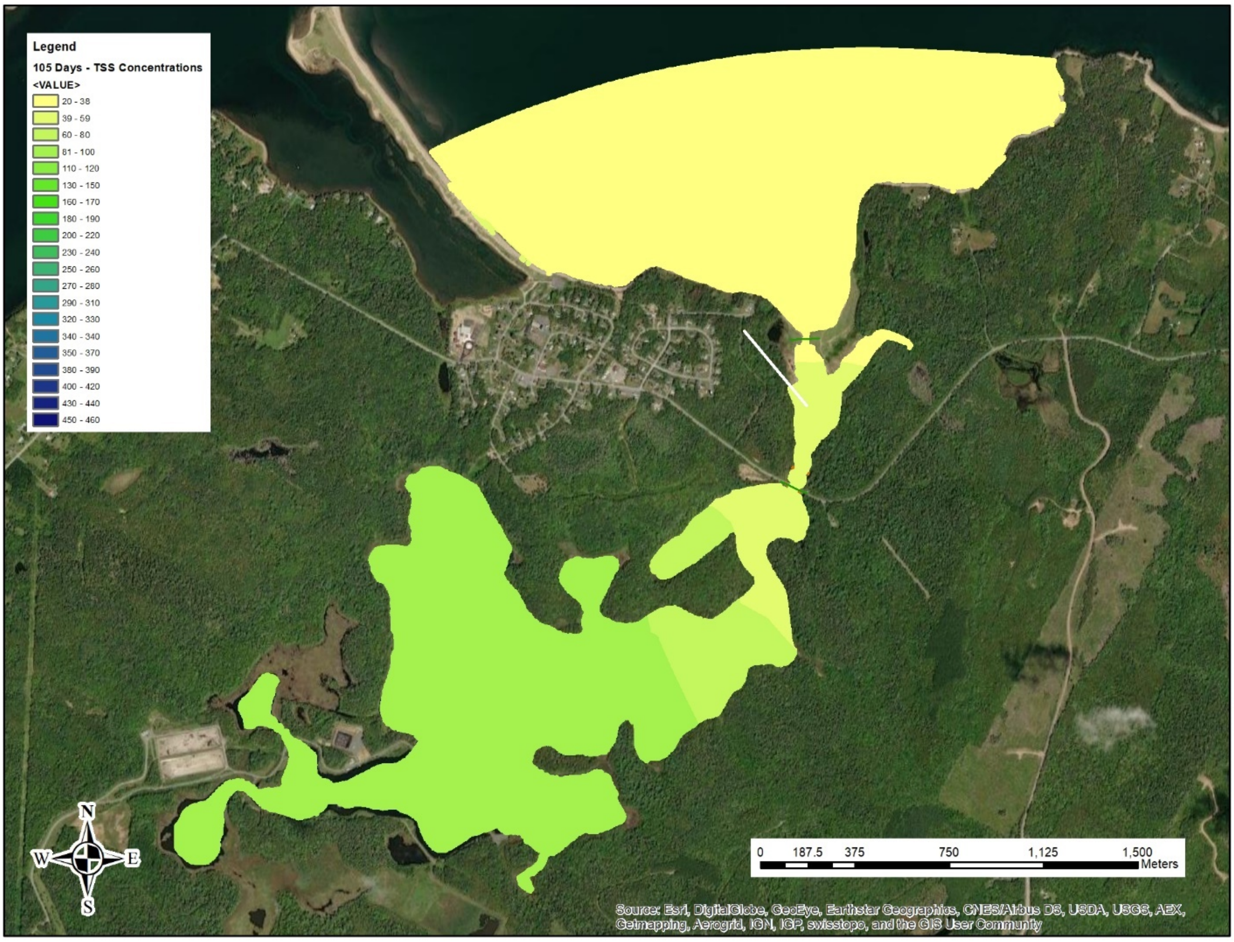


Figure 1.15 Grid map of TSS concentrations. 105 days after dam removal.

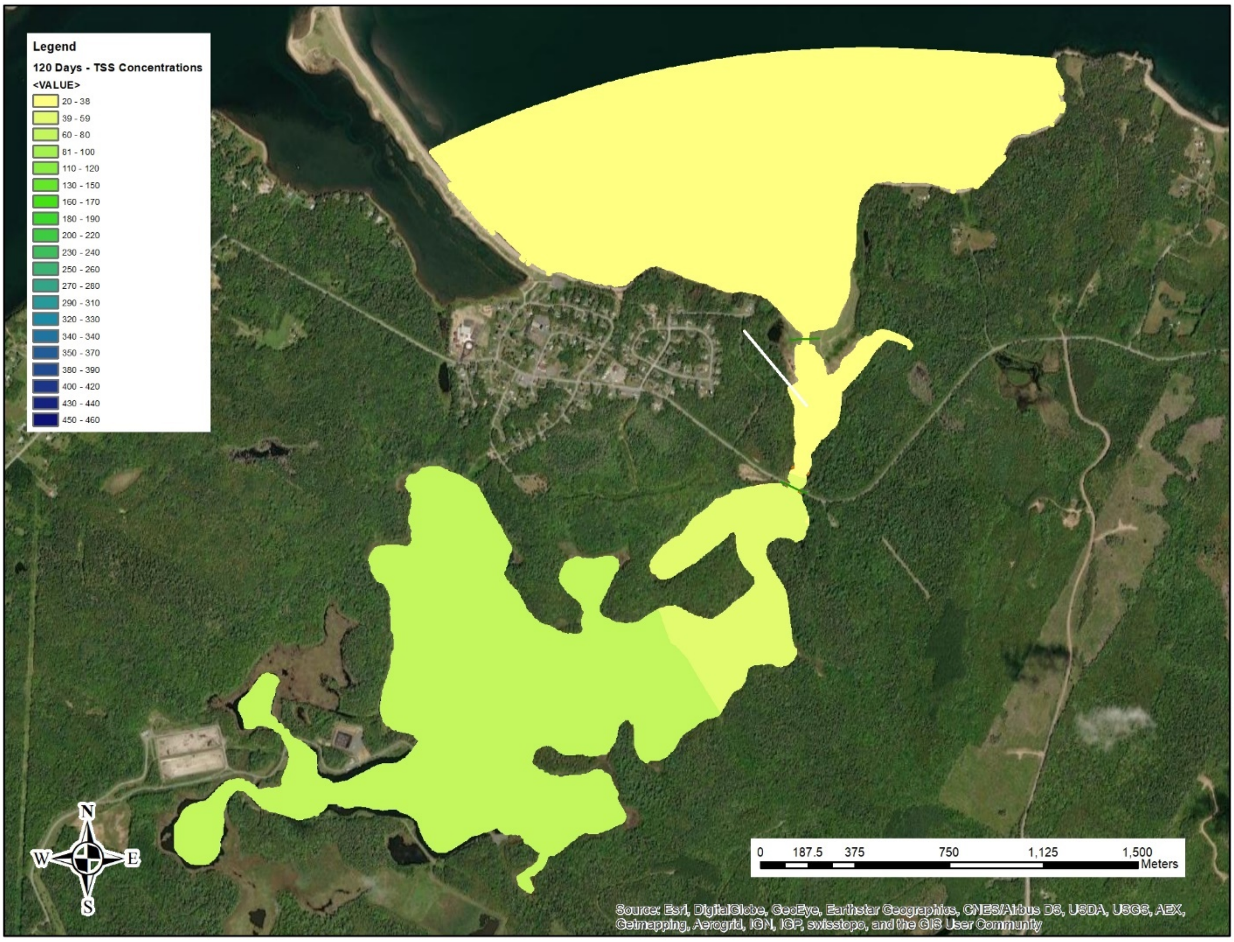


Figure 1.16 Grid Map of TSS concentrations. 120 days after dam removal.

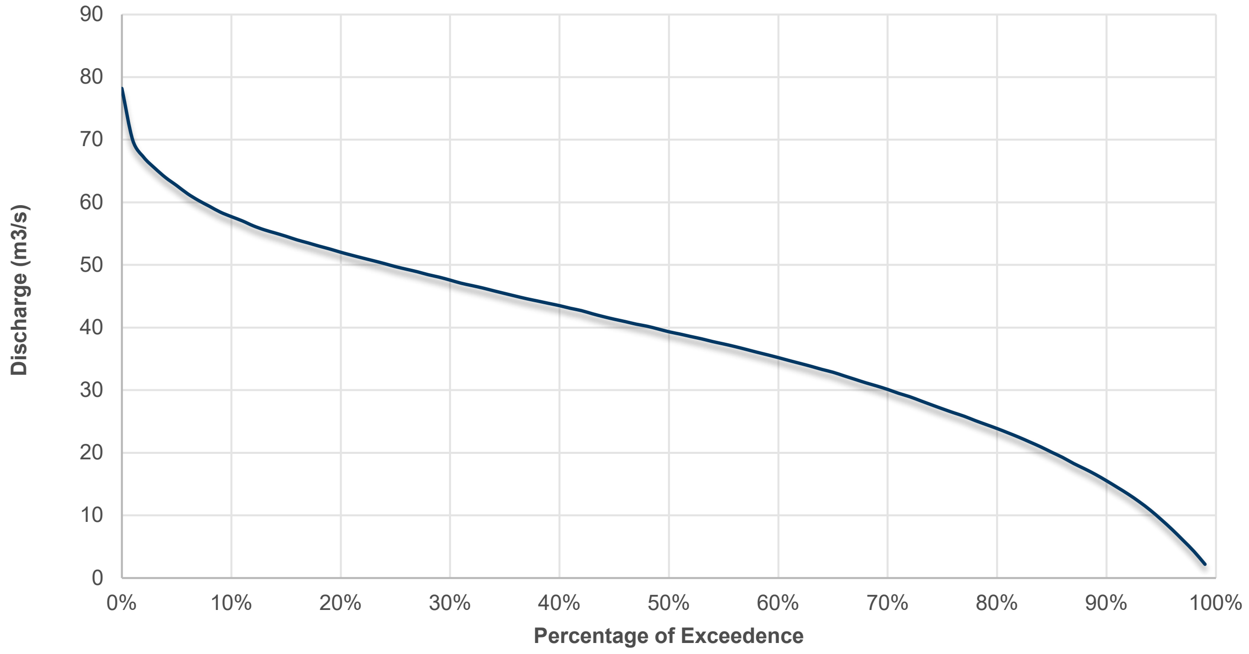


Figure 1.17 ***Flux of water through the inlet channel. Persistence curve. Scenario D.***

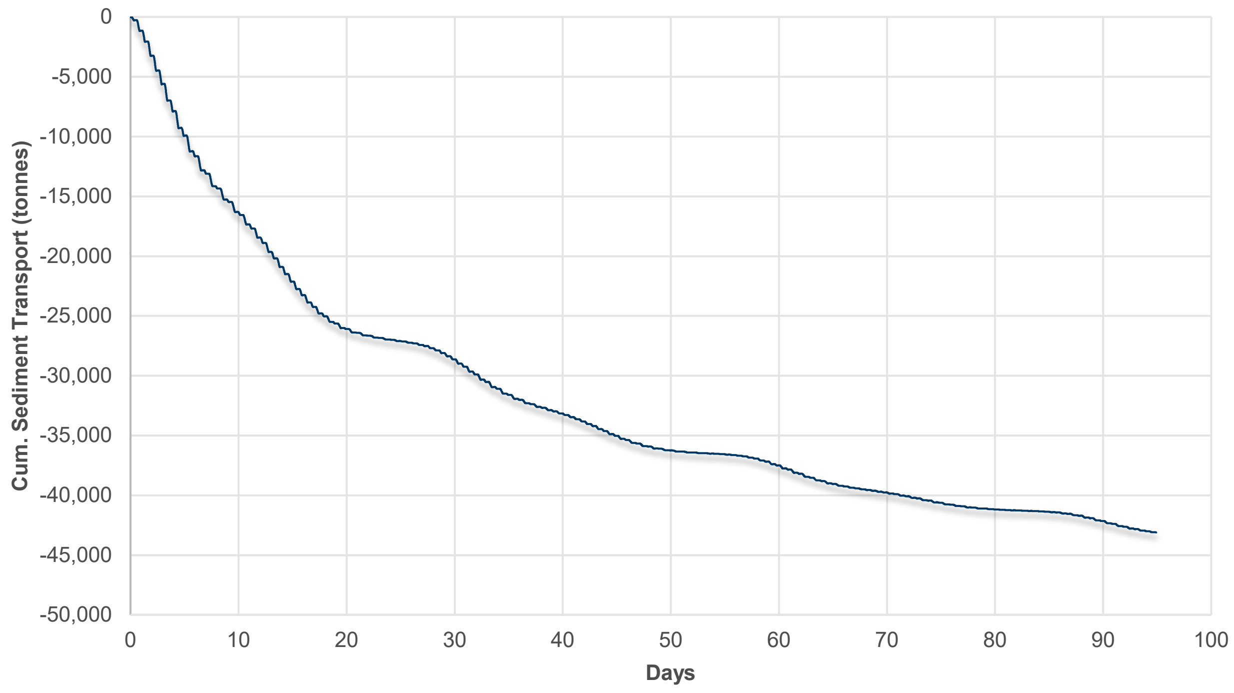


Figure 1.18 ***Cumulative sediment transport through the inlet of Boat Harbour. Scenario D. (Negative values represent sediment yield)***

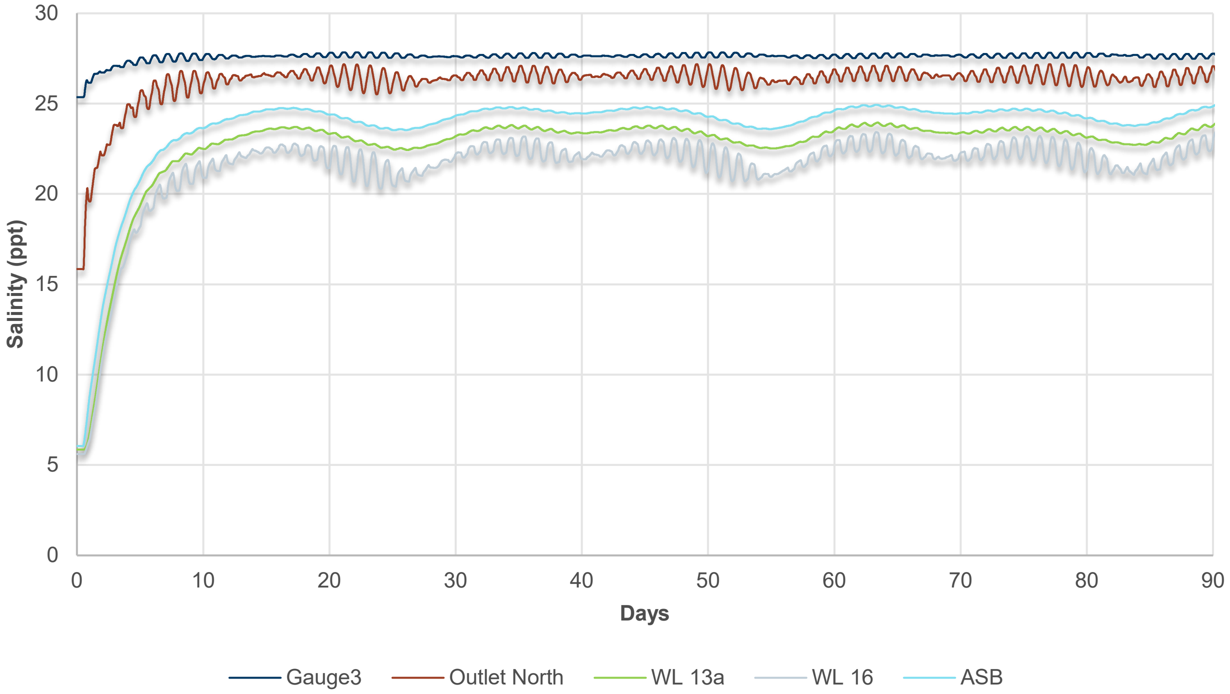


Figure 1.19 12 hours moving average of salnity concentrations. Scenario D.

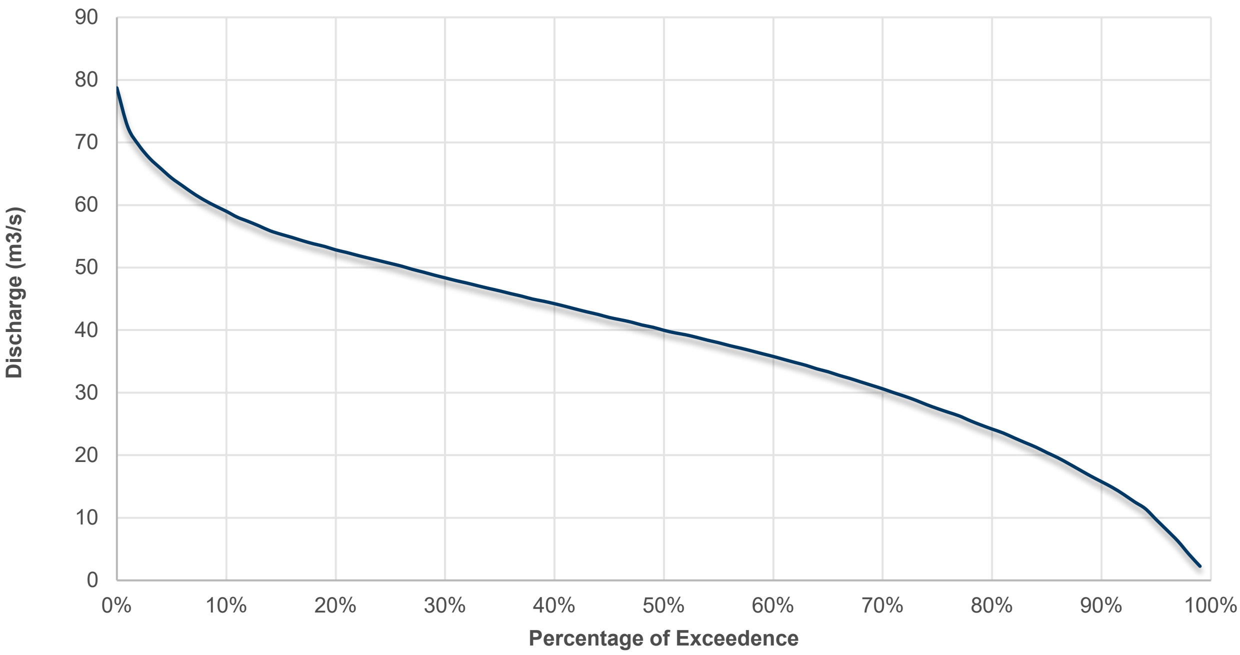


Figure 1.20 Flux of water through the inlet channel. Persistence curve. Scenario B1

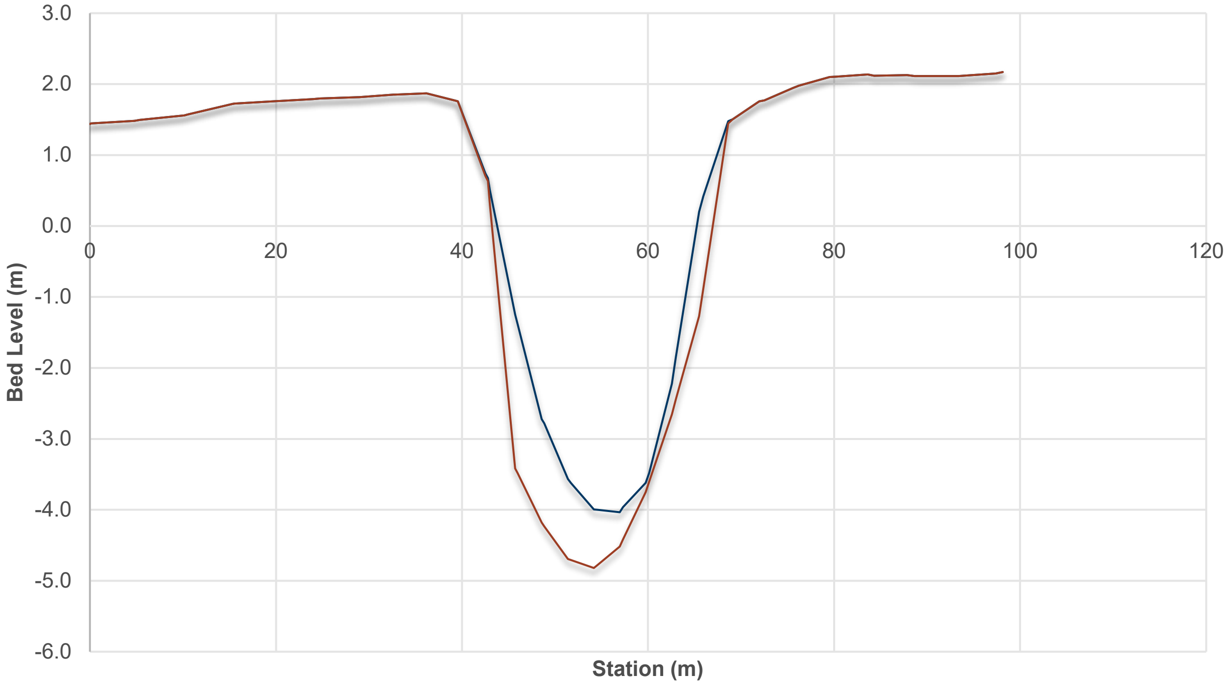


Figure 1.21 *Bed level development after 90 days of tidal action. Inlet channel cross-section. Scenario B1.*

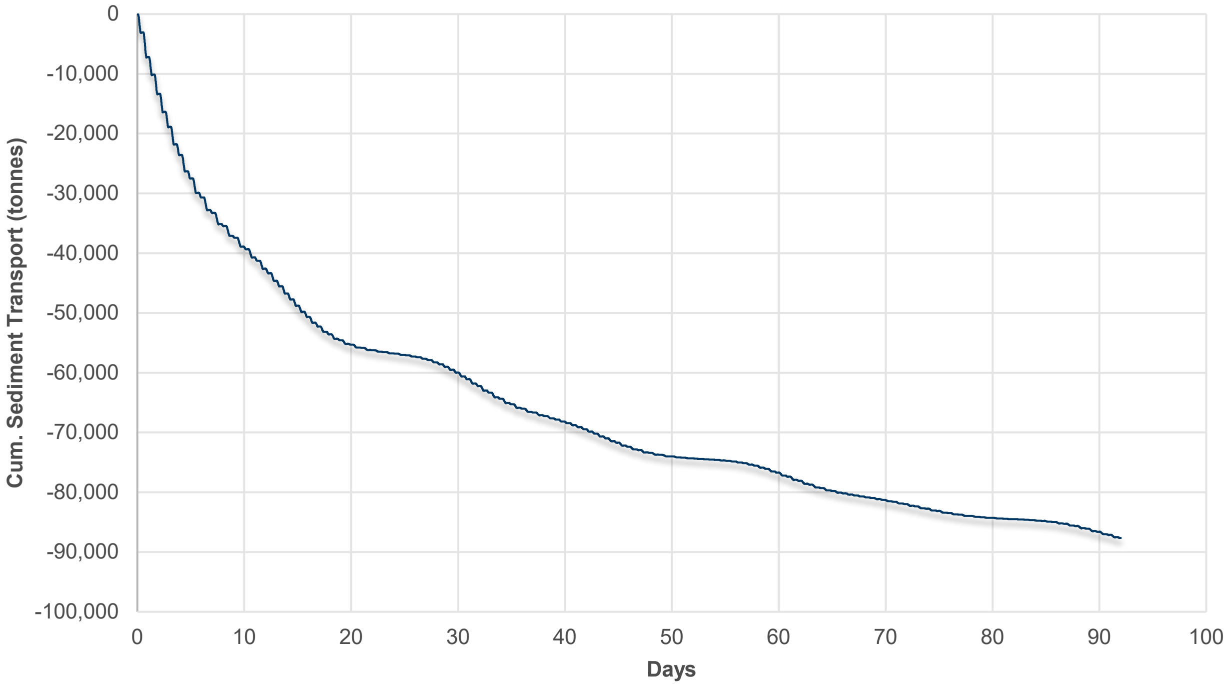


Figure 1.22 *Cumulative sediment transport through the inlet of Boat Harbour. Scenario B1. (Negative values represent sediment yield)*

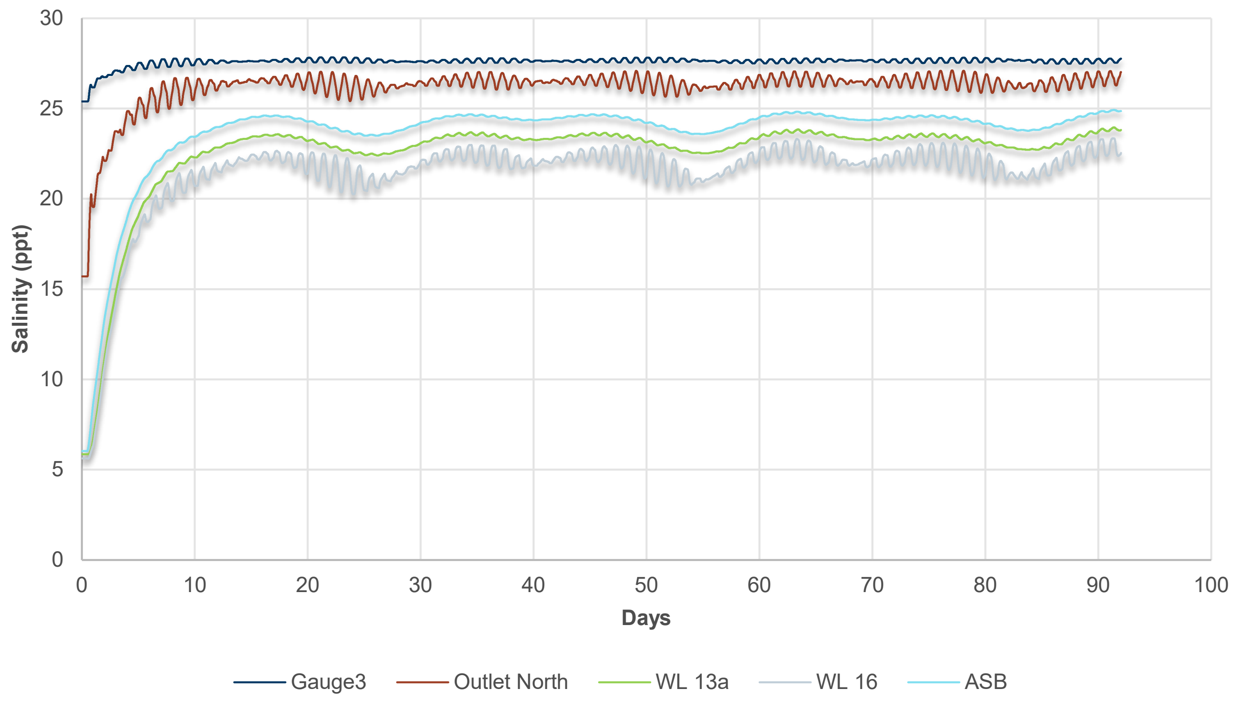


Figure 1.23 12-hours moving average of salinity concentrations. Scenario B1.

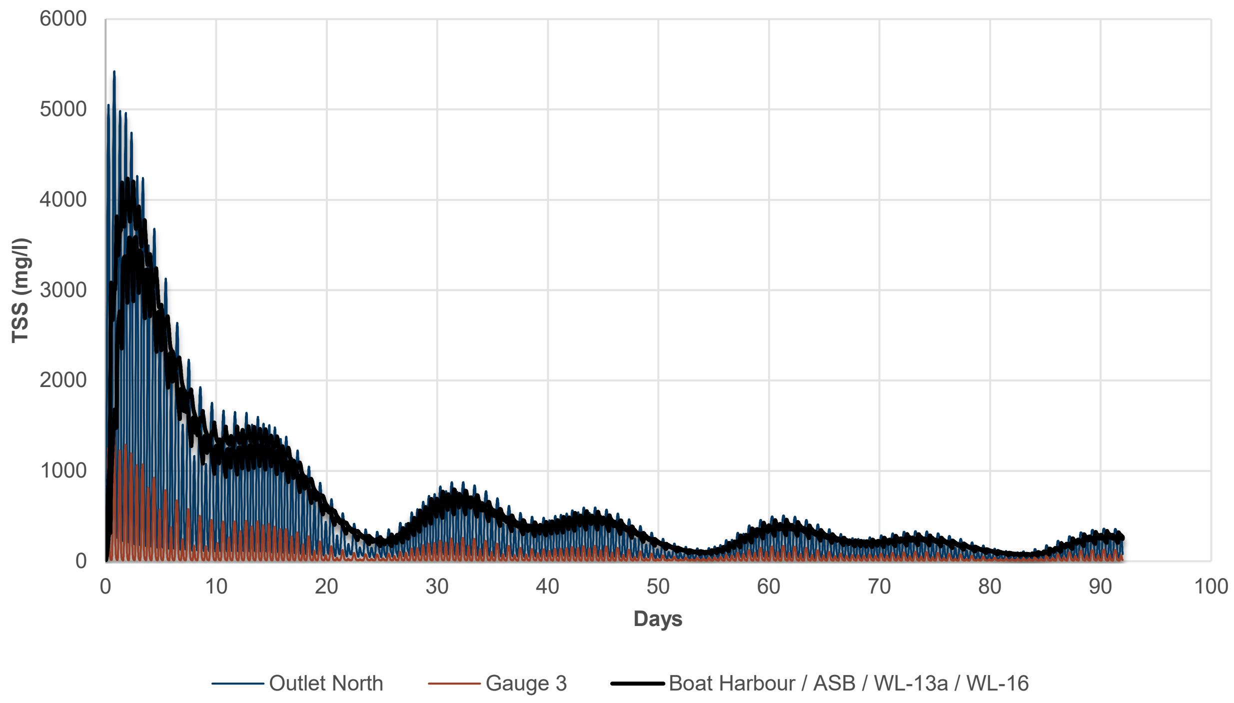


Figure 1.24 Time-series of hourly averaged TSS concentration. First 90-days post dam removal. Scenario B1.

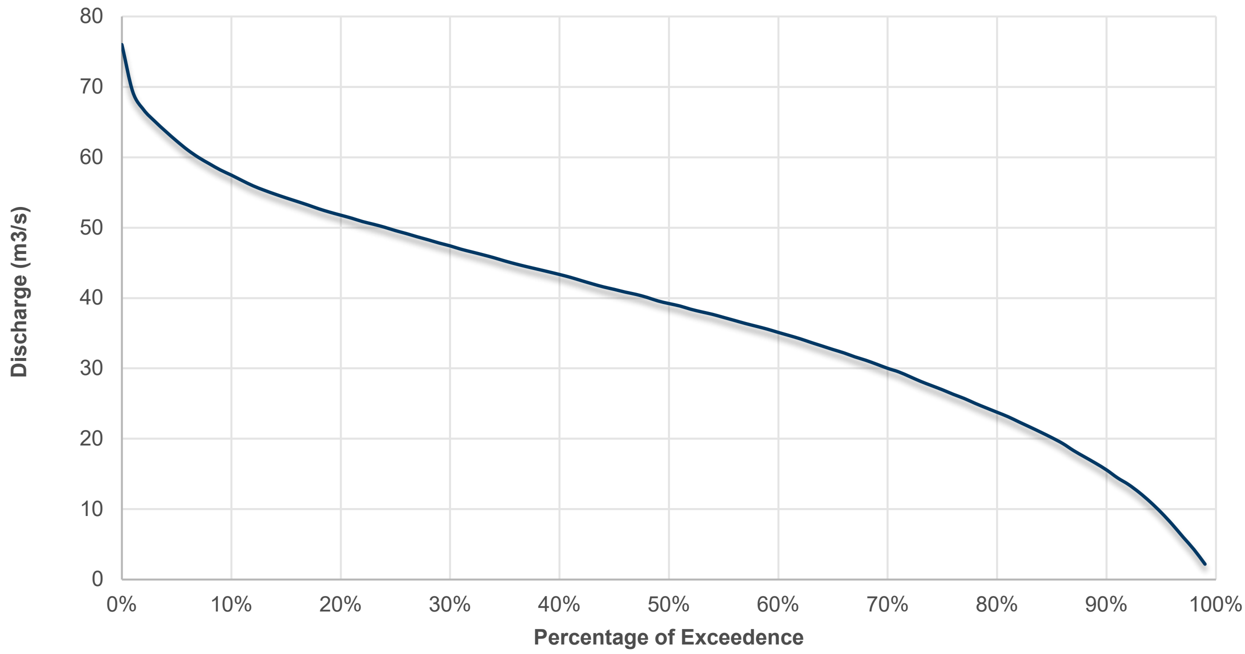


Figure 1.25 ***Flux of water throughtthe inlet channel. Persistence curve. Scenario B2.***

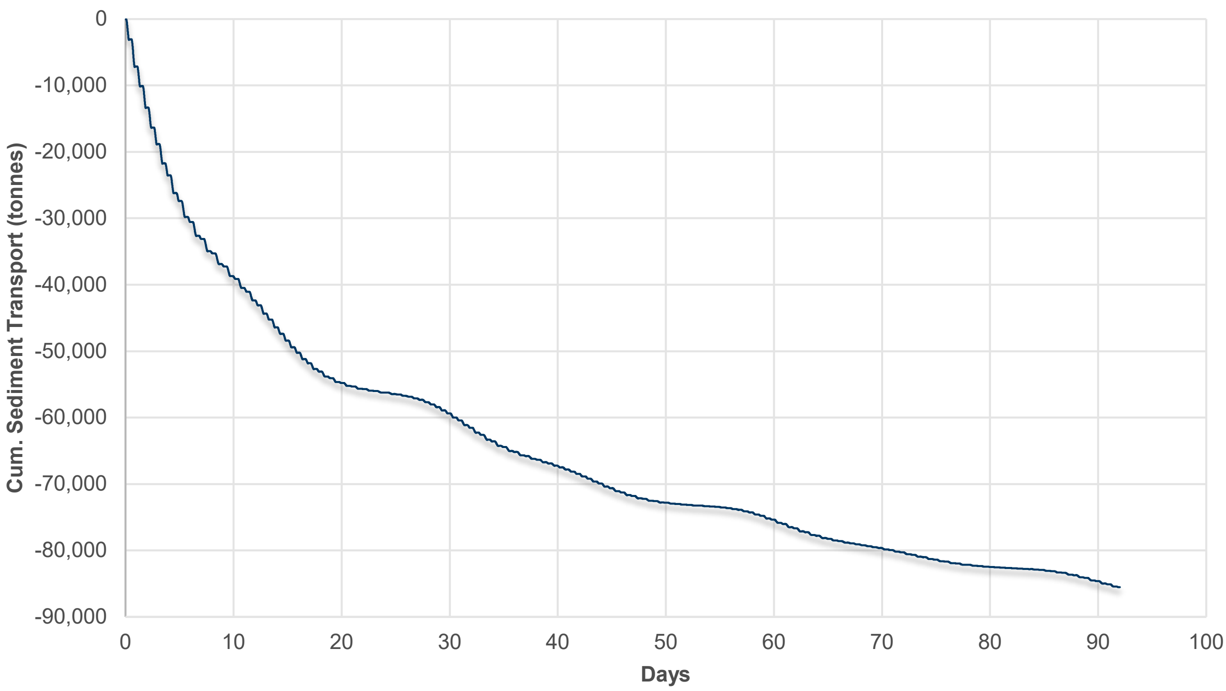


Figure 1.26 ***Cumulative sediment transport through the inlet of Boat Harbour. Scenario B2. (Negative values represent sediment yield)***

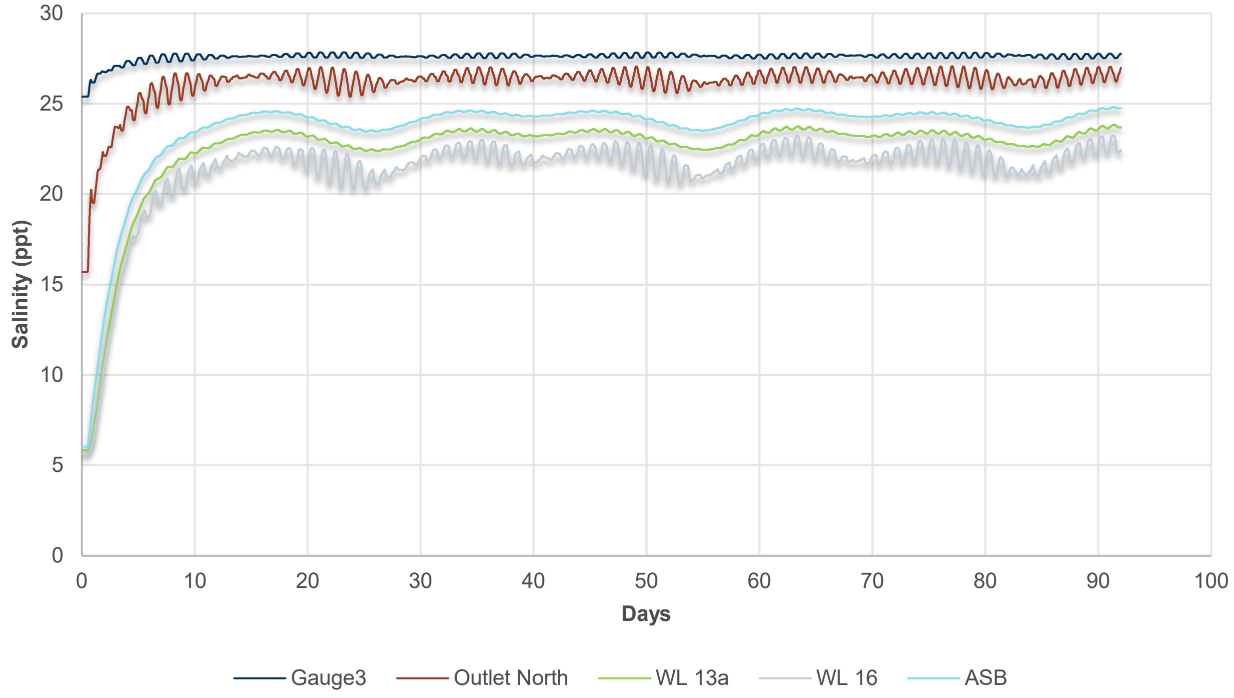


Figure 1.27 *12-hours moving average of salinity concentrations. Scenario B2.*

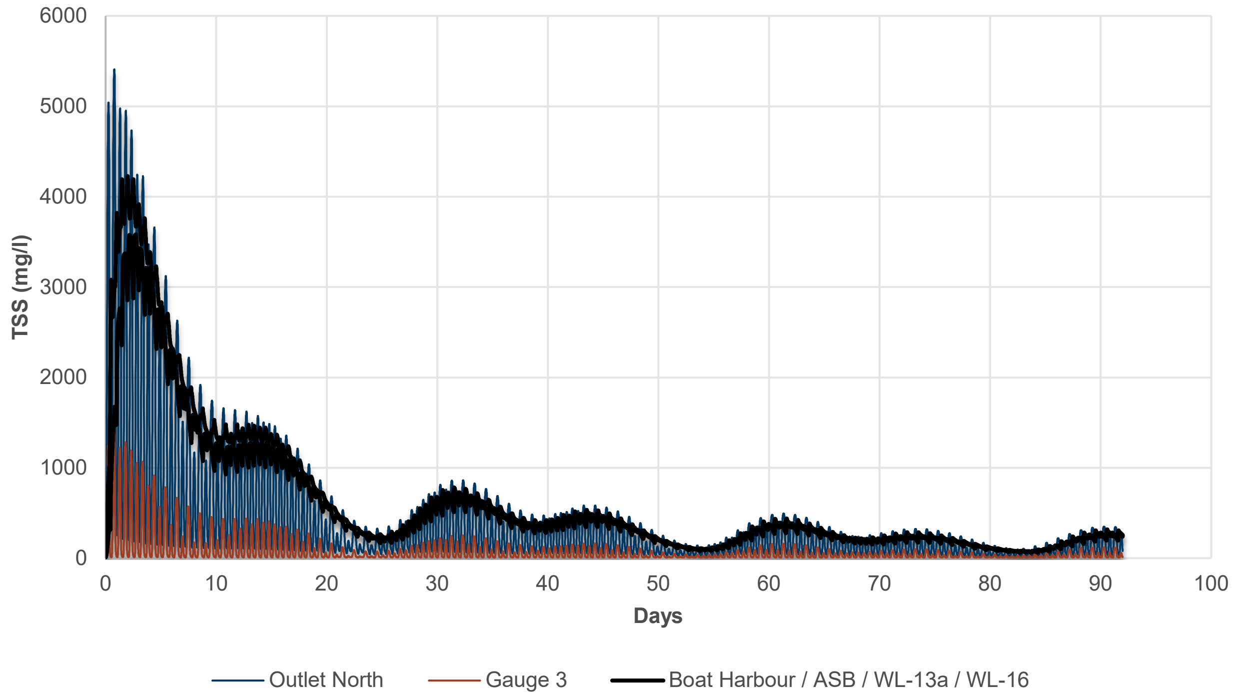


Figure 1.28 *Time-series of hourly averaged TSS concentrations. First 90-days post dam removal. Scenario B2.*

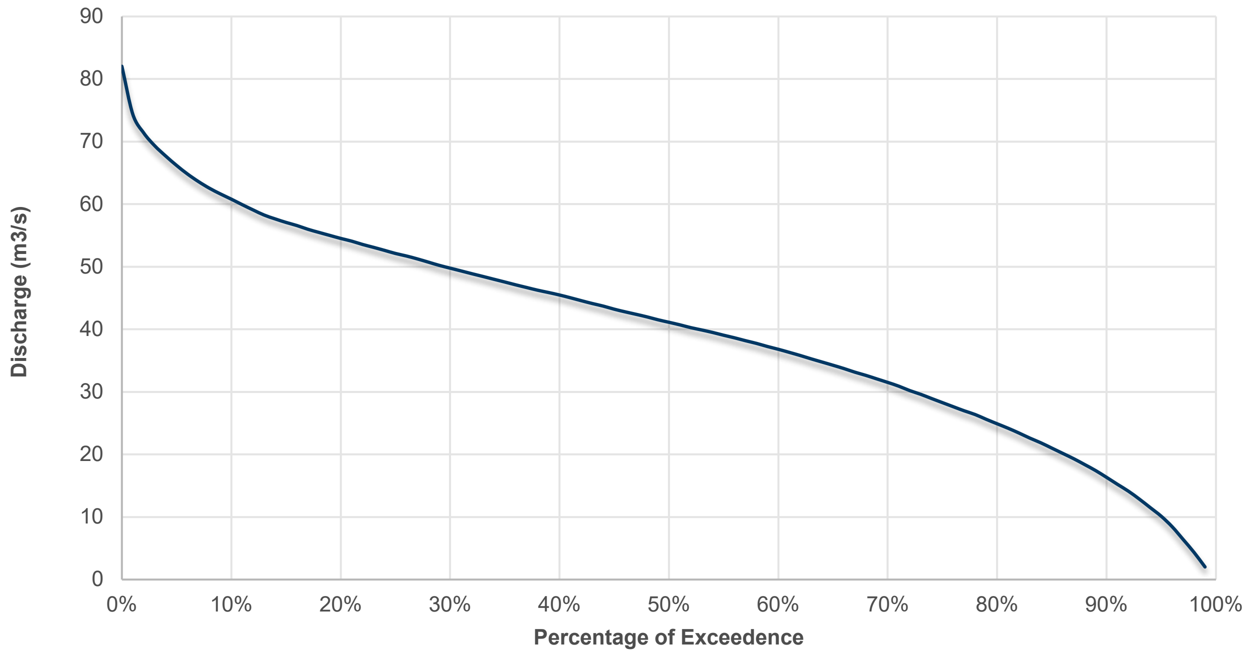


Figure 1.29 ***Flux of water through the inlet channel. Persistence curve. Scenario C1.***

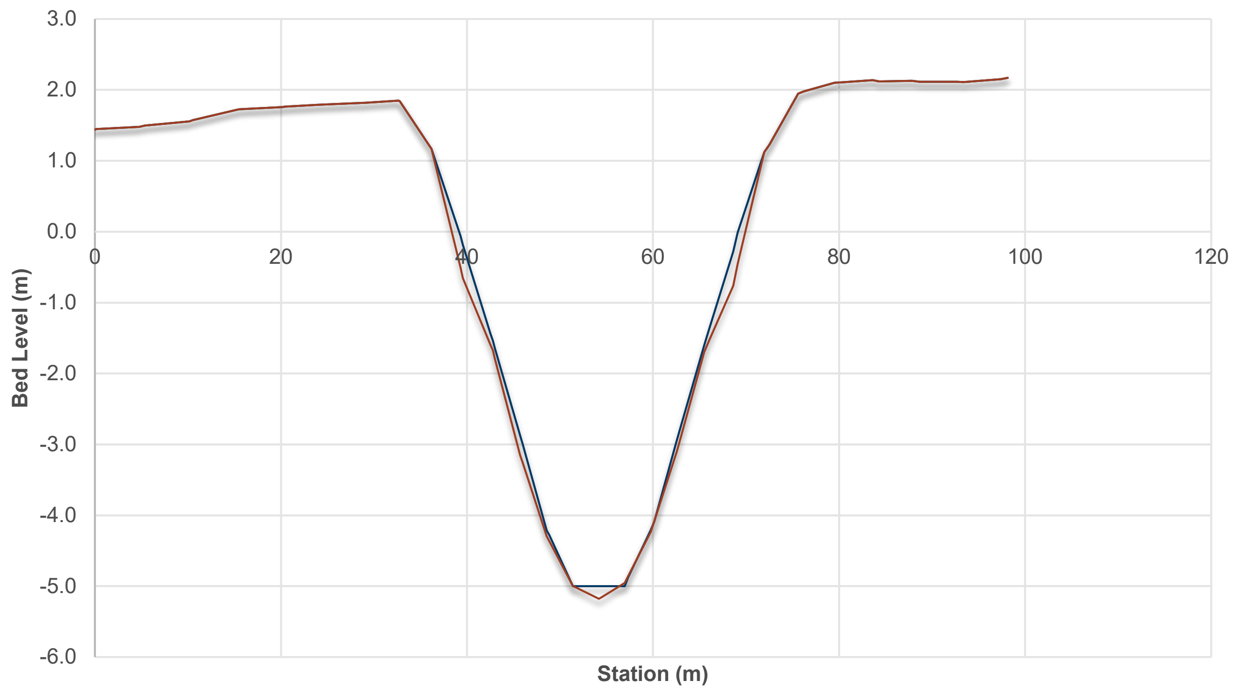


Figure 1.30 ***Bed level development after 90 days of tidal action. Inlet channel cross-section. Scenario C1.***

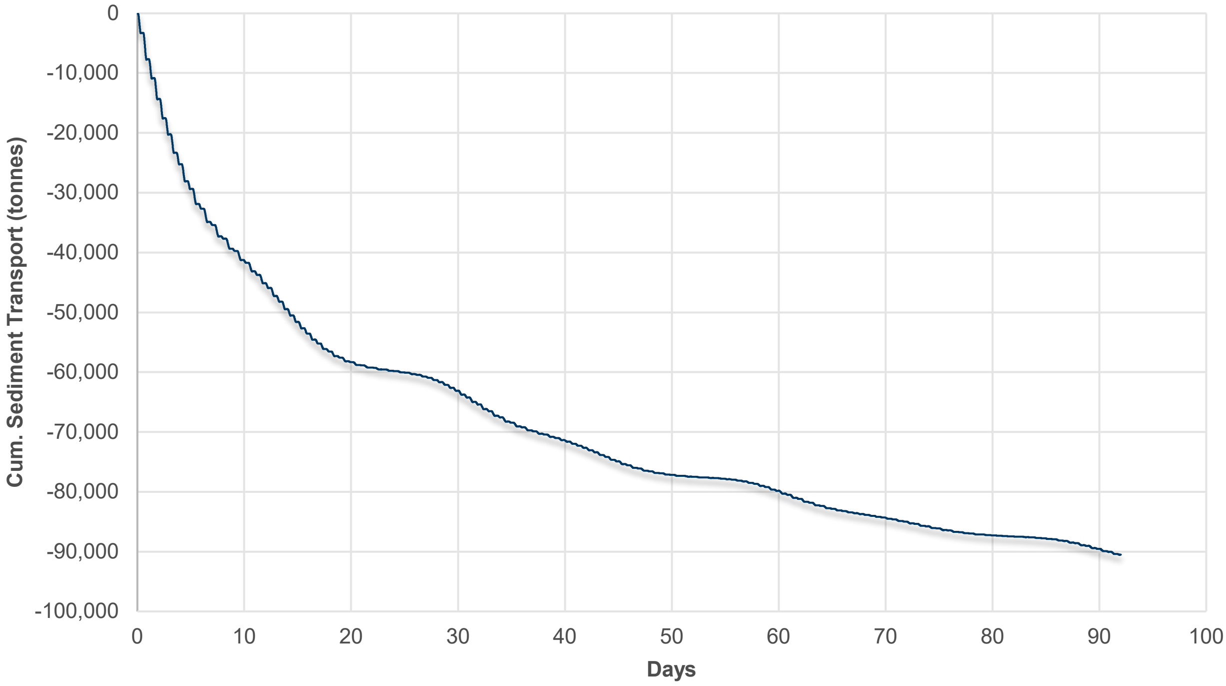


Figure 1.31 *Cumulative sediment transport through the inlet of Boat Harbour. Scenario C1. (Negative values represent sediment yield)*

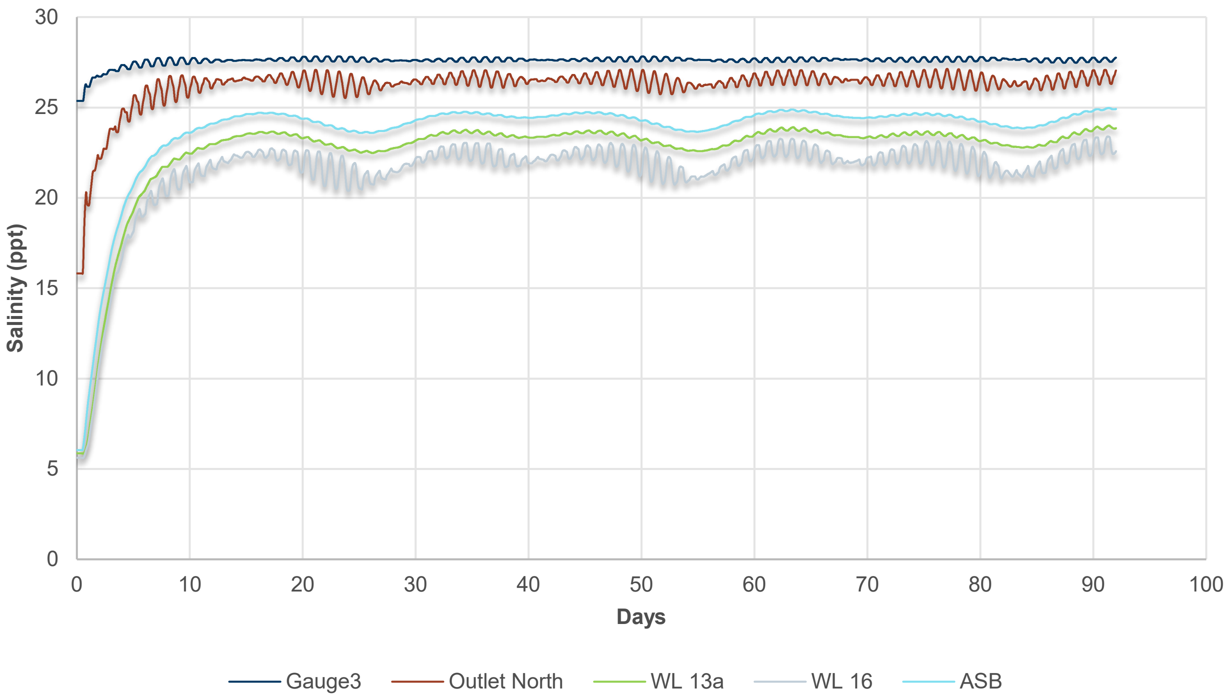


Figure 1.32 *12-hours moving average of salinity concentrations. Scenario C1.*

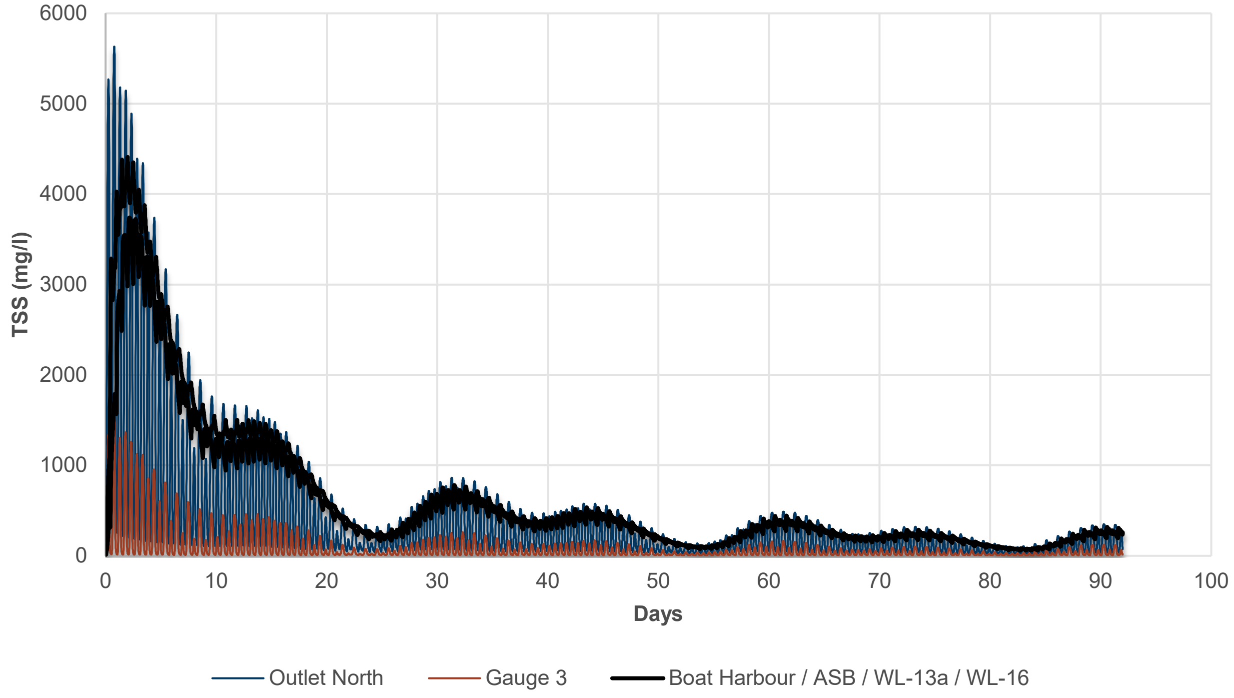


Figure 1.33 ***Time series of hourly-averaged TSS concentrations. First 90-days post dam removal. Scenario C1.***

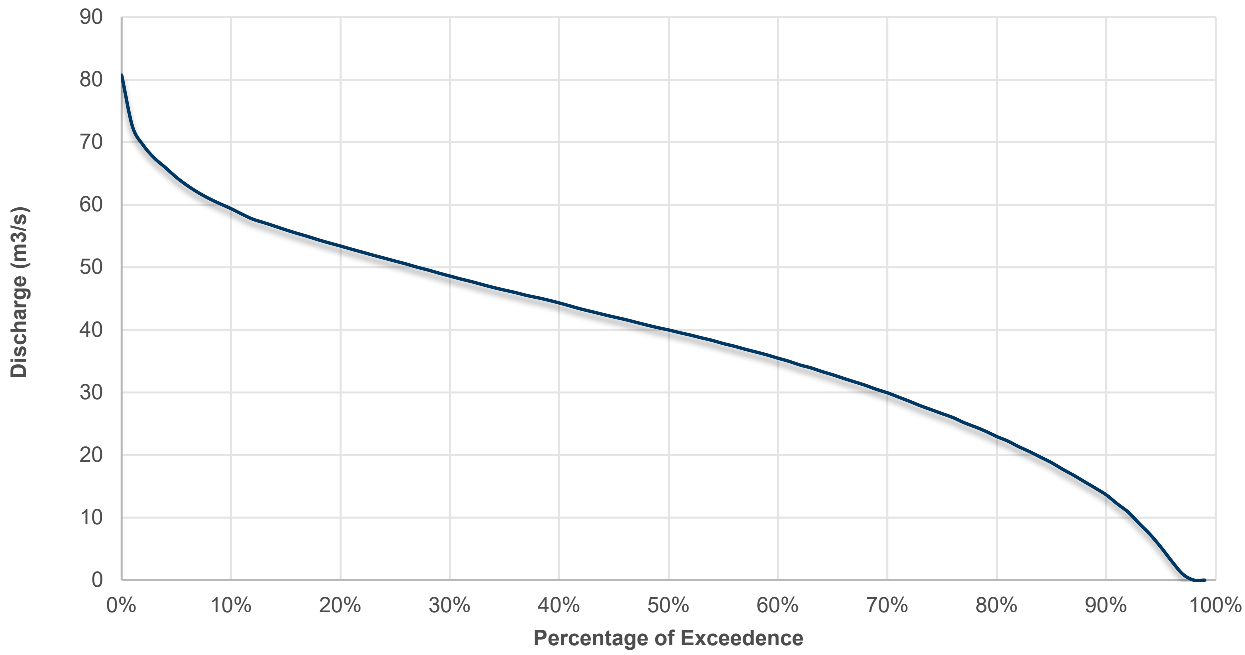


Figure 1.34 ***Flux of water through the inlet channel. Persistence curve. Scenario C2.***

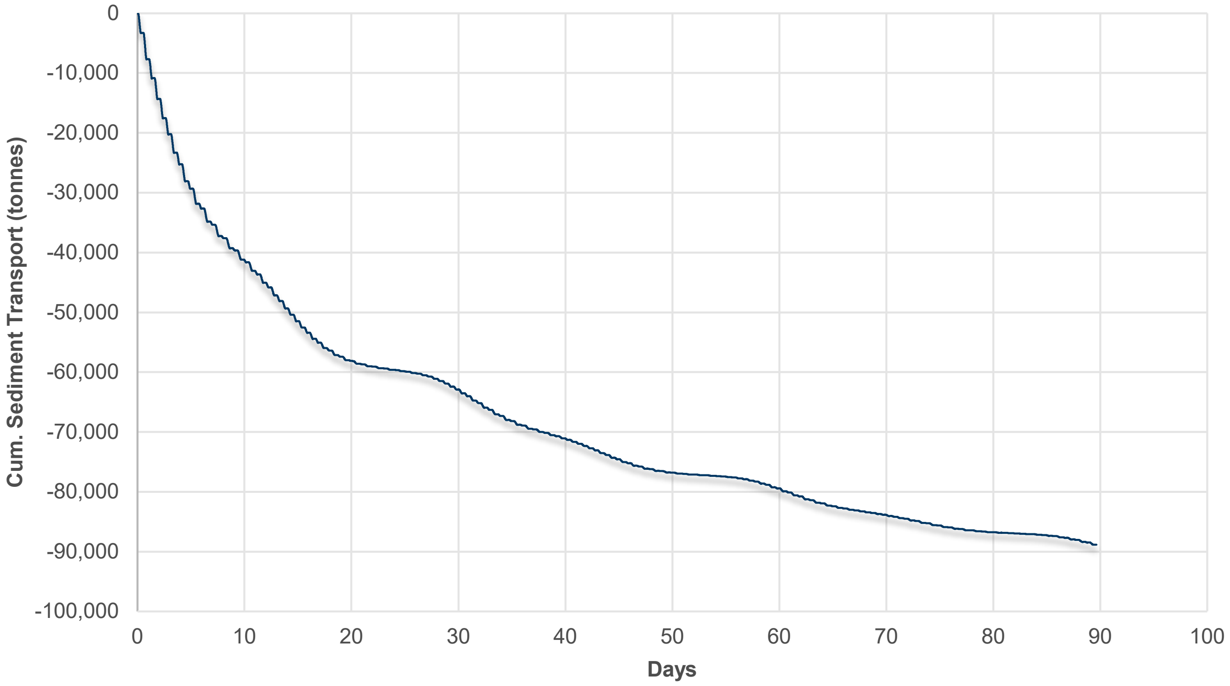


Figure 1.35 *Cumulative sediment transport through the inlet of Boat Harbour. Scenario C2. (Negative values represent sediment yield)*

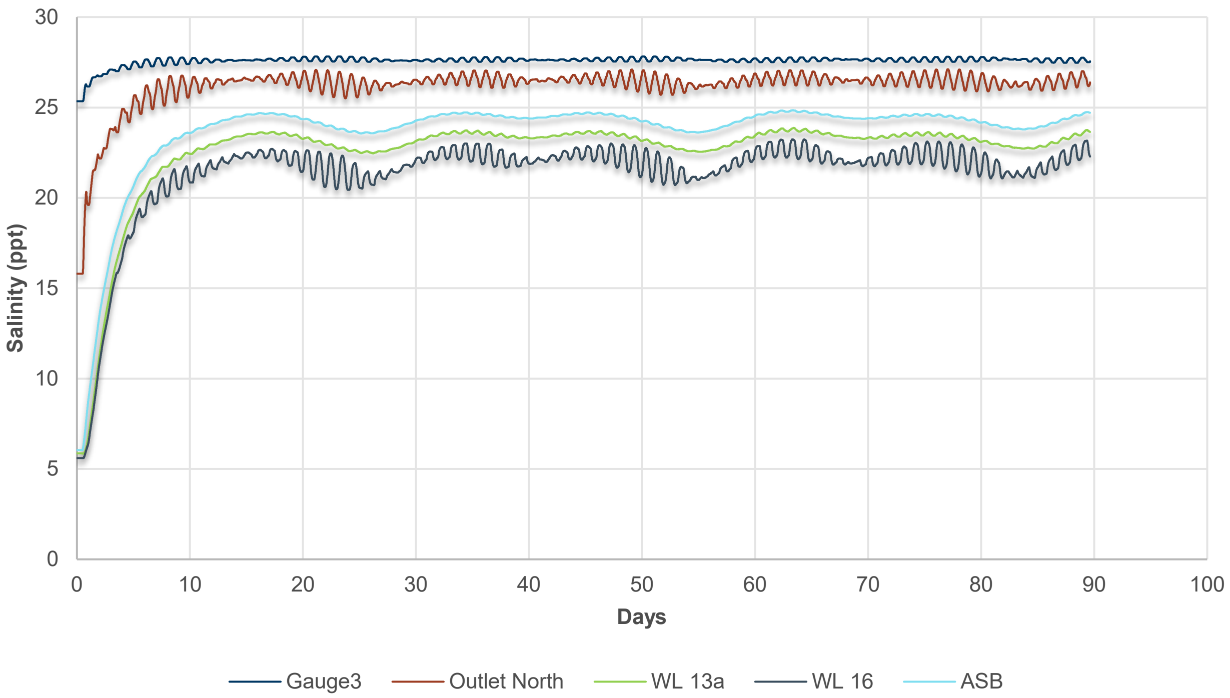


Figure 1.36 *12-hours moving average of salinity concentrations. Scenario C2.*

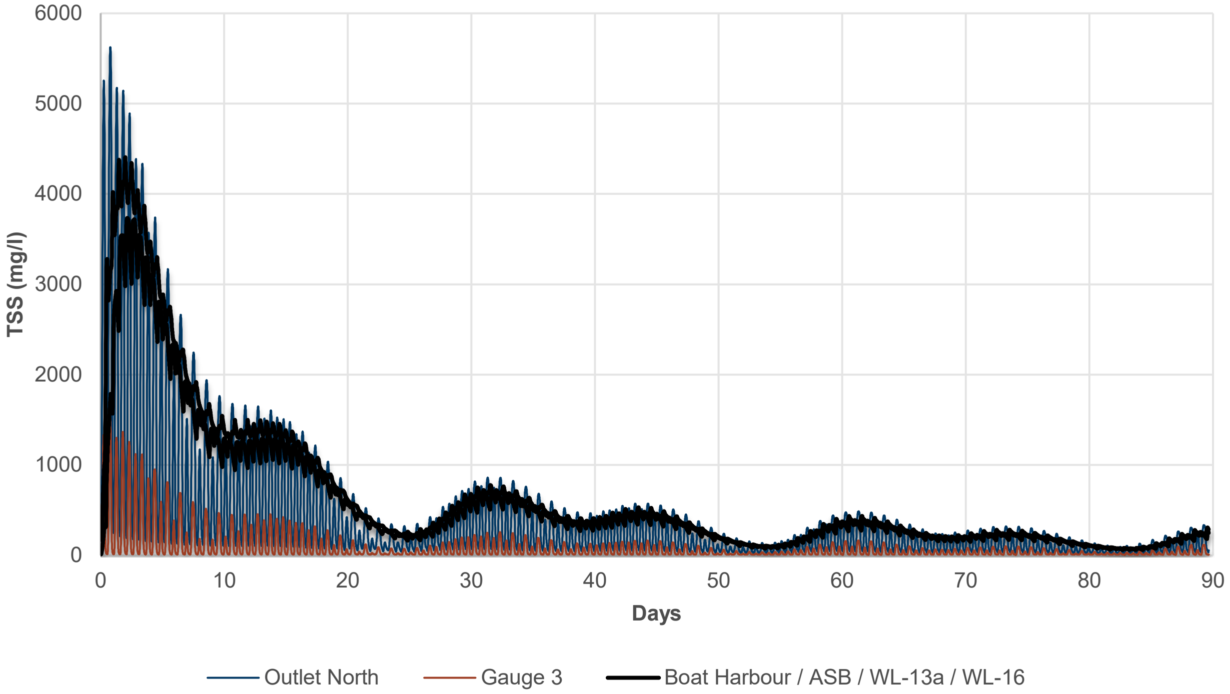


Figure 1.37 ***Time-series of hourly averaged TSS concentratons. First 90-days post dam removal. Scenario C2.***

Appendix C

Updated Residual Environmental Effects for Surface Water, Marine Environment and Fish and Fish Habitat

Table 7.3-131 Residual Environmental Effects for Surface Water

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
Waste Management	Site preparation and construction activities including, relocation of existing waste from containment cell to one of the settling basins and/or the ASB, upgrades to existing access roads, construction, and removal of berms, and constructing a new lined stormwater management pond.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft Project Environmental Protection Plan (PEPP). • Install the new stormwater management system to separate stormwater runoff and leachate, which will greatly improve the quality of the stormwater. • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect surface water from accidental spills.	A & P Positive effects associated with separation of leachate and stormwater runoff	M	SSA	A	ST	R	R	MD	Temporary increased sedimentation.	Not Significant
	Operation activities including, pumping of dewatering effluent, placement of interim cover on containment cell and building TLTF.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Ensure design controls are implemented as intended.	A	M	SSA	A	ST	R	R	MD	Temporary increased sedimentation.	Not Significant
	Decommissioning and Abandonment activities including, installation of final cover and vents, and hauling leachate off-site.	• Ensure spill management protocols as outlined in the Contingency Plan are in place and are fully communicated to staff to protect surface water from accidental spills.	A	L	SSA, RSA	A	LT	S	R	LD	Potential spill of leachate and resulting surface water impacts.	Not Significant
Dredging	Operation activities including hydraulic and mechanical dredging.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Control effluent discharge to estuary at the outlet control structure to respect the Total Suspended Solids (TSS) Canadian Council of Ministers of the Environment (CCME) criteria (< 25 micrograms/Litre [mg/L] from background level) and confirm by applying a TSS monitoring program. • Use properly installed silt curtains to control sedimentation as outlined in the most recent version of Nova Scotia Environments (NSE's) Erosion and Sedimentation Handbook for Construction Sites. • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect surface water from accidental spills. • Refueling will occur 30 metres (m) from the nearest waterbodies (except Boat Harbour).	A	M	SSA	A	MT	C	R	MD	Temporary increased sedimentation.	Not Significant

Table 7.3-131 Residual Environmental Effects for Surface Water

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics: Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)	Residual Effect	Significance of Residual Effect
		• Develop and implement a refueling plan for any refueling that will need to occur on or near water within Boat Harbour during active dredging. This will include the requirement for equipment to be fitted with emergency controls to limit leakage and the requirement to have floating spill containment booms on hand during refueling activities near water.										
Wetland Management	Site preparation and construction activities including construction of access roads and clearing of vegetation within access points.	• Implement mitigation measures listed in Table 7.3-1 and included in draft PEPP. • Confirm background TSS in the estuary before beginning remediation work to compare the results from the TSS monitoring that will be completed during remediation.	A	M	SAA	A	ST	R	R	MD	Temporary increased sedimentation.	Not Significant
	Operation activities including hydraulic and/or mechanical dredging.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Use properly installed silt curtains to control sedimentation as outlined in the most recent version of NSE's Erosion and Sedimentation Handbook for Construction Sites. • Use a "moon pool" system complete with dual perimeter curtains during any dredging within the estuary to limit an increase in TSS in adjacent areas. • Control effluent discharge to estuary at the outlet control structure to respect the TSS CCME criteria (< 25 mg/L from background level) and confirm by applying a TSS monitoring program. • Refueling will occur 30 m from the nearest waterbodies (except Boat Harbour). • Develop and implement a refueling plan for any refueling that will need to occur on or near water within wetlands during active dredging. This will include the requirement for equipment to be fitted with emergency controls to limit leakage and the requirement to have floating spill containment booms on hand during refueling activities near water.	A	M	SAA	A	MT	C	R	MD	Temporary increased sedimentation.	Not Significant

Table 7.3-131 Residual Environmental Effects for Surface Water

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect[1]	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude[2]	Geographic Extent[3]	Timing[4]	Duration[5]	Frequency[6]	Reversibility[7]	Ecological or Social Context[8]		
Bridge at Highway 348	Site preparation and construction activities including, construction of a single lane temporary by-pass causeway, removal of existing causeway and construction of new bridge and removal of the temporary by-pass causeway.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Confirm background TSS as per the draft EMP and draft PEPP in the estuary before beginning remediation work to compare the results from the TSS monitoring that will be completed during remediation. • Implement additional sediment controls as needed to respect the TSS CCME criteria (< 25 mg/L from background level) and confirm by applying a TSS monitoring program. • Refueling will occur 30 m from the nearest waterbodies (except Boat Harbour). • Develop and implement a refueling plan for any refueling that will need to occur on or near water within Boat Harbour. This will include the requirement for equipment to be fitted with emergency controls to limit leakage.	A	M	SAA	A	ST	R	R	MD	Temporary increased sedimentation.	Not Significant
Pipeline Decommissioning	The remaining portions of the pipeline will be managed in place by Nova Scotia Lands Inc. (NSLI).	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect surface water from accidental spills.	A	L	SAA	A	ST	O	R	LD	Temporary increased erosion and sedimentation.	Not Significant
Dam	Decommissioning and Abandonment activities including demolishing dam structure and dredging channel to match the channel shape and depth of the bridge. Reintroduction of tidal influences.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Confirm background TSS in estuary before beginning remediation work. • Implement surface water BMPs to respect the TSS CCME criteria (< 25 mg/L from background level) and confirm by applying a TSS monitoring program. • Implement scour protection measures in channel as required. • Ensure the works are carried out in late fall or early winter season (outside ecologically sensitive breeding and migration windows as	A & P increase in water quality as a result of reintroduction of tidal influences	H	LAA, RSA	A	LT	R	IR	HD	Water quality improvement through reintroduction of tidal influences	Not Significant

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Table 7.3-131 Residual Environmental Effects for Surface Water

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
		well as commercial fishing/harvesting seasons). • As articulated in the draft PEPP, properly installed silt curtains and cofferdams will be used as per the most recent version of NSE's Erosion and Sedimentation Handbook for Construction Sites to control sedimentation and water movement. • Install additional silt curtains in the water upstream and downstream of the dam decommissioning works to control the migration of silt generated as a result of the dam removal. • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect surface water from accidental spills. • Refueling will occur 30 m from the estuary. • Develop and implement a refueling plan for any refueling that will need to occur on or near water within Boat Harbour. This will include the requirement for equipment to be fitted with emergency controls to limit leakage and the requirement to have floating spill containment booms on hand during refueling activities near water.										

Notes:
Refer to Table 7.2-4 for definitions
(1) A - Adverse, P - Positive
(2) N - Negligible, L - Low, M - Moderate, H - High
(3) SSA - Site Study Area, LSA - Local Study Area, RSA - Regional Study Area
(4) N/A - Not Applicable, A- Applicable
(5) ST - Short-Term, MT - Medium-Term, LT - Long-Term, P - Permanent
(6) O - Once, S - Sporadic, R - Regular, C- Continuous
(7) R - Reversible, PR - Partially Reversible, IR - Irreversible
(8) HD - High Disturbance, MD - Moderate Disturbance, LD - Low Disturbance

Table 7.3-200 Residual Environmental Effects for the Marine Environment

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
Wetland Management	Hydraulic and/or mechanical dredging of impacted sediment in the estuary to be remediated.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Limit disturbance to areas in the estuary through refining the extent of the areas to be remediated based on additional sampling to preserve wetland habitat as much as possible. • Restrict all dredging activities in the wetlands to the limits that were identified for remediation based on the sampling that was completed. • Enforce Site-specific terms and conditions as per the approval obtained for all work associated with alterations in the Estuary. • Limit heavy machinery usage in the estuary. • Use appropriate erosion and siltation control measures during the remediation of the estuary, including use of silt curtains in conjunction with additional measures such as a "moon pool" system1. • Identify natural channels running through estuary prior to remediation to protect the integrity of hydrology in the wetland. • Use barge/floating equipment wherever possible to limit driving and use of machinery within the estuary. Where not practical, swamp mats/corduroy bridges in wet areas will be used to prevent rutting, diverting water flow, and sedimentation	A	H	SSA	A	MT	C	R	MD	Temporary increase in sedimentation, Temporary habitat loss and alteration	Not Significant

[1] Use appropriate erosion and siltation control measures during the remediation of the estuary, including use of silt curtains in conjunction with additional measures such as, a "Moon Pool"

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Table 7.3-200 Residual Environmental Effects for the Marine Environment

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
Dam	Demolish dam structure and dredge channel to match the channel shape and depth of the bridge, resulting in the introduction of tidal influence.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Ensure proper sedimentation and erosion controls are in place prior to the removal of the dam control structure including use of silt curtains in conjunction with additional measures such as a "moon pool" system. • Implement the following fish habitat awareness and avoidance measures: – Instruct personnel to avoid entering areas of the estuary that are outside of approved alteration areas with machinery – Adhere to watercourse alteration and general construction schedules – Implement scour protection measures in channel as required. • Ensure the works are carried out in late fall or early winter season (outside ecologically sensitive breeding and migration windows as well as commercial fishing/harvesting seasons). • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect marine habitat from accidental spills. • Ensure adequate remediation has taken place, and impacted sludge is removed before tidal influence is introduced.	A/P	M	RSA	A	ST	R	R	MD	Disturbance, habitat gain	Not Significant

Notes:
Refer to Table 7.2-4 for definitions
(1) A - Adverse, P - Positive
(2) N - Negligible, L - Low, M - Moderate, H - High
(3) SSA - Site Study Area, LSA - Local Study Area, RSA - Regional Study Area
(4) NA - Not Applicable, A- Applicable
(5) ST - Short-Term, MT - Medium-Term, LT - Long-Term, P - Permanent
(6) O - Once, S - Sporadic, R - Regular, C- Continuous
(7) R - Reversible, PR - Partially Reversible, IR - Irreversible
(8) HD - High Disturbance, MD - Moderate Disturbance, LD - Low Disturbance

NOVA SCOTIA

Table 7.3-218 Residual Environmental Effects for Fish and Aquatic Habitat

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
Waste Management	Upgrades to existing access roads	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Implement the following fish habitat awareness and avoidance measures: – Complete pre-construction meetings to ensure construction staff are aware of fish habitat on-site – Identify and communicate schedule of construction activities as it relates to alteration of fish habitat – Provide copies of relevant maps and digital format locations of fish habitat as well as approvals, terms, and conditions, as it pertains to the contractor – Enforce Site-specific terms and conditions as per the approval obtained for all work associated with wetland and watercourse alterations – Where aquatic habitat cannot be avoided, minimization of total Project footprint within the surface water system will be considered during planning – Submit surface water alteration applications (wetlands and watercourses) during Project planning and design to request an authorization to alter fish habitat. Loss of fish habitat will be addressed in these alteration applications and recommended timing windows will be adhered to for potential direct loss of fish and fish habitat – Compensate for permanent loss of aquatic habitat through habitat compensation activities, subject to Department of Fisheries and Oceans (DFO), based on the *Fisheries Act* current at time of the Project remedial phase, and decommissioning phase • Establish construction methods, such as working from upgradient to downgradient to reduce the potential to drain or flood a partially altered wetland or downgradient wetland via indirectly altered hydrology due to remediation, site dewatering, or road construction.	A	M	SSA	A	ST	O	R	MD	Disturbance	Not Significant

Table 7.3-218 Residual Environmental Effects for Fish and Aquatic Habitat

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
Dredging	Site preparation, including construction of water level control structure and the removal and destruction of fish.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Obtain authorization from DFO for fish euthanization and follow conditions of approval. • Complete euthanization of fish in a culturally sensitive manner that will be determined in consultation with Pictou Lands First Nation (PLFN). • Implement the following fish awareness and avoidance measures: – Complete pre-construction meetings to ensure construction staff are aware of potential and confirmed fish habitat on-site. – Provide copies of relevant maps and digital format locations of fish habitat as well as approvals, terms, and conditions, as they pertain to the contractor. – Where aquatic habitat cannot be avoided, minimization of total Project footprint within the surface water system will be considered during planning. • Establish construction methods, such as working from upgradient to downgradient to reduce the potential to drain or flood a partially altered wetland or downgradient wetland via indirectly altered hydrology due to remediation, site dewatering, or road construction.	A	M	SSA	A	ST	O	R	MD	Disturbance Direct mortality of fish	Not Significant
	Hydraulic and mechanical dredging.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP.	A	H	SSA	A	MT	C	R	MD	Disturbance	Not Significant
Wetland Management	Construction of access roads and clearing of vegetation within access points.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Implement the following designated protocols for fish: – Obtain authorization from DFO for fish euthanization and follow conditions of approval. – Complete euthanization of fish in a culturally sensitive manner that will be determined in consultation with PLFN. Submit surface water alteration applications (wetlands and watercourses) during Project planning and design to request an authorization to alter fish habitat. Loss of fish habitat will be addressed in these alteration applications and recommended timing	A	M	SSA	A	ST	O	R	MD	Disturbance	Not Significant

Table 7.3-218 Residual Environmental Effects for Fish and Aquatic Habitat

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics: Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)	Residual Effect	Significance of Residual Effect
		windows will be adhered to for potential direct loss of fish and fish habitat. – Compensate for permanent loss of fish habitat through fish habitat compensation activities, subject to DFO, based on the Fisheries Act current at time of the Project. • Implement the following fish habitat awareness and avoidance measures: – Complete pre-construction meetings to ensure construction staff are aware of fish habitat on-site. – Identify and communicate schedule of construction activities as it relates to alteration of fish habitat. – Provide copies of relevant maps and digital format locations of fish habitat as well as approvals, terms, and conditions, as it pertains to the contractor. – Where aquatic habitat cannot be avoided, minimization of total Project footprint within the surface water system will be considered during planning. – Submit surface water alteration applications (wetlands and watercourses) during Project planning and design to request an authorization to alter fish habitat, loss of fish habitat will be addressed in these alteration applications and recommended timing windows will be adhered to for potential direct loss of fish and fish habitat. – Compensate for permanent loss of aquatic habitat through habitat compensation activities, subject to DFO, based on the Fisheries Act current at time of the Project remedial phase, and decommissioning phase. • Establish construction methods, such as working from upgradient to downgradient to reduce the potential to drain or flood a partially altered wetland or downgradient wetland via indirectly altered hydrology due to remediation, site dewatering, or road construction.										

Table 7.3-218 Residual Environmental Effects for Fish and Aquatic Habitat

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect(1)	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude(2)	Geographic Extent(3)	Timing(4)	Duration(5)	Frequency(6)	Reversibility(7)	Ecological or Social Context(8)		
	Hydraulic and/or mechanical dredging of impacted sediment in the wetlands to be remediated.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Continue fish habitat awareness and avoidance measures implemented during site preparation and construction. • Implement the following fish habitat awareness and avoidance measures: – Enforce Site-specific terms and conditions as per the approval obtained for all work associated with wetland and watercourse alterations. – Identify natural channels running through wetlands prior to remediation to protect the integrity of hydrology in the wetland.	A	H	SSA	A	ST	C	R	MD	Disturbance	Not Significant
Bridge at Highway 348	Construction of a temporary by-pass causeway, removal of existing causeway and construction of new bridge.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Establish construction methods, such as working from upgradient to downgradient to reduce the potential to drain or flood fish habitat via indirectly altered hydrology due to remediation activities. • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect aquatic habitat from accidental spills.	A	M	SSA	A	ST	O	R	MD	Disturbance	Not Significant
Dam	Demolish dam structure and dredge channel to match the channel shape and depth of the bridge, and the re- introduction of tidal Influence.	• Implement mitigation measures listed in Table 7.3-1 and included in the draft PEPP. • Implement scour protection measures in channel as required. • Ensure the works are carried out in late fall or early winter season (outside ecologically sensitive breeding and migration windows as well as commercial fishing/harvesting seasons). • Develop and implement spill management protocols as outlined in the Contingency Plan and fully communicate protocols to staff to protect aquatic habitat from accidental spills.	A/P	M	A	A	ST	R	R	MD	Disturbance, habitat gain	Not Significant

Table 7.3-218 Residual Environmental Effects for Fish and Aquatic Habitat

Project Component	Project Component – VC Interactions	Mitigation and Compensation Measures	Nature of Effect[1]	Residual Environmental Effects Characteristics							Residual Effect	Significance of Residual Effect
				Magnitude[2]	Geographic Extent[3]	Timing[4]	Duration[5]	Frequency[6]	Reversibility[7]	Ecological or Social Context[8]		

Notes:
Refer to Table 7.2-4 for definitions
(1) A - Adverse, P - Positive
(2) N - Negligible, L - Low, M - Moderate, H - High
(3) SSA - Site Study Area, LSA - Local Study Area, RSA - Regional Study Area
(4) NA - Not Applicable, A- Applicable
(5) ST - Short-Term, MT - Medium-Term, LT - Long-Term, P - Permanent
(6) O - Once, S - Sporadic, R - Regular, C- Continuous
(7) R - Reversible, PR - Partially Reversible, IR - Irreversible
(8) HD - High Disturbance, MD - Moderate Disturbance, LD - Low Disturbance

Appendix D

Supporting Information for IAAC-33

Table 2

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Toddler (Sandy Beach Scenario)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia

Receptor: Pictou Landing First Nations Resident/Recreational User - Toddler

Exposure Scenario: Sandy Beach

Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	SAF	BSC	RAF_{oral}	RAF_{lung}	RAF_{derm}	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	1.6E+02	160
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	7.5E-05	75

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
SAF =	soil allocation factor (unitless)	chemical specific	Health Canada (2021a); CCME (2006)
BW =	body weight (kg)	16.5	Health Canada (2021a) - Toddler
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF_{oral} =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF_{lung} =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF_{derm} =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	72	Health Canada (2017; 2021a)
SA_{hands} =	surface area of hands (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SA_{arms} =	surface area of lower arms (cm^2)	890	Health Canada (2017; 2021a) - Toddler
SA_{legs} =	surface area of lower legs (cm^2)	1690	Health Canada (2017; 2021a) - Toddler
SA_{feet} =	surface area of feet (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SL_{hands} =	sediment loading rate to exposed skin of hands (kg/cm^2-event)	0.49	Health Canada (2017)
SL_{arms} =	sediment loading rate to exposed skin of lower arms (kg/cm^2-event)	0.17	Health Canada (2017)
SL_{legs} =	sediment loading rate to exposed skin of lower legs (kg/cm^2-event)	0.70	Health Canada (2017)
SL_{feet} =	sediment loading rate to exposed skin of feet (kg/cm^2-event)	21	Health Canada (2017)
D1 =	hours per day	8	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
$D3_{SUB\text{-}CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times SAF \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3) + ((SA_{hands} \times SL_{hands}) + (SA_{arms} \times SL_{arms}) + (SA_{legs} \times SL_{legs}) + (SA_{feet} \times SL_{feet})) \times RAF_{derm} \times D2 \times D3)} + BSC$$

Table 3

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Toddler (Intertidal Mudflats Scenario)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia

Receptor: Pictou Landing First Nations Resident/Recreational User - Toddler

Exposure Scenario: Intertidal Mudflats

Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	SAF	BSC	RAF_{oral}	RAF_{lung}	RAF_{derm}	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	7.0E+01	70
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	2.9E-05	29

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
SAF =	soil allocation factor (unitless)	chemical specific	Health Canada (2021a); CCME (2006)
BW =	body weight (kg)	16.5	Health Canada (2021a) - Toddler
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF_{oral} =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF_{lung} =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF_{derm} =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	72	Health Canada (2017; 2021a)
SA_{hands} =	surface area of hands (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SA_{arms} =	surface area of lower arms (cm^2)	450	Health Canada (2017; 2021a) - Toddler
SA_{legs} =	surface area of lower legs (cm^2)	845	Health Canada (2017; 2021a) - Toddler
SA_{feet} =	surface area of feet (cm^2)	430	Health Canada (2017; 2021a) - Toddler
SL_{hands} =	sediment loading rate to exposed skin of hands (kg/cm^2-event)	58	Health Canada (2017)
SL_{arms} =	sediment loading rate to exposed skin of lower arms (kg/cm^2-event)	11	Health Canada (2017)
SL_{legs} =	sediment loading rate to exposed skin of lower legs (kg/cm^2-event)	36	Health Canada (2017)
SL_{feet} =	sediment loading rate to exposed skin of feet (kg/cm^2-event)	24	Health Canada (2017)
D1 =	hours per day	4	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
$D3_{SUB\text{-}CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times SAF \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3) + (((SA_{hands} \times SL_{hands}) + (SA_{arms} \times SL_{arms}) + (SA_{legs} \times SL_{legs}) + (SA_{feet} \times SL_{feet})) \times RAF_{derm} \times D2 \times D3)} + BSC$$

Table 4

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Child (Reed Gathering Scenario)
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia

Receptor: Pictou Landing First Nations Resident/Recreational User - Child

Exposure Scenario: Reed Gathering

Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	SAF	BSC	RAF $_{oral}$	RAF $_{lung}$	RAF $_{derm}$	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	1.0E+03	999
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	5.0E-04	505

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
SAF =	soil allocation factor (unitless)	chemical specific	Health Canada (2021a); CCME (2006)
BW =	body weight (kg)	32.9	Health Canada (2021a) - Child
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF $_{oral}$ =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF $_{lung}$ =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF $_{derm}$ =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	57	Health Canada (2017; 2021a)
SA $_{hands}$ =	surface area of hands (cm^2)	590	Health Canada (2017; 2021a) - Child
SA $_{arms}$ =	surface area of lower arms (cm^2)	740	Health Canada (2017; 2021a) - Child
SA $_{legs}$ =	surface area of lower legs (cm^2)	1535	Health Canada (2017; 2021a) - Child
SA $_{feet}$ =	surface area of feet (cm^2)	720	Health Canada (2017; 2021a) - Child
SL $_{hands}$ =	sediment loading rate to exposed skin of hands (kg/cm^2-event)	0.66	Health Canada (2017)
SL $_{arms}$ =	sediment loading rate to exposed skin of lower arms (kg/cm^2-event)	0.036	Health Canada (2017)
SL $_{legs}$ =	sediment loading rate to exposed skin of lower legs (kg/cm^2-event)	0.16	Health Canada (2017)
SL $_{feet}$ =	sediment loading rate to exposed skin of feet (kg/cm^2-event)	0.63	Health Canada (2017)
D1 =	hours per day	4	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
D3$_{SUB-CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times SAF \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3) + (((SA_{hands} \times SL_{hands}) + (SA_{arms} \times SL_{arms}) + (SA_{legs} \times SL_{legs}) + (SA_{feet} \times SL_{feet})) \times RAF_{derm} \times D2 \times D3)} + BSC$$

Table 5

Site Specific Target Levels for Human Health
(Non-Carcinogenic Substances) - Toddler (In-Water Activities Scenario)
Boat Harbou Effluent Treatment Facility
Pictou Landing, Nova Scotia

Site Name: Boat Harbour Effluent Treatment Facility, Pictou Landing, Nova Scotia

Receptor: Pictou Landing First Nations Resident/Recreational User - Toddler

Exposure Scenario: In-Water Activities

Exposure Pathway: Direct Contact with Sediment

COPC	RfD (oral/dermal)	RfC (inhalation)	EDI	SAF	BSC	RAF $_{oral}$	RAF $_{lung}$	RAF $_{derm}$	SSTL (mg/kg)	SSTL (mg/kg; pg/g for dioxins/furans)
Vanadium	1.00E-02	Not Applicable	0.0023	1	1.0E+01	1	Not Applicable	0.026	2.1E+03	2080
Dioxins/Furans TEQ	2.00E-08	Not Applicable		0.2	1.6E-06	1	Not Applicable	0.03	1.1E-03	1073

Parameter	Definition (units)	Default Value	Reference
RfD =	reference dose (mg/kg bw-day)	chemical specific	ATSDR intermediate duration minimum risk levels (MRLs)
RfC =	reference concentration (mg/m^3)	chemical specific	Not applicable
EDI =	estimated daily intake (multimedia exposure assessment) (mg/kg bw-day)	chemical specific	See Table 1 for vanadium; no EDI available for dioxins/furans
SAF =	soil allocation factor (unitless)	chemical specific	Health Canada (2021); CCME (2006)
BW =	body weight (kg)	16.5	Health Canada (2021a) - Toddler
BSC =	background sediment concentration (mg/kg)	chemical specific	Based on calculated 95% upper confidence limit (UCL) using ProUCL Version 5.1 of background data collected from Chance Harbour Lake and an unnamed wetland.
RAF $_{oral}$ =	relative absorption factor for from the gastrointestinal tract (unitless)	chemical specific	Assumed 1.
RAF $_{lung}$ =	relative absorption factor by inhalation (unitless)	chemical specific	Not applicable
RAF $_{derm}$ =	relative dermal absorption factor (unitless)	chemical specific	0.026 for vanadium (USEPA, 2004); 0.03 for Total TEQ (Health Canada, 2021b).
SIR =	sediment ingestion rate (mg/hour)	7.7	Health Canada (2017; 2021a)
D1 =	hours per day	8	Health Canada (2021a) - assumed
D2 =	7 days per week exposed/7 days	1	Health Canada (2021a) - assumes 7 days per week
D3$_{SUB-CHRONIC}$ =	30 weeks per year exposed/30 weeks	1	Health Canada (2021a) - assumes 30 weeks/30 weeks exposed (non-winter)
CF =	conversion factor (kg/mg)	1.0E+06	Health Canada (2017; 2021a)

$$SSTL = \frac{(TDI-EDI) \times SAF \times BW \times CF}{(SIR \times RAF_{oral} \times D1 \times D2 \times D3)} + BSC$$

Appendix E

December 16, 2019 Meeting Minutes

Minutes

December 16, 2019

Subject:	IAAC/HC Session [2019-11-26] Boat Harbour Remediation Planning and Design	Ref. No.	11148275
Client:	Nova Scotia Lands Inc.		
From:	Christine Skirth	Tel:	613-297-7687
Venue/Date/Time:	IAAC Halifax, November 26, 2019, 10 AM to 12:15 PM		

Distribution:

☒ Email ☒ SharePoint ☐ Electronic Filing ☐ Other: ______________

☒ NS Lands (AS/KS/DB) ☐ GHD (CS/KG) ☐ All Attendees

Attendees:

Name	Representing	Name	Representing
Mike Atkins	IAAC	Christine Skirth	GHD
Melanie Smith	IAAC	Peter Oram	GHD
Lauchie MacLean	IAAC	Troy Small	GHD
Derek Prosper	PLFN	Angela Swaine	NSL
Wayne Denny	PLFN	Sara Rumbolt	HC
Dominic Denny	PLFN	Maureen Robinson	HC
Marsha Mills (MM)	PLFN	Rick O'Leary	HC
Michelle Francis Denny	PLFN	Brian Herbert (BH)	McKiggan Hebert
Chief Andrea Paul	PLFN		
Gordie Prosper	PLFN		
Heather Head	PLFN		

On the Phone:

Christine Plourde	GHD		

Item Description	Action	Due Date
1) Purpose of the meeting was to discuss comments from Health Canada (HC) on the Human Health and Ecological Risk Assessment (HHERA) for the Boat Harbour Remediation Project (BHRP). GHD received the comments by email on November 18, 2019. A copy of the email is attached. The email identified concerns/discussion points for the following:		

Item Description	Action	Due Date
i. Potential exposure via food that may be consumed from the BHETF area after remediation ii. HH site specific target limits (SSTLs) to address food consumption including serving size, consumption patterns by PLFN iii. Use of child as potential receptor vs. toddler for sediment iv. Rational needed for anticipated sediment exposure scenario of 4 days per week averaged over 7 days v. Ingestion rate for sediment exposure		
2) Traditional Food Consumption and SSTLs in HHERA i. GHD discussed the source of the food consumption values used, that being the First Nation Foods, Nutrition and Environment Study (FNFNES) for Atlantic AFN regions completed by University of Ottawa, Final Report. The values used in the draft HHERA were the 95^{th} percentile values for consumers only from the Atlantic FN communities surveyed. GHD also noted that the results of sampling completed as part of the HHERA indicate low levels of contaminants in vegetation and fish collected. GHD also explained that the main contaminant of concern is dioxin and furans (D&F) in sediment. It was noted D&F bioaccumulate in the food chain but do not biomagnify. ii. PLFN and HC engaged in a conversation around the data used in the FNFNES as well as data that may be collected as part of the Well Being baseline study being undertaken as part of the Environmental Impact Statement for the remediation of the BHETF. Following the discussion it was agreed that the use of the data was reasonable, however a small focus group would be organized with select PLFN community members to verify data. IAAC agreed to help coordinate the focus group. *<u>Post Meeting Note</u>: NS Lands with assistance from GHD and PLFN carried out a focus group session to validate anticipated traditional food consumption post remediation of Boat Harbour. The Focus group was held on December 10, 2019. The results will be presented in the final HHERA.*		
3) Sediment Exposure Scenario and Receptors i. GHD provided an overview of the scenarios being considered that being that a child and toddler being exposed to sediment (in a beach like setting) for 8 hours per day up to 5 days per week. GHD also provided informal sketches that showed the limited distance between the high and low water levels indicating limited shoreline exposure. Historical aerial phots were also review showing historic water marks. *ii.* PLFN and HC engaged in a conversation around the exposure scenarios. PLFN suggested that an exposure scenario of 7 days per week for 8 hours a day would be conservative, however indicated that an exposure scenario of 4 hours per day for 7 days per week was more realistic than limiting the number of days to 4 or 5. As part of the conversation HC provided information on the term Hazard Quotient (HQ) which is used in the calculation of risk to HH. In general, only 20 percent of the allowable exposure level (or HQ) can come from one specific site, as it is recognized that other sites visited in a given day may also result in similar exposure to a given contaminant. HC also noted that the 20 percent needs to consider the level of contaminants in five media, that being air, water, sediment, soil, and food. *<u>Post Meeting Note:</u> GHD discussed the use ATSDR - Agency for Toxic*		

Item Description	Action	Due Date
Substances and Disease Registry - sub-chronic (intermediate duration) minimal risk level (MRL) as a toxicity reference value (TRV) to calculate the SSTLs with Maureen Robinson from HC on December 9, 2019. HC is in general agreement with the use of the ATSDR intermediate duration MRL as it more accurately represents the exposure at the Site. HC also noted that the decision on the number of hours per day (4 or 8) could be acceptable as long a solid justification is provided. HC further noted that they generally prefer to see the use of the most conservative exposure assumptions unless there is good justification for doing otherwise. The HHERA will carry 8 hours per day, 7 days per week for 30 weeks per year (non-winter months) as the most conservative exposure time for direct contact with sediment. The most sensitive receptor is a toddler and the most sensitive exposure scenario will be a toddler playing in mudflats.		

☒ Attachments: Email from HC dated November 18, 2019

This confirms and records GHD's interpretation of the discussions which occurred and our understanding reached during this meeting. Unless notified in writing within 5 days of the date issued, we will assume that this recorded interpretation or description is complete and accurate.

Christine Skirth

From: Robinson, Maureen (HC/SC) <maureen.robinson@canada.ca>
Sent: Monday, November 18, 2019 11:48 AM
To: Ken.Swain@novascotia.ca; Angela.Swaine@novascotia.ca; Christine Skirth; Christine Plourde
Cc: Maclean, Lachlan (IAAC/AEIC); Rumbolt, Sara (HC/SC); O'Leary, Rick (HC/SC)
Subject: FW: HC's comments on SSTL derivation at BHRP

Hello,
Please see below recent correspondence from Health Canada to IAAC.
Maureen

From: Rumbolt, Sara (HC/SC) <sara.rumbolt@canada.ca>
Sent: 2019-11-13 1:07 PM
To: Maclean, Lachlan (IAAC/AEIC) <lachlan.maclean@canada.ca>
Cc: O'Leary, Rick (HC/SC) <rick.oleary@canada.ca>; Ma, Kitty (HC/SC) <kitty.ma@canada.ca>; Robinson, Maureen (HC/SC) <maureen.robinson@canada.ca>
Subject: Fwd: HC's comments on SSTL derivation at BHRP

Hi Lauchie,

Please see below from Maureen Robinson- Health Risk Assessment & Toxicology Specialist. Please review and let me know when you would like to discuss further.

Regards,
Sara

Sent from my iPhone

Begin forwarded message:

> **From:** "Robinson, Maureen (HC/SC)" <maureen.robinson@canada.ca>
> **Date:** November 13, 2019 at 12:35:56 PM AST
> **To:** "Rumbolt, Sara (HC/SC)" <sara.rumbolt@canada.ca>
> **Cc:** "Petrovic, Sanya (HC/SC)" <sanya.petrovic@canada.ca>, "Lorusso, Luigi (HC/SC)" <luigi.lorusso@canada.ca>, "O'Leary, Rick (HC/SC)" <rick.oleary@canada.ca>, "White, Louise (HC/SC)" <louise.white@canada.ca>
> **Subject: HC's comments on SSTL derivation at BHRP**
>
> Hi Sara,
>
> The Contaminated Sites Division has written the following letter to facilitate your discussion with the Impact Assessment Agency of Canada (formerly known as CEAA):
>
> Health Canada is providing the following comments in response to questions identified in a meeting with IAAC on October 22, 2019 regarding the draft Human Health and Environmental Risk Assessment (HHERA) (GHD, March 2019) for the Land Based Areas, Wetlands and Estuary site for the Boat Harbour Remediation Project (BHRP) .

The draft HHERA report has identified site-specific target levels (SSTLs) for remediation of wetlands which have been reported to have elevated concentrations of dioxins and other substances in sediments due to historical activities. Health Canada has provided comments on the draft HHERA for the Land Based Areas, Wetlands and Estuary site as some of the information presented in the report was not consistent with Health Canada guidance and may underestimate potential health risk. Health Canada received a request for additional clarification in relation to derivation of SSTLs related to protection of human health based on exposures to sediment in the freshwater and estuary wetlands. As indicated in previous comments, the proposed SSTLs for remediation targets may not be adequate to protect human health based on the information provided regarding the proposed use of the area.

Health Canada requests that the final report provide clarification of whether the SSTLs for dioxins and other substances are health protective in relation to several issues, including: i) whether all potentially impacted media were considered (e.g., whether foods may be consumed from the area in future); ii) whether all sensitive receptors were considered; iii) whether short duration exposure was adequately considered (e.g., dose averaging of short term exposures may underestimate potential exposure); and iv) whether exposure to sediments via incidental ingestion was assessed for exposed sediments in the intertidal zone (e.g., whether incidental ingestion of sediment is expected to be limited to only suspended sediment in the water column):

- i) The SSTLs provided in the HHERA report were derived based on direct contact with sediments and did not indicate whether potential exposure via foods that may be consumed from the area in future has been fully evaluated. It is understood by Health Canada that community surveys are ongoing to verify community expectations of future site usage (including traditional and country food collection and consumption). It is understood that there is no food consumption at the present time but it is not clear, given the current lack of information on future food consumption patterns, whether the report provided an SSTL that is expected to be protective of potential future food consumption. Identification of an SSTL based on direct contact exposure only may underestimate potential health risk if there is additional exposure via consumption of foods that may have elevated concentrations of dioxins or other contaminants as a result of uptake from the contaminated sediments. It is requested that the report fully evaluate whether the SSTL is intended to be protective of future food consumption in this area or whether an additional SSTL will be derived to address this issue.

- If foods that may be impacted by the contamination may be consumed from this area post-remediation, it is requested that the report specify which foods may be consumed, the serving size and consumption patterns and that an SSTL be identified that includes this exposure pathway. Please identify whether additional food chain modelling will be conducted to provide an estimate of future tissue concentrations of dioxins and other contaminants in edible biota in order to estimate future exposures and an SSTL for this pathway. Please identify whether a sampling program will be implemented at the site post-remediation to confirm the results of the food chain modelling.

- ii) The SSTLs did not consider the presence of toddlers in this area which may underestimate potential health risk for toddlers as they may have a higher ingestion rate of sediment based on their body weight. The report identified that there is a residential community near this area; however, it is not clear why a toddler receptor would not be present or would not be in contact with the sediments as the report identified for children. It is requested that all receptors that may be present at the site be included in the assessment or that rationale be provided if some receptors are not expected to be present in this area.

- iii) The SSTLs were based on anticipated exposure 4 days per week which was averaged over 7 days per week; however, the report did not provide rationale as to whether nearby residents may access the site daily in warmer months. Further, please note that dose averaging of 4 days over 7 days may underestimate potential exposure. Further, if it is expected that people may only access the area 4 days per week, it is requested that rationale for any dose averaging be provided on a chemical-specific basis with references to allow for technical review. Alternately, given the proximity to a residential area (based on the proposed future land use of the project site), if it is possible that people may access the site daily, it is requested that the report provide an SSTL associated with the highest exposure period (e.g., in summer months).

- iv) The SSTLs provided for sediment direct contact may underestimate exposure if people are exposed to sediments at the water's edge, as the ingestion rate of sediment was limited to ingestion of sediment suspended in the water column. For example, the exposure assessment did not include ingestion of sediment that people may be in contact with via hand to mouth activity while at the water's edge. Health Canada guidance specifies that the hand-to-mouth contact sediment ingestion rates are relevant for on-land activities (such as playing in the sand on a beach), where the sediment is exposed. The suspended sediment ingestion rates used in the report are accurate and are relevant for near-shore in-water activities in shallow water (such as wading, walking and playing in water) where immersion in water is likely. For sites where both on-land and near-shore in-water activities are expected, the hand-to-mouth contact rates should be applied for the duration of the time spent on-site, unless the division of time between on-land and in-water activities can be clearly defined. The input parameter used in the report may underestimate the potential exposure and it is requested that the calculation for direct contact with sediment be updated with information relevant to on-land activities if relevant. Alternately, it is requested that justification be provided for the input parameter used (e.g., please identify whether the contamination is limited to areas where the sediment is submerged and the SSTLs are not intended for use for on-land activities in areas at the water's edge).

Health Canada can review the revised report and/or provide additional clarification. It is recommended that Health Canada guidance be used in calculation of exposure and derivation of SSTLs, ensuring that all potential exposure pathways are fully considered.

Sara, please let me know if you request any additional clarification on any of the issues discussed above.

Thanks,
Maureen

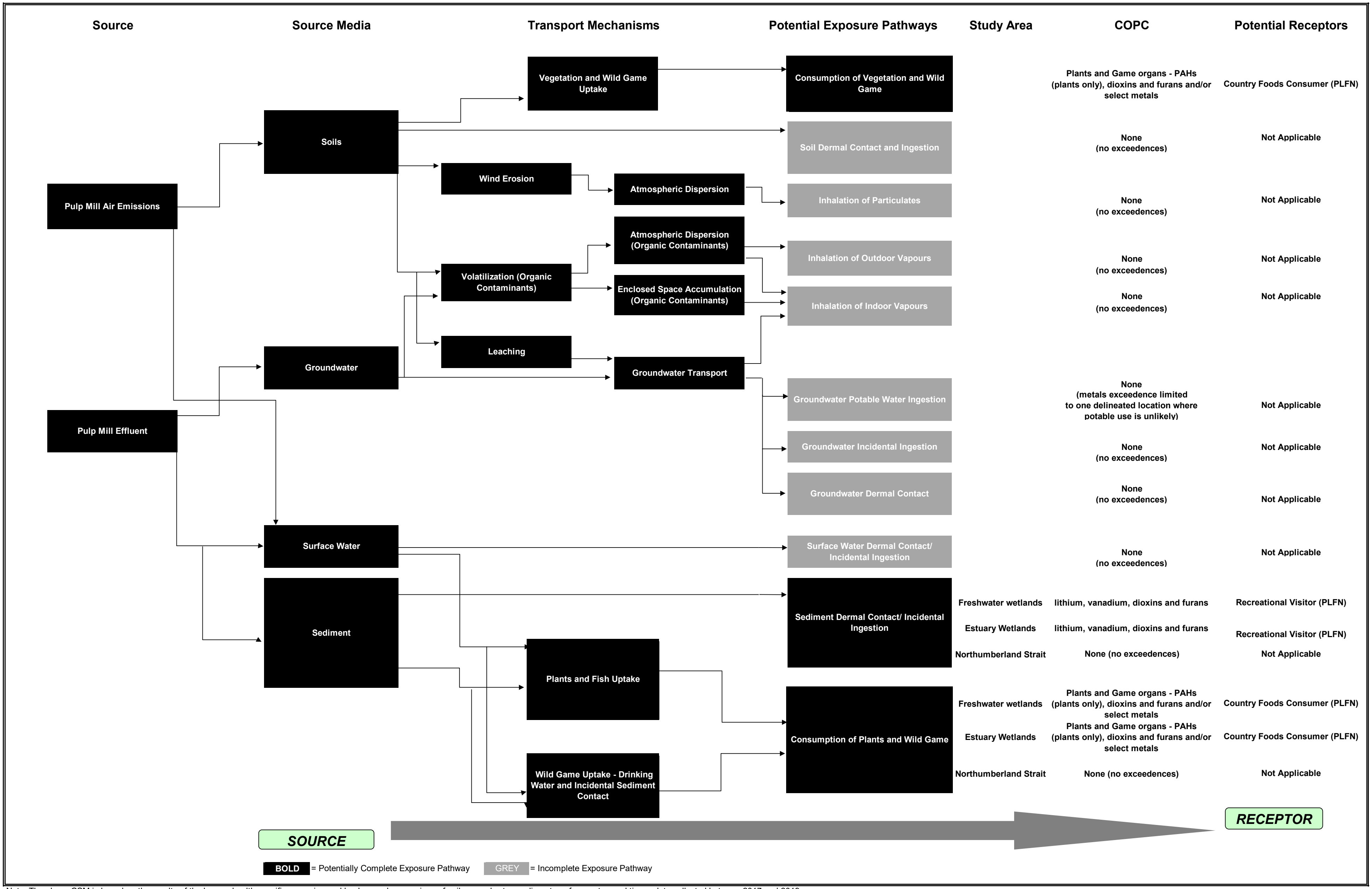
Maureen Robinson, M. Sc.
Health Risk Assessment & Toxicology Specialist
Health Canada / Government of Canada
maureen.robinson@canada.ca / Tel: 902-221-5606

Spécialiste d'évaluation des risques de santé et la toxicologie
Santé Canada / Gouvernement du Canada
maureen.robinson@canada.ca / Tél: 902-221-5606

Appendix F

Supporting Information for IAAC-36

Figure 12 Revised Conceptual Site Model for Human Receptors - Quantitative HHERA - Boat Harbour Effluent Treatment Facility



Note: The above CSM is based on the results of the human health specific screening and background comparison of soil, groundwater, sediment, surface water, and tissue data collected between 2017 and 2019.

Table H-2.9

Values Used for Daily Intake Calculations - Resident Consumption of Traditional Country Foods
Quantitative Human Health and Ecological Risk Assessment
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Scenario Timeframe: Current/ Future
Medium: Traditional Foods
Exposure Medium: Traditional Foods
Receptor Population: Traditional Foods Consumer
Receptor Age: Toddler, Child, Teen, & Adult (1)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation/ Model Name
Ingestion	Cp	Chemical Concentration in Plants	mg/kg	(2)	(2)	Dose (predicted daily intake) (mg/kg-day) =
	Cgo	Chemical Concentration in Game Organs	mg/kg	(2)	(2)	Cf x IRf x D_i x RAFo x D4 x 1/BW x 1/365 x 1/LE
	Cw	Chemical Concentration in Waterfowl	mg/kg	(2)	(2)	
	IRp - toddler	Ingestion Rate of Plants/Berries	kg/day	0.010	FNFNES (2017) (3)(4)	Note D4 and LE only used for carcinogens
	IRp - child	Ingestion Rate of Plants/Berries	kg/day	0.015	FNFNES (2017) (3)(4)	
	IRp - teen	Ingestion Rate of Plants/Berries	kg/day	0.022	FNFNES (2017) (3)(4)	This equation is used for each food item
	IRp - adult	Ingestion Rate of Plants/Berries	kg/day	0.018	FNFNES (2017) (3)	that is consumed.
	IRgo - toddler	Ingestion Rate of Game Organs	kg/day	0.0044	FNFNES (2017) (3)(4)	
	IRgo - child	Ingestion Rate of Game Organs	kg/day	0.0065	FNFNES (2017) (3)(4)	
	IRgo - teen	Ingestion Rate of Game Organs	kg/day	0.0091	FNFNES (2017) (3)(4)	
	IRgo - adult	Ingestion Rate of Game Organs	kg/day	0.014	FNFNES (2017) (3)	
	IRw - toddler	Ingestion Rate of Waterfowl	kg/day	0.00031	FNFNES (2017) (3)(4)	
	IRw - child	Ingestion Rate of Waterfowl	kg/day	0.00046	FNFNES (2017) (3)(4)	
	IRw - teen	Ingestion Rate of Waterfowl	kg/day	0.00065	FNFNES (2017) (3)(4)	
	IRw - adult	Ingestion Rate of Waterfowl	kg/day	0.0010	FNFNES (2017) (3)	
	D_i	Exposure Frequency (days per year consumption occurs)	days/year	365	Health Canada, 2012 (5)	
	D_4 - toddler	Exposure Duration (total years exposed to Site) - carcinogens only	years	4.5	Health Canada, 2010a	
	D_4 - child	Exposure Duration (total years exposed to Site) - carcinogens only	years	7	Health Canada, 2010a	
	D_4 - teen	Exposure Duration (total years exposed to Site) - carcinogens only	years	8	Health Canada, 2010a	
	D_4 - adult	Exposure Duration (total years exposed to Site) - carcinogens only	years	60	Health Canada, 2010a	
	BW - toddler	Body Weight	kg	16.5	Health Canada, 2010a	
	BW - child	Body Weight	kg	32.9	Health Canada, 2010a	
	BW - teen	Body Weight	kg	59.7	Health Canada, 2010a	
	BW - adult	Body Weight	kg	70.7	Health Canada, 2010a	
	LE	Life Expectancy - carcinogens only	years	79.5	Health Canada, 2010a	
	RAFo	Relative Absorption Factor - gastrointestinal tract	%/100	1	Health Canada, 2010b	

Notes:

(1) Carcinogenic risk evaluates a composite receptor which consists of a toddler, child, teen, and adult averaged over a 79.5-year lifetime.
Non-carcinogenic hazard quotient evaluates toddler exposure that being the most sensitive receptor.

(2) For concentrations in plants, game meat (organs), and waterfowl, refer to Tables H.2.2, H.2.3, and H.2.4, respectively.

(3) The ingestion rates obtained for the First Nations in the Atlantic (FNFNES, 2017) and are based on an adult heavy consumer (95th percentile, unless otherwise noted). Note that the consumption rate for game organs reflects the consumers only maximum ingestion rate reported in FNFNES study, due to the low number of individuals who reported consuming game organs.

(4) For plants/berries, the ingestion rates for the toddler, child, and teen were calculated by multiplying the adult ingestion rate by the ratio of the ingestion rate for each life stage to the ingestion rate for the adult presented for root vegetables in Health Canada (2012).
For game and waterfowl, the ingestion rates for the toddler, child, and teen were calculated by multiplying the adult ingestion rate by the ratio of the ingestion rate for each life stage to the ingestion rate for the adult presented for wild game in Health Canada (2012).

(5) The traditional food ingestion rates as presented in FNFNES (2017) already assume meal size and frequency. Therefore, exposure frequency assumes 365 days per year.

References:

FNFNES, 2017: Laurie Chan, Olivier Receveur, Malek Batal, William David, Harold Schwartz, Amy Ing, Karen Fediuk and Constantine Tikhonov. First Nations Food, Nutrition and Environment Study (FNFNES): Results from the Atlantic. Ottawa: University of Ottawa, 2017. Print. Ingestion rates are based on combined male and female heavy consumer (consumers only)

Health Canada, 2010a: Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0, September 2010, Revised 2012.

Health Canada, 2010b: Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-specific Factors, Version 2.0, September 2010.

Table H-2.16

Calculation of Chemical Cancer Risks and Non-Cancer Hazards for Pictou Landing First Nations Resident Exposure to Traditional Foods
Quantitative Human Health and Ecological Risk Assessment
Boat Harbour Effluent Treatment Facility
Pictou Landing, Nova Scotia

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Toddler to Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Contaminants of Potential Concern (COPC)	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
					Value	Units	Value	Units	Value	Units	Risk	Value	Units	Value	Units	Quotient
Plants	Plants/ Berries	Site	Ingestion	1-Chloronaphthalene	2.40E-03	µg/g	7.29E-07	mg/kg-d	--	--	NC	1.45E-06	mg/kg-d	8.00E-02	mg/kg-d	2E-05
				Acenaphthene	9.30E-03	µg/g	2.82E-06	mg/kg-d	--	--	NC	5.64E-06	mg/kg-d	6.00E-02	mg/kg-d	9E-05
				Acenaphthylene	6.50E-03	µg/g	1.97E-06	mg/kg-d	--	--	NC	3.94E-06	mg/kg-d	6.00E-02	mg/kg-d	7E-05
				Anthracene	2.30E-03	µg/g	6.98E-07	mg/kg-d	--	--	NC	1.39E-06	mg/kg-d	3.00E-01	mg/kg-d	5E-06
				Fluoranthene	1.36E-02	µg/g	4.13E-06	mg/kg-d	--	--	NC	8.24E-06	mg/kg-d	4.00E-02	mg/kg-d	2E-04
				Fluorene	5.90E-03	µg/g	1.79E-06	mg/kg-d	--	--	NC	3.58E-06	mg/kg-d	4.00E-02	mg/kg-d	9E-05
				Perylene	1.20E-03	µg/g	3.64E-07	mg/kg-d	--	--	NC	7.27E-07	mg/kg-d	3.00E-02	mg/kg-d	2E-05
				Phenanthrene	1.16E-02	µg/g	3.52E-06	mg/kg-d	--	--	NC	7.03E-06	mg/kg-d	2.00E-02	mg/kg-d	4E-04
				Pyrene	5.00E-03	µg/g	1.52E-06	mg/kg-d	--	--	NC	3.03E-06	mg/kg-d	3.00E-02	mg/kg-d	1E-04
				B(a)P TPE	8.77E-03	µg/g	2.66E-06	mg/kg-d	2.30E+00	(mg/kg-d)-1	6E-06	5.32E-06	mg/kg-d	--	mg/kg-d	NC
				Nickel	3.34E+00	µg/g	1.01E-03	mg/kg-d	--	--	NC	2.02E-03	mg/kg-d	1.10E-02	mg/kg-d	2E-01
				Tin	3.00E+00	µg/g	9.11E-04	mg/kg-d	--	--	NC	1.82E-03	mg/kg-d	6.00E-01	mg/kg-d	3E-03
				Uranium	1.09E-01	µg/g	3.31E-05	mg/kg-d	--	--	NC	6.61E-05	mg/kg-d	6.00E-04	mg/kg-d	1E-01
Game	Game Organs	Site	Ingestion	Cadmium	2.10E+00	µg/g	4.14E-04	mg/kg-d	--	--	NC	5.60E-04	mg/kg-d	1.00E-03	mg/kg-d	6E-01
				Copper	4.00E+00	µg/g	7.89E-04	mg/kg-d	--	--	NC	1.07E-03	mg/kg-d	9.10E-02	mg/kg-d	1E-02
				Manganese	1.20E+01	µg/g	2.37E-03	mg/kg-d	--	--	NC	3.20E-03	mg/kg-d	1.22E-01	mg/kg-d	3E-02
				Vanadium	6.00E+00	µg/g	1.18E-03	mg/kg-d	--	--	NC	1.60E-03	mg/kg-d	5.00E-03	mg/kg-d	3E-01
				Zinc	3.60E+01	µg/g	7.10E-03	mg/kg-d	--	--	NC	9.60E-03	mg/kg-d	4.80E-01	mg/kg-d	2E-02
				Total TEQ	1.80E-06	µg/g	3.55E-10	mg/kg-d	--	--	NC	4.80E-10	mg/kg-d	2.30E-09	mg/kg-d	2E-01
Waterfowl	Duck	Site	Ingestion	Copper	9.00E+00	µg/g	1.27E-04	mg/kg-d	--	--	NC	1.69E-04	mg/kg-d	9.10E-02	mg/kg-d	2E-03
				Mercury	8.00E-02	µg/g	1.13E-06	mg/kg-d	--	--	NC	1.50E-06	mg/kg-d	2.00E-04	mg/kg-d	8E-03
				Vanadium	4.00E+00	µg/g	5.63E-05	mg/kg-d	--	--	NC	7.52E-05	mg/kg-d	5.00E-03	mg/kg-d	2E-02
				Zinc	1.50E+01	µg/g	2.11E-04	mg/kg-d	--	--	NC	2.82E-04	mg/kg-d	4.80E-01	mg/kg-d	6E-04
				Total TEQ	1.30E-06	µg/g	1.83E-11	mg/kg-d	--	--	NC	2.44E-11	mg/kg-d	2.30E-09	mg/kg-d	1E-02

Notes:

NC Not Calculated

Calculated cancer risk or hazard quotient exceeds target cancer risk of 1E-05 or target hazard index of 0.2, respectively.

Appendix G

Supporting Information for IAAC-39

Figure 1 Conceptual Site Model for Human Receptors

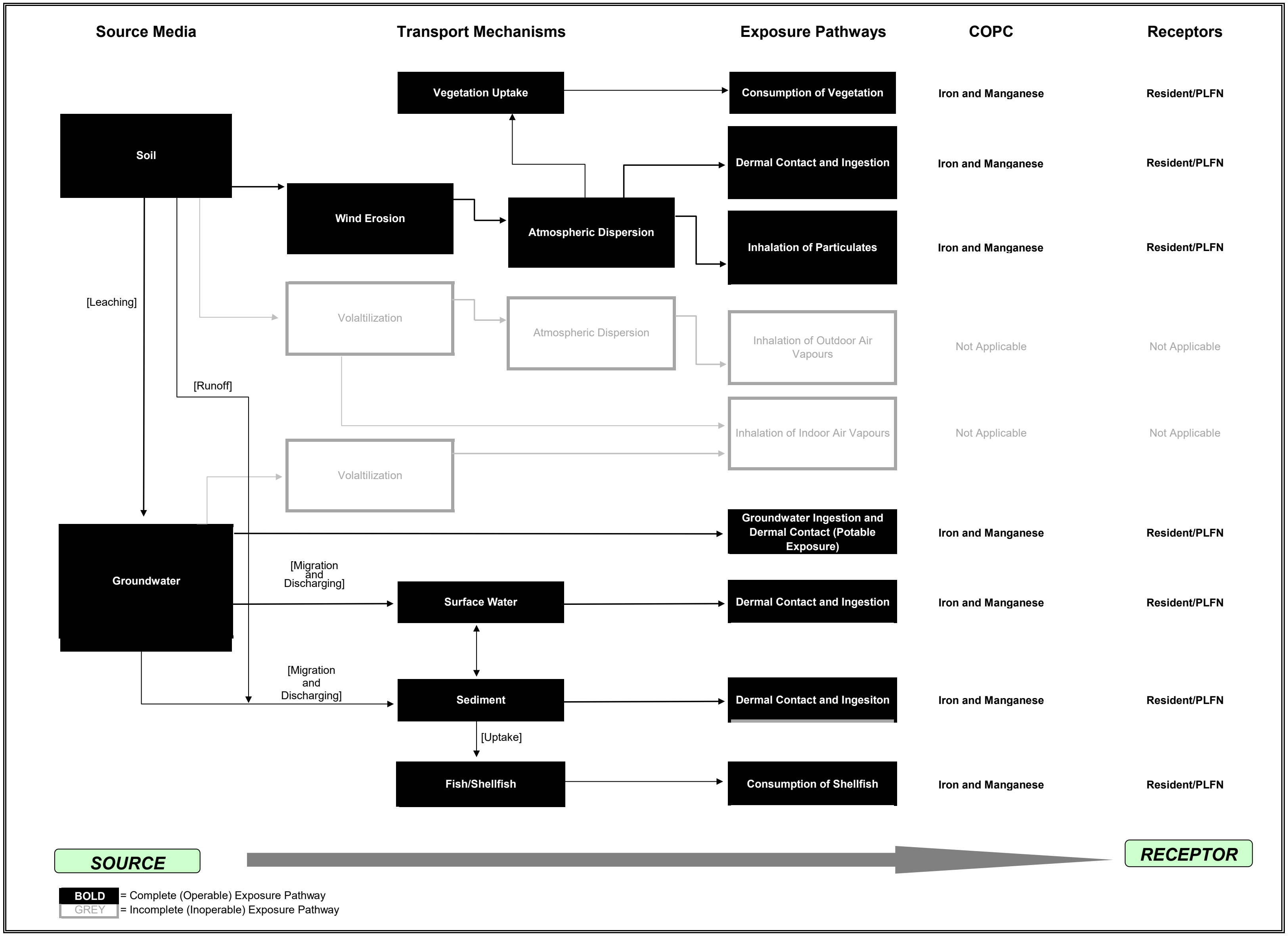


Table 1

Human Health Exposure Point Concentration (EPC) Summary
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

COPC	Exposure Point Concentration (EPC)						
	Soil (1) mg/kg	Groundwater (2) mg/L	Air (3) mg/m3	Surface Water (4) mg/L	Sediment (5) mg/kg	Plants (6) mg/kg	Shellfish (7) mg/kg
Iron	3800	0.52	0.0097	0.326	26244	180	204
Manganese	69	0.10	0.00042	0.623	1532	150	27.38

Notes:

(1) Predicted soil concentrations as a result of deposition of soils (dust) during project related activities (see PRA-HHRA).
(2) Measured groundwater concentrations (maximum concentration, 2004-2010) obtained from Pictou Landing Production Wells #1, #3, and #8 used for drinking water supply. Pictou Landing IR24, 2010 Groundwater Monitoring Program - Final Report, August 2011, prepared by Dillon Consulting Ltd.
(3) Predicted air concentrations as a result of soil disturbance during project related activities (see PRA-HHRA).
(4) Predicted surface water concentrations (maximum) of the BHSL during project related activities. GHD, 2021. Memorandum - Establishment of Water Treatment Compliance Criteria, Boat Harbour Remediation Planning and Design, October.
(5) Measured sediment concentrations (95% Upper Confidence Limit of the Mean) from Estuary/BHSL (see HHERA).
(6) Predicted plant concentrations as a result of deposition of soils (see PRA-HHRA).
(7) Measured concentrations (95% Upper Confidence Limit of the Mean) from mussels, clams, lobster, and crab collected from Northumberland Strait (see USEPA ProUCL output at end of this attachment).

Table 2

Exposure Assumptions for Direct Contact with Soil
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/ Future
Medium: Soil
Exposure Medium: Soil
Receptor Population: Resident/ Recreational User
Receptor Age: Toddler (1)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	(2)	(2)	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate of Soil	mg/day	80	Health Canada, 2021a	CS x IR x RAFo x CF x D_2 x D_3 x 1/BW
	CF	Conversion Factor	kg/mg	1.00E-06	--	
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1	Health Canada, 2021a	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1	Health Canada, 2021a	
	BW	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFo	Relative Absorption Factor	%/100	1	Health Canada, 2021b	
Dermal	CS	Chemical Concentration in Soil	mg/kg	(2)	(2)	CDI (mg/kg-day) =
	SAh	Surface Area Exposed - hands	cm^2	430	Health Canada, 2021a - hands	[(CS x CF x SAh x SLh) + (CS x CF x SAo x SLo)]
	SAo	Surface Area Exposed - other	cm^2	1,290	Health Canada, 2021a - 1/2 arms and 1/2 legs	x RAFd x D2 x D3 x 1/BW
	SLh	Soil Loading Rate - hands	$mg/cm^2/day$	0.1	Health Canada, 2021a - hands	
	SLo	Soil Loading Rate - other	$mg/cm^2/day$	0.01	Health Canada, 2021a - other surfaces	
	CF	Conversion Factor	kg/mg	1.00E-06	--	
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1	Health Canada, 2021a	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1	Health Canada, 2021a	
	BW	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFd	Relative Absorption Factor	%/100	1	Assumed (3)	

Notes:

(1) Calculations evaluate toddler exposure that being the most sensitive receptor.
(2) See Table 1.
(3) No RAFd available for iron and manganese, therefore assumed 100% absorption.

References:

Health Canada, 2021a: Federal Contaminated Site Risk Assessment in Canada, Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0, March 2021.
Health Canada, 2021b: Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.

Table 3

Exposure Assumptions for Direct Contact with Groundwater (Household Use)
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/ Future
Medium: Groundwater
Exposure Medium: Tapwater (Household Use)
Receptor Population: Resident/ Recreational User
Receptor Age: Toddler (1)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/L	(2)	(2)	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate of Water	L/day	0.6	Health Canada, 2021a	CW x IR x RAFo x D_2 x D_3 x 1/BW
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1	Health Canada, 2021a	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1	Health Canada, 2021a	
	BW	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFo	Relative Absorption Factor	%/100	1	Health Canada, 2021b	
Dermal	CW	Chemical Concentration in Water	mg/L	(2)	(2)	CDI (mg/kg-day) =
	SA	Surface Area Exposed - whole body	cm^2	6,130	Health Canada, 2021a	CW x CF x DAevent x SA x EV x D_2 x D_3 x 1/BW
	CF	Conversion Factor	L/cm^3	0.001	--	
	EV	Event Frequency	event/day	1	Health Canada, 2021a	DAevent (cm/event) - Inorganics=
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1	Health Canada, 2021a	PDerm x ET
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1	Health Canada, 2021a	
	BW	Body Weight	kg	16.5	Health Canada, 2021a	
	ET	Exposure Time	hours/day	0.54	USEPA, 2014 (3)	
	PDerm	Permeability Dermal constant	cm/hour	chemical-specific	USEPA, 2021 (4)	

Notes:

(1) Calculations evaluate toddler exposure that being the most sensitive receptor.
(2) See Table 1.
(3) Based on weighted average of 90th percentile time spent bathing for child (birth to 6 years) and adult (21 to 78).
(4) Dermal absorption of contaminants from contact with water during activities such as bathing and showering should be derived employing dermal permeability constants (PDerm) and methods described by the USEPA (Health Canada, 2021a). The following PDerm values for the COPCs are: 0.001 for both iron and manganese.

References:

Health Canada, 2021a: Federal Contaminated Site Risk Assessment in Canada, Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0, March 2021.
Health Canada, 2021b: Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.
USEPA, 2014: Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors, OSWER 9200.1-120, February 6, 2014.
USEPA, 2021: Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table, May.

Table 4

Exposure Assumptions for Inhalation of Ambient Air
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/ Future Medium: Air Exposure Medium: Ambient Air Receptor Population: Resident/ Recreational User Receptor Age: Toddler (1)

Exposure Route	Parameter Code	Parameter Definition	Units	Assumption Value	Assumption Rationale/Reference	Intake Equation/ Model Name
Inhalation of Particulates	CA	Chemical Concentration in Air	mg/kg	(2)	(2)	Dose (predicted daily intake) (mg/m^3) = CA x RAFinh x D_1 x D_2 x D_3
	D_1	Exposure Frequency (hours per day exposed/24 hours)	unitless	1	Health Canada, 2021	
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1	Health Canada, 2021	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1	Health Canada, 2021	
	RAFinh	Relative Absorption Factor - inhalation	%/100	1	Assumed	

Notes:

(1) Calculations evaluate toddler exposure that being the most sensitive receptor.
(2) See Table 1.

References:

Health Canada, 2021: Federal Contaminated Site Risk Assessment in Canada, Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0, March 2021.

Table 5

Exposure Assumptions for Direct Contact with Surface Water (Recreational Use)
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/ Future
Medium: Surface Water
Exposure Medium: Surface Water
Receptor Population: Resident/ Recreational User
Receptor Age: Toddler (1)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Water	mg/L	(2)	(2)	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate of Water	L/day	0.06	Health Canada, 2021a (3)	CW x IR x RAFo x D_2 x D_3 x 1/BW
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1 (7 days/7 days)	Assumed (4)	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1 (30 weeks/30 weeks)	Assumed (4)	
	BW	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFo	Relative Absorption Factor	%/100	1	Health Canada, 2021b	
Dermal	CW	Chemical Concentration in Water	mg/L	(2)	(2)	CDI (mg/kg-day) =
	SA	Surface Area Exposed - whole body	cm^2	6,130	Health Canada, 2021a	CW x CF x DAevent x SA x EV x D_2 x D_3 x 1/BW
	CF	Conversion Factor	L/cm^3	0.001	--	
	EV	Event Frequency	event/day	1	Health Canada, 2021a	DAevent (cm/event) - Inorganics=
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1 (7 days/7 days)	Assumed (4)	PDerm x ET
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1 (30 weeks/30 weeks)	Assumed (4)	
	BW	Body Weight	kg	16.5	Health Canada, 2021a	
	ET	Exposure Time	hours/day	4	Assumed (4)	
	PDerm	Permeability Dermal constant	cm/hour	chemical-specific	USEPA, 2021 (5)	

Notes:

(1) Calculations evaluate toddler exposure that being the most sensitive receptor.

(2) See Table 1.

(3) Since recreational users are not drinkning surface water, the potable water ingestion rate was reduced by a factor of 10.

(4) Resident exposure to surface water during recreational activities was assumed to occur for 4 hours per day, 7 days per week during the months between April and October (30 weeks). This is considered less than chronic exposure. Consistent with Health Canada (2021a), no dose averaging was assumed (i.e., D_3 was set to 30 weeks/30 weeks =1, rather than averaging over 52 weeks per year)

(5) Dermal absorption of contaminants from contact with surface water should be derived employing dermal permeability constants (PDerm) and methods described by the USEPA (Health Canada, 2021a). The following PDerm values for the COPCs are: 0.001 for both iron and manganese.

References:

Health Canada, 2021a: Federal Contaminated Site Risk Assessment in Canada, Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0, March 2021.

Health Canada, 2021b: Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.

USEPA, 2021: Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table, May.

Table 6

Exposure Assumptions for Direct Contact with Sediment
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/ Future
Medium: Sediment (mudflats)
Exposure Medium: Sediment (Mudflats)
Receptor Population: Resident/ Recreational User
Receptor Age: Toddler (1)

Exposure Route	Parameter Code	Parameter Definition	Units	Assumption Value	Assumption Rationale/Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg	(2)	(2)	Dose (predicted daily intake) (mg/kg-day) =
	SIR - toddler	Ingestion Rate of Sediment	mg/hr	72	Health Canada, 2017	CS x SIR x RAFo x CF x D_1 x D_2 x D_3 x 1/BW
	CF	Conversion Factor	kg/mg	1.00E-06	--	
	D_1	Exposure Frequency (hours per day)	hr/day	4	Assumed (3)	
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1 (7 days/7 days)	Assumed (3)	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1 (30 weeks/30 weeks)	Assumed (3)	
	BW - toddler	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFo	Relative Absorption Factor - gastrointestinal tract	%/100	1	Health Canada, 2021b	
Dermal	CS	Chemical Concentration in Sediment	mg/kg	(2)	(2)	Dose (predicted daily intake) (mg/kg-day) =
	SAh - toddler	Surface Area Exposed - hands	cm^2	430	Health Canada, 2017	CS x CF x [(SAh x SLh) + (SAa x SLa) + (SAl x SLl) +
	SAa - toddler	Surface Area Exposed - lower arms	cm^2	450	Health Canada, 2017	(SAf x SLf)] x RAFd x D2 x D3 x 1/BW
	SAl - toddler	Surface Area Exposed - lower legs	cm^2	845	Health Canada, 2017	
	SAf - toddler	Surface Area Exposed - feet	cm^2	430	Health Canada, 2017	
	SLh	Sediment Loading Rate - hands	$mg/cm^2/day$	58	Health Canada, 2017 (4)	
	SLa	Sediment Loading Rate - arms	$mg/cm^2/day$	11	Health Canada, 2017 (4)	
	SLl	Sediment Loading Rate - legs	$mg/cm^2/day$	36	Health Canada, 2017 (4)	
	SLf	Sediment Loading Rate - feet	$mg/cm^2/day$	24	Health Canada, 2017 (4)	
	CF	Conversion Factor	kg/mg	1.00E-06	--	
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1 (7 days/7 days)	Assumed (3)	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1 (30 weeks/30 weeks)	Assumed (3)	
	BW - toddler	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFd	Relative Absorption Factor - dermal	%/100	1	Assumed (5)	

Notes:

(1) Non-carcinogenic hazard quotient evaluates toddler exposure, that being the most sensitive receptor.
(2) See Table 1.
(3) Resident exposure to sediment during recreational activities such as clam digging was assumed to occur for 4 hours per day, 7 days per week during the months between April and October (30 weeks).
This is considered less than chronic exposure. Consistent with Health Canada (2021a; 2017), no dose averaging was assumed (i.e., D_3 was set to 30 weeks/30 weeks =1, rather than averaging over 52 weeks per year)
(4) For the scenario of the intertidal mudflats, adherence factors for mud (maximums) were applied.
(5) No RAFd available for iron and manganese, therefore assumed 100% absorption.

References:

Health Canada, 2021a: Federal Contaminated Site Risk Assessment in Canada, Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0, March 2021.
Health Canada, 2021b: Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.
Health Canada, 2017: Federal Contaminated Site Risk Assessment in Canada, Supplemental Guidance on Human Health Risk Assessment of Contaminated Sediments: Direct Contact Pathway, March 2017.

Table 7

Exposure Assumptions for Consumption of Country Foods
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/ Future
Medium: Country Foods
Exposure Medium: Plants/Shellfish
Receptor Population: Traditional Foods Consumer
Receptor Age: Toddler (1)

Exposure Route	Parameter Code	Parameter Definition	Units	Assumption Value	Assumption Rationale/Reference	Intake Equation/ Model Name
Ingestion	Cp	Chemical Concentration in Plants and Shellfish	mg/kg	(2)	(2)	Dose (predicted daily intake) (mg/kg-day) = Cf x IRf x D_2 x D_3 x RAFo x 1/BW
	IRp - toddler	Ingestion Rate of Plants/Berries	kg/day	0.010	FNFNES (2017) (3)(4)	
	IRs - toddler	Ingestion Rate of Shellfish	kg/day	0.019	FNFNES (2017) (3)	
	D_2	Exposure Frequency (days per week exposed/7 days)	unitless	1	Health Canada, 2021a	
	D_3	Exposure Frequency (weeks per year exposed/52 weeks)	unitless	1	Health Canada, 2021a	
	BW - toddler	Body Weight	kg	16.5	Health Canada, 2021a	
	RAFo	Relative Absorption Factor - gastrointestinal tract	%/100	1	Health Canada, 2021b	

Notes:

(1) Non-carcinogenic hazard quotient evaluates toddler exposure that being the most sensitive receptor.
(2) See Table 1.
(3) The ingestion rates obtained for the First Nations in the Atlantic (FNFNES, 2017) and are based on an adult heavy consumer (95th percentile, unless otherwise noted).
(4) For plants/berries, the ingestion rate for the toddler was calculated by multiplying the adult ingestion rate by the ratio of the ingestion rate for each life stage to the ingestion rate for the adult presented for root vegetables in Health Canada (2012).
For shellfish, the ingestion rates for the toddler was calculated by multiplying the adult ingestion rate by the ratio of the ingestion rate for each life stage to the ingestion rate for the adult presented for fish in Health Canada (2007).
(5) The traditional food ingestion rates as presented in FNFNES (2017) already assume meal size and frequency. Therefore, exposure frequency assumes 365 days per year.

References:

FNFNES, 2017: Laurie Chan, Olivier Receveur, Malek Batal, William David, Harold Schwartz, Amy Ing, Karen Fediuk and Constantine Tikhonov. First Nations Food, Nutrition and Environment Study (FNFNES): Results from the Atlantic. Ottawa: University of Ottawa, 2017. Print. Ingestion rates are based on combined male and female heavy consumer (consumers only)
Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption, Bureau of Chemical Safety Food Directorate, Health Products and Food Branch, March 2007.
Health Canada, 2021a: Federal Contaminated Site Risk Assessment in Canada, Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 3.0, March 2021.
Health Canada, 2021b: Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.

Table 8

Non-Cancer Toxicity Data - Oral/Dermal Route of Exposure
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

COPHC	Chronic/ Subchronic	Oral Reference Dose (RfD)	Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ (3)	Dates of RfD: Target Organ (MM-YY)
Metals										
Iron	chronic	7.00E-01	mg/kg-d	100%	7.00E-01	mg/kg-d	no effects	1.5	PPRTV	Sep-06
Manganese	chronic	2.50E-02	mg/kg-d	100%	2.50E-02	mg/kg-d	neuro-developmental effects	1000	Health Canada	Mar-21

Notes:

-- Not Available
(1) Default value of 100% was applied.
(2) Adjusted Dermal RfD = Oral RfD x Oral to Dermal Adjustment Factor
(3) Health Canada, 2021: Federal Contaminated Site Risk Assessment in Canada, Toxicological Reference Values (TRVs), Version 3.0, March 2021.
PPRTV: Provisional Peer Reviewed Toxicity Values (PPRTVs) for Iron and Compounds. Derivation of Subchronic and Chronic Oral RfDs, USEPA Superfund Technical Support Center, September 2006.

Table 9

Non-Cancer Toxicity Data - Inhalation Route of Exposure
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

COPC	Chronic/ Subchronic	Inhalation Reference Concentration (RfC)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC: Target Organ (1)
Metals						
Iron	24-hour	4.00E-03	mg/m^3	--	--	Ontario MOE, 2019
Manganese	24-hour	4.00E-04	mg/m^3	--	--	Ontario MOE, 2019

Notes:

-- Not Available

(1) Ontario MOE, 2019: Ministry of the Environment, Ontario Regulation 419/05, Schedule 3: Standards with Variable Averaging Periods, 2019. (https://www.ontario.ca/laws/regulation/050419).

Table 10

Calculation of Non-Cancer Hazards for Pictou Landing First Nations Resident/ Recreational User
Project Related Activities HHRA
Boat Harbour Effluent Treatment Facility
Pictou County, Nova Scotia

Scenario Timeframe: Current/Future
Receptor Population: Resident/ Recreational User
Receptor Age: Toddler

Medium	Exposure Medium	Exposure Point	Exposure Route	Contaminants of Potential Concern (COPC)	EPC		Non-Cancer Hazard Calculations					Contribution (%)
							Intake/Exposure Concentration		RfD/RfC		Hazard Quotient	
					Value	Units	Value	Units	Value	Units		
Soil	Soil	Study Area	Ingestion	Iron	3.8E+03	mg/kg	1.8E-02	mg/kg-d	7.00E-01	mg/kg-d	2.6E-02	
				Manganese	6.9E+01	mg/kg	3.3E-04	mg/kg-d	2.50E-02	mg/kg-d	1.3E-02	
			Dermal	Iron	3.8E+03	mg/kg	1.3E-02	mg/kg-d	7.00E-01	mg/kg-d	1.8E-02	
				Manganese	6.9E+01	mg/kg	2.3E-04	mg/kg-d	2.50E-02	mg/kg-d	9.4E-03	
										Iron Total Hazard Soil	**4.5E-02**	0
										Manganese Total Hazard Soil	**2.3E-02**	0
Groundwater	Tapwater	Household	Ingestion	Iron	5.2E-01	mg/L	1.9E-02	mg/kg-d	7.00E-01	mg/kg-d	2.7E-02	
				Manganese	1.0E-01	mg/L	3.6E-03	mg/kg-d	2.50E-02	mg/kg-d	1.5E-01	
			Dermal	Iron	5.2E-01	mg/L	1.0E-04	mg/kg-d	7.00E-01	mg/kg-d	1.5E-04	
				Manganese	1.0E-01	mg/L	2.0E-05	mg/kg-d	2.50E-02	mg/kg-d	8.0E-04	
										Iron Total Hazard Groundwater	**2.7E-02**	0
										Manganese Total Hazard Groundwater	**1.5E-01**	0
Air	Air	Study Area	Inhalation	Iron	9.7E-03	mg/m^3	9.7E-03	mg/m^3	4.00E-03	mg/m^3	2.4E+00	
				Manganese	4.2E-04	mg/m^3	4.2E-04	mg/m^3	4.00E-04	mg/m^3	1.1E+00	
										Iron Total Hazard Air	**2.4E+00**	1
										Manganese Total Hazard Air	**1.1E+00**	0
Surface Water	Surface Water	Northumberland Strait	Ingestion	Iron	3.3E-01	mg/L	1.2E-03	mg/kg-d	7.00E-01	mg/kg-d	1.7E-03	
				Manganese	6.2E-01	mg/L	2.3E-03	mg/kg-d	2.50E-02	mg/kg-d	9.1E-02	
			Dermal	Iron	3.3E-01	mg/L	4.8E-04	mg/kg-d	7.00E-01	mg/kg-d	6.9E-04	
				Manganese	6.2E-01	mg/L	9.3E-04	mg/kg-d	2.50E-02	mg/kg-d	3.7E-02	
										Iron Total Hazard Surface Water	**2.4E-03**	0
										Manganese Total Hazard Surface Water	**1.3E-01**	0
Sediment	Sediment Intertidal Mudflats	Northumberland Strait	Ingestion	Iron	2.6E+04	mg/kg	4.6E-01	mg/kg-d	7.00E-01	mg/kg-d	6.5E-01	
				Manganese	1.5E+03	mg/kg	2.7E-02	mg/kg-d	2.50E-02	mg/kg-d	1.1E+00	
			Dermal	Lithium	2.6E+04	mg/kg	1.1E+02	mg/kg-d	7.00E-01	mg/kg-d	1.6E+02	
				Vanadium	1.5E+03	mg/kg	6.6E+00	mg/kg-d	2.50E-02	mg/kg-d	2.6E+02	
										Iron Total Hazard Sediment	**1.6E+02**	98
										Manganese Total Hazard Sediment	**2.6E+02**	98
Plants	Plants	Study Area	Ingestion	Iron	1.8E+02	mg/kg	1.1E-01	mg/kg-d	7.00E-01	mg/kg-d	1.6E-01	
				Manganese	1.5E+02	mg/kg	9.1E-02	mg/kg-d	2.50E-02	mg/kg-d	3.6E+00	
										Iron Total Hazard Plants	**1.6E-01**	0
										Manganese Total Hazard Plants	**3.6E+00**	1
Shellfish	Shellfish	Northumberland Strait	Ingestion	Iron	2.0E+02	mg/kg	2.3E-01	mg/kg-d	7.00E-01	mg/kg-d	3.4E-01	
				Manganese	2.7E+01	mg/kg	3.2E-02	mg/kg-d	2.50E-02	mg/kg-d	1.3E+00	
										Iron Total Hazard Shellfish	**3.4E-01**	0
										Manganese Total Hazard Shellfish	**1.3E+00**	0

HQ > 0.2

Total Hazard for Iron (Soil, Groundwater, Air, Surface Water, Sediment, Plants, Shellfish)	**1.6E+02**
Total Hazard for Manganese (Soil, Groundwater, Air, Surface Water, Sediment, Plants, Shellfish)	**2.7E+02**

95 Percent Upper Confidence Limit of the Mean (95UCLM) Concentrations for Shellfish (Mussels, Clams, Lobster, Crab)

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.110/22/2021 11:00:34 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Iron

General Statistics

Total Number of Observations	44	Number of Distinct Observations	22
Number of Detects	23	Number of Non-Detects	21
Number of Distinct Detects	21	Number of Distinct Non-Detects	1
Minimum Detect	51	Minimum Non-Detect	50
Maximum Detect	553	Maximum Non-Detect	50
Variance Detects	21577	Percent Non-Detects	47.73%
Mean Detects	185.3	SD Detects	146.9
Median Detects	95	CV Detects	0.793
Skewness Detects	1.018	Kurtosis Detects	0.186
Mean of Logged Detects	4.922	SD of Logged Detects	0.792

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	120.8	KM Standard Error of Mean	19.1
KM SD	123.9	95% KM (BCA) UCL	158.3
95% KM (t) UCL	152.9	95% KM (Percentile Bootstrap) UCL	152.9
95% KM (z) UCL	152.2	95% KM Bootstrap t UCL	159.7
90% KM Chebyshev UCL	178.1	95% KM Chebyshev UCL	204
97.5% KM Chebyshev UCL	240	99% KM Chebyshev UCL	310.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.497	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.27	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.184	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.814	k star (bias corrected MLE)	1.606
Theta hat (MLE)	102.2	Theta star (bias corrected MLE)	115.4
nu hat (MLE)	83.43	nu star (bias corrected)	73.88
Mean (detects)	185.3		

	A	B	C	D	E	F	G	H	I	J	K	L
53	**Gamma ROS Statistics using Imputed Non-Detects**											
54	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
55	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
56	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
57	This is especially true when the sample size is small.											
58	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
59	Minimum					0.01	Mean					97
60	Maximum					553	Median					55
61	SD					140.7	CV					1.45
62	k hat (MLE)					0.184	k star (bias corrected MLE)					0.186
63	Theta hat (MLE)					528.1	Theta star (bias corrected MLE)					520.7
64	nu hat (MLE)					16.16	nu star (bias corrected)					16.39
65	Adjusted Level of Significance (β)					0.0445						
66	Approximate Chi Square Value (16.39, α)					8.24	Adjusted Chi Square Value (16.39, β)					8.044
67	95% Gamma Approximate UCL (use when n>=50)					193	95% Gamma Adjusted UCL (use when n<50)					197.7
68												
69	**Estimates of Gamma Parameters using KM Estimates**											
70	Mean (KM)					120.8	SD (KM)					123.9
71	Variance (KM)					15359	SE of Mean (KM)					19.1
72	k hat (KM)					0.949	k star (KM)					0.9
73	nu hat (KM)					83.54	nu star (KM)					79.18
74	theta hat (KM)					127.2	theta star (KM)					134.2
75	80% gamma percentile (KM)					195.9	90% gamma percentile (KM)					285.3
76	95% gamma percentile (KM)					375.6	99% gamma percentile (KM)					586.7
77												
78	**Gamma Kaplan-Meier (KM) Statistics**											
79	Approximate Chi Square Value (79.18, α)					59.68	Adjusted Chi Square Value (79.18, β)					59.1
80	95% Gamma Approximate KM-UCL (use when n>=50)					160.2	95% Gamma Adjusted KM-UCL (use when n<50)					161.8
81												
82	**Lognormal GOF Test on Detected Observations Only**											
83	Shapiro Wilk Test Statistic					0.865	**Shapiro Wilk GOF Test**					
84	5% Shapiro Wilk Critical Value					0.914	Detected Data Not Lognormal at 5% Significance Level					
85	Lilliefors Test Statistic					0.239	**Lilliefors GOF Test**					
86	5% Lilliefors Critical Value					0.18	Detected Data Not Lognormal at 5% Significance Level					
87	**Detected Data Not Lognormal at 5% Significance Level**											
88												
89	**Lognormal ROS Statistics Using Imputed Non-Detects**											
90	Mean in Original Scale					106.7	Mean in Log Scale					3.916
91	SD in Original Scale					134.3	SD in Log Scale					1.304
92	95% t UCL (assumes normality of ROS data)					140.7	95% Percentile Bootstrap UCL					141.6
93	95% BCA Bootstrap UCL					144.2	95% Bootstrap t UCL					148
94	95% H-UCL (Log ROS)					201.9						
95												
96	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
97	KM Mean (logged)					4.44	KM Geo Mean					84.77
98	KM SD (logged)					0.753	95% Critical H Value (KM-Log)					2.116
99	KM Standard Error of Mean (logged)					0.116	95% H-UCL (KM -Log)					143.6
100	KM SD (logged)					0.753	95% Critical H Value (KM-Log)					2.116
101	KM Standard Error of Mean (logged)					0.116						
102												
103	**DL/2 Statistics**											
104	**DL/2 Normal**						**DL/2 Log-Transformed**					

Mean in Original Scale	108.8	Mean in Log Scale	4.109
SD in Original Scale	132.7	SD in Log Scale	1.03
95% t UCL (Assumes normality)	142.4	95% H-Stat UCL	150.9
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	204		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Manganese			
General Statistics			
Total Number of Observations	44	Number of Distinct Observations	25
		Number of Missing Observations	0
Minimum	3	Mean	22.05
Maximum	177	Median	11
SD	35.5	Std. Error of Mean	5.352
Coefficient of Variation	1.61	Skewness	3.646
Normal GOF Test			
Shapiro Wilk Test Statistic	0.504	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	31.04	95% Adjusted-CLT UCL (Chen-1995)	33.99
		95% Modified-t UCL (Johnson-1978)	31.53
Gamma GOF Test			
A-D Test Statistic	2.612	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.777	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.212	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.137	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.999	k star (bias corrected MLE)	0.946
Theta hat (MLE)	22.07	Theta star (bias corrected MLE)	23.3
nu hat (MLE)	87.9	nu star (bias corrected)	83.24
MLE Mean (bias corrected)	22.05	MLE Sd (bias corrected)	22.67
		Approximate Chi Square Value (0.05)	63.22

	A	B	C	D	E	F	G	H	I	J	K	L
157	Adjusted Level of Significance					0.0445	Adjusted Chi Square Value					62.63
158												
159	**Assuming Gamma Distribution**											
160	95% Approximate Gamma UCL (use when n>=50))					29.03	95% Adjusted Gamma UCL (use when n<50)					29.3
161												
162	**Lognormal GOF Test**											
163	Shapiro Wilk Test Statistic					0.927	**Shapiro Wilk Lognormal GOF Test**					
164	5% Shapiro Wilk Critical Value					0.944	Data Not Lognormal at 5% Significance Level					
165	Lilliefors Test Statistic					0.12	**Lilliefors Lognormal GOF Test**					
166	5% Lilliefors Critical Value					0.132	Data appear Lognormal at 5% Significance Level					
167	**Data appear Approximate Lognormal at 5% Significance Level**											
168												
169	**Lognormal Statistics**											
170	Minimum of Logged Data					1.099	Mean of logged Data					2.515
171	Maximum of Logged Data					5.176	SD of logged Data					0.956
172												
173	**Assuming Lognormal Distribution**											
174	95% H-UCL					27.38	90% Chebyshev (MVUE) UCL					28.88
175	95% Chebyshev (MVUE) UCL					33.24	97.5% Chebyshev (MVUE) UCL					39.3
176	99% Chebyshev (MVUE) UCL					51.2						
177												
178	**Nonparametric Distribution Free UCL Statistics**											
179	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
180												
181	**Nonparametric Distribution Free UCLs**											
182	95% CLT UCL					30.85	95% Jackknife UCL					31.04
183	95% Standard Bootstrap UCL					30.79	95% Bootstrap-t UCL					44.71
184	95% Hall's Bootstrap UCL					74.4	95% Percentile Bootstrap UCL					31.5
185	95% BCA Bootstrap UCL					34.93						
186	90% Chebyshev(Mean, Sd) UCL					38.1	95% Chebyshev(Mean, Sd) UCL					45.37
187	97.5% Chebyshev(Mean, Sd) UCL					55.47	99% Chebyshev(Mean, Sd) UCL					75.29
188												
189	**Suggested UCL to Use**											
190	95% H-UCL					27.38						
191												
192	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
193	Recommendations are based upon data size, data distribution, and skewness.											
194	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
195	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
196												
197	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
198	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
199	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
200	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
201												

	A	B	C	D	E	F	G	H	I	J	K	L
1	Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.110/25/2021 10:52:05 AM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Substantial Difference			0.000								
9	Selected Null Hypothesis			Sample 1 Mean/Median = Sample 2 Mean/Median (Two Sided Alternative)								
10	Alternative Hypothesis			Sample 1 Mean/Median <> Sample 2 Mean/Median								
11												
12												
13	**Sample 1 Data: Iron-Site(BHSL)**											
14	**Sample 2 Data: Iron-Backgrond**											
15												
16				**Raw Statistics**								
17					Sample 1	Sample 2						
18	Number of Valid Observations				22	11						
19	Number of Distinct Observations				20	10						
20	Minimum				3000	13000						
21	Maximum				39000	30000						
22	Mean				22350	22273						
23	Median				24500	22000						
24	SD				10614	5658						
25	SE of Mean				2263	1706						
26												
27			**Wilcoxon-Mann-Whitney (WMW) Test**									
28												
29	**H0: Mean/Median of Sample 1 = Mean/Median of Sample 2**											
30												
31	Sample 1 Rank Sum W-Stat				384.5							
32	WMW U-Stat				131.5							
33	Standardized WMW U-Stat				0.401							
34	Mean (U)				121							
35	SD(U) - Adj ties				26.17							
36	Lower Approximate U-Stat Critical Value (0.025)				-1.96							
37	Upper Approximate U-Stat Critical Value (0.975)				1.96							
38	P-Value (Adjusted for Ties)				0.688							
39												
40	**Conclusion with Alpha = 0.05**											
41	**Do Not Reject H0, Conclude Sample 1 = Sample 2**											
42												
43	**P-Value >= alpha (0.05)**											
44												

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.110/25/2021 10:59:32 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median = Sample 2 Mean/Median (Two Sided Alternative)
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median

Sample 1 Data: Iron-Site(NS)

Sample 2 Data: Iron-Backgrond

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	2	5
Number of Distinct Observations	2	5
Minimum	6700	3400
Maximum	8000	6400
Mean	7350	4940
Median	7350	4700
SD	919.2	1155
SE of Mean	650	516.3

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 = Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	13
WMW U-Stat	10
Mean (U)	5
SD(U) - Adj ties	2.582
Lower U-Stat Critical Value (0.025)	0
Upper U-Stat Critical Value (0.975)	10
Standardized WMW U-Stat	1.743
Approximate P-Value	0.0814

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 = Sample 2

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.110/25/2021 10:53:40 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median = Sample 2 Mean/Median (Two Sided Alternative)
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median

Sample 1 Data: Manganese-Site(BHSL)

Sample 2 Data: Manganese-Backgrond

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	22	11
Number of Distinct Observations	22	9
Minimum	45	810
Maximum	3700	4300
Mean	1027	1636
Median	770	1300
SD	965.3	970.8
SE of Mean	205.8	292.7

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 = Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	312
WMW U-Stat	59
Standardized WMW U-Stat	-2.369
Mean (U)	121
SD(U) - Adj ties	26.17
Lower Approximate U-Stat Critical Value (0.025)	-1.96
Upper Approximate U-Stat Critical Value (0.975)	1.96
P-Value (Adjusted for Ties)	0.0178

Conclusion with Alpha = 0.05

Reject H0, Conclude Sample 1 <> Sample 2

P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.110/25/2021 10:54:14 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median >= Sample 2 Mean/Median (Form 2)
Alternative Hypothesis	Sample 1 Mean/Median < Sample 2 Mean/Median

Sample 1 Data: Manganese-Site(BHSL)

Sample 2 Data: Manganese-Backgrond

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	22	11
Number of Distinct Observations	22	9
Minimum	45	810
Maximum	3700	4300
Mean	1027	1636
Median	770	1300
SD	965.3	970.8
SE of Mean	205.8	292.7

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 >= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	312
Standardized WMW U-Stat	-2.388
Mean (U)	121
SD(U) - Adj ties	26.17
Approximate U-Stat Critical Value (0.05)	-1.645
P-Value (Adjusted for Ties)	0.00846

Conclusion with Alpha = 0.05

Reject H0, Conclude Sample 1 < Sample 2

P-Value < alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.110/25/2021 10:58:07 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median = Sample 2 Mean/Median (Two Sided Alternative)
Alternative Hypothesis	Sample 1 Mean/Median <> Sample 2 Mean/Median

Sample 1 Data: Manganese-Site(NS)

Sample 2 Data: Manganese-Backgrond

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	2	5
Number of Distinct Observations	2	4
Minimum	300	110
Maximum	440	180
Mean	370	142
Median	370	130
SD	98.99	27.75
SE of Mean	70	12.41

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 = Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	13
WMW U-Stat	10
Mean (U)	5
SD(U) - Adj ties	2.582
Lower U-Stat Critical Value (0.025)	0
Upper U-Stat Critical Value (0.975)	10
Standardized WMW U-Stat	1.954
Approximate P-Value	0.0507

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 = Sample 2

Appendix H

Noise Model Output File

Receiver
Name: (untitled)
ID: POR1
X: 524940.39 m
Y: 5055026.34 m
Z: 4.50 m

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
19	524849.32	5054984.79	2.00	0	D	A	75.0	16.5	0.0	0.0	0.0	51.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	39.0
19	524849.32	5054984.79	2.00	0	N	A	-34.1	16.5	0.0	0.0	0.0	51.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	-70.1
19	524849.32	5054984.79	2.00	0	E	A	75.0	16.5	0.0	0.0	0.0	51.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	39.0
26	524872.76	5055008.94	2.00	0	D	A	75.0	13.5	0.0	0.0	0.0	47.9	0.6	0.6	0.0	0.0	0.0	0.0	0.0	39.4
26	524872.76	5055008.94	2.00	0	N	A	-34.1	13.5	0.0	0.0	0.0	47.9	0.6	0.6	0.0	0.0	0.0	0.0	0.0	-69.6
26	524872.76	5055008.94	2.00	0	E	A	75.0	13.5	0.0	0.0	0.0	47.9	0.6	0.6	0.0	0.0	0.0	0.0	0.0	39.4
33	524888.38	5055025.04	2.00	0	D	A	75.0	13.5	0.0	0.0	0.0	45.3	0.4	0.5	0.0	0.0	0.0	0.0	0.0	42.2
33	524888.38	5055025.04	2.00	0	N	A	-34.1	13.5	0.0	0.0	0.0	45.3	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-66.9
33	524888.38	5055025.04	2.00	0	E	A	75.0	13.5	0.0	0.0	0.0	45.3	0.4	0.5	0.0	0.0	0.0	0.0	0.0	42.2
45	524900.10	5055037.11	2.00	0	D	A	75.0	10.5	0.0	0.0	0.0	43.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	41.2
45	524900.10	5055037.11	2.00	0	N	A	-34.1	10.5	0.0	0.0	0.0	43.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-67.8
45	524900.10	5055037.11	2.00	0	E	A	75.0	10.5	0.0	0.0	0.0	43.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	41.2
65	524907.92	5055045.16	2.00	0	D	A	75.0	10.5	0.0	0.0	0.0	42.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	42.2
65	524907.92	5055045.16	2.00	0	N	A	-34.1	10.5	0.0	0.0	0.0	42.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-66.8
65	524907.92	5055045.16	2.00	0	E	A	75.0	10.5	0.0	0.0	0.0	42.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0	42.2
343	524915.73	5055053.21	2.00	0	D	A	75.0	10.5	0.0	0.0	0.0	42.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	42.5
343	524915.73	5055053.21	2.00	0	N	A	-34.1	10.5	0.0	0.0	0.0	42.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-66.6
343	524915.73	5055053.21	2.00	0	E	A	75.0	10.5	0.0	0.0	0.0	42.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	42.5
351	524923.55	5055061.26	2.00	0	D	A	75.0	10.5	0.0	0.0	0.0	42.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	41.9
351	524923.55	5055061.26	2.00	0	N	A	-34.1	10.5	0.0	0.0	0.0	42.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	-67.1
351	524923.55	5055061.26	2.00	0	E	A	75.0	10.5	0.0	0.0	0.0	42.8	0.3	0.5	0.0	0.0	0.0	0.0	0.0	41.9
509	524935.27	5055073.34	2.00	0	D	A	75.0	13.5	0.0	0.0	0.0	44.5	0.4	0.5	0.0	0.0	0.0	0.0	0.0	43.1
509	524935.27	5055073.34	2.00	0	N	A	-34.1	13.5	0.0	0.0	0.0	44.5	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-66.0
509	524935.27	5055073.34	2.00	0	E	A	75.0	13.5	0.0	0.0	0.0	44.5	0.4	0.5	0.0	0.0	0.0	0.0	0.0	43.1
516	524950.89	5055089.43	2.00	0	D	A	75.0	13.5	0.0	0.0	0.0	47.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	40.2
516	524950.89	5055089.43	2.00	0	N	A	-34.1	13.5	0.0	0.0	0.0	47.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-68.8
516	524950.89	5055089.43	2.00	0	E	A	75.0	13.5	0.0	0.0	0.0	47.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	40.2
611	524883.71	5054723.38	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	29.9
611	524883.71	5054723.38	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	-79.2
611	524883.71	5054723.38	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	29.9
618	524869.42	5054793.47	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	58.7	1.6	1.0	0.0	0.0	0.0	0.0	0.0	32.3
618	524869.42	5054793.47	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	58.7	1.6	1.0	0.0	0.0	0.0	0.0	0.0	-76.8
618	524869.42	5054793.47	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	58.7	1.6	1.0	0.0	0.0	0.0	0.0	0.0	32.3
625	524855.13	5054863.56	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	56.3	1.3	0.9	0.0	0.0	0.0	0.0	0.0	35.1
625	524855.13	5054863.56	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	56.3	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-74.0
625	524855.13	5054863.56	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	56.3	1.3	0.9	0.0	0.0	0.0	0.0	0.0	35.1
632	524844.41	5054916.13	2.00	0	D	A	75.0	15.5	0.0	0.0	0.0	54.3	1.1	0.9	0.0	0.0	0.0	0.0	0.0	34.3
632	524844.41	5054916.13	2.00	0	N	A	-34.1	15.5	0.0	0.0	0.0	54.3	1.1	0.9	0.0	0.0	0.0	0.0	0.0	-74.7
632	524844.41	5054916.13	2.00	0	E	A	75.0	15.5	0.0	0.0	0.0	54.3	1.1	0.9	0.0	0.0	0.0	0.0	0.0	34.3
651	524837.26	5054951.17	2.00	0	D	A	75.0	15.5	0.0	0.0	0.0	53.1	0.9	0.8	0.0	0.0	0.0	0.0	0.0	35.6
651	524837.26	5054951.17	2.00	0	N	A	-34.1	15.5	0.0	0.0	0.0	53.1	0.9	0.8	0.0	0.0	0.0	0.0	0.0	-73.4
651	524837.26	5054951.17	2.00	0	E	A	75.0	15.5	0.0	0.0	0.0	53.1	0.9	0.8	0.0	0.0	0.0	0.0	0.0	35.6
659	524985.41	5055139.64	2.00	0	D	A	75.0	17.1	0.0	0.0	0.0	52.7	0.9	0.8	0.0	0.0	0.0	0.0	0.0	37.6
659	524985.41	5055139.64	2.00	0	N	A	-34.1	17.1	0.0	0.0	0.0	52.7	0.9	0.8	0.0	0.0	0.0	0.0	0.0	-71.4
659	524985.41	5055139.64	2.00	0	E	A	75.0	17.1	0.0	0.0	0.0	52.7	0.9	0.8	0.0	0.0	0.0	0.0	0.0	37.6
671	524970.43	5055188.63	2.00	0	D	A	75.0	17.1	0.0	0.0	0.0	55.4	1.2	0.9	0.0	0.0	0.0	0.0	0.0	34.7
671	524970.43	5055188.63	2.00	0	N	A	-34.1	17.1	0.0	0.0	0.0	55.4	1.2	0.9	0.0	0.0	0.0	0.0	0.0	-74.4
671	524970.43	5055188.63	2.00	0	E	A	75.0	17.1	0.0	0.0	0.0	55.4	1.2	0.9	0.0	0.0	0.0	0.0	0.0	34.7
678	524947.96	5055262.11	2.00	0	D	A	75.0	20.1	0.0	0.0	0.0	58.5	1.5	1.0	0.0	0.0	0.0	0.0	0.0	34.1
678	524947.96	5055262.11	2.00	0	N	A	-34.1	20.1	0.0	0.0	0.0	58.5	1.5	1.0	0.0	0.0	0.0	0.0	0.0	-74.9
678	524947.96	5055262.11	2.00	0	E	A	75.0	20.1	0.0	0.0	0.0	58.5	1.5	1.0	0.0	0.0	0.0	0.0	0.0	34.1
700	524975.80	5055106.32	2.00	0	D	A	75.0	15.9	0.0	0.0	0.0	49.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	39.6
700	524975.80	5055106.32	2.00	0	N	A	-34.1	15.9	0.0	0.0	0.0	49.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	-69.4

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
700	524975.80	5055106.32	2.00	0	E	A	75.0	15.9	0.0	0.0	0.0	49.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	39.6
720	524960.55	5055366.69	2.00	0	D	A	75.0	20.9	0.0	0.0	0.0	61.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	31.2
720	524960.55	5055366.69	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	61.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	-77.8
720	524960.55	5055366.69	2.00	0	E	A	75.0	20.9	0.0	0.0	0.0	61.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	31.2
721	525015.68	5055477.86	2.00	0	D	A	75.0	20.9	0.0	0.0	0.0	64.2	2.5	1.1	0.0	0.0	0.0	0.0	0.0	28.1
721	525015.68	5055477.86	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	64.2	2.5	1.1	0.0	0.0	0.0	0.0	0.0	-80.9
721	525015.68	5055477.86	2.00	0	E	A	75.0	20.9	0.0	0.0	0.0	64.2	2.5	1.1	0.0	0.0	0.0	0.0	0.0	28.1
743	525750.19	5053889.67	2.00	0	D	A	75.0	26.5	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	21.0
743	525750.19	5053889.67	2.00	0	N	A	-34.1	26.5	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	-88.1
743	525750.19	5053889.67	2.00	0	E	A	75.0	26.5	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	21.0
744	525385.08	5054143.19	2.00	0	D	A	75.0	26.5	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	25.1
744	525385.08	5054143.19	2.00	0	N	A	-34.1	26.5	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	-83.9
744	525385.08	5054143.19	2.00	0	E	A	75.0	26.5	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	25.1
765	525094.55	5054376.87	2.00	0	D	A	75.0	24.8	0.0	0.0	0.0	67.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	27.9
765	525094.55	5054376.87	2.00	0	N	A	-34.1	24.8	0.0	0.0	0.0	67.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	-81.1
765	525094.55	5054376.87	2.00	0	E	A	75.0	24.8	0.0	0.0	0.0	67.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	27.9
791	524945.20	5054551.24	2.00	0	D	A	75.0	22.0	0.0	0.0	0.0	64.5	2.6	1.1	0.0	0.0	0.0	0.0	0.0	28.8
791	524945.20	5054551.24	2.00	0	N	A	-34.1	22.0	0.0	0.0	0.0	64.5	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-80.2
791	524945.20	5054551.24	2.00	0	E	A	75.0	22.0	0.0	0.0	0.0	64.5	2.6	1.1	0.0	0.0	0.0	0.0	0.0	28.8
848	525121.99	5055577.58	2.00	0	D	A	75.0	22.6	0.0	0.0	0.0	66.3	2.9	1.1	0.0	0.0	0.0	0.0	0.0	27.2
848	525121.99	5055577.58	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	66.3	2.9	1.1	0.0	0.0	0.0	0.0	0.0	-81.8
848	525121.99	5055577.58	2.00	0	E	A	75.0	22.6	0.0	0.0	0.0	66.3	2.9	1.1	0.0	0.0	0.0	0.0	0.0	27.2
901	524897.33	5054653.52	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	27.8
901	524897.33	5054653.52	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	-81.2
901	524897.33	5054653.52	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	27.8
1053	525537.35	5055679.08	2.00	0	D	A	75.0	23.6	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	23.5
1053	525537.35	5055679.08	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-85.6
1053	525537.35	5055679.08	2.00	0	E	A	75.0	23.6	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	23.5
1122	525254.39	5055625.82	2.00	0	D	A	75.0	20.3	0.0	0.0	0.0	67.6	3.3	1.2	0.0	0.0	0.0	0.0	0.0	23.3
1122	525254.39	5055625.82	2.00	0	N	A	-34.1	20.3	0.0	0.0	0.0	67.6	3.3	1.2	0.0	0.0	0.0	0.0	0.0	-85.8
1122	525254.39	5055625.82	2.00	0	E	A	75.0	20.3	0.0	0.0	0.0	67.6	3.3	1.2	0.0	0.0	0.0	0.0	0.0	23.3
1338	525366.60	5055646.19	2.00	0	D	A	75.0	20.8	0.0	0.0	0.0	68.5	3.5	1.2	0.0	0.0	0.0	0.0	0.0	22.6
1338	525366.60	5055646.19	2.00	0	N	A	-34.1	20.8	0.0	0.0	0.0	68.5	3.5	1.2	0.0	0.0	0.0	0.0	0.0	-86.4
1338	525366.60	5055646.19	2.00	0	E	A	75.0	20.8	0.0	0.0	0.0	68.5	3.5	1.2	0.0	0.0	0.0	0.0	0.0	22.6
1365	525740.64	5055713.13	2.00	0	D	A	75.0	22.7	0.0	0.0	0.0	71.5	4.4	1.0	0.0	0.0	0.0	0.0	0.0	20.9
1365	525740.64	5055713.13	2.00	0	N	A	-34.1	22.7	0.0	0.0	0.0	71.5	4.4	1.0	0.0	0.0	0.0	0.0	0.0	-88.2
1365	525740.64	5055713.13	2.00	0	E	A	75.0	22.7	0.0	0.0	0.0	71.5	4.4	1.0	0.0	0.0	0.0	0.0	0.0	20.9
1474	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	73.4	5.1	0.7	0.0	0.0	0.0	0.0	0.0	18.3
1474	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	73.4	5.1	0.7	0.0	0.0	0.0	0.0	0.0	-90.7
1474	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	73.4	5.1	0.7	0.0	0.0	0.0	0.0	0.0	18.3
1503	525898.74	5055726.86	2.00	0	D	A	75.0	21.3	0.0	0.0	0.0	72.5	4.7	0.6	0.0	0.0	0.0	0.0	0.0	18.5
1503	525898.74	5055726.86	2.00	0	N	A	-34.1	21.3	0.0	0.0	0.0	72.5	4.7	0.6	0.0	0.0	0.0	0.0	0.0	-90.6
1503	525898.74	5055726.86	2.00	0	E	A	75.0	21.3	0.0	0.0	0.0	72.5	4.7	0.6	0.0	0.0	0.0	0.0	0.0	18.5
1557	526025.14	5053719.18	2.00	0	D	A	75.0	23.1	0.0	0.0	0.0	75.6	5.9	1.4	0.0	0.0	0.0	0.0	0.0	15.2
1557	526025.14	5053719.18	2.00	0	N	A	-34.1	23.1	0.0	0.0	0.0	75.6	5.9	1.4	0.0	0.0	0.0	0.0	0.0	-93.8
1557	526025.14	5053719.18	2.00	0	E	A	75.0	23.1	0.0	0.0	0.0	75.6	5.9	1.4	0.0	0.0	0.0	0.0	0.0	15.2
1587	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	74.5	5.5	-2.3	0.0	0.0	0.0	0.0	0.0	18.8
1587	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	74.5	5.5	-2.3	0.0	0.0	0.0	0.0	0.0	-90.2
1587	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	74.5	5.5	-2.3	0.0	0.0	0.0	0.0	0.0	18.8
1605	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	74.2	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	16.4
1605	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	74.2	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	-92.7
1605	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	74.2	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	16.4
1628	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	75.6	5.9	0.7	0.0	0.0	0.0	0.0	0.0	14.3
1628	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	75.6	5.9	0.7	0.0	0.0	0.0	0.0	0.0	-94.7
1628	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	75.6	5.9	0.7	0.0	0.0	0.0	0.0	0.0	14.3
1634	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	74.9	5.6	0.6	0.0	0.0	0.0	0.0	0.0	14.6
1634	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	74.9	5.6	0.6	0.0	0.0	0.0	0.0	0.0	-94.4
1634	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	74.9	5.6	0.6	0.0	0.0	0.0	0.0	0.0	14.6

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
523	524953.18	5055089.44	2.00	0	D	A	69.0	13.4	0.0	0.0	0.0	47.2	0.5	0.6	0.0	0.0	0.0	0.0	0.0	34.1

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
523	524953.18	5055089.44	2.00	0	N	A	-34.1	13.4	0.0	0.0	0.0	47.2	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-68.9
523	524953.18	5055089.44	2.00	0	E	A	69.0	13.4	0.0	0.0	0.0	47.2	0.5	0.6	0.0	0.0	0.0	0.0	0.0	34.1
530	524937.70	5055073.69	2.00	0	D	A	69.0	13.4	0.0	0.0	0.0	44.5	0.4	0.5	0.0	0.0	0.0	0.0	0.0	36.9
530	524937.70	5055073.69	2.00	0	N	A	-34.1	13.4	0.0	0.0	0.0	44.5	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-66.1
530	524937.70	5055073.69	2.00	0	E	A	69.0	13.4	0.0	0.0	0.0	44.5	0.4	0.5	0.0	0.0	0.0	0.0	0.0	36.9
541	524926.09	5055061.87	2.00	0	D	A	69.0	10.4	0.0	0.0	0.0	42.7	0.3	0.4	0.0	0.0	0.0	0.0	0.0	35.9
541	524926.09	5055061.87	2.00	0	N	A	-34.1	10.4	0.0	0.0	0.0	42.7	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-67.1
541	524926.09	5055061.87	2.00	0	E	A	69.0	10.4	0.0	0.0	0.0	42.7	0.3	0.4	0.0	0.0	0.0	0.0	0.0	35.9
550	524918.36	5055054.00	2.00	0	D	A	69.0	10.4	0.0	0.0	0.0	42.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	36.7
550	524918.36	5055054.00	2.00	0	N	A	-34.1	10.4	0.0	0.0	0.0	42.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-66.3
550	524918.36	5055054.00	2.00	0	E	A	69.0	10.4	0.0	0.0	0.0	42.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	36.7
565	524910.62	5055046.12	2.00	0	D	A	69.0	10.4	0.0	0.0	0.0	42.1	0.3	0.4	0.0	0.0	0.0	0.0	0.0	36.6
565	524910.62	5055046.12	2.00	0	N	A	-34.1	10.4	0.0	0.0	0.0	42.1	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-66.4
565	524910.62	5055046.12	2.00	0	E	A	69.0	10.4	0.0	0.0	0.0	42.1	0.3	0.4	0.0	0.0	0.0	0.0	0.0	36.6
572	524902.88	5055038.24	2.00	0	D	A	69.0	10.4	0.0	0.0	0.0	42.9	0.3	0.5	0.0	0.0	0.0	0.0	0.0	35.7
572	524902.88	5055038.24	2.00	0	N	A	-34.1	10.4	0.0	0.0	0.0	42.9	0.3	0.5	0.0	0.0	0.0	0.0	0.0	-67.3
572	524902.88	5055038.24	2.00	0	E	A	69.0	10.4	0.0	0.0	0.0	42.9	0.3	0.5	0.0	0.0	0.0	0.0	0.0	35.7
585	524891.27	5055026.43	2.00	0	D	A	69.0	13.4	0.0	0.0	0.0	44.8	0.4	0.5	0.0	0.0	0.0	0.0	0.0	36.6
585	524891.27	5055026.43	2.00	0	N	A	-34.1	13.4	0.0	0.0	0.0	44.8	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-66.4
585	524891.27	5055026.43	2.00	0	E	A	69.0	13.4	0.0	0.0	0.0	44.8	0.4	0.5	0.0	0.0	0.0	0.0	0.0	36.6
592	524875.80	5055010.67	2.00	0	D	A	69.0	13.4	0.0	0.0	0.0	47.5	0.5	0.6	0.0	0.0	0.0	0.0	0.0	33.8
592	524875.80	5055010.67	2.00	0	N	A	-34.1	13.4	0.0	0.0	0.0	47.5	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-69.2
592	524875.80	5055010.67	2.00	0	E	A	69.0	13.4	0.0	0.0	0.0	47.5	0.5	0.6	0.0	0.0	0.0	0.0	0.0	33.8
599	524852.58	5054987.04	2.00	0	D	A	69.0	16.5	0.0	0.0	0.0	50.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	33.3
599	524852.58	5054987.04	2.00	0	N	A	-34.1	16.5	0.0	0.0	0.0	50.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	-69.8
599	524852.58	5054987.04	2.00	0	E	A	69.0	16.5	0.0	0.0	0.0	50.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	33.3
705	524949.87	5055264.45	2.00	0	D	A	69.0	20.2	0.0	0.0	0.0	58.5	1.6	1.0	0.0	0.0	0.0	0.0	0.0	28.1
705	524949.87	5055264.45	2.00	0	N	A	-34.1	20.2	0.0	0.0	0.0	58.5	1.6	1.0	0.0	0.0	0.0	0.0	0.0	-75.0
705	524949.87	5055264.45	2.00	0	E	A	69.0	20.2	0.0	0.0	0.0	58.5	1.6	1.0	0.0	0.0	0.0	0.0	0.0	28.1
706	524971.53	5055189.80	2.00	0	D	A	69.0	17.1	0.0	0.0	0.0	55.4	1.2	0.9	0.0	0.0	0.0	0.0	0.0	28.6
706	524971.53	5055189.80	2.00	0	N	A	-34.1	17.1	0.0	0.0	0.0	55.4	1.2	0.9	0.0	0.0	0.0	0.0	0.0	-74.4
706	524971.53	5055189.80	2.00	0	E	A	69.0	17.1	0.0	0.0	0.0	55.4	1.2	0.9	0.0	0.0	0.0	0.0	0.0	28.6
707	524985.97	5055140.04	2.00	0	D	A	69.0	17.1	0.0	0.0	0.0	52.8	0.9	0.8	0.0	0.0	0.0	0.0	0.0	31.6
707	524985.97	5055140.04	2.00	0	N	A	-34.1	17.1	0.0	0.0	0.0	52.8	0.9	0.8	0.0	0.0	0.0	0.0	0.0	-71.4
707	524985.97	5055140.04	2.00	0	E	A	69.0	17.1	0.0	0.0	0.0	52.8	0.9	0.8	0.0	0.0	0.0	0.0	0.0	31.6
710	524825.11	5054998.11	2.00	0	D	A	69.0	17.7	0.0	0.0	0.0	52.5	0.9	0.8	0.0	0.0	0.0	0.0	0.0	32.5
710	524825.11	5054998.11	2.00	0	N	A	-34.1	17.7	0.0	0.0	0.0	52.5	0.9	0.8	0.0	0.0	0.0	0.0	0.0	-70.5
710	524825.11	5054998.11	2.00	0	E	A	69.0	17.7	0.0	0.0	0.0	52.5	0.9	0.8	0.0	0.0	0.0	0.0	0.0	32.5
711	524801.12	5055051.76	2.00	0	D	A	69.0	17.7	0.0	0.0	0.0	54.0	1.0	0.8	0.0	0.0	0.0	0.0	0.0	30.7
711	524801.12	5055051.76	2.00	0	N	A	-34.1	17.7	0.0	0.0	0.0	54.0	1.0	0.8	0.0	0.0	0.0	0.0	0.0	-72.3
711	524801.12	5055051.76	2.00	0	E	A	69.0	17.7	0.0	0.0	0.0	54.0	1.0	0.8	0.0	0.0	0.0	0.0	0.0	30.7
712	524777.13	5055105.41	2.00	0	D	A	69.0	17.7	0.0	0.0	0.0	56.2	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.3
712	524777.13	5055105.41	2.00	0	N	A	-34.1	17.7	0.0	0.0	0.0	56.2	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-74.7
712	524777.13	5055105.41	2.00	0	E	A	69.0	17.7	0.0	0.0	0.0	56.2	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.3
713	524753.14	5055159.06	2.00	0	D	A	69.0	17.7	0.0	0.0	0.0	58.2	1.5	0.9	0.0	0.0	0.0	0.0	0.0	26.0
713	524753.14	5055159.06	2.00	0	N	A	-34.1	17.7	0.0	0.0	0.0	58.2	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-77.0
713	524753.14	5055159.06	2.00	0	E	A	69.0	17.7	0.0	0.0	0.0	58.2	1.5	0.9	0.0	0.0	0.0	0.0	0.0	26.0
737	524977.05	5055106.24	2.00	0	D	A	69.0	15.7	0.0	0.0	0.0	49.9	0.7	0.7	0.0	0.0	0.0	0.0	0.0	33.3
737	524977.05	5055106.24	2.00	0	N	A	-34.1	15.7	0.0	0.0	0.0	49.9	0.7	0.7	0.0	0.0	0.0	0.0	0.0	-69.7
737	524977.05	5055106.24	2.00	0	E	A	69.0	15.7	0.0	0.0	0.0	49.9	0.7	0.7	0.0	0.0	0.0	0.0	0.0	33.3
746	524682.89	5055244.78	2.00	0	D	A	69.0	22.2	0.0	0.0	0.0	61.6	2.0	1.0	0.0	0.0	0.0	0.0	0.0	26.6
746	524682.89	5055244.78	2.00	0	N	A	-34.1	22.2	0.0	0.0	0.0	61.6	2.0	1.0	0.0	0.0	0.0	0.0	0.0	-76.5
746	524682.89	5055244.78	2.00	0	E	A	69.0	22.2	0.0	0.0	0.0	61.6	2.0	1.0	0.0	0.0	0.0	0.0	0.0	26.6
747	524566.37	5055362.58	2.00	0	D	A	69.0	22.2	0.0	0.0	0.0	65.0	2.7	1.1	0.0	0.0	0.0	0.0	0.0	22.4
747	524566.37	5055362.58	2.00	0	N	A	-34.1	22.2	0.0	0.0	0.0	65.0	2.7	1.1	0.0	0.0	0.0	0.0	0.0	-80.6
747	524566.37	5055362.58	2.00	0	E	A	69.0	22.2	0.0	0.0	0.0	65.0	2.7	1.1	0.0	0.0	0.0	0.0	0.0	22.4
828	525016.51	5055481.72	2.00	0	D	A	69.0	20.9	0.0	0.0	0.0	64.3	2.5	1.1	0.0	0.0	0.0	0.0	0.0	22.0
828	525016.51	5055481.72	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	64.3	2.5	1.1	0.0	0.0	0.0	0.0	0.0	-81.0
828	525016.51	5055481.72	2.00	0	E	A	69.0	20.9	0.0	0.0	0.0	64.3	2.5	1.1	0.0	0.0	0.0	0.0	0.0	22.0
835	524962.45	5055370.05	2.00	0	D	A	69.0	20.9	0.0	0.0	0.0	61.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	25.1
835	524962.45	5055370.05	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	61.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	-77.9
835	524962.45	5055370.05	2.00	0	E	A	69.0	20.9	0.0	0.0	0.0	61.7	2.0	1.0	0.0	0.0	0.0	0.0	0.0	25.1
1359	524400.73	5055517.25	2.00	0	D	A	69.0	24.6	0.0	0.0	0.0	68.3	3.4	1.2	0.0	0.0	0.0	0.0	0.0	20.7

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1359	524400.73	5055517.25	2.00	0	N	A	-34.1	24.6	0.0	0.0	0.0	68.3	3.4	1.2	0.0	0.0	0.0	0.0	0.0	-82.3
1359	524400.73	5055517.25	2.00	0	E	A	69.0	24.6	0.0	0.0	0.0	68.3	3.4	1.2	0.0	0.0	0.0	0.0	0.0	20.7
1390	525342.09	5055645.00	2.00	0	D	A	69.0	24.7	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	20.7
1390	525342.09	5055645.00	2.00	0	N	A	-34.1	24.7	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	-82.3
1390	525342.09	5055645.00	2.00	0	E	A	69.0	24.7	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	20.7
1402	526406.62	5055378.34	2.00	0	D	A	69.0	26.0	0.0	0.0	0.0	74.6	5.5	1.4	0.0	0.0	0.0	0.0	0.0	13.5
1402	526406.62	5055378.34	2.00	0	N	A	-34.1	26.0	0.0	0.0	0.0	74.6	5.5	1.4	0.0	0.0	0.0	0.0	0.0	-89.5
1402	526406.62	5055378.34	2.00	0	E	A	69.0	26.0	0.0	0.0	0.0	74.6	5.5	1.4	0.0	0.0	0.0	0.0	0.0	13.5
1408	526036.24	5055524.23	2.00	0	D	A	69.0	26.0	0.0	0.0	0.0	72.6	4.8	1.1	0.0	0.0	0.0	0.0	0.0	16.5
1408	526036.24	5055524.23	2.00	0	N	A	-34.1	26.0	0.0	0.0	0.0	72.6	4.8	1.1	0.0	0.0	0.0	0.0	0.0	-86.5
1408	526036.24	5055524.23	2.00	0	E	A	69.0	26.0	0.0	0.0	0.0	72.6	4.8	1.1	0.0	0.0	0.0	0.0	0.0	16.5
1438	525119.36	5055578.25	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	66.3	2.9	1.1	0.0	0.0	0.0	0.0	0.0	21.0
1438	525119.36	5055578.25	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	66.3	2.9	1.1	0.0	0.0	0.0	0.0	0.0	-82.0
1438	525119.36	5055578.25	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	66.3	2.9	1.1	0.0	0.0	0.0	0.0	0.0	21.0
1462	525665.68	5055700.14	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	70.9	4.2	1.2	0.0	0.0	0.0	0.0	0.0	18.2
1462	525665.68	5055700.14	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	70.9	4.2	1.2	0.0	0.0	0.0	0.0	0.0	-84.8
1462	525665.68	5055700.14	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	70.9	4.2	1.2	0.0	0.0	0.0	0.0	0.0	18.2
1468	524207.68	5055774.03	2.00	0	D	A	69.0	25.6	0.0	0.0	0.0	71.4	4.4	1.3	0.0	0.0	0.0	0.0	0.0	17.5
1468	524207.68	5055774.03	2.00	0	N	A	-34.1	25.6	0.0	0.0	0.0	71.4	4.4	1.3	0.0	0.0	0.0	0.0	0.0	-85.5
1468	524207.68	5055774.03	2.00	0	E	A	69.0	25.6	0.0	0.0	0.0	71.4	4.4	1.3	0.0	0.0	0.0	0.0	0.0	17.5
1486	524956.37	5057160.92	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	77.6	6.8	1.4	0.0	0.0	0.0	0.0	0.0	12.0
1486	524956.37	5057160.92	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	77.6	6.8	1.4	0.0	0.0	0.0	0.0	0.0	-91.0
1486	524956.37	5057160.92	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	77.6	6.8	1.4	0.0	0.0	0.0	0.0	0.0	12.0
1492	525493.03	5057702.88	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	79.7	7.9	1.3	0.0	0.0	0.0	0.0	0.0	8.8
1492	525493.03	5057702.88	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	79.7	7.9	1.3	0.0	0.0	0.0	0.0	0.0	-94.2
1492	525493.03	5057702.88	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	79.7	7.9	1.3	0.0	0.0	0.0	0.0	0.0	8.8
1597	524142.97	5056113.07	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	73.6	5.1	1.3	0.0	0.0	0.0	0.0	0.0	14.4
1597	524142.97	5056113.07	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	73.6	5.1	1.3	0.0	0.0	0.0	0.0	0.0	-88.6
1597	524142.97	5056113.07	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	73.6	5.1	1.3	0.0	0.0	0.0	0.0	0.0	14.4
1681	524542.93	5056718.72	2.00	0	D	A	69.0	26.5	0.0	0.0	0.0	75.8	6.0	1.4	0.0	0.0	0.0	0.0	0.0	12.3
1681	524542.93	5056718.72	2.00	0	N	A	-34.1	26.5	0.0	0.0	0.0	75.8	6.0	1.4	0.0	0.0	0.0	0.0	0.0	-90.7
1681	524542.93	5056718.72	2.00	0	E	A	69.0	26.5	0.0	0.0	0.0	75.8	6.0	1.4	0.0	0.0	0.0	0.0	0.0	12.3
1687	524280.87	5056419.30	2.00	0	D	A	69.0	25.4	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	12.7
1687	524280.87	5056419.30	2.00	0	N	A	-34.1	25.4	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-90.3
1687	524280.87	5056419.30	2.00	0	E	A	69.0	25.4	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	12.7
1701	525846.70	5055663.19	2.00	0	D	A	69.0	21.2	0.0	0.0	0.0	71.9	4.5	0.6	0.0	0.0	0.0	0.0	0.0	13.2
1701	525846.70	5055663.19	2.00	0	N	A	-34.1	21.2	0.0	0.0	0.0	71.9	4.5	0.6	0.0	0.0	0.0	0.0	0.0	-89.8
1701	525846.70	5055663.19	2.00	0	E	A	69.0	21.2	0.0	0.0	0.0	71.9	4.5	0.6	0.0	0.0	0.0	0.0	0.0	13.2

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
679	525609.35	5055488.24	2.00	0	DEN	A	59.2	44.4	0.0	0.0	0.0	69.2	2.4	-0.8	0.0	0.0	0.0	0.0	0.0	32.8
686	525803.20	5055038.91	2.00	0	DEN	A	59.2	44.7	0.0	0.0	0.0	69.7	2.5	2.5	0.0	0.0	0.0	0.0	0.0	29.2
703	525885.00	5055059.08	2.00	0	DEN	A	59.2	42.9	0.0	0.0	0.0	70.5	2.7	2.6	0.0	0.0	0.0	0.0	0.0	26.3
704	525693.39	5055435.57	2.00	0	DEN	A	59.2	41.3	0.0	0.0	0.0	69.7	2.5	-0.9	0.0	0.0	0.0	0.0	0.0	29.1
708	525785.27	5055461.34	2.00	0	DEN	A	59.2	39.1	0.0	0.0	0.0	70.6	2.7	2.1	0.0	0.0	0.0	0.0	0.0	23.0
709	525870.43	5055275.34	2.00	0	DEN	A	59.2	39.1	0.0	0.0	0.0	70.7	2.7	2.6	0.0	0.0	0.0	0.0	0.0	22.3
714	526169.61	5055362.74	2.00	0	DEN	A	59.2	43.5	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	23.3
716	526103.50	5055297.75	2.00	0	DEN	A	59.2	42.5	0.0	0.0	0.0	72.5	3.2	2.9	0.0	0.0	0.0	0.0	0.0	23.0
717	525753.90	5055424.37	2.00	0	DEN	A	59.2	40.6	0.0	0.0	0.0	70.1	2.6	1.0	0.0	0.0	0.0	0.0	0.0	26.1
726	525581.34	5055582.36	2.00	0	DEN	A	59.2	37.6	0.0	0.0	0.0	69.6	2.5	-0.6	0.0	0.0	0.0	0.0	0.0	25.2
727	525918.61	5055233.88	2.00	0	DEN	A	59.2	39.9	0.0	0.0	0.0	71.0	2.8	2.6	0.0	0.0	0.0	0.0	0.0	22.6
729	526158.40	5055231.64	2.00	0	DEN	A	59.2	40.8	0.0	0.0	0.0	72.8	3.3	2.9	0.0	0.0	0.0	0.0	0.0	20.9
730	525948.87	5055345.93	2.00	0	DEN	A	59.2	39.6	0.0	0.0	0.0	71.5	2.9	2.7	0.0	0.0	0.0	0.0	0.0	21.7
740	525763.98	5055137.52	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	69.4	2.5	2.4	0.0	0.0	0.0	0.0	0.0	20.9
741	525524.19	5055442.30	2.00	0	DEN	A	59.2	35.0	0.0	0.0	0.0	68.1	2.2	0.4	0.0	0.0	0.0	0.0	0.0	23.5
751	525933.18	5054948.15	2.00	0	DEN	A	59.2	36.1	0.0	0.0	0.0	71.0	2.8	2.6	0.0	0.0	0.0	0.0	0.0	18.9
779	525514.11	5055557.71	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	68.9	2.3	2.4	0.0	0.0	0.0	0.0	0.0	19.1
811	525928.70	5055298.87	2.00	0	DEN	A	59.2	35.2	0.0	0.0	0.0	71.2	2.9	2.7	0.0	0.0	0.0	0.0	0.0	17.6
821	525753.90	5055673.12	2.00	0	DEN	A	59.2	34.9	0.0	0.0	0.0	71.3	2.9	-1.3	0.0	0.0	0.0	0.0	0.0	21.1
836	525926.46	5054869.71	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	71.0	2.8	2.6	0.0	0.0	0.0	0.0	0.0	17.2
837	525942.15	5054912.29	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	71.1	2.8	2.7	0.0	0.0	0.0	0.0	0.0	17.1

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
838	525863.71	5055240.60	2.00	0	DEN	A	59.2	31.2	0.0	0.0	0.0	70.5	2.7	2.6	0.0	0.0	0.0	0.0	0.0	14.5
839	525778.55	5055426.61	2.00	0	DEN	A	59.2	31.2	0.0	0.0	0.0	70.4	2.7	2.0	0.0	0.0	0.0	0.0	0.0	15.3
857	525908.53	5055128.55	2.00	0	DEN	A	59.2	33.8	0.0	0.0	0.0	70.8	2.8	2.6	0.0	0.0	0.0	0.0	0.0	16.9
859	526224.51	5055201.39	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	73.3	3.4	3.0	0.0	0.0	0.0	0.0	0.0	15.6
897	525767.35	5055654.07	2.00	0	DEN	A	59.2	34.0	0.0	0.0	0.0	71.3	2.9	-1.3	0.0	0.0	0.0	0.0	0.0	20.3
910	525766.23	5055537.54	2.00	0	DEN	A	59.2	33.6	0.0	0.0	0.0	70.7	2.8	0.5	0.0	0.0	0.0	0.0	0.0	18.8
920	525989.21	5054994.09	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	71.4	2.9	2.7	0.0	0.0	0.0	0.0	0.0	15.7
927	525741.57	5055618.22	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	71.0	2.8	-1.2	0.0	0.0	0.0	0.0	0.0	19.7
931	525807.68	5054912.29	2.00	0	DEN	A	59.2	30.9	0.0	0.0	0.0	69.8	2.6	2.5	0.0	0.0	0.0	0.0	0.0	15.2
938	525612.72	5055358.26	2.00	0	DEN	A	59.2	30.6	0.0	0.0	0.0	68.5	2.3	0.9	0.0	0.0	0.0	0.0	0.0	18.1
991	525963.44	5054860.75	2.00	0	DEN	A	59.2	32.8	0.0	0.0	0.0	71.3	2.9	2.7	0.0	0.0	0.0	0.0	0.0	15.1
1005	526071.00	5055213.71	2.00	0	DEN	A	59.2	33.2	0.0	0.0	0.0	72.2	3.1	2.8	0.0	0.0	0.0	0.0	0.0	14.3
1012	526018.34	5054970.56	2.00	0	DEN	A	59.2	32.4	0.0	0.0	0.0	71.7	3.0	2.7	0.0	0.0	0.0	0.0	0.0	14.2
1047	525744.94	5055584.60	2.00	0	DEN	A	59.2	31.7	0.0	0.0	0.0	70.8	2.8	-1.1	0.0	0.0	0.0	0.0	0.0	18.4
1108	525956.71	5055150.96	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	71.2	2.9	2.7	0.0	0.0	0.0	0.0	0.0	13.1
1129	526307.43	5055299.99	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	73.9	3.6	3.0	0.0	0.0	0.0	0.0	0.0	11.7
1331	525845.78	5055137.52	2.00	0	DEN	A	59.2	29.5	0.0	0.0	0.0	70.2	2.6	2.5	0.0	0.0	0.0	0.0	0.0	13.3
1377	525788.64	5055492.72	2.00	0	DEN	A	59.2	28.8	0.0	0.0	0.0	70.7	2.8	2.0	0.0	0.0	0.0	0.0	0.0	12.5
1384	525621.68	5055623.82	2.00	0	DEN	A	59.2	27.6	0.0	0.0	0.0	70.1	2.6	0.5	0.0	0.0	0.0	0.0	0.0	13.5
1414	526104.62	5055261.89	2.00	0	DEN	A	59.2	29.1	0.0	0.0	0.0	72.5	3.2	2.8	0.0	0.0	0.0	0.0	0.0	9.7
1432	526252.53	5055352.65	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	73.6	3.5	3.0	0.0	0.0	0.0	0.0	0.0	9.7
1450	526221.15	5055407.56	2.00	0	DEN	A	59.2	30.0	0.0	0.0	0.0	73.5	3.5	3.0	0.0	0.0	0.0	0.0	0.0	9.2
1527	525790.88	5055696.65	2.00	0	DEN	A	59.2	26.2	0.0	0.0	0.0	71.7	3.0	-1.1	0.0	0.0	0.0	0.0	0.0	11.8
1533	525573.50	5055412.04	2.00	0	DEN	A	59.2	23.1	0.0	0.0	0.0	68.4	2.3	0.4	0.0	0.0	0.0	0.0	0.0	11.2
1620	526092.29	5055415.40	2.00	0	DEN	A	59.2	24.8	0.0	0.0	0.0	72.7	3.3	2.9	0.0	0.0	0.0	0.0	0.0	5.1
1646	525830.09	5055679.84	2.00	0	DEN	A	59.2	23.8	0.0	0.0	0.0	71.9	3.0	0.6	0.0	0.0	0.0	0.0	0.0	7.5
1653	525804.32	5055496.08	2.00	0	DEN	A	59.2	22.8	0.0	0.0	0.0	70.9	2.8	2.0	0.0	0.0	0.0	0.0	0.0	6.3
1751	525809.93	5055667.52	2.00	0	DEN	A	59.2	16.0	0.0	0.0	0.0	71.7	3.0	0.9	0.0	0.0	0.0	0.0	0.0	-0.4

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
693	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	75.2	4.0	-0.5	0.0	0.0	0.0	0.0	0.0	27.7
702	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	73.7	3.5	-0.6	0.0	0.0	0.0	0.0	0.0	27.7
719	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	75.8	4.2	-0.9	0.0	0.0	0.0	0.0	0.0	25.2
724	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	74.7	3.9	-1.0	0.0	0.0	0.0	0.0	0.0	24.2
725	526740.61	5055502.08	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.4	4.4	-0.2	0.0	0.0	0.0	0.0	0.0	23.7
736	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	73.8	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	23.9
738	526641.01	5055518.97	2.00	0	DEN	A	59.7	42.6	0.0	0.0	0.0	76.0	4.2	0.9	0.0	0.0	0.0	0.0	0.0	21.2
742	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	73.6	3.5	2.5	0.0	0.0	0.0	0.0	0.0	18.5
758	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	74.0	3.6	-0.8	0.0	0.0	0.0	0.0	0.0	20.9
855	526528.50	5055398.47	2.00	0	DEN	A	59.7	37.9	0.0	0.0	0.0	75.2	4.0	3.3	0.0	0.0	0.0	0.0	0.0	15.1
929	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	75.2	4.0	-0.9	0.0	0.0	0.0	0.0	0.0	17.4
954	526538.73	5055431.82	2.00	0	DEN	A	59.7	36.4	0.0	0.0	0.0	75.3	4.0	3.3	0.0	0.0	0.0	0.0	0.0	13.5
977	525977.99	5055643.04	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	72.6	3.2	-1.0	0.0	0.0	0.0	0.0	0.0	18.4
1019	526793.98	5055599.46	2.00	0	DEN	A	59.7	37.1	0.0	0.0	0.0	76.8	4.5	-0.4	0.0	0.0	0.0	0.0	0.0	16.0
1033	525942.86	5055649.71	2.00	0	DEN	A	59.7	32.6	0.0	0.0	0.0	72.4	3.2	-1.0	0.0	0.0	0.0	0.0	0.0	17.7
1080	526578.75	5055444.27	2.00	0	DEN	A	59.7	35.2	0.0	0.0	0.0	75.6	4.1	3.3	0.0	0.0	0.0	0.0	0.0	11.9
1087	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	74.2	3.7	-1.2	0.0	0.0	0.0	0.0	0.0	16.9
1101	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	74.1	3.7	-1.1	0.0	0.0	0.0	0.0	0.0	16.6
1143	525922.85	5055637.70	2.00	0	DEN	A	59.7	30.9	0.0	0.0	0.0	72.3	3.1	-1.0	0.0	0.0	0.0	0.0	0.0	16.2
1396	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	74.4	3.7	2.0	0.0	0.0	0.0	0.0	0.0	8.9
1515	526497.82	5055471.84	2.00	0	DEN	A	59.7	29.4	0.0	0.0	0.0	75.2	4.0	3.3	0.0	0.0	0.0	0.0	0.0	6.7
1545	526730.39	5055412.70	2.00	0	DEN	A	59.7	29.9	0.0	0.0	0.0	76.3	4.3	1.6	0.0	0.0	0.0	0.0	0.0	7.4
1592	525949.09	5055683.50	2.00	0	DEN	A	59.7	25.3	0.0	0.0	0.0	72.6	3.2	2.1	0.0	0.0	0.0	0.0	0.0	7.1
1612	526045.14	5055566.55	2.00	0	DEN	A	59.7	24.5	0.0	0.0	0.0	72.8	3.3	1.5	0.0	0.0	0.0	0.0	0.0	6.6
1640	526587.20	5055466.95	2.00	0	DEN	A	59.7	27.2	0.0	0.0	0.0	75.6	4.1	3.3	0.0	0.0	0.0	0.0	0.0	3.9
1757	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	74.0	3.6	-0.7	0.0	0.0	0.0	0.0	0.0	0.7

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
701	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	74.6	3.8	-0.8	0.0	0.0	0.0	0.0	0.0	28.3

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
723	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	75.4	4.1	2.9	0.0	0.0	0.0	0.0	0.0	20.9
728	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	74.8	3.9	2.5	0.0	0.0	0.0	0.0	0.0	20.9
734	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	73.7	3.5	-0.8	0.0	0.0	0.0	0.0	0.0	24.5
735	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	75.3	4.0	3.1	0.0	0.0	0.0	0.0	0.0	19.4
739	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	73.9	3.6	-0.5	0.0	0.0	0.0	0.0	0.0	22.9
745	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	75.0	3.9	2.9	0.0	0.0	0.0	0.0	0.0	18.2
750	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	73.7	3.5	-0.3	0.0	0.0	0.0	0.0	0.0	21.6
772	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	75.1	4.0	2.4	0.0	0.0	0.0	0.0	0.0	17.0
797	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	75.0	3.9	3.0	0.0	0.0	0.0	0.0	0.0	16.6
809	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	73.4	3.5	0.5	0.0	0.0	0.0	0.0	0.0	19.8
819	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	75.0	3.9	2.8	0.0	0.0	0.0	0.0	0.0	16.3
899	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	76.2	4.3	3.0	0.0	0.0	0.0	0.0	0.0	15.0
912	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	74.1	3.6	-0.7	0.0	0.0	0.0	0.0	0.0	18.6
916	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	73.3	3.4	2.4	0.0	0.0	0.0	0.0	0.0	15.9
918	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	76.0	4.2	3.0	0.0	0.0	0.0	0.0	0.0	14.3
961	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	75.7	4.2	3.0	0.0	0.0	0.0	0.0	0.0	13.7
984	525743.96	5056017.73	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	73.1	3.4	2.4	0.0	0.0	0.0	0.0	0.0	15.1
998	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	75.8	4.2	3.2	0.0	0.0	0.0	0.0	0.0	12.8
1026	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	73.2	3.4	2.3	0.0	0.0	0.0	0.0	0.0	14.4
1059	526011.21	5056249.85	2.00	0	DEN	A	62.6	32.3	0.0	0.0	0.0	75.2	4.0	2.6	0.0	0.0	0.0	0.0	0.0	13.1
1073	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	73.9	3.6	0.5	0.0	0.0	0.0	0.0	0.0	15.5
1094	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	76.3	4.4	2.8	0.0	0.0	0.0	0.0	0.0	12.1
1115	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	76.4	4.4	3.0	0.0	0.0	0.0	0.0	0.0	11.1
1345	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	76.3	4.3	3.1	0.0	0.0	0.0	0.0	0.0	10.3
1353	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	73.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	13.2
1426	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	73.2	3.4	1.9	0.0	0.0	0.0	0.0	0.0	11.2
1456	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	75.1	4.0	3.0	0.0	0.0	0.0	0.0	0.0	8.0
1497	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	75.6	4.1	2.7	0.0	0.0	0.0	0.0	0.0	7.8
1509	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	74.4	3.7	2.6	0.0	0.0	0.0	0.0	0.0	7.5
1521	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	76.4	4.4	3.1	0.0	0.0	0.0	0.0	0.0	6.4
1539	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	73.3	3.4	2.5	0.0	0.0	0.0	0.0	0.0	7.9
1551	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	73.9	3.6	1.2	0.0	0.0	0.0	0.0	0.0	8.7
1563	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	75.6	4.1	3.0	0.0	0.0	0.0	0.0	0.0	6.2
1569	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	73.3	3.4	2.5	0.0	0.0	0.0	0.0	0.0	6.9
1575	526224.65	5056060.42	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	75.3	4.0	2.6	0.0	0.0	0.0	0.0	0.0	6.1
1674	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	76.5	4.4	2.8	0.0	0.0	0.0	0.0	0.0	3.7
1715	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	74.4	3.8	-1.0	0.0	0.0	0.0	0.0	0.0	4.3

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
715	525591.21	5055845.98	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	71.4	3.7	-1.5	0.0	0.0	0.0	0.0	0.0	40.6
715	525591.21	5055845.98	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	71.4	3.7	-1.5	0.0	0.0	0.0	0.0	0.0	-147.4
715	525591.21	5055845.98	3.00	0	E	A	114.2	0.0	-188.0	0.0	0.0	71.4	3.7	-1.5	0.0	0.0	0.0	0.0	0.0	-147.4

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
718	526725.11	5056383.74	2.00	0	DEN	A	52.3	53.8	0.0	0.0	0.0	78.0	5.0	-0.8	0.0	0.0	0.0	0.0	0.0	24.0
731	527436.76	5056170.95	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	79.8	5.6	-1.4	0.0	0.0	0.0	0.0	0.0	14.2
732	527013.61	5056020.54	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	78.2	5.0	-1.4	0.0	0.0	0.0	0.0	0.0	16.4
733	527685.64	5056177.11	2.00	0	DEN	A	52.3	48.9	0.0	0.0	0.0	80.5	5.9	-1.2	0.0	0.0	0.0	0.0	0.0	16.1
748	527024.01	5056113.38	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	78.4	5.1	-1.1	0.0	0.0	0.0	0.0	0.0	16.5
749	527447.17	5056263.79	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	79.9	5.7	-1.4	0.0	0.0	0.0	0.0	0.0	14.7
805	527546.77	5056045.17	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	79.9	5.7	-1.1	0.0	0.0	0.0	0.0	0.0	12.9
807	527086.31	5055963.80	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	78.4	5.1	-1.1	0.0	0.0	0.0	0.0	0.0	15.1
903	527020.82	5055900.10	2.00	0	DEN	A	52.3	46.3	0.0	0.0	0.0	78.1	5.0	-1.0	0.0	0.0	0.0	0.0	0.0	16.6
914	526527.13	5056356.58	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	77.3	4.7	0.4	0.0	0.0	0.0	0.0	0.0	15.8
945	526827.92	5055821.88	2.00	0	DEN	A	52.3	45.4	0.0	0.0	0.0	77.2	4.7	-1.0	0.0	0.0	0.0	0.0	0.0	16.8
1040	526915.98	5056188.19	2.00	0	DEN	A	52.3	44.3	0.0	0.0	0.0	78.2	5.0	-1.3	0.0	0.0	0.0	0.0	0.0	14.6
1066	527014.48	5056172.88	2.00	0	DEN	A	52.3	43.9	0.0	0.0	0.0	78.5	5.1	-1.1	0.0	0.0	0.0	0.0	0.0	13.7
1371	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	76.5	4.4	-0.8	0.0	0.0	0.0	0.0	0.0	13.6
1420	526691.60	5055797.09	2.00	0	DEN	A	52.3	40.8	0.0	0.0	0.0	76.6	4.5	-1.0	0.0	0.0	0.0	0.0	0.0	13.0

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1444	526959.64	5056175.16	2.00	0	DEN	A	52.3	40.3	0.0	0.0	0.0	78.3	5.1	-1.2	0.0	0.0	0.0	0.0	0.0	10.4
1480	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	76.2	4.3	0.1	0.0	0.0	0.0	0.0	0.0	10.3
1581	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	76.5	4.4	-1.1	0.0	0.0	0.0	0.0	0.0	9.1
1659	526594.14	5055830.77	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	76.3	4.4	1.7	0.0	0.0	0.0	0.0	0.0	4.9
1665	526560.63	5056492.38	2.00	0	DEN	A	52.3	35.1	0.0	0.0	0.0	77.8	4.9	-0.2	0.0	0.0	0.0	0.0	0.0	4.9
1694	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	76.1	4.3	1.9	0.0	0.0	0.0	0.0	0.0	3.3
1708	526507.84	5056218.61	2.00	0	DEN	A	52.3	32.5	0.0	0.0	0.0	76.9	4.6	0.2	0.0	0.0	0.0	0.0	0.0	3.2
1722	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	76.0	4.3	1.7	0.0	0.0	0.0	0.0	0.0	1.3
1729	526754.55	5055738.43	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	76.8	4.5	0.1	0.0	0.0	0.0	0.0	0.0	1.7
1736	526705.82	5055738.43	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	76.6	4.5	-0.8	0.0	0.0	0.0	0.0	0.0	2.7
1743	526800.24	5055721.04	2.00	0	DEN	A	52.3	28.9	0.0	0.0	0.0	77.0	4.6	1.8	0.0	0.0	0.0	0.0	0.0	-2.1
1763	526602.26	5055849.24	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.4	4.4	0.6	0.0	0.0	0.0	0.0	0.0	-1.7
1771	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.8	4.5	2.8	0.0	0.0	0.0	0.0	0.0	-4.5
1778	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	76.6	4.5	2.9	0.0	0.0	0.0	0.0	0.0	-6.4
1785	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	77.2	4.7	3.4	0.0	0.0	0.0	0.0	0.0	-15.6

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
722	526650.08	5055183.13	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	75.7	5.8	-1.4	0.0	0.0	0.0	0.0	0.0	34.1
722	526650.08	5055183.13	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	75.7	5.8	-1.4	0.0	0.0	0.0	0.0	0.0	-153.9
722	526650.08	5055183.13	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	75.7	5.8	-1.4	0.0	0.0	0.0	0.0	0.0	34.1

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
846	525527.68	5055841.75	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	71.0	3.3	-0.1	0.0	0.0	0.0	0.0	0.0	29.2
846	525527.68	5055841.75	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	71.0	3.3	-0.1	0.0	0.0	0.0	0.0	0.0	-158.8
846	525527.68	5055841.75	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	71.0	3.3	-0.1	0.0	0.0	0.0	0.0	0.0	29.2

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1137	526614.08	5055193.84	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	75.5	4.5	0.5	0.0	0.0	0.0	0.0	0.0	22.9
1137	526614.08	5055193.84	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	75.5	4.5	0.5	0.0	0.0	0.0	0.0	0.0	-165.1
1137	526614.08	5055193.84	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	75.5	4.5	0.5	0.0	0.0	0.0	0.0	0.0	22.9

Receiver
Name: (untitled)
ID: POR2
X: 524761.84 m
Y: 5055385.52 m
Z: 4.50 m

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
22	524946.76	5055338.89	2.00	0	D	A	75.0	17.9	0.0	0.0	0.0	56.6	1.3	0.9	0.0	0.0	0.0	0.0	0.0	34.1
22	524946.76	5055338.89	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	56.6	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-75.0
22	524946.76	5055338.89	2.00	0	E	A	75.0	17.9	0.0	0.0	0.0	56.6	1.3	0.9	0.0	0.0	0.0	0.0	0.0	34.1
29	524974.33	5055394.48	2.00	0	D	A	75.0	17.9	0.0	0.0	0.0	57.6	1.4	0.9	0.0	0.0	0.0	0.0	0.0	33.0
29	524974.33	5055394.48	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	57.6	1.4	0.9	0.0	0.0	0.0	0.0	0.0	-76.0
29	524974.33	5055394.48	2.00	0	E	A	75.0	17.9	0.0	0.0	0.0	57.6	1.4	0.9	0.0	0.0	0.0	0.0	0.0	33.0
36	525015.68	5055477.86	2.00	0	D	A	75.0	20.9	0.0	0.0	0.0	59.6	1.7	1.0	0.0	0.0	0.0	0.0	0.0	33.6
36	525015.68	5055477.86	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	59.6	1.7	1.0	0.0	0.0	0.0	0.0	0.0	-75.4
36	525015.68	5055477.86	2.00	0	E	A	75.0	20.9	0.0	0.0	0.0	59.6	1.7	1.0	0.0	0.0	0.0	0.0	0.0	33.6
43	524977.92	5055164.14	2.00	0	D	A	75.0	20.1	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	31.4
43	524977.92	5055164.14	2.00	0	N	A	-34.1	20.1	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	-77.6
43	524977.92	5055164.14	2.00	0	E	A	75.0	20.1	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	31.4
50	524947.96	5055262.11	2.00	0	D	A	75.0	20.1	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	34.7
50	524947.96	5055262.11	2.00	0	N	A	-34.1	20.1	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-74.4
50	524947.96	5055262.11	2.00	0	E	A	75.0	20.1	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	34.7
251	525121.99	5055577.58	2.00	0	D	A	75.0	22.6	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	31.0
251	525121.99	5055577.58	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-78.1
251	525121.99	5055577.58	2.00	0	E	A	75.0	22.6	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	31.0
281	524876.56	5054758.42	2.00	0	D	A	75.0	21.6	0.0	0.0	0.0	67.1	3.1	1.1	0.0	0.0	0.0	0.0	0.0	25.2
281	524876.56	5054758.42	2.00	0	N	A	-34.1	21.6	0.0	0.0	0.0	67.1	3.1	1.1	0.0	0.0	0.0	0.0	0.0	-83.9
281	524876.56	5054758.42	2.00	0	E	A	75.0	21.6	0.0	0.0	0.0	67.1	3.1	1.1	0.0	0.0	0.0	0.0	0.0	25.2
288	524847.98	5054898.60	2.00	0	D	A	75.0	21.6	0.0	0.0	0.0	64.9	2.6	1.1	0.0	0.0	0.0	0.0	0.0	27.9
288	524847.98	5054898.60	2.00	0	N	A	-34.1	21.6	0.0	0.0	0.0	64.9	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-81.1
288	524847.98	5054898.60	2.00	0	E	A	75.0	21.6	0.0	0.0	0.0	64.9	2.6	1.1	0.0	0.0	0.0	0.0	0.0	27.9
295	524896.20	5055033.09	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	31.8
295	524896.20	5055033.09	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	-77.3
295	524896.20	5055033.09	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	31.8
354	525750.19	5053889.67	2.00	0	D	A	75.0	26.5	0.0	0.0	0.0	76.1	6.1	1.4	0.0	0.0	0.0	0.0	0.0	17.9
354	525750.19	5053889.67	2.00	0	N	A	-34.1	26.5	0.0	0.0	0.0	76.1	6.1	1.4	0.0	0.0	0.0	0.0	0.0	-91.1
354	525750.19	5053889.67	2.00	0	E	A	75.0	26.5	0.0	0.0	0.0	76.1	6.1	1.4	0.0	0.0	0.0	0.0	0.0	17.9
513	525385.08	5054143.19	2.00	0	D	A	75.0	26.5	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	21.0
513	525385.08	5054143.19	2.00	0	N	A	-34.1	26.5	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	-88.0
513	525385.08	5054143.19	2.00	0	E	A	75.0	26.5	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	21.0
539	525537.35	5055679.08	2.00	0	D	A	75.0	23.6	0.0	0.0	0.0	69.4	3.7	1.2	0.0	0.0	0.0	0.0	0.0	24.2
539	525537.35	5055679.08	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	69.4	3.7	1.2	0.0	0.0	0.0	0.0	0.0	-84.8
539	525537.35	5055679.08	2.00	0	E	A	75.0	23.6	0.0	0.0	0.0	69.4	3.7	1.2	0.0	0.0	0.0	0.0	0.0	24.2
546	525254.39	5055625.82	2.00	0	D	A	75.0	20.3	0.0	0.0	0.0	65.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	25.6
546	525254.39	5055625.82	2.00	0	N	A	-34.1	20.3	0.0	0.0	0.0	65.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	-83.5
546	525254.39	5055625.82	2.00	0	E	A	75.0	20.3	0.0	0.0	0.0	65.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	25.6
608	525094.55	5054376.87	2.00	0	D	A	75.0	24.8	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	22.6
608	525094.55	5054376.87	2.00	0	N	A	-34.1	24.8	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	-86.4
608	525094.55	5054376.87	2.00	0	E	A	75.0	24.8	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	22.6
615	525366.60	5055646.19	2.00	0	D	A	75.0	20.8	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	24.1
615	525366.60	5055646.19	2.00	0	N	A	-34.1	20.8	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	-84.9
615	525366.60	5055646.19	2.00	0	E	A	75.0	20.8	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	24.1
668	524975.80	5055106.32	2.00	0	D	A	75.0	15.9	0.0	0.0	0.0	61.9	2.1	1.0	0.0	0.0	0.0	0.0	0.0	25.8
668	524975.80	5055106.32	2.00	0	N	A	-34.1	15.9	0.0	0.0	0.0	61.9	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-83.2
668	524975.80	5055106.32	2.00	0	E	A	75.0	15.9	0.0	0.0	0.0	61.9	2.1	1.0	0.0	0.0	0.0	0.0	0.0	25.8
774	524945.20	5054551.24	2.00	0	D	A	75.0	22.0	0.0	0.0	0.0	69.6	3.8	1.2	0.0	0.0	0.0	0.0	0.0	22.3
774	524945.20	5054551.24	2.00	0	N	A	-34.1	22.0	0.0	0.0	0.0	69.6	3.8	1.2	0.0	0.0	0.0	0.0	0.0	-86.7
774	524945.20	5054551.24	2.00	0	E	A	75.0	22.0	0.0	0.0	0.0	69.6	3.8	1.2	0.0	0.0	0.0	0.0	0.0	22.3
810	525740.64	5055713.13	2.00	0	D	A	75.0	22.7	0.0	0.0	0.0	71.3	4.3	1.3	0.0	0.0	0.0	0.0	0.0	20.8
810	525740.64	5055713.13	2.00	0	N	A	-34.1	22.7	0.0	0.0	0.0	71.3	4.3	1.3	0.0	0.0	0.0	0.0	0.0	-88.2

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
810	525740.64	5055713.13	2.00	0	E	A	75.0	22.7	0.0	0.0	0.0	71.3	4.3	1.3	0.0	0.0	0.0	0.0	0.0	20.8
877	524897.33	5054653.52	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	20.4
877	524897.33	5054653.52	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	-88.7
877	524897.33	5054653.52	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	20.4
889	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	73.4	5.0	1.3	0.0	0.0	0.0	0.0	0.0	17.7
889	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	73.4	5.0	1.3	0.0	0.0	0.0	0.0	0.0	-91.3
889	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	73.4	5.0	1.3	0.0	0.0	0.0	0.0	0.0	17.7
895	525898.74	5055726.86	2.00	0	D	A	75.0	21.3	0.0	0.0	0.0	72.5	4.7	1.2	0.0	0.0	0.0	0.0	0.0	17.9
895	525898.74	5055726.86	2.00	0	N	A	-34.1	21.3	0.0	0.0	0.0	72.5	4.7	1.2	0.0	0.0	0.0	0.0	0.0	-91.2
895	525898.74	5055726.86	2.00	0	E	A	75.0	21.3	0.0	0.0	0.0	72.5	4.7	1.2	0.0	0.0	0.0	0.0	0.0	17.9
959	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	74.6	5.5	-1.8	0.0	0.0	0.0	0.0	0.0	18.2
959	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	74.6	5.5	-1.8	0.0	0.0	0.0	0.0	0.0	-90.9
959	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	74.6	5.5	-1.8	0.0	0.0	0.0	0.0	0.0	18.2
1006	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	74.1	5.3	0.8	0.0	0.0	0.0	0.0	0.0	15.3
1006	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	74.1	5.3	0.8	0.0	0.0	0.0	0.0	0.0	-93.8
1006	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	74.1	5.3	0.8	0.0	0.0	0.0	0.0	0.0	15.3
1034	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	75.8	6.0	0.8	0.0	0.0	0.0	0.0	0.0	14.0
1034	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	75.8	6.0	0.8	0.0	0.0	0.0	0.0	0.0	-95.1
1034	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	75.8	6.0	0.8	0.0	0.0	0.0	0.0	0.0	14.0
1041	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	75.1	5.7	0.7	0.0	0.0	0.0	0.0	0.0	14.2
1041	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	75.1	5.7	0.7	0.0	0.0	0.0	0.0	0.0	-94.8
1041	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	75.1	5.7	0.7	0.0	0.0	0.0	0.0	0.0	14.2

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
58	525591.21	5055845.98	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	70.5	3.4	-1.5	0.0	0.0	0.0	0.0	0.0	41.8
58	525591.21	5055845.98	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	70.5	3.4	-1.5	0.0	0.0	0.0	0.0	0.0	-146.2
58	525591.21	5055845.98	3.00	0	E	A	114.2	0.0	-188.0	0.0	0.0	70.5	3.4	-1.5	0.0	0.0	0.0	0.0	0.0	-146.2

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
66	525609.35	5055488.24	2.00	0	DEN	A	59.2	44.4	0.0	0.0	0.0	69.6	2.5	-0.8	0.0	0.0	0.0	0.0	0.0	32.2
249	525803.20	5055038.91	2.00	0	DEN	A	59.2	44.7	0.0	0.0	0.0	71.8	3.0	2.7	0.0	0.0	0.0	0.0	0.0	26.3
313	525785.27	5055461.34	2.00	0	DEN	A	59.2	39.1	0.0	0.0	0.0	71.2	2.9	1.7	0.0	0.0	0.0	0.0	0.0	22.5
314	525870.43	5055275.34	2.00	0	DEN	A	59.2	39.1	0.0	0.0	0.0	71.9	3.1	2.8	0.0	0.0	0.0	0.0	0.0	20.5
315	525885.00	5055059.08	2.00	0	DEN	A	59.2	42.9	0.0	0.0	0.0	72.4	3.2	2.8	0.0	0.0	0.0	0.0	0.0	23.8
316	525693.39	5055435.57	2.00	0	DEN	A	59.2	41.3	0.0	0.0	0.0	70.4	2.7	-1.0	0.0	0.0	0.0	0.0	0.0	28.4
319	526169.61	5055362.74	2.00	0	DEN	A	59.2	43.5	0.0	0.0	0.0	74.0	3.6	2.7	0.0	0.0	0.0	0.0	0.0	22.4
323	525753.90	5055424.37	2.00	0	DEN	A	59.2	40.6	0.0	0.0	0.0	70.9	2.8	0.8	0.0	0.0	0.0	0.0	0.0	25.3
326	526103.50	5055297.75	2.00	0	DEN	A	59.2	42.5	0.0	0.0	0.0	73.6	3.5	3.0	0.0	0.0	0.0	0.0	0.0	21.6
327	525581.34	5055582.36	2.00	0	DEN	A	59.2	37.6	0.0	0.0	0.0	69.5	2.5	0.7	0.0	0.0	0.0	0.0	0.0	24.1
520	525918.61	5055233.88	2.00	0	DEN	A	59.2	39.9	0.0	0.0	0.0	72.3	3.2	2.8	0.0	0.0	0.0	0.0	0.0	20.7
534	525948.87	5055345.93	2.00	0	DEN	A	59.2	39.6	0.0	0.0	0.0	72.5	3.2	2.5	0.0	0.0	0.0	0.0	0.0	20.6
535	526158.40	5055231.64	2.00	0	DEN	A	59.2	40.8	0.0	0.0	0.0	74.0	3.6	3.1	0.0	0.0	0.0	0.0	0.0	19.3
547	525524.19	5055442.30	2.00	0	DEN	A	59.2	35.0	0.0	0.0	0.0	68.7	2.3	0.3	0.0	0.0	0.0	0.0	0.0	22.9
682	525514.11	5055557.71	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	68.7	2.3	2.4	0.0	0.0	0.0	0.0	0.0	19.3
696	525763.98	5055137.52	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	71.3	2.9	2.7	0.0	0.0	0.0	0.0	0.0	18.3
781	525753.90	5055673.12	2.00	0	DEN	A	59.2	34.9	0.0	0.0	0.0	71.3	2.9	-0.2	0.0	0.0	0.0	0.0	0.0	20.1
798	525863.71	5055240.60	2.00	0	DEN	A	59.2	31.2	0.0	0.0	0.0	71.9	3.1	2.8	0.0	0.0	0.0	0.0	0.0	12.6
806	525778.55	5055426.61	2.00	0	DEN	A	59.2	31.2	0.0	0.0	0.0	71.2	2.9	1.8	0.0	0.0	0.0	0.0	0.0	14.5
818	525928.70	5055298.87	2.00	0	DEN	A	59.2	35.2	0.0	0.0	0.0	72.4	3.2	2.8	0.0	0.0	0.0	0.0	0.0	16.0
820	525767.35	5055654.07	2.00	0	DEN	A	59.2	34.0	0.0	0.0	0.0	71.3	2.9	-0.7	0.0	0.0	0.0	0.0	0.0	19.7
829	525933.18	5054948.15	2.00	0	DEN	A	59.2	36.1	0.0	0.0	0.0	72.9	3.3	2.9	0.0	0.0	0.0	0.0	0.0	16.1
847	525766.23	5055537.54	2.00	0	DEN	A	59.2	33.6	0.0	0.0	0.0	71.1	2.9	0.3	0.0	0.0	0.0	0.0	0.0	18.5
868	525741.57	5055618.22	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	71.1	2.8	-0.9	0.0	0.0	0.0	0.0	0.0	19.2
872	525908.53	5055128.55	2.00	0	DEN	A	59.2	33.8	0.0	0.0	0.0	72.4	3.2	2.8	0.0	0.0	0.0	0.0	0.0	14.6
873	526224.51	5055201.39	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	74.4	3.7	3.1	0.0	0.0	0.0	0.0	0.0	14.0
878	525926.46	5054869.71	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	14.3
879	525942.15	5054912.29	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	14.3
885	525612.72	5055358.26	2.00	0	DEN	A	59.2	30.6	0.0	0.0	0.0	69.6	2.5	0.3	0.0	0.0	0.0	0.0	0.0	17.3
887	525744.94	5055584.60	2.00	0	DEN	A	59.2	31.7	0.0	0.0	0.0	71.0	2.8	-0.9	0.0	0.0	0.0	0.0	0.0	17.9

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
894	525989.21	5054994.09	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	73.2	3.4	2.9	0.0	0.0	0.0	0.0	0.0	13.2
902	526071.00	5055213.71	2.00	0	DEN	A	59.2	33.2	0.0	0.0	0.0	73.4	3.5	3.0	0.0	0.0	0.0	0.0	0.0	12.5
911	525807.68	5054912.29	2.00	0	DEN	A	59.2	30.9	0.0	0.0	0.0	72.2	3.1	2.8	0.0	0.0	0.0	0.0	0.0	12.0
915	525963.44	5054860.75	2.00	0	DEN	A	59.2	32.8	0.0	0.0	0.0	73.4	3.4	3.0	0.0	0.0	0.0	0.0	0.0	12.2
919	526018.34	5054970.56	2.00	0	DEN	A	59.2	32.4	0.0	0.0	0.0	73.4	3.5	3.0	0.0	0.0	0.0	0.0	0.0	11.8
939	526307.43	5055299.99	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	74.8	3.9	3.1	0.0	0.0	0.0	0.0	0.0	10.5
979	525788.64	5055492.72	2.00	0	DEN	A	59.2	28.8	0.0	0.0	0.0	71.3	2.9	1.2	0.0	0.0	0.0	0.0	0.0	12.6
986	525621.68	5055623.82	2.00	0	DEN	A	59.2	27.6	0.0	0.0	0.0	70.0	2.6	2.0	0.0	0.0	0.0	0.0	0.0	12.2
999	525956.71	5055150.96	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	72.7	3.3	2.9	0.0	0.0	0.0	0.0	0.0	11.0
1013	525845.78	5055137.52	2.00	0	DEN	A	59.2	29.5	0.0	0.0	0.0	71.9	3.1	2.8	0.0	0.0	0.0	0.0	0.0	10.9
1060	526252.53	5055352.65	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	74.5	3.8	2.8	0.0	0.0	0.0	0.0	0.0	8.8
1067	526104.62	5055261.89	2.00	0	DEN	A	59.2	29.1	0.0	0.0	0.0	73.6	3.5	3.0	0.0	0.0	0.0	0.0	0.0	8.2
1074	526221.15	5055407.56	2.00	0	DEN	A	59.2	30.0	0.0	0.0	0.0	74.3	3.7	2.7	0.0	0.0	0.0	0.0	0.0	8.5
1116	525790.88	5055696.65	2.00	0	DEN	A	59.2	26.2	0.0	0.0	0.0	71.6	3.0	-0.1	0.0	0.0	0.0	0.0	0.0	10.9
1123	525573.50	5055412.04	2.00	0	DEN	A	59.2	23.1	0.0	0.0	0.0	69.2	2.4	-0.6	0.0	0.0	0.0	0.0	0.0	11.3
1208	525830.09	5055679.84	2.00	0	DEN	A	59.2	23.8	0.0	0.0	0.0	71.9	3.0	-0.2	0.0	0.0	0.0	0.0	0.0	8.2
1215	526092.29	5055415.40	2.00	0	DEN	A	59.2	24.8	0.0	0.0	0.0	73.5	3.5	2.5	0.0	0.0	0.0	0.0	0.0	4.4
1243	525804.32	5055496.08	2.00	0	DEN	A	59.2	22.8	0.0	0.0	0.0	71.4	2.9	1.9	0.0	0.0	0.0	0.0	0.0	5.7
1299	525809.93	5055667.52	2.00	0	DEN	A	59.2	16.0	0.0	0.0	0.0	71.7	3.0	-0.8	0.0	0.0	0.0	0.0	0.0	1.2

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
189	524712.02	5055215.33	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	56.0	1.2	0.9	0.0	0.0	0.0	0.0	0.0	30.0
189	524712.02	5055215.33	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	56.0	1.2	0.9	0.0	0.0	0.0	0.0	0.0	-73.0
189	524712.02	5055215.33	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	56.0	1.2	0.9	0.0	0.0	0.0	0.0	0.0	30.0
196	524668.32	5055259.51	2.00	0	D	A	69.0	16.2	0.0	0.0	0.0	54.9	1.1	0.9	0.0	0.0	0.0	0.0	0.0	28.2
196	524668.32	5055259.51	2.00	0	N	A	-34.1	16.2	0.0	0.0	0.0	54.9	1.1	0.9	0.0	0.0	0.0	0.0	0.0	-74.8
196	524668.32	5055259.51	2.00	0	E	A	69.0	16.2	0.0	0.0	0.0	54.9	1.1	0.9	0.0	0.0	0.0	0.0	0.0	28.2
203	524639.19	5055288.96	2.00	0	D	A	69.0	16.2	0.0	0.0	0.0	54.9	1.1	0.9	0.0	0.0	0.0	0.0	0.0	28.3
203	524639.19	5055288.96	2.00	0	N	A	-34.1	16.2	0.0	0.0	0.0	54.9	1.1	0.9	0.0	0.0	0.0	0.0	0.0	-74.7
203	524639.19	5055288.96	2.00	0	E	A	69.0	16.2	0.0	0.0	0.0	54.9	1.1	0.9	0.0	0.0	0.0	0.0	0.0	28.3
210	524595.50	5055333.13	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	55.8	1.2	0.9	0.0	0.0	0.0	0.0	0.0	30.2
210	524595.50	5055333.13	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	55.8	1.2	0.9	0.0	0.0	0.0	0.0	0.0	-72.8
210	524595.50	5055333.13	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	55.8	1.2	0.9	0.0	0.0	0.0	0.0	0.0	30.2
222	524537.24	5055392.03	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	27.7
222	524537.24	5055392.03	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-75.3
222	524537.24	5055392.03	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	27.7
258	525016.51	5055481.72	2.00	0	D	A	69.0	20.9	0.0	0.0	0.0	59.7	1.7	1.0	0.0	0.0	0.0	0.0	0.0	27.5
258	525016.51	5055481.72	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	59.7	1.7	1.0	0.0	0.0	0.0	0.0	0.0	-75.5
258	525016.51	5055481.72	2.00	0	E	A	69.0	20.9	0.0	0.0	0.0	59.7	1.7	1.0	0.0	0.0	0.0	0.0	0.0	27.5
265	524975.97	5055397.97	2.00	0	D	A	69.0	17.9	0.0	0.0	0.0	57.6	1.4	0.9	0.0	0.0	0.0	0.0	0.0	26.9
265	524975.97	5055397.97	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	57.6	1.4	0.9	0.0	0.0	0.0	0.0	0.0	-76.1
265	524975.97	5055397.97	2.00	0	E	A	69.0	17.9	0.0	0.0	0.0	57.6	1.4	0.9	0.0	0.0	0.0	0.0	0.0	26.9
272	524948.94	5055342.13	2.00	0	D	A	69.0	17.9	0.0	0.0	0.0	56.7	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.0
272	524948.94	5055342.13	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	56.7	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-75.0
272	524948.94	5055342.13	2.00	0	E	A	69.0	17.9	0.0	0.0	0.0	56.7	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.0
309	524949.87	5055264.45	2.00	0	D	A	69.0	20.2	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	28.7
309	524949.87	5055264.45	2.00	0	N	A	-34.1	20.2	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-74.3
309	524949.87	5055264.45	2.00	0	E	A	69.0	20.2	0.0	0.0	0.0	58.0	1.5	0.9	0.0	0.0	0.0	0.0	0.0	28.7
310	524978.75	5055164.92	2.00	0	D	A	69.0	20.2	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	25.4
310	524978.75	5055164.92	2.00	0	N	A	-34.1	20.2	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	-77.6
310	524978.75	5055164.92	2.00	0	E	A	69.0	20.2	0.0	0.0	0.0	60.8	1.9	1.0	0.0	0.0	0.0	0.0	0.0	25.4
311	524813.12	5055024.94	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	62.2	2.1	1.0	0.0	0.0	0.0	0.0	0.0	24.3
311	524813.12	5055024.94	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	62.2	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-78.7
311	524813.12	5055024.94	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	62.2	2.1	1.0	0.0	0.0	0.0	0.0	0.0	24.3
312	524765.14	5055132.24	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	59.1	1.6	1.0	0.0	0.0	0.0	0.0	0.0	28.0
312	524765.14	5055132.24	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	59.1	1.6	1.0	0.0	0.0	0.0	0.0	0.0	-75.0
312	524765.14	5055132.24	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	59.1	1.6	1.0	0.0	0.0	0.0	0.0	0.0	28.0
317	524454.42	5055469.36	2.00	0	D	A	69.0	21.6	0.0	0.0	0.0	61.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	26.5
317	524454.42	5055469.36	2.00	0	N	A	-34.1	21.6	0.0	0.0	0.0	61.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	-76.5
317	524454.42	5055469.36	2.00	0	E	A	69.0	21.6	0.0	0.0	0.0	61.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	26.5
318	524347.04	5055565.13	2.00	0	D	A	69.0	21.6	0.0	0.0	0.0	64.1	2.5	1.1	0.0	0.0	0.0	0.0	0.0	22.9

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
318	524347.04	5055565.13	2.00	0	N	A	-34.1	21.6	0.0	0.0	0.0	64.1	2.5	1.1	0.0	0.0	0.0	0.0	0.0	-80.1
318	524347.04	5055565.13	2.00	0	E	A	69.0	21.6	0.0	0.0	0.0	64.1	2.5	1.1	0.0	0.0	0.0	0.0	0.0	22.9
555	525119.36	5055578.25	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	24.8
555	525119.36	5055578.25	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-78.2
555	525119.36	5055578.25	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	24.8
596	524899.01	5055034.30	2.00	0	D	A	69.0	22.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	25.7
596	524899.01	5055034.30	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	-77.3
596	524899.01	5055034.30	2.00	0	E	A	69.0	22.5	0.0	0.0	0.0	62.5	2.2	1.0	0.0	0.0	0.0	0.0	0.0	25.7
627	524250.52	5055693.52	2.00	0	D	A	69.0	22.6	0.0	0.0	0.0	66.5	3.0	1.1	0.0	0.0	0.0	0.0	0.0	20.9
627	524250.52	5055693.52	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	66.5	3.0	1.1	0.0	0.0	0.0	0.0	0.0	-82.1
627	524250.52	5055693.52	2.00	0	E	A	69.0	22.6	0.0	0.0	0.0	66.5	3.0	1.1	0.0	0.0	0.0	0.0	0.0	20.9
634	524164.85	5055854.53	2.00	0	D	A	69.0	22.6	0.0	0.0	0.0	68.6	3.5	1.2	0.0	0.0	0.0	0.0	0.0	18.2
634	524164.85	5055854.53	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	68.6	3.5	1.2	0.0	0.0	0.0	0.0	0.0	-84.8
634	524164.85	5055854.53	2.00	0	E	A	69.0	22.6	0.0	0.0	0.0	68.6	3.5	1.2	0.0	0.0	0.0	0.0	0.0	18.2
689	525342.09	5055645.00	2.00	0	D	A	69.0	24.7	0.0	0.0	0.0	67.1	3.1	1.1	0.0	0.0	0.0	0.0	0.0	22.4
689	525342.09	5055645.00	2.00	0	N	A	-34.1	24.7	0.0	0.0	0.0	67.1	3.1	1.1	0.0	0.0	0.0	0.0	0.0	-80.6
689	525342.09	5055645.00	2.00	0	E	A	69.0	24.7	0.0	0.0	0.0	67.1	3.1	1.1	0.0	0.0	0.0	0.0	0.0	22.4
866	524956.37	5057160.92	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	14.3
866	524956.37	5057160.92	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	-88.8
866	524956.37	5057160.92	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	14.3
867	525493.03	5057702.88	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	78.7	7.3	1.4	0.0	0.0	0.0	0.0	0.0	10.3
867	525493.03	5057702.88	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	78.7	7.3	1.4	0.0	0.0	0.0	0.0	0.0	-92.7
867	525493.03	5057702.88	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	78.7	7.3	1.4	0.0	0.0	0.0	0.0	0.0	10.3
869	526406.62	5055378.34	2.00	0	D	A	69.0	26.0	0.0	0.0	0.0	75.3	5.8	1.1	0.0	0.0	0.0	0.0	0.0	12.7
869	526406.62	5055378.34	2.00	0	N	A	-34.1	26.0	0.0	0.0	0.0	75.3	5.8	1.1	0.0	0.0	0.0	0.0	0.0	-90.3
869	526406.62	5055378.34	2.00	0	E	A	69.0	26.0	0.0	0.0	0.0	75.3	5.8	1.1	0.0	0.0	0.0	0.0	0.0	12.7
870	526036.24	5055524.23	2.00	0	D	A	69.0	26.0	0.0	0.0	0.0	73.2	5.0	0.8	0.0	0.0	0.0	0.0	0.0	16.0
870	526036.24	5055524.23	2.00	0	N	A	-34.1	26.0	0.0	0.0	0.0	73.2	5.0	0.8	0.0	0.0	0.0	0.0	0.0	-87.0
870	526036.24	5055524.23	2.00	0	E	A	69.0	26.0	0.0	0.0	0.0	73.2	5.0	0.8	0.0	0.0	0.0	0.0	0.0	16.0
876	525665.68	5055700.14	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	18.5
876	525665.68	5055700.14	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-84.5
876	525665.68	5055700.14	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	18.5
886	524142.97	5056113.07	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	18.5
886	524142.97	5056113.07	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-84.5
886	524142.97	5056113.07	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	18.5
928	524542.93	5056718.72	2.00	0	D	A	69.0	26.5	0.0	0.0	0.0	73.6	5.1	1.3	0.0	0.0	0.0	0.0	0.0	15.4
928	524542.93	5056718.72	2.00	0	N	A	-34.1	26.5	0.0	0.0	0.0	73.6	5.1	1.3	0.0	0.0	0.0	0.0	0.0	-87.6
928	524542.93	5056718.72	2.00	0	E	A	69.0	26.5	0.0	0.0	0.0	73.6	5.1	1.3	0.0	0.0	0.0	0.0	0.0	15.4
930	524977.05	5055106.24	2.00	0	D	A	69.0	15.7	0.0	0.0	0.0	61.9	2.1	1.0	0.0	0.0	0.0	0.0	0.0	19.6
930	524977.05	5055106.24	2.00	0	N	A	-34.1	15.7	0.0	0.0	0.0	61.9	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-83.4
930	524977.05	5055106.24	2.00	0	E	A	69.0	15.7	0.0	0.0	0.0	61.9	2.1	1.0	0.0	0.0	0.0	0.0	0.0	19.6
937	524280.87	5056419.30	2.00	0	D	A	69.0	25.4	0.0	0.0	0.0	72.1	4.6	1.3	0.0	0.0	0.0	0.0	0.0	16.3
937	524280.87	5056419.30	2.00	0	N	A	-34.1	25.4	0.0	0.0	0.0	72.1	4.6	1.3	0.0	0.0	0.0	0.0	0.0	-86.7
937	524280.87	5056419.30	2.00	0	E	A	69.0	25.4	0.0	0.0	0.0	72.1	4.6	1.3	0.0	0.0	0.0	0.0	0.0	16.3
1145	525846.70	5055663.19	2.00	0	D	A	69.0	21.2	0.0	0.0	0.0	72.0	4.5	0.9	0.0	0.0	0.0	0.0	0.0	12.8
1145	525846.70	5055663.19	2.00	0	N	A	-34.1	21.2	0.0	0.0	0.0	72.0	4.5	0.9	0.0	0.0	0.0	0.0	0.0	-90.2
1145	525846.70	5055663.19	2.00	0	E	A	69.0	21.2	0.0	0.0	0.0	72.0	4.5	0.9	0.0	0.0	0.0	0.0	0.0	12.8

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
229	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	74.1	3.7	-0.9	0.0	0.0	0.0	0.0	0.0	29.0
321	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	75.0	3.9	2.5	0.0	0.0	0.0	0.0	0.0	21.9
325	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	74.2	3.7	3.0	0.0	0.0	0.0	0.0	0.0	21.2
329	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	73.1	3.4	-0.8	0.0	0.0	0.0	0.0	0.0	25.2
331	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	75.0	3.9	2.4	0.0	0.0	0.0	0.0	0.0	20.5
527	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	73.5	3.5	-1.0	0.0	0.0	0.0	0.0	0.0	23.9
538	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	74.8	3.9	2.5	0.0	0.0	0.0	0.0	0.0	18.9
548	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	73.3	3.4	-1.0	0.0	0.0	0.0	0.0	0.0	22.8
594	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	74.5	3.8	2.9	0.0	0.0	0.0	0.0	0.0	17.2
648	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	74.7	3.8	2.4	0.0	0.0	0.0	0.0	0.0	17.6
661	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	73.0	3.4	-0.4	0.0	0.0	0.0	0.0	0.0	21.3
767	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	74.7	3.9	2.6	0.0	0.0	0.0	0.0	0.0	16.7

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
788	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	73.5	3.5	-1.0	0.0	0.0	0.0	0.0	0.0	19.6
796	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	75.8	4.2	3.1	0.0	0.0	0.0	0.0	0.0	15.4
808	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	72.6	3.2	2.6	0.0	0.0	0.0	0.0	0.0	16.6
840	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	75.6	4.1	2.7	0.0	0.0	0.0	0.0	0.0	15.1
858	525743.96	5056017.73	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	72.3	3.2	2.6	0.0	0.0	0.0	0.0	0.0	15.9
871	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	75.4	4.1	2.6	0.0	0.0	0.0	0.0	0.0	14.5
880	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	75.5	4.1	2.6	0.0	0.0	0.0	0.0	0.0	13.8
882	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	72.7	3.3	1.8	0.0	0.0	0.0	0.0	0.0	15.4
884	526011.21	5056249.85	2.00	0	DEN	A	62.6	32.3	0.0	0.0	0.0	74.6	3.8	3.2	0.0	0.0	0.0	0.0	0.0	13.3
890	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	73.6	3.5	0.1	0.0	0.0	0.0	0.0	0.0	16.3
891	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	75.9	4.2	3.4	0.0	0.0	0.0	0.0	0.0	12.2
904	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	76.0	4.3	3.2	0.0	0.0	0.0	0.0	0.0	11.5
917	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	72.7	3.3	2.2	0.0	0.0	0.0	0.0	0.0	13.2
921	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	75.9	4.2	2.9	0.0	0.0	0.0	0.0	0.0	11.1
972	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	72.6	3.2	2.1	0.0	0.0	0.0	0.0	0.0	11.9
1054	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	74.7	3.9	2.4	0.0	0.0	0.0	0.0	0.0	9.0
1081	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	73.7	3.5	3.0	0.0	0.0	0.0	0.0	0.0	8.0
1088	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	75.4	4.1	2.7	0.0	0.0	0.0	0.0	0.0	8.1
1102	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	72.5	3.2	2.8	0.0	0.0	0.0	0.0	0.0	8.6
1109	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	76.1	4.3	3.0	0.0	0.0	0.0	0.0	0.0	7.1
1130	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	72.4	3.2	2.8	0.0	0.0	0.0	0.0	0.0	7.7
1138	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	73.6	3.5	0.7	0.0	0.0	0.0	0.0	0.0	9.5
1152	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	75.3	4.0	2.6	0.0	0.0	0.0	0.0	0.0	6.9
1173	526224.65	5056060.42	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	75.1	4.0	2.7	0.0	0.0	0.0	0.0	0.0	6.3
1201	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	76.0	4.3	3.4	0.0	0.0	0.0	0.0	0.0	3.8
1257	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	73.8	3.6	1.5	0.0	0.0	0.0	0.0	0.0	2.6

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
236	526650.08	5055183.13	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	76.6	6.3	-1.3	0.0	0.0	0.0	0.0	0.0	32.7
236	526650.08	5055183.13	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	76.6	6.3	-1.3	0.0	0.0	0.0	0.0	0.0	-155.3
236	526650.08	5055183.13	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	76.6	6.3	-1.3	0.0	0.0	0.0	0.0	0.0	32.7

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
242	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	75.6	4.1	-1.3	0.0	0.0	0.0	0.0	0.0	28.0
279	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	74.1	3.7	-1.0	0.0	0.0	0.0	0.0	0.0	27.5
322	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.1	4.3	-1.4	0.0	0.0	0.0	0.0	0.0	25.3
328	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	75.1	4.0	-1.3	0.0	0.0	0.0	0.0	0.0	24.1
330	526740.61	5055502.08	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.9	4.6	-0.5	0.0	0.0	0.0	0.0	0.0	23.3
536	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	73.9	3.6	-0.8	0.0	0.0	0.0	0.0	0.0	23.3
537	526641.01	5055518.97	2.00	0	DEN	A	59.7	42.6	0.0	0.0	0.0	76.5	4.4	0.2	0.0	0.0	0.0	0.0	0.0	21.3
557	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	74.1	3.7	1.4	0.0	0.0	0.0	0.0	0.0	18.9
675	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	74.4	3.7	-1.2	0.0	0.0	0.0	0.0	0.0	20.8
856	526528.50	5055398.47	2.00	0	DEN	A	59.7	37.9	0.0	0.0	0.0	75.9	4.2	3.1	0.0	0.0	0.0	0.0	0.0	14.4
874	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	75.5	4.1	-1.3	0.0	0.0	0.0	0.0	0.0	17.4
881	525977.99	5055643.04	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	72.9	3.3	-1.0	0.0	0.0	0.0	0.0	0.0	18.0
883	526538.73	5055431.82	2.00	0	DEN	A	59.7	36.4	0.0	0.0	0.0	76.0	4.3	3.1	0.0	0.0	0.0	0.0	0.0	12.9
892	526793.98	5055599.46	2.00	0	DEN	A	59.7	37.1	0.0	0.0	0.0	77.2	4.7	-1.1	0.0	0.0	0.0	0.0	0.0	16.1
893	525942.86	5055649.71	2.00	0	DEN	A	59.7	32.6	0.0	0.0	0.0	72.7	3.3	-0.9	0.0	0.0	0.0	0.0	0.0	17.4
898	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	74.3	3.7	-0.5	0.0	0.0	0.0	0.0	0.0	16.2
900	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	74.1	3.7	-0.4	0.0	0.0	0.0	0.0	0.0	15.8
913	526578.75	5055444.27	2.00	0	DEN	A	59.7	35.2	0.0	0.0	0.0	76.2	4.3	3.1	0.0	0.0	0.0	0.0	0.0	11.3
922	525922.85	5055637.70	2.00	0	DEN	A	59.7	30.9	0.0	0.0	0.0	72.5	3.2	-0.9	0.0	0.0	0.0	0.0	0.0	15.8
1027	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	74.9	3.9	-0.2	0.0	0.0	0.0	0.0	0.0	10.5
1159	526497.82	5055471.84	2.00	0	DEN	A	59.7	29.4	0.0	0.0	0.0	75.8	4.2	3.0	0.0	0.0	0.0	0.0	0.0	6.2
1166	526730.39	5055412.70	2.00	0	DEN	A	59.7	29.9	0.0	0.0	0.0	76.9	4.6	1.1	0.0	0.0	0.0	0.0	0.0	7.1
1187	525949.09	5055683.50	2.00	0	DEN	A	59.7	25.3	0.0	0.0	0.0	72.8	3.3	2.1	0.0	0.0	0.0	0.0	0.0	6.9
1194	526045.14	5055566.55	2.00	0	DEN	A	59.7	24.5	0.0	0.0	0.0	73.3	3.4	-0.1	0.0	0.0	0.0	0.0	0.0	7.6
1236	526587.20	5055466.95	2.00	0	DEN	A	59.7	27.2	0.0	0.0	0.0	76.2	4.3	3.1	0.0	0.0	0.0	0.0	0.0	3.3
1306	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	74.0	3.6	0.3	0.0	0.0	0.0	0.0	0.0	-0.3

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
320	526725.11	5056383.74	2.00	0	DEN	A	52.3	53.8	0.0	0.0	0.0	77.9	4.9	-0.8	0.0	0.0	0.0	0.0	0.0	24.1
332	527436.76	5056170.95	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	79.9	5.7	-0.9	0.0	0.0	0.0	0.0	0.0	13.5
333	527013.61	5056020.54	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	78.4	5.1	-0.9	0.0	0.0	0.0	0.0	0.0	15.6
334	527685.64	5056177.11	2.00	0	DEN	A	52.3	48.9	0.0	0.0	0.0	80.6	6.0	-1.1	0.0	0.0	0.0	0.0	0.0	15.8
563	527024.01	5056113.38	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	78.5	5.1	-0.8	0.0	0.0	0.0	0.0	0.0	16.0
570	527447.17	5056263.79	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	80.0	5.7	-0.9	0.0	0.0	0.0	0.0	0.0	14.1
698	527546.77	5056045.17	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	80.1	5.8	-1.2	0.0	0.0	0.0	0.0	0.0	12.7
755	527086.31	5055963.80	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	78.6	5.2	-1.0	0.0	0.0	0.0	0.0	0.0	14.7
854	527020.82	5055900.10	2.00	0	DEN	A	52.3	46.3	0.0	0.0	0.0	78.3	5.1	-1.4	0.0	0.0	0.0	0.0	0.0	16.7
865	526527.13	5056356.58	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	77.1	4.6	0.2	0.0	0.0	0.0	0.0	0.0	16.3
875	526827.92	5055821.88	2.00	0	DEN	A	52.3	45.4	0.0	0.0	0.0	77.5	4.8	-1.5	0.0	0.0	0.0	0.0	0.0	16.9
888	526915.98	5056188.19	2.00	0	DEN	A	52.3	44.3	0.0	0.0	0.0	78.2	5.0	-0.5	0.0	0.0	0.0	0.0	0.0	13.8
896	527014.48	5056172.88	2.00	0	DEN	A	52.3	43.9	0.0	0.0	0.0	78.6	5.2	-0.6	0.0	0.0	0.0	0.0	0.0	13.1
970	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	76.4	4.4	-0.3	0.0	0.0	0.0	0.0	0.0	13.2
1020	526691.60	5055797.09	2.00	0	DEN	A	52.3	40.8	0.0	0.0	0.0	76.9	4.6	-1.4	0.0	0.0	0.0	0.0	0.0	13.0
1048	526959.64	5056175.16	2.00	0	DEN	A	52.3	40.3	0.0	0.0	0.0	78.4	5.1	-0.5	0.0	0.0	0.0	0.0	0.0	9.7
1095	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	76.2	4.3	1.0	0.0	0.0	0.0	0.0	0.0	9.4
1180	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	76.5	4.4	-0.2	0.0	0.0	0.0	0.0	0.0	8.2
1222	526594.14	5055830.77	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	76.5	4.4	2.1	0.0	0.0	0.0	0.0	0.0	4.3
1229	526560.63	5056492.38	2.00	0	DEN	A	52.3	35.1	0.0	0.0	0.0	77.5	4.8	-0.5	0.0	0.0	0.0	0.0	0.0	5.7
1250	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	76.0	4.3	2.9	0.0	0.0	0.0	0.0	0.0	2.4
1264	526507.84	5056218.61	2.00	0	DEN	A	52.3	32.5	0.0	0.0	0.0	76.7	4.5	0.7	0.0	0.0	0.0	0.0	0.0	2.8
1271	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	76.1	4.3	2.2	0.0	0.0	0.0	0.0	0.0	0.6
1278	526754.55	5055738.43	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	77.1	4.6	-1.4	0.0	0.0	0.0	0.0	0.0	2.8
1285	526705.82	5055738.43	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	76.9	4.6	-1.5	0.0	0.0	0.0	0.0	0.0	3.0
1292	526467.22	5056405.47	2.00	0	DEN	A	52.3	29.0	0.0	0.0	0.0	77.0	4.6	2.9	0.0	0.0	0.0	0.0	0.0	-3.1
1313	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.6	4.5	2.9	0.0	0.0	0.0	0.0	0.0	-4.3
1320	526602.26	5055849.24	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.6	4.4	0.6	0.0	0.0	0.0	0.0	0.0	-2.0
1327	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	76.5	4.4	3.0	0.0	0.0	0.0	0.0	0.0	-6.3
1335	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	76.9	4.6	2.9	0.0	0.0	0.0	0.0	0.0	-14.7

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
324	525527.68	5055841.75	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	70.0	3.1	0.3	0.0	0.0	0.0	0.0	0.0	30.1
324	525527.68	5055841.75	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	70.0	3.1	0.3	0.0	0.0	0.0	0.0	0.0	-157.9
324	525527.68	5055841.75	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	70.0	3.1	0.3	0.0	0.0	0.0	0.0	0.0	30.1

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
822	526614.08	5055193.84	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	76.4	4.8	0.8	0.0	0.0	0.0	0.0	0.0	21.5
822	526614.08	5055193.84	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	76.4	4.8	0.8	0.0	0.0	0.0	0.0	0.0	-166.5
822	526614.08	5055193.84	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	76.4	4.8	0.8	0.0	0.0	0.0	0.0	0.0	21.5

Receiver
Name: (untitled)
ID: POR3
X: 524555.98 m
Y: 5056194.98 m
Z: 4.50 m

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
55	525591.21	5055845.98	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	71.8	3.8	-1.4	0.0	0.0	0.0	0.0	0.0	40.0
55	525591.21	5055845.98	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	71.8	3.8	-1.4	0.0	0.0	0.0	0.0	0.0	-148.0
55	525591.21	5055845.98	3.00	0	E	A	114.2	0.0	-188.0	0.0	0.0	71.8	3.8	-1.4	0.0	0.0	0.0	0.0	0.0	-148.0

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
62	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	74.1	3.7	-0.3	0.0	0.0	0.0	0.0	0.0	28.5
252	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	75.0	3.9	3.2	0.0	0.0	0.0	0.0	0.0	21.2
266	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	73.9	3.6	3.1	0.0	0.0	0.0	0.0	0.0	21.5
296	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	73.4	3.5	-0.2	0.0	0.0	0.0	0.0	0.0	24.3
300	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	75.0	3.9	3.2	0.0	0.0	0.0	0.0	0.0	19.6
346	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	73.9	3.6	-0.5	0.0	0.0	0.0	0.0	0.0	22.9
528	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	75.1	4.0	3.0	0.0	0.0	0.0	0.0	0.0	18.0
545	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	73.9	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	21.5
554	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	74.3	3.7	3.1	0.0	0.0	0.0	0.0	0.0	17.2
601	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	74.9	3.9	3.0	0.0	0.0	0.0	0.0	0.0	16.7
621	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	73.7	3.5	-0.3	0.0	0.0	0.0	0.0	0.0	20.4
623	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	75.1	4.0	3.0	0.0	0.0	0.0	0.0	0.0	15.8
641	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	75.5	4.1	3.3	0.0	0.0	0.0	0.0	0.0	15.6
652	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	73.8	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	18.6
654	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	72.8	3.3	2.9	0.0	0.0	0.0	0.0	0.0	16.1
663	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	75.3	4.0	3.3	0.0	0.0	0.0	0.0	0.0	14.8
756	525743.96	5056017.73	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	72.6	3.2	2.9	0.0	0.0	0.0	0.0	0.0	15.4
770	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	75.6	4.1	3.3	0.0	0.0	0.0	0.0	0.0	13.6
784	526011.21	5056249.85	2.00	0	DEN	A	62.6	32.3	0.0	0.0	0.0	74.3	3.7	3.1	0.0	0.0	0.0	0.0	0.0	13.8
824	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	75.5	4.1	3.3	0.0	0.0	0.0	0.0	0.0	13.0
833	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	75.4	4.1	3.3	0.0	0.0	0.0	0.0	0.0	12.9
926	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	73.4	3.5	2.3	0.0	0.0	0.0	0.0	0.0	14.1
964	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	75.7	4.1	3.3	0.0	0.0	0.0	0.0	0.0	11.9
965	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	74.3	3.7	0.2	0.0	0.0	0.0	0.0	0.0	15.3
1004	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	72.9	3.3	2.9	0.0	0.0	0.0	0.0	0.0	12.2
1011	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	75.6	4.1	3.3	0.0	0.0	0.0	0.0	0.0	11.0
1072	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	72.9	3.3	2.2	0.0	0.0	0.0	0.0	0.0	11.3
1150	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	74.9	3.9	3.1	0.0	0.0	0.0	0.0	0.0	8.1
1192	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	73.5	3.5	3.0	0.0	0.0	0.0	0.0	0.0	8.3
1206	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	75.6	4.1	3.2	0.0	0.0	0.0	0.0	0.0	7.3
1213	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	72.6	3.2	2.9	0.0	0.0	0.0	0.0	0.0	8.5
1227	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	75.8	4.2	3.4	0.0	0.0	0.0	0.0	0.0	7.1
1276	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	72.5	3.2	2.8	0.0	0.0	0.0	0.0	0.0	7.6
1290	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	75.5	4.1	3.2	0.0	0.0	0.0	0.0	0.0	6.1
1311	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	74.4	3.8	-0.1	0.0	0.0	0.0	0.0	0.0	9.3
1318	526224.65	5056060.42	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	75.5	4.1	3.1	0.0	0.0	0.0	0.0	0.0	5.5
1349	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	75.4	4.1	3.3	0.0	0.0	0.0	0.0	0.0	4.6
1404	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	73.7	3.6	2.4	0.0	0.0	0.0	0.0	0.0	1.7

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
64	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	76.9	4.6	-0.9	0.0	0.0	0.0	0.0	0.0	25.8
200	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	75.7	4.2	-0.8	0.0	0.0	0.0	0.0	0.0	25.1
298	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	77.1	4.6	-0.4	0.0	0.0	0.0	0.0	0.0	22.9
306	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	76.3	4.4	-0.7	0.0	0.0	0.0	0.0	0.0	21.9

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
561	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	75.2	4.0	-0.5	0.0	0.0	0.0	0.0	0.0	21.4
630	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	75.8	4.2	-0.7	0.0	0.0	0.0	0.0	0.0	18.8
643	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	75.9	4.2	-0.8	0.0	0.0	0.0	0.0	0.0	18.4
907	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	76.7	4.5	-0.5	0.0	0.0	0.0	0.0	0.0	15.1
976	525977.99	5055643.04	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	74.7	3.8	-0.6	0.0	0.0	0.0	0.0	0.0	15.4
997	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	75.4	4.1	-0.3	0.0	0.0	0.0	0.0	0.0	14.6
1025	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	75.2	4.0	-0.3	0.0	0.0	0.0	0.0	0.0	14.3
1046	525942.86	5055649.71	2.00	0	DEN	A	59.7	32.6	0.0	0.0	0.0	74.5	3.8	0.8	0.0	0.0	0.0	0.0	0.0	13.3
1135	525922.85	5055637.70	2.00	0	DEN	A	59.7	30.9	0.0	0.0	0.0	74.4	3.7	-0.7	0.0	0.0	0.0	0.0	0.0	13.2
1241	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	76.5	4.4	-0.9	0.0	0.0	0.0	0.0	0.0	9.1
1363	525949.09	5055683.50	2.00	0	DEN	A	59.7	25.3	0.0	0.0	0.0	74.4	3.8	2.6	0.0	0.0	0.0	0.0	0.0	4.3
1380	526045.14	5055566.55	2.00	0	DEN	A	59.7	24.5	0.0	0.0	0.0	75.2	4.0	0.3	0.0	0.0	0.0	0.0	0.0	4.7
1464	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	75.0	3.9	2.6	0.0	0.0	0.0	0.0	0.0	-3.9

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
193	525609.35	5055488.24	2.00	0	DEN	A	59.2	44.4	0.0	0.0	0.0	73.1	3.4	-0.4	0.0	0.0	0.0	0.0	0.0	27.6
273	525803.20	5055038.91	2.00	0	DEN	A	59.2	44.7	0.0	0.0	0.0	75.6	4.1	3.3	0.0	0.0	0.0	0.0	0.0	20.8
294	525827.85	5055368.34	2.00	0	DEN	A	59.2	42.1	0.0	0.0	0.0	74.6	3.8	2.7	0.0	0.0	0.0	0.0	0.0	20.1
302	525693.39	5055435.57	2.00	0	DEN	A	59.2	41.3	0.0	0.0	0.0	73.7	3.5	-0.6	0.0	0.0	0.0	0.0	0.0	23.8
304	525885.00	5055059.08	2.00	0	DEN	A	59.2	42.9	0.0	0.0	0.0	75.9	4.2	3.4	0.0	0.0	0.0	0.0	0.0	18.7
305	526169.61	5055362.74	2.00	0	DEN	A	59.2	43.5	0.0	0.0	0.0	76.2	4.3	3.3	0.0	0.0	0.0	0.0	0.0	18.9
307	525753.90	5055424.37	2.00	0	DEN	A	59.2	40.6	0.0	0.0	0.0	74.1	3.7	1.2	0.0	0.0	0.0	0.0	0.0	20.9
521	526103.50	5055297.75	2.00	0	DEN	A	59.2	42.5	0.0	0.0	0.0	76.1	4.3	3.1	0.0	0.0	0.0	0.0	0.0	18.2
587	525581.34	5055582.36	2.00	0	DEN	A	59.2	37.6	0.0	0.0	0.0	72.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	19.8
589	525918.61	5055233.88	2.00	0	DEN	A	59.2	39.9	0.0	0.0	0.0	75.4	4.1	2.9	0.0	0.0	0.0	0.0	0.0	16.7
612	525948.87	5055345.93	2.00	0	DEN	A	59.2	39.6	0.0	0.0	0.0	75.3	4.0	2.9	0.0	0.0	0.0	0.0	0.0	16.7
619	526158.40	5055231.64	2.00	0	DEN	A	59.2	40.8	0.0	0.0	0.0	76.4	4.4	3.2	0.0	0.0	0.0	0.0	0.0	15.9
699	525524.19	5055442.30	2.00	0	DEN	A	59.2	35.0	0.0	0.0	0.0	72.8	3.3	0.2	0.0	0.0	0.0	0.0	0.0	17.9
777	525753.90	5055673.12	2.00	0	DEN	A	59.2	34.9	0.0	0.0	0.0	73.3	3.4	1.5	0.0	0.0	0.0	0.0	0.0	15.8
802	525514.11	5055557.71	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	72.2	3.1	2.8	0.0	0.0	0.0	0.0	0.0	14.6
844	525821.13	5055333.61	2.00	0	DEN	A	59.2	34.2	0.0	0.0	0.0	74.7	3.8	2.7	0.0	0.0	0.0	0.0	0.0	12.1
851	525767.35	5055654.07	2.00	0	DEN	A	59.2	34.0	0.0	0.0	0.0	73.5	3.5	0.1	0.0	0.0	0.0	0.0	0.0	16.2
864	525763.98	5055137.52	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	75.1	4.0	3.3	0.0	0.0	0.0	0.0	0.0	12.8
947	525928.70	5055298.87	2.00	0	DEN	A	59.2	35.2	0.0	0.0	0.0	75.3	4.0	2.9	0.0	0.0	0.0	0.0	0.0	12.2
956	525766.23	5055537.54	2.00	0	DEN	A	59.2	33.6	0.0	0.0	0.0	73.8	3.6	1.2	0.0	0.0	0.0	0.0	0.0	14.3
966	525741.57	5055618.22	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	73.4	3.5	-0.3	0.0	0.0	0.0	0.0	0.0	15.8
967	525933.18	5054948.15	2.00	0	DEN	A	59.2	36.1	0.0	0.0	0.0	76.4	4.4	3.5	0.0	0.0	0.0	0.0	0.0	11.1
983	526224.51	5055201.39	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	76.8	4.5	3.2	0.0	0.0	0.0	0.0	0.0	10.7
1039	525908.53	5055128.55	2.00	0	DEN	A	59.2	33.8	0.0	0.0	0.0	75.7	4.2	3.0	0.0	0.0	0.0	0.0	0.0	10.1
1058	525744.94	5055584.60	2.00	0	DEN	A	59.2	31.7	0.0	0.0	0.0	73.5	3.5	-0.3	0.0	0.0	0.0	0.0	0.0	14.2
1079	525926.46	5054869.71	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	76.6	4.5	3.5	0.0	0.0	0.0	0.0	0.0	9.1
1086	525942.15	5054912.29	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	76.5	4.4	3.5	0.0	0.0	0.0	0.0	0.0	9.2
1114	526071.00	5055213.71	2.00	0	DEN	A	59.2	33.2	0.0	0.0	0.0	76.1	4.3	3.1	0.0	0.0	0.0	0.0	0.0	8.9
1121	525612.72	5055358.26	2.00	0	DEN	A	59.2	30.6	0.0	0.0	0.0	73.6	3.5	-0.5	0.0	0.0	0.0	0.0	0.0	13.1
1128	525989.21	5054994.09	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	76.4	4.4	3.5	0.0	0.0	0.0	0.0	0.0	8.4
1157	526307.43	5055299.99	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	76.9	4.6	3.5	0.0	0.0	0.0	0.0	0.0	7.4
1178	525963.44	5054860.75	2.00	0	DEN	A	59.2	32.8	0.0	0.0	0.0	76.8	4.5	3.6	0.0	0.0	0.0	0.0	0.0	7.2
1185	526018.34	5054970.56	2.00	0	DEN	A	59.2	32.4	0.0	0.0	0.0	76.6	4.5	3.5	0.0	0.0	0.0	0.0	0.0	7.0
1199	525788.64	5055492.72	2.00	0	DEN	A	59.2	28.8	0.0	0.0	0.0	74.0	3.6	2.4	0.0	0.0	0.0	0.0	0.0	7.9
1220	525807.68	5054912.29	2.00	0	DEN	A	59.2	30.9	0.0	0.0	0.0	76.1	4.3	3.4	0.0	0.0	0.0	0.0	0.0	6.4
1248	525621.68	5055623.82	2.00	0	DEN	A	59.2	27.6	0.0	0.0	0.0	72.6	3.2	2.9	0.0	0.0	0.0	0.0	0.0	8.0
1262	525956.71	5055150.96	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	75.8	4.2	3.0	0.0	0.0	0.0	0.0	0.0	6.8
1269	526252.53	5055352.65	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	76.5	4.4	3.4	0.0	0.0	0.0	0.0	0.0	5.5
1283	525845.78	5055137.52	2.00	0	DEN	A	59.2	29.5	0.0	0.0	0.0	75.4	4.1	3.1	0.0	0.0	0.0	0.0	0.0	6.0
1304	526221.15	5055407.56	2.00	0	DEN	A	59.2	30.0	0.0	0.0	0.0	76.3	4.4	3.3	0.0	0.0	0.0	0.0	0.0	5.3
1325	526104.62	5055261.89	2.00	0	DEN	A	59.2	29.1	0.0	0.0	0.0	76.1	4.3	3.1	0.0	0.0	0.0	0.0	0.0	4.7
1333	525790.88	5055696.65	2.00	0	DEN	A	59.2	26.2	0.0	0.0	0.0	73.5	3.5	2.5	0.0	0.0	0.0	0.0	0.0	5.9
1374	525573.50	5055412.04	2.00	0	DEN	A	59.2	23.1	0.0	0.0	0.0	73.2	3.4	-0.5	0.0	0.0	0.0	0.0	0.0	6.2
1386	525830.09	5055679.84	2.00	0	DEN	A	59.2	23.8	0.0	0.0	0.0	73.8	3.6	2.6	0.0	0.0	0.0	0.0	0.0	3.0
1410	526092.29	5055415.40	2.00	0	DEN	A	59.2	24.8	0.0	0.0	0.0	75.7	4.2	3.2	0.0	0.0	0.0	0.0	0.0	0.8
1416	525804.32	5055496.08	2.00	0	DEN	A	59.2	22.8	0.0	0.0	0.0	74.1	3.7	2.8	0.0	0.0	0.0	0.0	0.0	1.5

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1470	525809.93	5055667.52	2.00	0	DEN	A	59.2	16.0	0.0	0.0	0.0	73.7	3.5	-0.7	0.0	0.0	0.0	0.0	0.0	-1.3

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
213	524822.20	5057025.43	2.00	0	D	A	69.0	25.8	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	19.9
213	524822.20	5057025.43	2.00	0	N	A	-34.1	25.8	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-83.2
213	524822.20	5057025.43	2.00	0	E	A	69.0	25.8	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	19.9
215	525090.53	5057296.41	2.00	0	D	A	69.0	25.8	0.0	0.0	0.0	72.8	4.8	1.3	0.0	0.0	0.0	0.0	0.0	15.9
215	525090.53	5057296.41	2.00	0	N	A	-34.1	25.8	0.0	0.0	0.0	72.8	4.8	1.3	0.0	0.0	0.0	0.0	0.0	-87.1
215	525090.53	5057296.41	2.00	0	E	A	69.0	25.8	0.0	0.0	0.0	72.8	4.8	1.3	0.0	0.0	0.0	0.0	0.0	15.9
217	525493.03	5057702.88	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	14.3
217	525493.03	5057702.88	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	-88.7
217	525493.03	5057702.88	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	14.3
224	524434.10	5056590.30	2.00	0	D	A	69.0	20.5	0.0	0.0	0.0	63.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	22.8
224	524434.10	5056590.30	2.00	0	N	A	-34.1	20.5	0.0	0.0	0.0	63.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-80.3
224	524434.10	5056590.30	2.00	0	E	A	69.0	20.5	0.0	0.0	0.0	63.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	22.8
231	524506.66	5056675.91	2.00	0	D	A	69.0	20.5	0.0	0.0	0.0	64.7	2.6	1.1	0.0	0.0	0.0	0.0	0.0	21.1
231	524506.66	5056675.91	2.00	0	N	A	-34.1	20.5	0.0	0.0	0.0	64.7	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-81.9
231	524506.66	5056675.91	2.00	0	E	A	69.0	20.5	0.0	0.0	0.0	64.7	2.6	1.1	0.0	0.0	0.0	0.0	0.0	21.1
237	524615.49	5056804.33	2.00	0	D	A	69.0	23.5	0.0	0.0	0.0	66.7	3.1	1.1	0.0	0.0	0.0	0.0	0.0	21.5
237	524615.49	5056804.33	2.00	0	N	A	-34.1	23.5	0.0	0.0	0.0	66.7	3.1	1.1	0.0	0.0	0.0	0.0	0.0	-81.5
237	524615.49	5056804.33	2.00	0	E	A	69.0	23.5	0.0	0.0	0.0	66.7	3.1	1.1	0.0	0.0	0.0	0.0	0.0	21.5
239	524222.40	5056355.21	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	62.4	2.1	1.0	0.0	0.0	0.0	0.0	0.0	25.8
239	524222.40	5056355.21	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	62.4	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-77.2
239	524222.40	5056355.21	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	62.4	2.1	1.0	0.0	0.0	0.0	0.0	0.0	25.8
245	524339.35	5056483.40	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	62.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	26.1
245	524339.35	5056483.40	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	62.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-76.9
245	524339.35	5056483.40	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	62.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	26.1
280	524132.49	5056024.05	2.00	0	D	A	69.0	22.5	0.0	0.0	0.0	64.2	2.5	1.1	0.0	0.0	0.0	0.0	0.0	23.7
280	524132.49	5056024.05	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	64.2	2.5	1.1	0.0	0.0	0.0	0.0	0.0	-79.3
280	524132.49	5056024.05	2.00	0	E	A	69.0	22.5	0.0	0.0	0.0	64.2	2.5	1.1	0.0	0.0	0.0	0.0	0.0	23.7
287	524153.44	5056202.09	2.00	0	D	A	69.0	22.5	0.0	0.0	0.0	63.1	2.3	1.0	0.0	0.0	0.0	0.0	0.0	25.1
287	524153.44	5056202.09	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	63.1	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-77.9
287	524153.44	5056202.09	2.00	0	E	A	69.0	22.5	0.0	0.0	0.0	63.1	2.3	1.0	0.0	0.0	0.0	0.0	0.0	25.1
356	524250.52	5055693.52	2.00	0	D	A	69.0	22.6	0.0	0.0	0.0	66.4	3.0	1.1	0.0	0.0	0.0	0.0	0.0	21.1
356	524250.52	5055693.52	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	66.4	3.0	1.1	0.0	0.0	0.0	0.0	0.0	-81.9
356	524250.52	5055693.52	2.00	0	E	A	69.0	22.6	0.0	0.0	0.0	66.4	3.0	1.1	0.0	0.0	0.0	0.0	0.0	21.1
514	524164.85	5055854.53	2.00	0	D	A	69.0	22.6	0.0	0.0	0.0	65.3	2.7	1.1	0.0	0.0	0.0	0.0	0.0	22.4
514	524164.85	5055854.53	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	65.3	2.7	1.1	0.0	0.0	0.0	0.0	0.0	-80.6
514	524164.85	5055854.53	2.00	0	E	A	69.0	22.6	0.0	0.0	0.0	65.3	2.7	1.1	0.0	0.0	0.0	0.0	0.0	22.4
639	524400.73	5055517.25	2.00	0	D	A	69.0	24.6	0.0	0.0	0.0	67.8	3.3	1.2	0.0	0.0	0.0	0.0	0.0	21.2
639	524400.73	5055517.25	2.00	0	N	A	-34.1	24.6	0.0	0.0	0.0	67.8	3.3	1.2	0.0	0.0	0.0	0.0	0.0	-81.8
639	524400.73	5055517.25	2.00	0	E	A	69.0	24.6	0.0	0.0	0.0	67.8	3.3	1.2	0.0	0.0	0.0	0.0	0.0	21.2
665	524624.63	5055303.68	2.00	0	D	A	69.0	25.2	0.0	0.0	0.0	70.0	3.9	1.2	0.0	0.0	0.0	0.0	0.0	19.0
665	524624.63	5055303.68	2.00	0	N	A	-34.1	25.2	0.0	0.0	0.0	70.0	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-84.0
665	524624.63	5055303.68	2.00	0	E	A	69.0	25.2	0.0	0.0	0.0	70.0	3.9	1.2	0.0	0.0	0.0	0.0	0.0	19.0
786	525342.09	5055645.00	2.00	0	D	A	69.0	24.7	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	17.7
786	525342.09	5055645.00	2.00	0	N	A	-34.1	24.7	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-85.3
786	525342.09	5055645.00	2.00	0	E	A	69.0	24.7	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	17.7
793	526221.43	5055451.28	2.00	0	D	A	69.0	29.0	0.0	0.0	0.0	76.2	6.2	1.0	0.0	0.0	0.0	0.0	0.0	14.6
793	526221.43	5055451.28	2.00	0	N	A	-34.1	29.0	0.0	0.0	0.0	76.2	6.2	1.0	0.0	0.0	0.0	0.0	0.0	-88.4
793	526221.43	5055451.28	2.00	0	E	A	69.0	29.0	0.0	0.0	0.0	76.2	6.2	1.0	0.0	0.0	0.0	0.0	0.0	14.6
826	524989.48	5055425.89	2.00	0	D	A	69.0	23.9	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	17.8
826	524989.48	5055425.89	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-85.2
826	524989.48	5055425.89	2.00	0	E	A	69.0	23.9	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	17.8
940	525665.68	5055700.14	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	72.7	4.8	1.1	0.0	0.0	0.0	0.0	0.0	15.9
940	525665.68	5055700.14	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	72.7	4.8	1.1	0.0	0.0	0.0	0.0	0.0	-87.1
940	525665.68	5055700.14	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	72.7	4.8	1.1	0.0	0.0	0.0	0.0	0.0	15.9
969	525119.36	5055578.25	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	69.4	3.8	1.2	0.0	0.0	0.0	0.0	0.0	16.9
969	525119.36	5055578.25	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	69.4	3.8	1.2	0.0	0.0	0.0	0.0	0.0	-86.1
969	525119.36	5055578.25	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	69.4	3.8	1.2	0.0	0.0	0.0	0.0	0.0	16.9
1018	524964.31	5055214.69	2.00	0	D	A	69.0	23.2	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	14.9

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																			
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1018	524964.31	5055214.69	2.00	0	N	A	-34.1	23.2	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	-88.1
1018	524964.31	5055214.69	2.00	0	E	A	69.0	23.2	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	14.9
1032	524789.13	5055078.59	2.00	0	D	A	69.0	23.7	0.0	0.0	0.0	72.1	4.6	1.3	0.0	0.0	0.0	0.0	0.0	14.6
1032	524789.13	5055078.59	2.00	0	N	A	-34.1	23.7	0.0	0.0	0.0	72.1	4.6	1.3	0.0	0.0	0.0	0.0	0.0	-88.4
1032	524789.13	5055078.59	2.00	0	E	A	69.0	23.7	0.0	0.0	0.0	72.1	4.6	1.3	0.0	0.0	0.0	0.0	0.0	14.6
1142	524899.01	5055034.30	2.00	0	D	A	69.0	22.5	0.0	0.0	0.0	72.7	4.8	1.3	0.0	0.0	0.0	0.0	0.0	12.7
1142	524899.01	5055034.30	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	72.7	4.8	1.3	0.0	0.0	0.0	0.0	0.0	-90.3
1142	524899.01	5055034.30	2.00	0	E	A	69.0	22.5	0.0	0.0	0.0	72.7	4.8	1.3	0.0	0.0	0.0	0.0	0.0	12.7
1297	525846.70	5055663.19	2.00	0	D	A	69.0	21.2	0.0	0.0	0.0	73.9	5.2	-0.3	0.0	0.0	0.0	0.0	0.0	11.4
1297	525846.70	5055663.19	2.00	0	N	A	-34.1	21.2	0.0	0.0	0.0	73.9	5.2	-0.3	0.0	0.0	0.0	0.0	0.0	-91.6
1297	525846.70	5055663.19	2.00	0	E	A	69.0	21.2	0.0	0.0	0.0	73.9	5.2	-0.3	0.0	0.0	0.0	0.0	0.0	11.4
1392	524977.05	5055106.24	2.00	0	D	A	69.0	15.7	0.0	0.0	0.0	72.3	4.7	1.3	0.0	0.0	0.0	0.0	0.0	6.3
1392	524977.05	5055106.24	2.00	0	N	A	-34.1	15.7	0.0	0.0	0.0	72.3	4.7	1.3	0.0	0.0	0.0	0.0	0.0	-96.7
1392	524977.05	5055106.24	2.00	0	E	A	69.0	15.7	0.0	0.0	0.0	72.3	4.7	1.3	0.0	0.0	0.0	0.0	0.0	6.3

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
259	525527.68	5055841.75	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	71.3	3.4	0.3	0.0	0.0	0.0	0.0	0.0	28.5
259	525527.68	5055841.75	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	71.3	3.4	0.3	0.0	0.0	0.0	0.0	0.0	-159.5
259	525527.68	5055841.75	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	71.3	3.4	0.3	0.0	0.0	0.0	0.0	0.0	28.5

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
348	524988.11	5055422.27	2.00	0	D	A	75.0	23.9	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	23.8
348	524988.11	5055422.27	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-85.2
348	524988.11	5055422.27	2.00	0	E	A	75.0	23.9	0.0	0.0	0.0	69.9	3.9	1.2	0.0	0.0	0.0	0.0	0.0	23.8
568	525121.99	5055577.58	2.00	0	D	A	75.0	22.6	0.0	0.0	0.0	69.5	3.8	1.2	0.0	0.0	0.0	0.0	0.0	23.1
568	525121.99	5055577.58	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	69.5	3.8	1.2	0.0	0.0	0.0	0.0	0.0	-85.9
568	525121.99	5055577.58	2.00	0	E	A	75.0	22.6	0.0	0.0	0.0	69.5	3.8	1.2	0.0	0.0	0.0	0.0	0.0	23.1
603	524962.94	5055213.12	2.00	0	D	A	75.0	23.1	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	20.9
603	524962.94	5055213.12	2.00	0	N	A	-34.1	23.1	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	-88.2
603	524962.94	5055213.12	2.00	0	E	A	75.0	23.1	0.0	0.0	0.0	71.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	20.9
605	525537.35	5055679.08	2.00	0	D	A	75.0	23.6	0.0	0.0	0.0	71.9	4.5	1.3	0.0	0.0	0.0	0.0	0.0	20.8
605	525537.35	5055679.08	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	71.9	4.5	1.3	0.0	0.0	0.0	0.0	0.0	-88.2
605	525537.35	5055679.08	2.00	0	E	A	75.0	23.6	0.0	0.0	0.0	71.9	4.5	1.3	0.0	0.0	0.0	0.0	0.0	20.8
637	524862.27	5054828.51	2.00	0	D	A	75.0	24.6	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	19.0
637	524862.27	5054828.51	2.00	0	N	A	-34.1	24.6	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	-90.0
637	524862.27	5054828.51	2.00	0	E	A	75.0	24.6	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	19.0
656	525254.39	5055625.82	2.00	0	D	A	75.0	20.3	0.0	0.0	0.0	70.1	3.9	1.2	0.0	0.0	0.0	0.0	0.0	20.0
656	525254.39	5055625.82	2.00	0	N	A	-34.1	20.3	0.0	0.0	0.0	70.1	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-89.0
656	525254.39	5055625.82	2.00	0	E	A	75.0	20.3	0.0	0.0	0.0	70.1	3.9	1.2	0.0	0.0	0.0	0.0	0.0	20.0
672	525366.60	5055646.19	2.00	0	D	A	75.0	20.8	0.0	0.0	0.0	70.8	4.2	1.3	0.0	0.0	0.0	0.0	0.0	19.6
672	525366.60	5055646.19	2.00	0	N	A	-34.1	20.8	0.0	0.0	0.0	70.8	4.2	1.3	0.0	0.0	0.0	0.0	0.0	-89.5
672	525366.60	5055646.19	2.00	0	E	A	75.0	20.8	0.0	0.0	0.0	70.8	4.2	1.3	0.0	0.0	0.0	0.0	0.0	19.6
685	524896.20	5055033.09	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	72.7	4.8	1.3	0.0	0.0	0.0	0.0	0.0	18.8
685	524896.20	5055033.09	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	72.7	4.8	1.3	0.0	0.0	0.0	0.0	0.0	-90.3
685	524896.20	5055033.09	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	72.7	4.8	1.3	0.0	0.0	0.0	0.0	0.0	18.8
692	525740.64	5055713.13	2.00	0	D	A	75.0	22.7	0.0	0.0	0.0	73.1	4.9	0.9	0.0	0.0	0.0	0.0	0.0	18.6
692	525740.64	5055713.13	2.00	0	N	A	-34.1	22.7	0.0	0.0	0.0	73.1	4.9	0.9	0.0	0.0	0.0	0.0	0.0	-90.4
692	525740.64	5055713.13	2.00	0	E	A	75.0	22.7	0.0	0.0	0.0	73.1	4.9	0.9	0.0	0.0	0.0	0.0	0.0	18.6
795	525094.55	5054376.87	2.00	0	D	A	75.0	24.8	0.0	0.0	0.0	76.6	6.3	1.4	0.0	0.0	0.0	0.0	0.0	15.5
795	525094.55	5054376.87	2.00	0	N	A	-34.1	24.8	0.0	0.0	0.0	76.6	6.3	1.4	0.0	0.0	0.0	0.0	0.0	-93.5
795	525094.55	5054376.87	2.00	0	E	A	75.0	24.8	0.0	0.0	0.0	76.6	6.3	1.4	0.0	0.0	0.0	0.0	0.0	15.5
933	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	74.6	5.5	1.2	0.0	0.0	0.0	0.0	0.0	16.2
933	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	74.6	5.5	1.2	0.0	0.0	0.0	0.0	0.0	-92.8
933	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	74.6	5.5	1.2	0.0	0.0	0.0	0.0	0.0	16.2
963	525898.74	5055726.86	2.00	0	D	A	75.0	21.3	0.0	0.0	0.0	74.1	5.3	0.9	0.0	0.0	0.0	0.0	0.0	16.0
963	525898.74	5055726.86	2.00	0	N	A	-34.1	21.3	0.0	0.0	0.0	74.1	5.3	0.9	0.0	0.0	0.0	0.0	0.0	-93.0
963	525898.74	5055726.86	2.00	0	E	A	75.0	21.3	0.0	0.0	0.0	74.1	5.3	0.9	0.0	0.0	0.0	0.0	0.0	16.0
990	524945.20	5054551.24	2.00	0	D	A	75.0	22.0	0.0	0.0	0.0	75.6	5.9	1.4	0.0	0.0	0.0	0.0	0.0	14.1
990	524945.20	5054551.24	2.00	0	N	A	-34.1	22.0	0.0	0.0	0.0	75.6	5.9	1.4	0.0	0.0	0.0	0.0	0.0	-94.9

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
990	524945.20	5054551.24	2.00	0	E	A	75.0	22.0	0.0	0.0	0.0	75.6	5.9	1.4	0.0	0.0	0.0	0.0	0.0	14.1
1052	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	75.7	5.9	-1.5	0.0	0.0	0.0	0.0	0.0	16.4
1052	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	75.7	5.9	-1.5	0.0	0.0	0.0	0.0	0.0	-92.6
1052	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	75.7	5.9	-1.5	0.0	0.0	0.0	0.0	0.0	16.4
1065	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	75.0	5.7	1.4	0.0	0.0	0.0	0.0	0.0	13.4
1065	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	75.0	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-95.6
1065	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	75.0	5.7	1.4	0.0	0.0	0.0	0.0	0.0	13.4
1100	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	76.7	6.4	1.3	0.0	0.0	0.0	0.0	0.0	12.2
1100	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	76.7	6.4	1.3	0.0	0.0	0.0	0.0	0.0	-96.8
1100	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	76.7	6.4	1.3	0.0	0.0	0.0	0.0	0.0	12.2
1107	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	76.2	6.1	1.2	0.0	0.0	0.0	0.0	0.0	12.3
1107	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	76.2	6.1	1.2	0.0	0.0	0.0	0.0	0.0	-96.8
1107	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	76.2	6.1	1.2	0.0	0.0	0.0	0.0	0.0	12.3
1164	524897.33	5054653.52	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	75.0	5.6	1.4	0.0	0.0	0.0	0.0	0.0	11.5
1164	524897.33	5054653.52	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	75.0	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-97.5
1164	524897.33	5054653.52	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	75.0	5.6	1.4	0.0	0.0	0.0	0.0	0.0	11.5
1171	524975.80	5055106.32	2.00	0	D	A	75.0	15.9	0.0	0.0	0.0	72.3	4.7	1.3	0.0	0.0	0.0	0.0	0.0	12.5
1171	524975.80	5055106.32	2.00	0	N	A	-34.1	15.9	0.0	0.0	0.0	72.3	4.7	1.3	0.0	0.0	0.0	0.0	0.0	-96.5
1171	524975.80	5055106.32	2.00	0	E	A	75.0	15.9	0.0	0.0	0.0	72.3	4.7	1.3	0.0	0.0	0.0	0.0	0.0	12.5

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
763	526527.13	5056356.58	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	76.9	4.6	0.9	0.0	0.0	0.0	0.0	0.0	15.8
1093	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	76.8	4.5	0.6	0.0	0.0	0.0	0.0	0.0	11.8
1234	526450.98	5056597.76	2.00	0	DEN	A	52.3	38.8	0.0	0.0	0.0	76.7	4.5	-0.0	0.0	0.0	0.0	0.0	0.0	9.9
1255	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	76.7	4.5	0.4	0.0	0.0	0.0	0.0	0.0	9.2
1341	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	77.0	4.6	-0.3	0.0	0.0	0.0	0.0	0.0	7.7
1357	526434.74	5056637.96	2.00	0	DEN	A	52.3	34.9	0.0	0.0	0.0	76.7	4.5	0.4	0.0	0.0	0.0	0.0	0.0	5.6
1369	526483.47	5056564.08	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	76.9	4.5	-0.1	0.0	0.0	0.0	0.0	0.0	6.0
1398	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	76.5	4.4	2.8	0.0	0.0	0.0	0.0	0.0	1.8
1422	526507.84	5056218.61	2.00	0	DEN	A	52.3	32.5	0.0	0.0	0.0	76.8	4.5	1.6	0.0	0.0	0.0	0.0	0.0	1.8
1428	526443.87	5056660.77	2.00	0	DEN	A	52.3	31.7	0.0	0.0	0.0	76.8	4.5	0.8	0.0	0.0	0.0	0.0	0.0	1.9
1434	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	76.8	4.5	2.1	0.0	0.0	0.0	0.0	0.0	-0.1
1440	526407.32	5056556.48	2.00	0	DEN	A	52.3	30.4	0.0	0.0	0.0	76.5	4.4	3.2	0.0	0.0	0.0	0.0	0.0	-1.5
1446	526508.85	5056621.66	2.00	0	DEN	A	52.3	30.1	0.0	0.0	0.0	77.0	4.6	-0.1	0.0	0.0	0.0	0.0	0.0	0.8
1452	526467.22	5056405.47	2.00	0	DEN	A	52.3	29.0	0.0	0.0	0.0	76.7	4.5	3.4	0.0	0.0	0.0	0.0	0.0	-3.3
1458	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.7	4.5	3.4	0.0	0.0	0.0	0.0	0.0	-4.9
1476	526381.94	5056629.27	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	76.5	4.4	3.4	0.0	0.0	0.0	0.0	0.0	-6.4
1482	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	76.6	4.5	3.5	0.0	0.0	0.0	0.0	0.0	-7.0
1488	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	76.7	4.5	3.5	0.0	0.0	0.0	0.0	0.0	-15.1

Receiver
Name: (untitled)
ID: POR4
X: 525251.65 m
Y: 5057183.92 m
Z: 4.50 m

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
14	524755.12	5056957.69	2.00	0	D	A	69.0	22.8	0.0	0.0	0.0	65.7	2.8	1.1	0.0	0.0	0.0	0.0	0.0	22.1
14	524755.12	5056957.69	2.00	0	N	A	-34.1	22.8	0.0	0.0	0.0	65.7	2.8	1.1	0.0	0.0	0.0	0.0	0.0	-80.9
14	524755.12	5056957.69	2.00	0	E	A	69.0	22.8	0.0	0.0	0.0	65.7	2.8	1.1	0.0	0.0	0.0	0.0	0.0	22.1
21	524855.74	5057059.30	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	63.4	2.3	1.0	0.0	0.0	0.0	0.0	0.0	22.0
21	524855.74	5057059.30	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	63.4	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-81.0
21	524855.74	5057059.30	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	63.4	2.3	1.0	0.0	0.0	0.0	0.0	0.0	22.0
28	524922.83	5057127.05	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	61.5	2.0	1.0	0.0	0.0	0.0	0.0	0.0	24.3
28	524922.83	5057127.05	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	61.5	2.0	1.0	0.0	0.0	0.0	0.0	0.0	-78.7
28	524922.83	5057127.05	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	61.5	2.0	1.0	0.0	0.0	0.0	0.0	0.0	24.3
35	524989.91	5057194.79	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	59.4	1.7	1.0	0.0	0.0	0.0	0.0	0.0	26.7
35	524989.91	5057194.79	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	59.4	1.7	1.0	0.0	0.0	0.0	0.0	0.0	-76.3
35	524989.91	5057194.79	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	59.4	1.7	1.0	0.0	0.0	0.0	0.0	0.0	26.7
42	525056.99	5057262.54	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	57.4	1.4	0.9	0.0	0.0	0.0	0.0	0.0	29.0
42	525056.99	5057262.54	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	57.4	1.4	0.9	0.0	0.0	0.0	0.0	0.0	-74.1
42	525056.99	5057262.54	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	57.4	1.4	0.9	0.0	0.0	0.0	0.0	0.0	29.0
49	525124.07	5057330.28	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	56.8	1.3	0.9	0.0	0.0	0.0	0.0	0.0	29.7
49	525124.07	5057330.28	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	56.8	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-73.3
49	525124.07	5057330.28	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	56.8	1.3	0.9	0.0	0.0	0.0	0.0	0.0	29.7
57	525191.16	5057398.03	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	57.9	1.5	0.9	0.0	0.0	0.0	0.0	0.0	28.4
57	525191.16	5057398.03	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	57.9	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-74.6
57	525191.16	5057398.03	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	57.9	1.5	0.9	0.0	0.0	0.0	0.0	0.0	28.4
59	525258.24	5057465.77	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	60.0	1.8	1.0	0.0	0.0	0.0	0.0	0.0	26.0
59	525258.24	5057465.77	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	60.0	1.8	1.0	0.0	0.0	0.0	0.0	0.0	-77.0
59	525258.24	5057465.77	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	60.0	1.8	1.0	0.0	0.0	0.0	0.0	0.0	26.0
67	525325.32	5057533.51	2.00	0	D	A	69.0	19.8	0.0	0.0	0.0	62.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	23.6
67	525325.32	5057533.51	2.00	0	N	A	-34.1	19.8	0.0	0.0	0.0	62.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-79.4
67	525325.32	5057533.51	2.00	0	E	A	69.0	19.8	0.0	0.0	0.0	62.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	23.6
68	525425.95	5057635.13	2.00	0	D	A	69.0	22.8	0.0	0.0	0.0	64.7	2.6	1.1	0.0	0.0	0.0	0.0	0.0	23.4
68	525425.95	5057635.13	2.00	0	N	A	-34.1	22.8	0.0	0.0	0.0	64.7	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-79.6
68	525425.95	5057635.13	2.00	0	E	A	69.0	22.8	0.0	0.0	0.0	64.7	2.6	1.1	0.0	0.0	0.0	0.0	0.0	23.4
69	525560.11	5057770.62	2.00	0	D	A	69.0	22.8	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	20.0
69	525560.11	5057770.62	2.00	0	N	A	-34.1	22.8	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	-83.1
69	525560.11	5057770.62	2.00	0	E	A	69.0	22.8	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	20.0
70	525694.28	5057906.11	2.00	0	D	A	69.0	22.8	0.0	0.0	0.0	69.6	3.8	1.2	0.0	0.0	0.0	0.0	0.0	17.2
70	525694.28	5057906.11	2.00	0	N	A	-34.1	22.8	0.0	0.0	0.0	69.6	3.8	1.2	0.0	0.0	0.0	0.0	0.0	-85.8
70	525694.28	5057906.11	2.00	0	E	A	69.0	22.8	0.0	0.0	0.0	69.6	3.8	1.2	0.0	0.0	0.0	0.0	0.0	17.2
101	524470.38	5056633.10	2.00	0	D	A	69.0	23.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	16.5
101	524470.38	5056633.10	2.00	0	N	A	-34.1	23.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-86.5
101	524470.38	5056633.10	2.00	0	E	A	69.0	23.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	16.5
102	524615.49	5056804.33	2.00	0	D	A	69.0	23.5	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	19.4
102	524615.49	5056804.33	2.00	0	N	A	-34.1	23.5	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	-83.6
102	524615.49	5056804.33	2.00	0	E	A	69.0	23.5	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	19.4
106	526066.72	5057807.44	2.00	0	D	A	69.0	26.6	0.0	0.0	0.0	71.2	4.3	1.3	0.0	0.0	0.0	0.0	0.0	18.8
106	526066.72	5057807.44	2.00	0	N	A	-34.1	26.6	0.0	0.0	0.0	71.2	4.3	1.3	0.0	0.0	0.0	0.0	0.0	-84.2
106	526066.72	5057807.44	2.00	0	E	A	69.0	26.6	0.0	0.0	0.0	71.2	4.3	1.3	0.0	0.0	0.0	0.0	0.0	18.8
107	526470.16	5057587.94	2.00	0	D	A	69.0	26.6	0.0	0.0	0.0	73.2	5.0	1.3	0.0	0.0	0.0	0.0	0.0	16.1
107	526470.16	5057587.94	2.00	0	N	A	-34.1	26.6	0.0	0.0	0.0	73.2	5.0	1.3	0.0	0.0	0.0	0.0	0.0	-86.9
107	526470.16	5057587.94	2.00	0	E	A	69.0	26.6	0.0	0.0	0.0	73.2	5.0	1.3	0.0	0.0	0.0	0.0	0.0	16.1
140	524280.87	5056419.30	2.00	0	D	A	69.0	25.4	0.0	0.0	0.0	72.8	4.8	1.3	0.0	0.0	0.0	0.0	0.0	15.4
140	524280.87	5056419.30	2.00	0	N	A	-34.1	25.4	0.0	0.0	0.0	72.8	4.8	1.3	0.0	0.0	0.0	0.0	0.0	-87.7
140	524280.87	5056419.30	2.00	0	E	A	69.0	25.4	0.0	0.0	0.0	72.8	4.8	1.3	0.0	0.0	0.0	0.0	0.0	15.4
146	526221.43	5055451.28	2.00	0	D	A	69.0	29.0	0.0	0.0	0.0	77.0	6.5	0.9	0.0	0.0	0.0	0.0	0.0	13.6
146	526221.43	5055451.28	2.00	0	N	A	-34.1	29.0	0.0	0.0	0.0	77.0	6.5	0.9	0.0	0.0	0.0	0.0	0.0	-89.4

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
146	526221.43	5055451.28	2.00	0	E	A	69.0	29.0	0.0	0.0	0.0	77.0	6.5	0.9	0.0	0.0	0.0	0.0	0.0	13.6
166	524142.97	5056113.07	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	12.8
166	524142.97	5056113.07	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-90.2
166	524142.97	5056113.07	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	12.8
171	527262.17	5057360.86	2.00	0	D	A	69.0	27.1	0.0	0.0	0.0	77.1	6.6	1.4	0.0	0.0	0.0	0.0	0.0	11.0
171	527262.17	5057360.86	2.00	0	N	A	-34.1	27.1	0.0	0.0	0.0	77.1	6.6	1.4	0.0	0.0	0.0	0.0	0.0	-92.1
171	527262.17	5057360.86	2.00	0	E	A	69.0	27.1	0.0	0.0	0.0	77.1	6.6	1.4	0.0	0.0	0.0	0.0	0.0	11.0
176	525665.68	5055700.14	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	74.8	5.6	0.4	0.0	0.0	0.0	0.0	0.0	13.8
176	525665.68	5055700.14	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	74.8	5.6	0.4	0.0	0.0	0.0	0.0	0.0	-89.2
176	525665.68	5055700.14	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	74.8	5.6	0.4	0.0	0.0	0.0	0.0	0.0	13.8
183	525813.18	5057945.52	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	70.5	4.1	1.3	0.0	0.0	0.0	0.0	0.0	13.8
183	525813.18	5057945.52	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	70.5	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-89.2
183	525813.18	5057945.52	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	70.5	4.1	1.3	0.0	0.0	0.0	0.0	0.0	13.8
191	524207.68	5055774.03	2.00	0	D	A	69.0	25.6	0.0	0.0	0.0	75.9	6.0	1.4	0.0	0.0	0.0	0.0	0.0	11.3
191	524207.68	5055774.03	2.00	0	N	A	-34.1	25.6	0.0	0.0	0.0	75.9	6.0	1.4	0.0	0.0	0.0	0.0	0.0	-91.7
191	524207.68	5055774.03	2.00	0	E	A	69.0	25.6	0.0	0.0	0.0	75.9	6.0	1.4	0.0	0.0	0.0	0.0	0.0	11.3
198	525342.09	5055645.00	2.00	0	D	A	69.0	24.7	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	12.0
198	525342.09	5055645.00	2.00	0	N	A	-34.1	24.7	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-91.0
198	525342.09	5055645.00	2.00	0	E	A	69.0	24.7	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	12.0
232	524624.63	5055303.68	2.00	0	D	A	69.0	25.2	0.0	0.0	0.0	76.9	6.5	1.4	0.0	0.0	0.0	0.0	0.0	9.3
232	524624.63	5055303.68	2.00	0	N	A	-34.1	25.2	0.0	0.0	0.0	76.9	6.5	1.4	0.0	0.0	0.0	0.0	0.0	-93.7
232	524624.63	5055303.68	2.00	0	E	A	69.0	25.2	0.0	0.0	0.0	76.9	6.5	1.4	0.0	0.0	0.0	0.0	0.0	9.3
238	524989.48	5055425.89	2.00	0	D	A	69.0	23.9	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	9.4
238	524989.48	5055425.89	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	-93.6
238	524989.48	5055425.89	2.00	0	E	A	69.0	23.9	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	9.4
262	524400.73	5055517.25	2.00	0	D	A	69.0	24.6	0.0	0.0	0.0	76.4	6.3	1.4	0.0	0.0	0.0	0.0	0.0	9.4
262	524400.73	5055517.25	2.00	0	N	A	-34.1	24.6	0.0	0.0	0.0	76.4	6.3	1.4	0.0	0.0	0.0	0.0	0.0	-93.6
262	524400.73	5055517.25	2.00	0	E	A	69.0	24.6	0.0	0.0	0.0	76.4	6.3	1.4	0.0	0.0	0.0	0.0	0.0	9.4
301	525119.36	5055578.25	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	9.1
301	525119.36	5055578.25	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-93.9
301	525119.36	5055578.25	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	9.1
352	526821.31	5057447.55	2.00	0	D	A	69.0	21.7	0.0	0.0	0.0	75.0	5.7	1.4	0.0	0.0	0.0	0.0	0.0	8.5
352	526821.31	5057447.55	2.00	0	N	A	-34.1	21.7	0.0	0.0	0.0	75.0	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-94.5
352	526821.31	5057447.55	2.00	0	E	A	69.0	21.7	0.0	0.0	0.0	75.0	5.7	1.4	0.0	0.0	0.0	0.0	0.0	8.5
524	524964.31	5055214.69	2.00	0	D	A	69.0	23.2	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	7.2
524	524964.31	5055214.69	2.00	0	N	A	-34.1	23.2	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	-95.8
524	524964.31	5055214.69	2.00	0	E	A	69.0	23.2	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	7.2
551	525846.70	5055663.19	2.00	0	D	A	69.0	21.2	0.0	0.0	0.0	75.3	5.8	1.4	0.0	0.0	0.0	0.0	0.0	7.8
551	525846.70	5055663.19	2.00	0	N	A	-34.1	21.2	0.0	0.0	0.0	75.3	5.8	1.4	0.0	0.0	0.0	0.0	0.0	-95.2
551	525846.70	5055663.19	2.00	0	E	A	69.0	21.2	0.0	0.0	0.0	75.3	5.8	1.4	0.0	0.0	0.0	0.0	0.0	7.8
558	526952.60	5057423.37	2.00	0	D	A	69.0	21.1	0.0	0.0	0.0	75.7	5.9	1.4	0.0	0.0	0.0	0.0	0.0	7.1
558	526952.60	5057423.37	2.00	0	N	A	-34.1	21.1	0.0	0.0	0.0	75.7	5.9	1.4	0.0	0.0	0.0	0.0	0.0	-96.0
558	526952.60	5057423.37	2.00	0	E	A	69.0	21.1	0.0	0.0	0.0	75.7	5.9	1.4	0.0	0.0	0.0	0.0	0.0	7.1
600	526709.92	5057460.27	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	74.4	5.4	1.4	0.0	0.0	0.0	0.0	0.0	7.0
600	526709.92	5057460.27	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	74.4	5.4	1.4	0.0	0.0	0.0	0.0	0.0	-96.0
600	526709.92	5057460.27	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	74.4	5.4	1.4	0.0	0.0	0.0	0.0	0.0	7.0

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
71	525591.21	5055845.98	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	73.8	4.7	-0.6	0.0	0.0	0.0	0.0	0.0	36.3
71	525591.21	5055845.98	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	73.8	4.7	-0.6	0.0	0.0	0.0	0.0	0.0	-151.7
71	525591.21	5055845.98	3.00	0	E	A	114.2	0.0	-188.0	0.0	0.0	73.8	4.7	-0.6	0.0	0.0	0.0	0.0	0.0	-151.7

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
72	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	73.2	3.4	1.5	0.0	0.0	0.0	0.0	0.0	27.9
76	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	73.5	3.5	3.0	0.0	0.0	0.0	0.0	0.0	23.4
77	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	72.7	3.3	2.9	0.0	0.0	0.0	0.0	0.0	23.2
80	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	73.8	3.6	3.0	0.0	0.0	0.0	0.0	0.0	21.5
82	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	73.3	3.4	0.7	0.0	0.0	0.0	0.0	0.0	23.5
86	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	74.2	3.7	3.1	0.0	0.0	0.0	0.0	0.0	19.1

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
87	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	73.7	3.5	-0.4	0.0	0.0	0.0	0.0	0.0	23.1
94	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	72.9	3.3	2.9	0.0	0.0	0.0	0.0	0.0	19.2
95	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	73.3	3.4	3.0	0.0	0.0	0.0	0.0	0.0	18.8
99	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	73.9	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	21.5
100	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	73.9	3.6	3.1	0.0	0.0	0.0	0.0	0.0	18.0
110	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	73.4	3.5	3.0	0.0	0.0	0.0	0.0	0.0	17.7
111	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	74.3	3.7	3.1	0.0	0.0	0.0	0.0	0.0	16.8
114	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	73.9	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	20.2
115	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	72.9	3.3	2.9	0.0	0.0	0.0	0.0	0.0	16.5
116	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	73.4	3.5	-0.4	0.0	0.0	0.0	0.0	0.0	19.1
117	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	74.2	3.7	3.1	0.0	0.0	0.0	0.0	0.0	15.6
119	526011.21	5056249.85	2.00	0	DEN	A	62.6	32.3	0.0	0.0	0.0	72.6	3.2	2.9	0.0	0.0	0.0	0.0	0.0	16.2
123	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	15.7
125	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	73.9	3.6	3.1	0.0	0.0	0.0	0.0	0.0	15.3
126	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	73.3	3.4	3.0	0.0	0.0	0.0	0.0	0.0	15.3
129	525743.96	5056017.73	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	73.0	3.4	2.9	0.0	0.0	0.0	0.0	0.0	14.7
130	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	73.5	3.5	3.0	0.0	0.0	0.0	0.0	0.0	14.1
137	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	73.8	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	16.2
138	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	74.3	3.7	2.8	0.0	0.0	0.0	0.0	0.0	12.7
149	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	11.9
165	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	73.5	3.5	3.0	0.0	0.0	0.0	0.0	0.0	10.4
168	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	73.2	3.4	2.3	0.0	0.0	0.0	0.0	0.0	10.8
172	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	73.8	3.6	3.0	0.0	0.0	0.0	0.0	0.0	9.6
178	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	74.4	3.7	3.1	0.0	0.0	0.0	0.0	0.0	9.0
180	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	72.7	3.3	2.9	0.0	0.0	0.0	0.0	0.0	9.4
212	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	74.2	3.7	3.1	0.0	0.0	0.0	0.0	0.0	7.9
214	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	72.8	3.3	2.9	0.0	0.0	0.0	0.0	0.0	8.4
216	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	72.8	3.3	2.9	0.0	0.0	0.0	0.0	0.0	8.1
240	526224.65	5056060.42	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	74.4	3.8	3.1	0.0	0.0	0.0	0.0	0.0	6.8
283	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	72.8	3.3	2.9	0.0	0.0	0.0	0.0	0.0	7.2
299	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	74.4	3.8	2.7	0.0	0.0	0.0	0.0	0.0	6.4
629	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	72.9	3.3	2.4	0.0	0.0	0.0	0.0	0.0	2.8

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
73	526722.57	5056549.42	2.00	0	DEN	A	52.3	50.8	0.0	0.0	0.0	75.1	4.0	-0.6	0.0	0.0	0.0	0.0	0.0	24.6
74	526727.64	5056218.07	2.00	0	DEN	A	52.3	50.8	0.0	0.0	0.0	75.9	4.2	-0.5	0.0	0.0	0.0	0.0	0.0	23.5
83	527436.76	5056170.95	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	78.6	5.2	-1.1	0.0	0.0	0.0	0.0	0.0	15.6
84	527013.61	5056020.54	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	77.5	4.8	-0.8	0.0	0.0	0.0	0.0	0.0	16.8
85	527685.64	5056177.11	2.00	0	DEN	A	52.3	48.9	0.0	0.0	0.0	79.4	5.5	-0.8	0.0	0.0	0.0	0.0	0.0	17.1
92	527024.01	5056113.38	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	77.3	4.7	-0.9	0.0	0.0	0.0	0.0	0.0	17.7
93	527447.17	5056263.79	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	78.5	5.1	-0.7	0.0	0.0	0.0	0.0	0.0	15.9
105	526773.84	5056745.51	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	75.0	3.9	-0.6	0.0	0.0	0.0	0.0	0.0	19.8
108	526530.17	5056228.39	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	75.1	4.0	0.9	0.0	0.0	0.0	0.0	0.0	15.3
109	526524.08	5056484.78	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	74.2	3.7	-0.4	0.0	0.0	0.0	0.0	0.0	17.7
112	527546.77	5056045.17	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	79.2	5.4	-1.1	0.0	0.0	0.0	0.0	0.0	14.0
113	527086.31	5055963.80	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	77.9	4.9	-0.9	0.0	0.0	0.0	0.0	0.0	15.6
120	527020.82	5055900.10	2.00	0	DEN	A	52.3	46.3	0.0	0.0	0.0	77.8	4.9	-0.7	0.0	0.0	0.0	0.0	0.0	16.7
128	526827.92	5055821.88	2.00	0	DEN	A	52.3	45.4	0.0	0.0	0.0	77.4	4.7	-0.6	0.0	0.0	0.0	0.0	0.0	16.2
132	526915.98	5056188.19	2.00	0	DEN	A	52.3	44.3	0.0	0.0	0.0	76.8	4.5	-0.8	0.0	0.0	0.0	0.0	0.0	16.1
133	526707.85	5056917.16	2.00	0	DEN	A	52.3	41.3	0.0	0.0	0.0	74.4	3.8	-0.5	0.0	0.0	0.0	0.0	0.0	16.0
136	527014.48	5056172.88	2.00	0	DEN	A	52.3	43.9	0.0	0.0	0.0	77.2	4.7	-0.9	0.0	0.0	0.0	0.0	0.0	15.3
144	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	75.4	4.1	0.3	0.0	0.0	0.0	0.0	0.0	13.9
145	526646.93	5056896.52	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.1	3.7	-0.4	0.0	0.0	0.0	0.0	0.0	14.8
153	526450.98	5056597.76	2.00	0	DEN	A	52.3	38.8	0.0	0.0	0.0	73.5	3.5	-0.2	0.0	0.0	0.0	0.0	0.0	14.3
170	526691.60	5055797.09	2.00	0	DEN	A	52.3	40.8	0.0	0.0	0.0	77.0	4.6	-0.5	0.0	0.0	0.0	0.0	0.0	12.0
173	526959.64	5056175.16	2.00	0	DEN	A	52.3	40.3	0.0	0.0	0.0	76.9	4.6	-0.8	0.0	0.0	0.0	0.0	0.0	12.0
174	526817.50	5056618.40	2.00	0	DEN	A	52.3	37.5	0.0	0.0	0.0	75.4	4.1	-0.5	0.0	0.0	0.0	0.0	0.0	10.9
179	526904.81	5056675.98	2.00	0	DEN	A	52.3	38.9	0.0	0.0	0.0	75.8	4.2	-0.6	0.0	0.0	0.0	0.0	0.0	11.9
182	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	75.7	4.2	-0.1	0.0	0.0	0.0	0.0	0.0	11.1
223	526434.74	5056637.96	2.00	0	DEN	A	52.3	34.9	0.0	0.0	0.0	73.3	3.4	1.1	0.0	0.0	0.0	0.0	0.0	9.3
230	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	75.8	4.2	-0.3	0.0	0.0	0.0	0.0	0.0	9.3

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
248	526563.17	5056326.71	2.00	0	DEN	A	52.3	32.1	0.0	0.0	0.0	74.9	3.9	-0.3	0.0	0.0	0.0	0.0	0.0	5.9
255	526558.09	5056658.06	2.00	0	DEN	A	52.3	32.1	0.0	0.0	0.0	74.0	3.6	2.1	0.0	0.0	0.0	0.0	0.0	4.7
269	526483.47	5056564.08	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	73.8	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	10.3
344	526785.01	5056905.21	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	74.9	3.9	-0.6	0.0	0.0	0.0	0.0	0.0	8.9
517	526632.72	5056979.09	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	73.9	3.6	1.4	0.0	0.0	0.0	0.0	0.0	6.7
564	526443.87	5056660.77	2.00	0	DEN	A	52.3	31.7	0.0	0.0	0.0	73.3	3.4	1.6	0.0	0.0	0.0	0.0	0.0	5.7
571	526507.84	5056218.61	2.00	0	DEN	A	52.3	32.5	0.0	0.0	0.0	75.0	3.9	1.8	0.0	0.0	0.0	0.0	0.0	4.1
584	526594.14	5055830.77	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	76.6	4.5	0.8	0.0	0.0	0.0	0.0	0.0	5.4
586	526861.15	5056558.65	2.00	0	DEN	A	52.3	31.8	0.0	0.0	0.0	75.7	4.2	-0.6	0.0	0.0	0.0	0.0	0.0	4.8
602	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	75.4	4.1	2.7	0.0	0.0	0.0	0.0	0.0	3.3
606	526407.32	5056556.48	2.00	0	DEN	A	52.3	30.4	0.0	0.0	0.0	73.4	3.5	2.5	0.0	0.0	0.0	0.0	0.0	3.3
613	526646.93	5056873.71	2.00	0	DEN	A	52.3	29.9	0.0	0.0	0.0	74.1	3.7	-0.3	0.0	0.0	0.0	0.0	0.0	4.7
620	526548.45	5056809.61	2.00	0	DEN	A	52.3	30.0	0.0	0.0	0.0	73.6	3.5	2.8	0.0	0.0	0.0	0.0	0.0	2.3
622	526508.85	5056621.66	2.00	0	DEN	A	52.3	30.1	0.0	0.0	0.0	73.8	3.6	-0.4	0.0	0.0	0.0	0.0	0.0	5.4
638	526540.33	5056950.84	2.00	0	DEN	A	52.3	29.2	0.0	0.0	0.0	73.3	3.4	2.0	0.0	0.0	0.0	0.0	0.0	2.7
642	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	75.9	4.2	-0.2	0.0	0.0	0.0	0.0	0.0	3.3
644	526467.22	5056405.47	2.00	0	DEN	A	52.3	29.0	0.0	0.0	0.0	74.2	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.5
645	526524.08	5056944.32	2.00	0	DEN	A	52.3	28.1	0.0	0.0	0.0	73.2	3.4	2.6	0.0	0.0	0.0	0.0	0.0	1.2
664	526754.55	5055738.43	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	77.4	4.7	-0.5	0.0	0.0	0.0	0.0	0.0	1.5
666	526705.82	5055738.43	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	77.2	4.7	-0.4	0.0	0.0	0.0	0.0	0.0	1.4
673	526952.53	5056480.43	2.00	0	DEN	A	52.3	29.4	0.0	0.0	0.0	76.3	4.4	-0.7	0.0	0.0	0.0	0.0	0.0	1.8
680	526893.64	5056743.34	2.00	0	DEN	A	52.3	28.0	0.0	0.0	0.0	75.6	4.1	-0.7	0.0	0.0	0.0	0.0	0.0	1.2
687	526381.94	5056629.27	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	73.0	3.3	2.8	0.0	0.0	0.0	0.0	0.0	-1.3
694	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	74.9	3.9	3.1	0.0	0.0	0.0	0.0	0.0	-2.2
757	526940.35	5056608.63	2.00	0	DEN	A	52.3	27.2	0.0	0.0	0.0	76.0	4.3	-0.7	0.0	0.0	0.0	0.0	0.0	-0.2
759	526602.26	5055849.24	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.6	4.4	1.2	0.0	0.0	0.0	0.0	0.0	-2.6
766	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	75.0	3.9	3.2	0.0	0.0	0.0	0.0	0.0	-4.5
773	526543.37	5056779.19	2.00	0	DEN	A	52.3	23.9	0.0	0.0	0.0	73.6	3.5	3.0	0.0	0.0	0.0	0.0	0.0	-3.9
792	526554.54	5056837.85	2.00	0	DEN	A	52.3	23.0	0.0	0.0	0.0	73.6	3.5	2.7	0.0	0.0	0.0	0.0	0.0	-4.5
794	526889.58	5056641.22	2.00	0	DEN	A	52.3	23.8	0.0	0.0	0.0	75.7	4.2	-0.7	0.0	0.0	0.0	0.0	0.0	-3.2
803	526554.54	5056771.58	2.00	0	DEN	A	52.3	20.2	0.0	0.0	0.0	73.7	3.5	2.6	0.0	0.0	0.0	0.0	0.0	-7.4
825	526545.40	5056845.46	2.00	0	DEN	A	52.3	19.7	0.0	0.0	0.0	73.5	3.5	3.0	0.0	0.0	0.0	0.0	0.0	-8.0
841	526530.17	5056954.10	2.00	0	DEN	A	52.3	19.3	0.0	0.0	0.0	73.3	3.4	2.6	0.0	0.0	0.0	0.0	0.0	-7.7
853	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	74.4	3.7	3.1	0.0	0.0	0.0	0.0	0.0	-11.6

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
75	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	76.8	4.5	-0.2	0.0	0.0	0.0	0.0	0.0	25.2
78	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.3	4.3	-0.8	0.0	0.0	0.0	0.0	0.0	24.5
81	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.7	4.5	-0.1	0.0	0.0	0.0	0.0	0.0	23.2
88	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	76.3	4.3	1.4	0.0	0.0	0.0	0.0	0.0	19.8
98	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	75.4	4.1	-0.4	0.0	0.0	0.0	0.0	0.0	21.0
121	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	76.4	4.4	-0.8	0.0	0.0	0.0	0.0	0.0	18.1
124	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	76.2	4.3	-0.5	0.0	0.0	0.0	0.0	0.0	17.7
135	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	76.5	4.4	0.4	0.0	0.0	0.0	0.0	0.0	14.4
147	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	75.4	4.1	-0.0	0.0	0.0	0.0	0.0	0.0	14.3
150	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	75.3	4.0	1.0	0.0	0.0	0.0	0.0	0.0	12.9
157	525977.99	5055643.04	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	75.6	4.1	2.0	0.0	0.0	0.0	0.0	0.0	11.5
164	525942.86	5055649.71	2.00	0	DEN	A	59.7	32.6	0.0	0.0	0.0	75.5	4.1	2.5	0.0	0.0	0.0	0.0	0.0	10.3
205	525922.85	5055637.70	2.00	0	DEN	A	59.7	30.9	0.0	0.0	0.0	75.5	4.1	2.0	0.0	0.0	0.0	0.0	0.0	8.9
290	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	76.8	4.5	-0.6	0.0	0.0	0.0	0.0	0.0	8.4
604	525949.09	5055683.50	2.00	0	DEN	A	59.7	25.3	0.0	0.0	0.0	75.4	4.1	3.1	0.0	0.0	0.0	0.0	0.0	2.5
631	526045.14	5055566.55	2.00	0	DEN	A	59.7	24.5	0.0	0.0	0.0	76.1	4.3	3.2	0.0	0.0	0.0	0.0	0.0	0.6
785	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	75.0	3.9	3.0	0.0	0.0	0.0	0.0	0.0	-4.3

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
79	525609.35	5055488.24	2.00	0	DEN	A	59.2	44.4	0.0	0.0	0.0	75.8	4.2	-0.5	0.0	0.0	0.0	0.0	0.0	24.2
90	525827.85	5055368.34	2.00	0	DEN	A	59.2	42.1	0.0	0.0	0.0	76.6	4.5	3.2	0.0	0.0	0.0	0.0	0.0	17.1
91	526169.61	5055362.74	2.00	0	DEN	A	59.2	43.5	0.0	0.0	0.0	77.2	4.7	3.4	0.0	0.0	0.0	0.0	0.0	17.5
96	525693.39	5055435.57	2.00	0	DEN	A	59.2	41.3	0.0	0.0	0.0	76.1	4.3	-0.6	0.0	0.0	0.0	0.0	0.0	20.6

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
97	525885.00	5055059.08	2.00	0	DEN	A	59.2	42.9	0.0	0.0	0.0	77.9	4.9	3.4	0.0	0.0	0.0	0.0	0.0	15.9
103	526103.50	5055297.75	2.00	0	DEN	A	59.2	42.5	0.0	0.0	0.0	77.3	4.7	3.5	0.0	0.0	0.0	0.0	0.0	16.2
104	525753.90	5055424.37	2.00	0	DEN	A	59.2	40.6	0.0	0.0	0.0	76.2	4.3	2.5	0.0	0.0	0.0	0.0	0.0	16.7
118	525918.61	5055233.88	2.00	0	DEN	A	59.2	39.9	0.0	0.0	0.0	77.3	4.7	3.4	0.0	0.0	0.0	0.0	0.0	13.7
122	525948.87	5055345.93	2.00	0	DEN	A	59.2	39.6	0.0	0.0	0.0	76.9	4.6	3.6	0.0	0.0	0.0	0.0	0.0	13.8
127	525581.34	5055582.36	2.00	0	DEN	A	59.2	37.6	0.0	0.0	0.0	75.3	4.0	1.4	0.0	0.0	0.0	0.0	0.0	16.1
142	525753.90	5055673.12	2.00	0	DEN	A	59.2	34.9	0.0	0.0	0.0	75.0	3.9	1.8	0.0	0.0	0.0	0.0	0.0	13.2
148	525524.19	5055442.30	2.00	0	DEN	A	59.2	35.0	0.0	0.0	0.0	75.9	4.2	-0.2	0.0	0.0	0.0	0.0	0.0	14.2
151	525821.13	5055333.61	2.00	0	DEN	A	59.2	34.2	0.0	0.0	0.0	76.7	4.5	3.2	0.0	0.0	0.0	0.0	0.0	8.9
152	525767.35	5055654.07	2.00	0	DEN	A	59.2	34.0	0.0	0.0	0.0	75.2	4.0	0.4	0.0	0.0	0.0	0.0	0.0	13.7
155	525928.70	5055298.87	2.00	0	DEN	A	59.2	35.2	0.0	0.0	0.0	77.0	4.6	3.5	0.0	0.0	0.0	0.0	0.0	9.3
159	525766.23	5055537.54	2.00	0	DEN	A	59.2	33.6	0.0	0.0	0.0	75.7	4.2	3.0	0.0	0.0	0.0	0.0	0.0	9.9
160	525514.11	5055557.71	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	75.3	4.0	3.3	0.0	0.0	0.0	0.0	0.0	10.1
163	525741.57	5055618.22	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	75.3	4.0	-0.5	0.0	0.0	0.0	0.0	0.0	13.4
177	525908.53	5055128.55	2.00	0	DEN	A	59.2	33.8	0.0	0.0	0.0	77.7	4.8	3.5	0.0	0.0	0.0	0.0	0.0	7.0
181	525744.94	5055584.60	2.00	0	DEN	A	59.2	31.7	0.0	0.0	0.0	75.5	4.1	-0.5	0.0	0.0	0.0	0.0	0.0	11.9
276	525612.72	5055358.26	2.00	0	DEN	A	59.2	30.6	0.0	0.0	0.0	76.4	4.4	-0.7	0.0	0.0	0.0	0.0	0.0	9.7
297	526252.53	5055352.65	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	77.4	4.7	3.1	0.0	0.0	0.0	0.0	0.0	4.6
303	525788.64	5055492.72	2.00	0	DEN	A	59.2	28.8	0.0	0.0	0.0	76.0	4.3	3.0	0.0	0.0	0.0	0.0	0.0	4.7
510	526221.15	5055407.56	2.00	0	DEN	A	59.2	30.0	0.0	0.0	0.0	77.1	4.6	3.1	0.0	0.0	0.0	0.0	0.0	4.4
531	525621.68	5055623.82	2.00	0	DEN	A	59.2	27.6	0.0	0.0	0.0	75.1	4.0	2.9	0.0	0.0	0.0	0.0	0.0	4.8
542	525845.78	5055137.52	2.00	0	DEN	A	59.2	29.5	0.0	0.0	0.0	77.6	4.8	3.3	0.0	0.0	0.0	0.0	0.0	3.0
593	525790.88	5055696.65	2.00	0	DEN	A	59.2	26.2	0.0	0.0	0.0	75.0	3.9	3.2	0.0	0.0	0.0	0.0	0.0	3.3
640	525830.09	5055679.84	2.00	0	DEN	A	59.2	23.8	0.0	0.0	0.0	75.1	4.0	3.3	0.0	0.0	0.0	0.0	0.0	0.6
647	526092.29	5055415.40	2.00	0	DEN	A	59.2	24.8	0.0	0.0	0.0	76.8	4.5	3.2	0.0	0.0	0.0	0.0	0.0	-0.6
655	525573.50	5055412.04	2.00	0	DEN	A	59.2	23.1	0.0	0.0	0.0	76.1	4.3	-0.5	0.0	0.0	0.0	0.0	0.0	2.4
657	525804.32	5055496.08	2.00	0	DEN	A	59.2	22.8	0.0	0.0	0.0	76.0	4.3	3.1	0.0	0.0	0.0	0.0	0.0	-1.3
801	525809.93	5055667.52	2.00	0	DEN	A	59.2	16.0	0.0	0.0	0.0	75.2	4.0	2.0	0.0	0.0	0.0	0.0	0.0	-6.0

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
89	525527.68	5055841.75	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	73.7	4.0	0.8	0.0	0.0	0.0	0.0	0.0	24.9
89	525527.68	5055841.75	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	73.7	4.0	0.8	0.0	0.0	0.0	0.0	0.0	-163.1
89	525527.68	5055841.75	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	73.7	4.0	0.8	0.0	0.0	0.0	0.0	0.0	24.9

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
131	525537.35	5055679.08	2.00	0	D	A	75.0	23.6	0.0	0.0	0.0	74.7	5.5	0.8	0.0	0.0	0.0	0.0	0.0	17.5
131	525537.35	5055679.08	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	74.7	5.5	0.8	0.0	0.0	0.0	0.0	0.0	-91.6
131	525537.35	5055679.08	2.00	0	E	A	75.0	23.6	0.0	0.0	0.0	74.7	5.5	0.8	0.0	0.0	0.0	0.0	0.0	17.5
134	524988.11	5055422.27	2.00	0	D	A	75.0	23.9	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	15.4
134	524988.11	5055422.27	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	-93.6
134	524988.11	5055422.27	2.00	0	E	A	75.0	23.9	0.0	0.0	0.0	76.0	6.1	1.4	0.0	0.0	0.0	0.0	0.0	15.4
139	525740.64	5055713.13	2.00	0	D	A	75.0	22.7	0.0	0.0	0.0	74.8	5.6	0.7	0.0	0.0	0.0	0.0	0.0	16.6
139	525740.64	5055713.13	2.00	0	N	A	-34.1	22.7	0.0	0.0	0.0	74.8	5.6	0.7	0.0	0.0	0.0	0.0	0.0	-92.5
139	525740.64	5055713.13	2.00	0	E	A	75.0	22.7	0.0	0.0	0.0	74.8	5.6	0.7	0.0	0.0	0.0	0.0	0.0	16.6
141	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	75.0	5.6	1.1	0.0	0.0	0.0	0.0	0.0	15.8
141	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	75.0	5.6	1.1	0.0	0.0	0.0	0.0	0.0	-93.2
141	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	75.0	5.6	1.1	0.0	0.0	0.0	0.0	0.0	15.8
143	525121.99	5055577.58	2.00	0	D	A	75.0	22.6	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	15.3
143	525121.99	5055577.58	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-93.7
143	525121.99	5055577.58	2.00	0	E	A	75.0	22.6	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	15.3
154	524962.94	5055213.12	2.00	0	D	A	75.0	23.1	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	13.2
154	524962.94	5055213.12	2.00	0	N	A	-34.1	23.1	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	-95.8
154	524962.94	5055213.12	2.00	0	E	A	75.0	23.1	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	13.2
156	525898.74	5055726.86	2.00	0	D	A	75.0	21.3	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	14.2
156	525898.74	5055726.86	2.00	0	N	A	-34.1	21.3	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-94.9
156	525898.74	5055726.86	2.00	0	E	A	75.0	21.3	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	14.2
158	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	75.6	5.9	-0.6	0.0	0.0	0.0	0.0	0.0	15.7
158	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	75.6	5.9	-0.6	0.0	0.0	0.0	0.0	0.0	-93.4
158	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	75.6	5.9	-0.6	0.0	0.0	0.0	0.0	0.0	15.7

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
161	525366.60	5055646.19	2.00	0	D	A	75.0	20.8	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	14.1
161	525366.60	5055646.19	2.00	0	N	A	-34.1	20.8	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-94.9
161	525366.60	5055646.19	2.00	0	E	A	75.0	20.8	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	14.1
162	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	75.0	5.6	1.2	0.0	0.0	0.0	0.0	0.0	13.7
162	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	75.0	5.6	1.2	0.0	0.0	0.0	0.0	0.0	-95.3
162	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	75.0	5.6	1.2	0.0	0.0	0.0	0.0	0.0	13.7
167	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	12.8
167	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	-96.3
167	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	12.8
169	525254.39	5055625.82	2.00	0	D	A	75.0	20.3	0.0	0.0	0.0	74.9	5.6	1.4	0.0	0.0	0.0	0.0	0.0	13.5
169	525254.39	5055625.82	2.00	0	N	A	-34.1	20.3	0.0	0.0	0.0	74.9	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-95.6
169	525254.39	5055625.82	2.00	0	E	A	75.0	20.3	0.0	0.0	0.0	74.9	5.6	1.4	0.0	0.0	0.0	0.0	0.0	13.5
175	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	75.9	6.0	1.4	0.0	0.0	0.0	0.0	0.0	12.4
175	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	75.9	6.0	1.4	0.0	0.0	0.0	0.0	0.0	-96.7
175	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	75.9	6.0	1.4	0.0	0.0	0.0	0.0	0.0	12.4

Receiver
Name: (untitled)
ID: POR5
X: 526952.70 m
Y: 5057036.64 m
Z: 4.50 m

Point Source, ISO 9613, Name: "Impact Pile Driver", ID: "s-Pile Driver"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
909	528199.11	5056993.87	1.00	0	D	A	141.5	0.0	-7.0	0.0	0.0	72.9	2.4	8.8	0.0	0.0	0.0	0.0	0.0	50.4
909	528199.11	5056993.87	1.00	0	N	A	129.5	0.0	-188.0	0.0	0.0	72.9	2.4	8.8	0.0	0.0	0.0	0.0	0.0	-142.6
909	528199.11	5056993.87	1.00	0	E	A	141.5	0.0	-7.0	0.0	0.0	72.9	2.4	8.8	0.0	0.0	0.0	0.0	0.0	50.4

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
923	526763.43	5056503.52	2.00	0	DEN	A	52.3	41.8	0.0	0.0	0.0	66.1	1.8	-2.0	0.0	0.0	0.0	0.0	0.0	28.2
935	526684.24	5056429.64	2.00	0	DEN	A	52.3	41.8	0.0	0.0	0.0	67.4	2.1	-2.2	0.0	0.0	0.0	0.0	0.0	26.8
942	526843.89	5056494.56	2.00	0	DEN	A	52.3	41.8	0.0	0.0	0.0	65.9	1.8	-1.8	0.0	0.0	0.0	0.0	0.0	28.2
949	526925.62	5056402.76	2.00	0	DEN	A	52.3	41.8	0.0	0.0	0.0	67.0	2.0	-1.3	0.0	0.0	0.0	0.0	0.0	26.4
958	526681.70	5056595.32	2.00	0	DEN	A	52.3	41.8	0.0	0.0	0.0	65.3	1.7	-2.0	0.0	0.0	0.0	0.0	0.0	29.1
968	526602.51	5056521.44	2.00	0	DEN	A	52.3	41.8	0.0	0.0	0.0	66.9	2.0	-2.3	0.0	0.0	0.0	0.0	0.0	27.5
975	526640.20	5056682.64	2.00	0	DEN	A	52.3	38.7	0.0	0.0	0.0	64.5	1.6	-2.1	0.0	0.0	0.0	0.0	0.0	27.1
982	526720.66	5056673.67	2.00	0	DEN	A	52.3	38.7	0.0	0.0	0.0	63.7	1.5	-1.8	0.0	0.0	0.0	0.0	0.0	27.7
989	526599.34	5056728.54	2.00	0	DEN	A	52.3	38.7	0.0	0.0	0.0	64.4	1.6	-2.0	0.0	0.0	0.0	0.0	0.0	27.1
996	526598.07	5056811.37	2.00	0	DEN	A	52.3	38.7	0.0	0.0	0.0	63.5	1.4	-1.9	0.0	0.0	0.0	0.0	0.0	28.1
1003	526726.38	5056300.91	2.00	0	DEN	A	52.3	44.8	0.0	0.0	0.0	68.7	2.3	-2.3	0.0	0.0	0.0	0.0	0.0	28.3
1010	526887.30	5056282.98	2.00	0	DEN	A	52.3	44.8	0.0	0.0	0.0	68.6	2.3	-2.0	0.0	0.0	0.0	0.0	0.0	28.2
1017	526647.18	5056227.03	2.00	0	DEN	A	52.3	44.8	0.0	0.0	0.0	69.7	2.5	-2.4	0.0	0.0	0.0	0.0	0.0	27.2
1024	526649.72	5056061.36	2.00	0	DEN	A	52.3	44.8	0.0	0.0	0.0	71.2	2.9	-2.4	0.0	0.0	0.0	0.0	0.0	25.4
1031	526762.67	5056792.77	2.00	0	DEN	A	52.3	39.8	0.0	0.0	0.0	60.8	1.1	-1.3	0.0	0.0	0.0	0.0	0.0	31.5
1038	526695.16	5056791.14	2.00	0	DEN	A	52.3	36.8	0.0	0.0	0.0	62.0	1.2	-1.6	0.0	0.0	0.0	0.0	0.0	27.4
1045	526635.25	5056853.06	2.00	0	DEN	A	52.3	36.8	0.0	0.0	0.0	62.3	1.3	-1.7	0.0	0.0	0.0	0.0	0.0	27.3
1051	526822.57	5056730.84	2.00	0	DEN	A	52.3	39.8	0.0	0.0	0.0	61.4	1.2	-1.1	0.0	0.0	0.0	0.0	0.0	30.6
1057	526814.96	5056667.29	2.00	0	DEN	A	52.3	36.8	0.0	0.0	0.0	62.9	1.4	-1.4	0.0	0.0	0.0	0.0	0.0	26.3
1064	526874.86	5056605.37	2.00	0	DEN	A	52.3	36.8	0.0	0.0	0.0	63.8	1.5	-1.3	0.0	0.0	0.0	0.0	0.0	25.1
1071	526634.75	5056956.27	2.00	0	DEN	A	52.3	35.3	0.0	0.0	0.0	61.3	1.2	-1.0	0.0	0.0	0.0	0.0	0.0	26.2
1078	526683.48	5056930.20	2.00	0	DEN	A	52.3	35.3	0.0	0.0	0.0	60.2	1.0	-1.0	0.0	0.0	0.0	0.0	0.0	27.3
1085	526734.75	5056918.25	2.00	0	DEN	A	52.3	35.3	0.0	0.0	0.0	58.9	0.9	-0.5	0.0	0.0	0.0	0.0	0.0	28.3
1092	526754.04	5056876.96	2.00	0	DEN	A	52.3	32.3	0.0	0.0	0.0	59.1	0.9	-0.9	0.0	0.0	0.0	0.0	0.0	25.4
1099	526802.78	5056850.89	2.00	0	DEN	A	52.3	32.3	0.0	0.0	0.0	58.6	0.9	0.2	0.0	0.0	0.0	0.0	0.0	25.0
1113	527446.08	5056153.69	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	71.1	2.9	-1.7	0.0	0.0	0.0	0.0	0.0	20.0
1120	527639.01	5056263.41	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	71.3	2.9	-0.9	0.0	0.0	0.0	0.0	0.0	18.9
1127	527330.97	5056133.35	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	70.8	2.8	-0.8	0.0	0.0	0.0	0.0	0.0	22.4
1134	527128.72	5056040.88	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	71.1	2.8	-1.2	0.0	0.0	0.0	0.0	0.0	22.5
1141	527004.28	5056037.80	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	71.0	2.8	-1.5	0.0	0.0	0.0	0.0	0.0	19.9
1149	526792.70	5055962.59	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	71.7	3.0	-2.4	0.0	0.0	0.0	0.0	0.0	19.9
1156	527800.76	5056197.46	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	72.5	3.2	-1.0	0.0	0.0	0.0	0.0	0.0	23.5
1163	527666.99	5056211.63	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	71.8	3.0	-1.0	0.0	0.0	0.0	0.0	0.0	21.4
1170	527474.06	5056101.91	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	71.6	3.0	-1.8	0.0	0.0	0.0	0.0	0.0	22.5
1177	526643.38	5056887.29	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	61.7	1.2	-1.5	0.0	0.0	0.0	0.0	0.0	24.7
1184	526723.58	5056866.64	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	60.1	1.0	-1.2	0.0	0.0	0.0	0.0	0.0	23.2
1191	526746.17	5056848.99	2.00	0	DEN	A	52.3	27.9	0.0	0.0	0.0	59.9	1.0	-1.1	0.0	0.0	0.0	0.0	0.0	20.3
1198	526798.46	5056832.15	2.00	0	DEN	A	52.3	27.9	0.0	0.0	0.0	59.2	0.9	-0.3	0.0	0.0	0.0	0.0	0.0	20.4
1205	526598.20	5056922.59	2.00	0	DEN	A	52.3	36.9	0.0	0.0	0.0	62.4	1.3	-1.5	0.0	0.0	0.0	0.0	0.0	27.0
1212	527144.33	5056180.14	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	69.9	2.6	-0.8	0.0	0.0	0.0	0.0	0.0	24.3
1219	527009.48	5056084.22	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	70.6	2.7	-1.4	0.0	0.0	0.0	0.0	0.0	20.9
1226	526797.91	5056009.01	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	71.3	2.9	-2.3	0.0	0.0	0.0	0.0	0.0	20.9
1233	527461.70	5056292.95	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	70.1	2.6	-1.2	0.0	0.0	0.0	0.0	0.0	21.3
1240	527644.21	5056309.83	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	71.0	2.8	-0.8	0.0	0.0	0.0	0.0	0.0	19.8
1247	527341.38	5056226.18	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	70.1	2.6	-0.8	0.0	0.0	0.0	0.0	0.0	24.0
1254	526510.88	5056326.16	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	69.5	2.5	-2.5	0.0	0.0	0.0	0.0	0.0	22.8

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1261	526549.46	5056130.61	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	70.9	2.8	-2.5	0.0	0.0	0.0	0.0	0.0	21.0
1268	526522.56	5056548.87	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	67.3	2.0	-2.4	0.0	0.0	0.0	0.0	0.0	25.3
1275	526525.60	5056420.68	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	68.5	2.3	-2.5	0.0	0.0	0.0	0.0	0.0	23.9
1289	526914.46	5056683.59	2.00	0	DEN	A	52.3	32.9	0.0	0.0	0.0	62.0	1.2	0.4	0.0	0.0	0.0	0.0	0.0	21.6
1296	526876.89	5056743.34	2.00	0	DEN	A	52.3	32.9	0.0	0.0	0.0	60.6	1.1	0.3	0.0	0.0	0.0	0.0	0.0	23.1
1303	526913.95	5056638.50	2.00	0	DEN	A	52.3	35.9	0.0	0.0	0.0	63.0	1.4	-0.9	0.0	0.0	0.0	0.0	0.0	24.7
1346	526763.18	5056932.37	2.00	0	DEN	A	52.3	31.7	0.0	0.0	0.0	57.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	24.6
1354	526796.68	5056898.15	2.00	0	DEN	A	52.3	28.7	0.0	0.0	0.0	57.4	0.8	0.9	0.0	0.0	0.0	0.0	0.0	21.8
1360	526816.99	5056857.95	2.00	0	DEN	A	52.3	28.7	0.0	0.0	0.0	58.0	0.8	1.0	0.0	0.0	0.0	0.0	0.0	21.1
1382	527661.88	5056065.51	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	72.6	3.2	-1.5	0.0	0.0	0.0	0.0	0.0	20.1
1388	527431.65	5056024.83	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	72.0	3.1	-1.1	0.0	0.0	0.0	0.0	0.0	20.5
1394	527228.45	5055973.03	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	71.8	3.0	-1.2	0.0	0.0	0.0	0.0	0.0	20.8
1400	527059.28	5055974.91	2.00	0	DEN	A	52.3	39.2	0.0	0.0	0.0	71.6	3.0	-1.4	0.0	0.0	0.0	0.0	0.0	18.4
1406	526829.05	5055934.22	2.00	0	DEN	A	52.3	39.2	0.0	0.0	0.0	71.9	3.1	-2.4	0.0	0.0	0.0	0.0	0.0	18.9
1412	526902.27	5056194.17	2.00	0	DEN	A	52.3	38.3	dB	0.0	0.0	69.5	2.5	-1.9	0.0	0.0	0.0	0.0	0.0	20.4
1418	526743.89	5056046.42	2.00	0	DEN	A	52.3	38.3	0.0	0.0	0.0	71.1	2.9	-2.4	0.0	0.0	0.0	0.0	0.0	19.0
1424	527008.88	5056256.09	2.00	0	DEN	A	52.3	41.3	0.0	0.0	0.0	68.9	2.3	-1.0	0.0	0.0	0.0	0.0	0.0	23.3
1436	527821.53	5056767.78	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	70.2	2.6	-0.5	0.0	0.0	0.0	0.0	0.0	21.5
1442	527684.74	5056659.05	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	69.3	2.4	-0.1	0.0	0.0	0.0	0.0	0.0	22.1
1460	526995.18	5056173.48	2.00	0	DEN	A	52.3	37.9	0.0	0.0	0.0	69.7	2.5	-1.3	0.0	0.0	0.0	0.0	0.0	19.2
1466	526793.14	5056038.76	2.00	0	DEN	A	52.3	37.9	0.0	0.0	0.0	71.1	2.8	-2.4	0.0	0.0	0.0	0.0	0.0	18.6
1472	527194.96	5056273.03	2.00	0	DEN	A	52.3	37.9	0.0	0.0	0.0	69.1	2.4	0.6	0.0	0.0	0.0	0.0	0.0	18.1
1478	527074.64	5056206.26	2.00	0	DEN	A	52.3	37.9	0.0	0.0	0.0	69.5	2.5	-0.8	0.0	0.0	0.0	0.0	0.0	19.1
1495	526836.79	5056603.74	2.00	0	DEN	A	52.3	28.5	0.0	0.0	0.0	64.0	1.5	-1.6	0.0	0.0	0.0	0.0	0.0	16.8
1500	526776.89	5056665.66	2.00	0	DEN	A	52.3	28.5	0.0	0.0	0.0	63.3	1.4	-1.6	0.0	0.0	0.0	0.0	0.0	17.7
1506	526722.31	5056719.44	2.00	0	DEN	A	52.3	28.5	0.0	0.0	0.0	62.9	1.3	-1.7	0.0	0.0	0.0	0.0	0.0	18.3
1512	526681.70	5056766.70	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	62.7	1.3	-1.8	0.0	0.0	0.0	0.0	0.0	15.6
1519	526621.80	5056828.62	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	62.8	1.3	-1.8	0.0	0.0	0.0	0.0	0.0	15.4
1525	526923.34	5056501.07	2.00	0	DEN	A	52.3	31.5	0.0	0.0	0.0	65.6	1.7	0.5	0.0	0.0	0.0	0.0	0.0	16.0
1531	526852.78	5056579.29	2.00	0	DEN	A	52.3	31.5	0.0	0.0	0.0	64.4	1.6	-1.5	0.0	0.0	0.0	0.0	0.0	19.4
1549	526632.72	5056979.09	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	61.2	1.2	-0.0	0.0	0.0	0.0	0.0	0.0	23.2
1561	527162.96	5055909.34	2.00	0	DEN	A	52.3	43.3	0.0	0.0	0.0	72.2	3.1	-1.3	0.0	0.0	0.0	0.0	0.0	21.6
1567	526878.68	5055890.87	2.00	0	DEN	A	52.3	43.3	0.0	0.0	0.0	72.2	3.1	-2.2	0.0	0.0	0.0	0.0	0.0	22.5
1606	527249.93	5056556.41	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	66.0	1.8	-0.7	0.0	0.0	0.0	0.0	0.0	23.7
1613	526827.92	5055821.88	2.00	0	DEN	A	52.3	45.4	0.0	0.0	0.0	72.7	3.3	-2.4	0.0	0.0	0.0	0.0	0.0	24.1
1629	526450.98	5056597.76	2.00	0	DEN	A	52.3	38.8	0.0	0.0	0.0	67.5	2.1	-2.3	0.0	0.0	0.0	0.0	0.0	23.9
1641	528071.65	5056357.27	2.00	0	DEN	A	52.3	45.1	0.0	0.0	0.0	73.3	3.4	-0.8	0.0	0.0	0.0	0.0	0.0	21.4
1652	527716.84	5056002.61	2.00	0	DEN	A	52.3	45.2	0.0	K0	0.0	73.2	3.4	-1.6	0.0	0.0	0.0	0.0	0.0	22.5
1679	527368.59	5056562.31	2.00		DEN	A	52.3	38.5	0.0	(dB)	0.0	67.0	2.0	-0.8	0.0	0.0	0.0	0.0	0.0	22.6
1706	527309.44	5056492.87	2.00	0	DEN	A	52.3	38.3	0.0	0.0	0.0	67.3	2.0	-1.0	0.0	0.0	0.0	0.0	0.0	22.3
1713	528096.93	5056835.69	2.00	0	DEN	A	52.3	43.2	0.0	0.0	0.0	72.3	3.2	-0.8	0.0	0.0	0.0	0.0	0.0	20.8
1720	526951.51	5056175.70	2.00	0	DEN	A	52.3	34.3	0.0	0.0	0.0	69.7	2.5	-1.6	0.0	0.0	0.0	0.0	0.0	16.0
1727	526765.72	5056039.90	2.00	0	DEN	A	52.3	34.3	0.0	0.0	0.0	71.1	2.9	-2.4	0.0	0.0	0.0	0.0	0.0	15.0
1733	527060.66	5056242.51	2.00	0	DEN	A	52.3	37.3	0.0	0.0	0.0	69.1	2.4	-0.8	0.0	0.0	0.0	0.0	0.0	19.0
1740	526558.60	5056519.00	2.00	0	DEN	A	52.3	26.1	0.0	0.0	0.0	67.3	2.0	-2.4	0.0	0.0	0.0	0.0	0.0	11.5
1747	526561.65	5056390.80	2.00	0	DEN	A	52.3	26.1	0.0	0.0	0.0	68.6	2.3	-2.5	0.0	0.0	0.0	0.0	0.0	10.0
1759	526564.95	5056281.35	2.00	0	DEN	A	52.3	26.1	0.0	0.0	0.0	69.6	2.5	-2.4	0.0	0.0	0.0	0.0	0.0	8.7
1765	526567.48	5056115.68	2.00	0	DEN	A	52.3	26.1	0.0	0.0	0.0	71.0	2.8	-2.5	0.0	0.0	0.0	0.0	0.0	7.1
1772	526556.19	5056782.31	2.00	0	DEN	A	52.3	26.1	0.0	0.0	0.0	64.5	1.6	-2.1	0.0	0.0	0.0	0.0	0.0	14.4
1779	526557.46	5056699.48	2.00	0	DEN	A	52.3	26.1	0.0	0.0	0.0	65.3	1.7	-2.1	0.0	0.0	0.0	0.0	0.0	13.5
1786	526559.36	5056575.22	2.00	0	DEN	A	52.3	29.1	0.0	0.0	0.0	66.7	1.9	-2.2	0.0	0.0	0.0	0.0	0.0	15.0
1816	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	71.5	2.9	-2.6	0.0	0.0	0.0	0.0	0.0	21.8
1828	527966.63	5056737.52	2.00	0	DEN	A	52.3	42.1	0.0	0.0	0.0	71.5	2.9	-0.6	0.0	0.0	0.0	0.0	0.0	20.5
1846	526650.48	5056871.53	2.00	0	DEN	A	52.3	23.8	0.0	0.0	0.0	61.7	1.2	-1.6	0.0	0.0	0.0	0.0	0.0	14.8
1852	526721.81	5056850.62	2.00	0	DEN	A	52.3	20.8	0.0	0.0	0.0	60.4	1.1	-1.3	0.0	0.0	0.0	0.0	0.0	12.9
1858	526749.73	5056841.11	2.00	0	DEN	A	52.3	17.8	0.0	0.0	0.0	60.0	1.0	-1.1	0.0	0.0	0.0	0.0	0.0	10.2
1864	526798.46	5056826.45	2.00	0	DEN	A	52.3	17.8	0.0	0.0	0.0	59.3	1.0	-0.4	0.0	0.0	0.0	0.0	0.0	10.2
1870	526594.64	5056890.54	2.00	0	DEN	A	52.3	26.8	0.0	0.0	0.0	62.7	1.3	-1.7	0.0	0.0	0.0	0.0	0.0	16.7
1884	527727.09	5056751.88	2.00	0	DEN	A	52.3	36.2	0.0	0.0	0.0	69.3	2.4	2.3	0.0	0.0	0.0	0.0	0.0	14.5
1889	527863.87	5056860.62	2.00	0	DEN	A	52.3	36.2	0.0	0.0	0.0	70.4	2.7	2.2	0.0	0.0	0.0	0.0	0.0	13.3
1901	527661.51	5056372.09	2.00	0	DEN	A	52.3	40.7	0.0	0.0	0.0	70.7	2.8	0.9	0.0	0.0	0.0	0.0	0.0	18.5
1936	527870.54	5056765.46	2.00	0	DEN	A	52.3	40.4	0.0	K0	0.0	70.6	2.7	-0.6	0.0	0.0	0.0	0.0	0.0	19.9
1950	527307.17	5055876.20	2.00	0	DEN	A	52.3	42.5	0.0	0.0	0.0	72.7	3.3	-1.3	0.0	0.0	0.0	0.0	0.0	20.2

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2060	527275.93	5056519.94	2.00	0	DEN	A	52.3	35.6	0.0	0.0	0.0	66.7	1.9	-0.8	0.0	0.0	0.0	0.0	0.0	20.1
2065	527965.90	5056367.24	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	72.7	3.3	-0.7	0.0	0.0	0.0	0.0	0.0	18.6
2070	527321.11	5056360.04	2.00	0	DEN	A	52.3	37.2	0.0	0.0	0.0	68.7	2.3	-1.2	0.0	0.0	0.0	0.0	0.0	19.6
2113	526483.47	5056564.08	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	67.5	2.1	-2.4	0.0	0.0	0.0	0.0	0.0	20.1
2118	527906.87	5056312.52	2.00	0	DEN	A	52.3	41.2	0.0	0.0	0.0	72.6	3.2	-0.4	0.0	0.0	0.0	0.0	0.0	18.1
2123	527626.51	5056582.16	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	69.2	2.4	-0.6	0.0	0.0	0.0	0.0	0.0	18.9
2127	526855.57	5056565.44	2.00	0	DEN	A	52.3	19.8	0.0	0.0	0.0	64.6	1.6	-1.5	0.0	0.0	0.0	0.0	0.0	7.4
2133	526914.96	5056500.80	2.00	0	DEN	A	52.3	19.8	0.0	0.0	0.0	65.6	1.7	-0.7	0.0	0.0	0.0	0.0	0.0	5.4
2137	526814.71	5056611.34	2.00	0	DEN	A	52.3	22.8	0.0	0.0	0.0	64.0	1.5	-1.6	0.0	0.0	0.0	0.0	0.0	11.2
2141	526749.73	5056682.77	2.00	0	DEN	A	52.3	22.8	0.0	0.0	0.0	63.2	1.4	-1.7	0.0	0.0	0.0	0.0	0.0	12.2
2145	526703.28	5056735.46	2.00	0	DEN	A	52.3	19.8	0.0	0.0	0.0	62.8	1.3	-1.7	0.0	0.0	0.0	0.0	0.0	9.6
2149	526632.72	5056813.68	2.00	0	DEN	A	52.3	19.8	0.0	0.0	0.0	62.8	1.3	-1.9	0.0	0.0	0.0	0.0	0.0	9.8
2154	526983.75	5056420.95	2.00	0	DEN	A	52.3	25.8	0.0	0.0	0.0	66.8	1.9	1.1	0.0	0.0	0.0	0.0	0.0	8.3
2159	526931.72	5056480.43	2.00	0	DEN	A	52.3	22.8	0.0	0.0	0.0	65.9	1.8	-0.0	0.0	0.0	0.0	0.0	0.0	7.4
2164	526872.32	5056545.07	2.00	0	DEN	A	52.3	22.8	0.0	0.0	0.0	64.9	1.6	-1.5	0.0	0.0	0.0	0.0	0.0	10.0
2169	526874.86	5056773.21	2.00	0	DEN	A	52.3	25.0	0.0	0.0	0.0	59.8	1.0	1.1	0.0	0.0	0.0	0.0	0.0	15.3
2174	526897.20	5056739.54	2.00	0	DEN	A	52.3	21.9	0.0	0.0	0.0	60.6	1.1	1.4	0.0	0.0	0.0	0.0	0.0	11.2
2179	526927.66	5056687.39	2.00	0	DEN	A	52.3	21.9	0.0	0.0	0.0	61.9	1.2	1.3	0.0	0.0	0.0	0.0	0.0	9.9
2185	526434.74	5056637.96	2.00	0	DEN	A	52.3	34.9	0.0	0.0	0.0	67.3	2.0	-1.5	0.0	0.0	0.0	0.0	0.0	19.4
2191	528014.30	5056693.86	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	71.9	3.1	-0.8	0.0	0.0	0.0	0.0	0.0	18.2
2203	526691.60	5055797.09	2.00	0	DEN	A	52.3	40.8	0.0	0.0	0.0	73.1	3.4	-2.5	0.0	0.0	0.0	0.0	0.0	19.1
2228	527255.62	5056599.77	2.00	0	DEN	A	52.3	33.0	0.0	0.0	0.0	65.5	1.7	1.3	0.0	0.0	0.0	0.0	0.0	16.8
2235	527456.17	5056326.20	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	69.8	2.5	-0.1	0.0	0.0	0.0	0.0	0.0	13.9
2241	527638.69	5056343.09	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	70.8	2.8	-0.5	0.0	0.0	0.0	0.0	0.0	13.1
2247	528003.75	5056320.82	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	73.1	3.4	-0.8	0.0	0.0	0.0	0.0	0.0	16.7
2264	528175.65	5056754.58	2.00	0	DEN	A	52.3	39.7	0.0	0.0	0.0	73.0	3.3	-1.1	0.0	0.0	0.0	0.0	0.0	16.8
2269	527551.75	5055861.98	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	73.4	3.5	-1.7	0.0	0.0	0.0	0.0	0.0	17.0
2278	527613.15	5055896.44	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	73.4	3.5	-2.0	0.0	0.0	0.0	0.0	0.0	17.3
2292	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	72.3	3.1	-2.6	0.0	0.0	0.0	0.0	0.0	18.0
2298	528038.35	5056784.98	2.00	0	DEN	A	52.3	38.0	0.0	0.0	0.0	71.9	3.1	-0.8	0.0	0.0	0.0	0.0	0.0	16.1
2310	527336.73	5056490.90	2.00	0	DEN	A	52.3	32.7	0.0	0.0	0.0	67.5	2.1	-1.1	0.0	0.0	0.0	0.0	0.0	16.5
2316	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	71.8	3.0	-2.5	0.0	0.0	0.0	0.0	0.0	16.6
2328	526548.45	5056809.61	2.00	0	DEN	A	52.3	30.0	0.0	0.0	0.0	64.3	1.5	-2.1	0.0	0.0	0.0	0.0	0.0	18.5
2334	527622.54	5056021.48	2.00	0	DEN	A	52.3	38.6	0.0	0.0	0.0	72.7	3.3	-1.7	0.0	0.0	0.0	0.0	0.0	16.6
2346	526540.33	5056950.84	2.00	0	DEN	A	52.3	29.2	0.0	0.0	0.0	63.5	1.4	-1.4	0.0	0.0	0.0	0.0	0.0	18.0
2365	526443.87	5056660.77	2.00	0	DEN	A	52.3	31.7	0.0	0.0	0.0	67.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	14.9
2375	527393.33	5056331.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	69.4	2.5	0.6	0.0	0.0	0.0	0.0	0.0	14.5
2380	528120.08	5056893.75	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	72.4	3.2	-0.7	0.0	0.0	0.0	0.0	0.0	14.0
2394	528114.21	5056481.81	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	73.2	3.4	-0.7	0.0	0.0	0.0	0.0	0.0	14.1
2403	526887.55	5056651.00	2.00	0	DEN	A	52.3	17.7	0.0	0.0	0.0	62.8	1.3	-1.0	0.0	0.0	0.0	0.0	0.0	6.9
2406	526869.28	5056725.96	2.00	0	DEN	A	52.3	17.7	0.0	0.0	0.0	61.1	1.1	-0.6	0.0	0.0	0.0	0.0	0.0	8.4
2409	526900.75	5056593.96	2.00	0	DEN	A	52.3	20.8	0.0	0.0	0.0	64.0	1.5	-1.2	0.0	0.0	0.0	0.0	0.0	8.8
2424	526988.60	5055781.19	2.00	0	DEN	A	52.3	37.1	0.0	0.0	0.0	73.0	3.3	-1.9	0.0	0.0	0.0	0.0	0.0	15.0
2436	526508.85	5056621.66	2.00	0	DEN	A	52.3	30.1	0.0	0.0	0.0	66.7	1.9	-2.4	0.0	0.0	0.0	0.0	0.0	16.2
2439	526524.08	5056944.32	2.00	0	DEN	A	52.3	28.1	0.0	0.0	0.0	63.8	1.5	-1.5	0.0	0.0	0.0	0.0	0.0	16.6
2445	526952.53	5056480.43	2.00	0	DEN	A	52.3	29.4	0.0	0.0	0.0	65.9	1.8	0.9	0.0	0.0	0.0	0.0	0.0	13.1
2448	526527.13	5056120.84	2.00	0	DEN	A	52.3	29.5	0.0	0.0	0.0	71.1	2.8	-2.5	0.0	0.0	0.0	0.0	0.0	10.4
2450	526488.55	5056316.39	2.00	0	DEN	A	52.3	29.5	0.0	0.0	0.0	69.7	2.5	-2.1	0.0	0.0	0.0	0.0	0.0	11.7
2453	526940.35	5056608.63	2.00	0	DEN	A	52.3	27.2	0.0	0.0	0.0	63.6	1.5	-0.8	0.0	0.0	0.0	0.0	0.0	15.2
2459	527961.71	5056629.28	2.00	0	DEN	A	52.3	34.8	0.0	0.0	0.0	71.7	3.0	1.8	0.0	0.0	0.0	0.0	0.0	10.5
2480	527231.18	5055827.31	2.00	0	DEN	A	52.3	35.4	0.0	0.0	0.0	72.9	3.3	-1.4	0.0	0.0	0.0	0.0	0.0	13.0
2492	527809.24	5055979.29	2.00	0	DEN	A	52.3	36.3	0.0	0.0	0.0	73.7	3.5	-1.3	0.0	0.0	0.0	0.0	0.0	12.6
2495	528008.74	5056433.02	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	72.7	3.3	-0.7	0.0	0.0	0.0	0.0	0.0	12.0
2498	528025.65	5056751.88	2.00	0	DEN	A	52.3	33.7	0.0	0.0	0.0	71.9	3.1	-0.9	0.0	0.0	0.0	0.0	0.0	12.0
2507	526594.14	5055830.77	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	73.0	3.3	-2.6	0.0	0.0	0.0	0.0	0.0	13.5
2510	526407.32	5056556.48	2.00	0	DEN	A	52.3	30.4	0.0	0.0	0.0	68.2	2.2	-2.3	0.0	0.0	0.0	0.0	0.0	14.5
2525	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	72.2	3.1	-2.5	0.0	0.0	0.0	0.0	0.0	12.7
2540	528148.76	5056221.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	74.2	3.7	-0.9	0.0	0.0	0.0	0.0	0.0	10.0
2543	527394.60	5055872.64	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	72.9	3.3	-1.3	0.0	0.0	0.0	0.0	0.0	10.5
2546	526467.22	5056405.47	2.00	0	DEN	A	52.3	29.0	0.0	0.0	0.0	69.0	2.4	-2.5	0.0	0.0	0.0	0.0	0.0	12.5
2553	528119.15	5056408.72	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	73.4	3.5	-0.8	0.0	0.0	0.0	0.0	0.0	9.3
2557	527207.69	5056522.44	2.00	0	DEN	A	52.3	25.7	0.0	0.0	0.0	66.2	1.8	-0.2	0.0	0.0	0.0	0.0	0.0	10.2
2559	527311.85	5056412.29	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	68.2	2.2	-1.3	0.0	0.0	0.0	0.0	0.0	10.7

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2572	527848.96	5056038.84	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	73.6	3.5	-1.4	0.0	0.0	0.0	0.0	0.0	9.9
2596	528082.86	5056212.59	2.00	0	DEN	A	52.3	33.4	0.0	0.0	0.0	73.9	3.6	-0.8	0.0	0.0	0.0	0.0	0.0	9.0
2600	527289.02	5056366.95	2.00	0	DEN	A	52.3	27.6	0.0	0.0	0.0	68.5	2.3	1.5	0.0	0.0	0.0	0.0	0.0	7.6
2611	526554.54	5056837.85	2.00	0	DEN	A	52.3	23.0	0.0	0.0	0.0	64.0	1.5	-2.0	0.0	0.0	0.0	0.0	0.0	11.8
2617	526543.37	5056779.19	2.00	0	DEN	A	52.3	23.9	0.0	0.0	0.0	64.7	1.6	-2.0	0.0	0.0	0.0	0.0	0.0	12.0
2630	528139.11	5056191.06	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	74.3	3.7	1.4	0.0	0.0	0.0	0.0	0.0	6.0
2636	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	72.6	3.2	-2.6	0.0	0.0	0.0	0.0	0.0	10.0
2642	526381.94	5056629.27	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	67.9	2.2	-1.9	0.0	0.0	0.0	0.0	0.0	9.6
2644	526754.55	5055738.43	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	73.4	3.4	-2.5	0.0	0.0	0.0	0.0	0.0	8.8
2646	526705.82	5055738.43	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	73.4	3.5	-2.5	0.0	0.0	0.0	0.0	0.0	8.6
2705	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	70.6	2.7	-1.9	0.0	0.0	0.0	0.0	0.0	8.3
2708	527587.02	5055809.42	2.00	0	DEN	A	52.3	30.8	0.0	0.0	0.0	73.8	3.6	0.1	0.0	0.0	0.0	0.0	0.0	5.7
2711	527324.42	5056404.58	2.00	0	DEN	A	52.3	24.5	0.0	0.0	0.0	68.3	2.2	-0.9	0.0	0.0	0.0	0.0	0.0	7.1
2714	527925.77	5056103.14	2.00	0	DEN	A	52.3	30.5	0.0	0.0	0.0	73.6	3.5	-0.8	0.0	0.0	0.0	0.0	0.0	6.5
2717	526554.54	5056771.58	2.00	0	DEN	A	52.3	20.2	0.0	0.0	0.0	64.6	1.6	-2.2	0.0	0.0	0.0	0.0	0.0	8.5
2729	526545.40	5056845.46	2.00	0	DEN	A	52.3	19.7	0.0	0.0	0.0	64.1	1.5	-1.6	0.0	0.0	0.0	0.0	0.0	8.1
2735	526530.17	5056954.10	2.00	0	DEN	A	52.3	19.3	0.0	0.0	0.0	63.7	1.5	-1.4	0.0	0.0	0.0	0.0	0.0	7.8
2738	526800.24	5055721.04	2.00	0	DEN	A	52.3	28.9	0.0	0.0	0.0	73.4	3.5	-2.3	0.0	0.0	0.0	0.0	0.0	6.7
2742	527504.16	5055876.80	2.00	0	DEN	A	52.3	27.9	0.0	0.0	0.0	73.2	3.4	2.0	0.0	0.0	0.0	0.0	0.0	1.7
2744	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	70.9	2.8	-2.2	0.0	0.0	0.0	0.0	0.0	6.0
2746	527209.95	5055884.50	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	72.4	3.2	-1.4	0.0	0.0	0.0	0.0	0.0	5.6
2750	526602.26	5055849.24	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	72.9	3.3	-2.5	0.0	0.0	0.0	0.0	0.0	5.9
2755	527356.53	5056374.75	2.00	0	DEN	A	52.3	21.9	0.0	0.0	0.0	68.8	2.3	1.6	0.0	0.0	0.0	0.0	0.0	1.5
2771	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	69.3	2.4	-2.3	0.0	0.0	0.0	0.0	0.0	0.2

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1106	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	73.5	3.5	0.7	0.0	0.0	0.0	0.0	0.0	28.2
1310	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	72.4	3.2	1.5	0.0	0.0	0.0	0.0	0.0	26.2
1339	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	72.6	3.2	1.6	0.0	0.0	0.0	0.0	0.0	24.4
1366	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	73.3	3.4	1.9	0.0	0.0	0.0	0.0	0.0	23.4
1454	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	71.2	2.9	1.2	0.0	0.0	0.0	0.0	0.0	23.3
1490	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	73.1	3.4	1.6	0.0	0.0	0.0	0.0	0.0	22.0
1537	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	74.4	3.8	-1.6	0.0	0.0	0.0	0.0	0.0	24.4
1573	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	73.0	3.3	1.7	0.0	0.0	0.0	0.0	0.0	20.4
1579	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	71.6	3.0	1.3	0.0	0.0	0.0	0.0	0.0	21.6
1585	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	74.2	3.7	-0.6	0.0	0.0	0.0	0.0	0.0	22.6
1593	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	73.0	3.3	1.7	0.0	0.0	0.0	0.0	0.0	20.6
1621	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	73.2	3.4	1.6	0.0	0.0	0.0	0.0	0.0	19.7
1647	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	71.0	2.8	1.2	0.0	0.0	0.0	0.0	0.0	20.7
1672	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	72.2	3.1	1.3	0.0	0.0	0.0	0.0	0.0	20.0
1685	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	70.8	2.8	1.0	0.0	0.0	0.0	0.0	0.0	20.5
1692	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	72.0	3.1	1.3	0.0	0.0	0.0	0.0	0.0	19.6
1699	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	74.4	3.8	-0.3	0.0	0.0	0.0	0.0	0.0	20.7
1834	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	71.1	2.8	1.2	0.0	0.0	0.0	0.0	0.0	19.0
1930	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	74.6	3.8	-1.4	0.0	0.0	0.0	0.0	0.0	20.2
1942	526011.21	5056249.85	2.00	0	DEN	A	62.6	32.3	0.0	0.0	0.0	72.8	3.3	1.8	0.0	0.0	0.0	0.0	0.0	17.1
2050	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	74.1	3.7	-1.5	0.0	0.0	0.0	0.0	0.0	19.3
2215	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	74.8	3.9	2.3	0.0	0.0	0.0	0.0	0.0	14.0
2259	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	70.8	2.8	1.0	0.0	0.0	0.0	0.0	0.0	15.8
2282	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	74.3	3.7	2.0	0.0	0.0	0.0	0.0	0.0	13.5
2286	525743.96	5056017.73	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	75.0	3.9	2.4	0.0	0.0	0.0	0.0	0.0	12.8
2340	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	74.9	3.9	-1.4	0.0	0.0	0.0	0.0	0.0	15.9
2358	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	72.3	3.2	1.3	0.0	0.0	0.0	0.0	0.0	13.4
2390	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	72.9	3.3	1.7	0.0	0.0	0.0	0.0	0.0	12.1
2430	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	70.7	2.8	1.2	0.0	0.0	0.0	0.0	0.0	12.7
2433	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	72.3	3.2	1.4	0.0	0.0	0.0	0.0	0.0	12.0
2442	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	74.7	3.8	2.2	0.0	0.0	0.0	0.0	0.0	10.5
2477	526224.65	5056060.42	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	72.7	3.3	1.5	0.0	0.0	0.0	0.0	0.0	10.7
2483	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	73.8	3.6	2.1	0.0	0.0	0.0	0.0	0.0	8.7
2489	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	74.9	3.9	0.1	0.0	0.0	0.0	0.0	0.0	10.9
2537	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	74.3	3.7	2.0	0.0	0.0	0.0	0.0	0.0	7.2

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2562	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	74.9	3.9	2.4	0.0	0.0	0.0	0.0	0.0	6.0
2632	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	74.9	3.9	2.4	0.0	0.0	0.0	0.0	0.0	5.0
2702	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	73.7	3.6	0.6	0.0	0.0	0.0	0.0	0.0	3.6

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1282	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	74.5	3.8	-2.4	0.0	0.0	0.0	0.0	0.0	30.5
1317	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	73.7	3.5	-2.4	0.0	0.0	0.0	0.0	0.0	29.5
1332	526740.61	5055502.08	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	74.8	3.9	-2.4	0.0	0.0	0.0	0.0	0.0	28.0
1376	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	75.3	4.0	-1.8	0.0	0.0	0.0	0.0	0.0	26.8
1430	526641.01	5055518.97	2.00	0	DEN	A	59.7	42.6	0.0	0.0	0.0	74.8	3.9	-2.5	0.0	0.0	0.0	0.0	0.0	26.2
1448	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	74.4	3.8	-0.8	0.0	0.0	0.0	0.0	0.0	24.4
1598	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	74.7	3.8	-1.5	0.0	0.0	0.0	0.0	0.0	23.1
1876	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	75.4	4.1	-1.9	0.0	0.0	0.0	0.0	0.0	20.5
1895	526793.98	5055599.46	2.00	0	DEN	A	59.7	37.1	0.0	0.0	0.0	74.2	3.7	-2.4	0.0	0.0	0.0	0.0	0.0	21.4
1925	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	75.0	3.9	-1.9	0.0	0.0	0.0	0.0	0.0	20.7
1973	526528.50	5055398.47	2.00	0	DEN	A	59.7	37.9	0.0	0.0	0.0	75.6	4.1	1.1	0.0	0.0	0.0	0.0	0.0	16.9
2055	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	74.1	3.7	-2.3	0.0	0.0	0.0	0.0	0.0	20.3
2197	526538.73	5055431.82	2.00	0	DEN	A	59.7	36.4	0.0	0.0	0.0	75.4	4.1	1.1	0.0	0.0	0.0	0.0	0.0	15.7
2253	526578.75	5055444.27	2.00	0	DEN	A	59.7	35.2	0.0	0.0	0.0	75.3	4.0	1.0	0.0	0.0	0.0	0.0	0.0	14.6
2275	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	74.3	3.7	-0.6	0.0	0.0	0.0	0.0	0.0	16.3
2304	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	74.4	3.7	-0.9	0.0	0.0	0.0	0.0	0.0	16.0
2370	525977.99	5055643.04	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	75.6	4.1	1.4	0.0	0.0	0.0	0.0	0.0	12.1
2418	525942.86	5055649.71	2.00	0	DEN	A	59.7	32.6	0.0	0.0	0.0	75.7	4.2	1.3	0.0	0.0	0.0	0.0	0.0	11.2
2486	525922.85	5055637.70	2.00	0	DEN	A	59.7	30.9	0.0	0.0	0.0	75.8	4.2	0.5	0.0	0.0	0.0	0.0	0.0	10.1
2501	526730.39	5055412.70	2.00	0	DEN	A	59.7	29.9	0.0	0.0	0.0	75.3	4.0	-2.4	0.0	0.0	0.0	0.0	0.0	12.8
2516	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	75.1	4.0	-2.3	0.0	0.0	0.0	0.0	0.0	12.3
2519	526497.82	5055471.84	2.00	0	DEN	A	59.7	29.4	0.0	0.0	0.0	75.2	4.0	1.0	0.0	0.0	0.0	0.0	0.0	8.9
2565	526587.20	5055466.95	2.00	0	DEN	A	59.7	27.2	0.0	0.0	0.0	75.1	4.0	0.3	0.0	0.0	0.0	0.0	0.0	7.6
2698	525949.09	5055683.50	2.00	0	DEN	A	59.7	25.3	0.0	0.0	0.0	75.5	4.1	2.2	0.0	0.0	0.0	0.0	0.0	3.2
2720	526045.14	5055566.55	2.00	0	DEN	A	59.7	24.5	0.0	0.0	0.0	75.7	4.2	-0.9	0.0	0.0	0.0	0.0	0.0	5.2
2768	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	74.3	3.7	1.9	0.0	0.0	0.0	0.0	0.0	-2.4

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1324	528214.13	5056987.32	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	73.0	4.4	0.3	0.0	0.0	0.0	0.0	0.0	36.5
1324	528214.13	5056987.32	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	73.0	4.4	0.3	0.0	0.0	0.0	0.0	0.0	-151.5
1324	528214.13	5056987.32	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	73.0	4.4	0.3	0.0	0.0	0.0	0.0	0.0	36.5

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1484	526650.08	5055183.13	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	76.5	6.2	-3.0	0.0	0.0	0.0	0.0	0.0	34.4
1484	526650.08	5055183.13	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	76.5	6.2	-3.0	0.0	0.0	0.0	0.0	0.0	-153.6
1484	526650.08	5055183.13	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	76.5	6.2	-3.0	0.0	0.0	0.0	0.0	0.0	34.4

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1543	525609.35	5055488.24	2.00	0	DEN	A	59.2	44.4	0.0	0.0	0.0	77.2	4.7	-1.2	0.0	0.0	0.0	0.0	0.0	22.9
1555	526169.61	5055362.74	2.00	0	DEN	A	59.2	43.5	0.0	0.0	0.0	76.3	4.4	1.7	0.0	0.0	0.0	0.0	0.0	20.3
1635	526103.50	5055297.75	2.00	0	DEN	A	59.2	42.5	0.0	0.0	0.0	76.7	4.5	1.9	0.0	0.0	0.0	0.0	0.0	18.5
1664	525827.85	5055368.34	2.00	0	DEN	A	59.2	42.1	0.0	0.0	0.0	77.1	4.6	2.3	0.0	0.0	0.0	0.0	0.0	17.3
1792	525693.39	5055435.57	2.00	0	DEN	A	59.2	41.3	0.0	0.0	0.0	77.2	4.7	-0.9	0.0	0.0	0.0	0.0	0.0	19.5
1822	526158.40	5055231.64	2.00	0	DEN	A	59.2	40.8	0.0	0.0	0.0	76.9	4.6	1.9	0.0	0.0	0.0	0.0	0.0	16.6
1840	525753.90	5055424.37	2.00	0	DEN	A	59.2	40.6	0.0	0.0	0.0	77.1	4.6	2.6	0.0	0.0	0.0	0.0	0.0	15.6
2040	525948.87	5055345.93	2.00	0	DEN	A	59.2	39.6	0.0	0.0	0.0	76.9	4.6	2.2	0.0	0.0	0.0	0.0	0.0	15.2
2045	525918.61	5055233.88	2.00	0	DEN	A	59.2	39.9	0.0	0.0	0.0	77.4	4.7	2.3	0.0	0.0	0.0	0.0	0.0	14.7
2222	525581.34	5055582.36	2.00	0	DEN	A	59.2	37.6	0.0	0.0	0.0	77.0	4.6	0.3	0.0	0.0	0.0	0.0	0.0	14.8
2322	526224.51	5055201.39	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	76.9	4.6	1.8	0.0	0.0	0.0	0.0	0.0	11.9
2352	525753.90	5055673.12	2.00	0	DEN	A	59.2	34.9	0.0	0.0	0.0	76.2	4.3	0.7	0.0	0.0	0.0	0.0	0.0	12.8
2397	525928.70	5055298.87	2.00	0	DEN	A	59.2	35.2	0.0	0.0	0.0	77.1	4.6	2.3	0.0	0.0	0.0	0.0	0.0	10.4

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2400	525767.35	5055654.07	2.00	0	DEN	A	59.2	34.0	0.0	0.0	0.0	76.2	4.3	-0.4	0.0	0.0	0.0	0.0	0.0	13.1
2421	525821.13	5055333.61	2.00	0	DEN	A	59.2	34.2	0.0	0.0	0.0	77.2	4.7	2.4	0.0	0.0	0.0	0.0	0.0	9.1
2456	525766.23	5055537.54	2.00	0	DEN	A	59.2	33.6	0.0	0.0	0.0	76.6	4.5	2.6	0.0	0.0	0.0	0.0	0.0	9.1
2462	526307.43	5055299.99	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	76.4	4.4	1.6	0.0	0.0	0.0	0.0	0.0	9.9
2465	525741.57	5055618.22	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	76.4	4.4	0.3	0.0	0.0	0.0	0.0	0.0	11.2
2474	525514.11	5055557.71	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	77.3	4.7	2.7	0.0	0.0	0.0	0.0	0.0	8.1
2513	525744.94	5055584.60	2.00	0	DEN	A	59.2	31.7	0.0	0.0	0.0	76.5	4.4	2.5	0.0	0.0	0.0	0.0	0.0	7.4
2522	526252.53	5055352.65	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	76.2	4.3	1.5	0.0	0.0	0.0	0.0	0.0	7.8
2531	526221.15	5055407.56	2.00	0	DEN	A	59.2	30.0	0.0	0.0	0.0	76.0	4.3	1.5	0.0	0.0	0.0	0.0	0.0	7.4
2623	526104.62	5055261.89	2.00	0	DEN	A	59.2	29.1	0.0	0.0	0.0	76.9	4.6	1.9	0.0	0.0	0.0	0.0	0.0	4.9
2628	525788.64	5055492.72	2.00	0	DEN	A	59.2	28.8	0.0	0.0	0.0	76.7	4.5	2.6	0.0	0.0	0.0	0.0	0.0	4.2
2640	525621.68	5055623.82	2.00	0	DEN	A	59.2	27.6	0.0	0.0	0.0	76.8	4.5	2.7	0.0	0.0	0.0	0.0	0.0	2.9
2648	525790.88	5055696.65	2.00	0	DEN	A	59.2	26.2	0.0	0.0	0.0	76.0	4.2	2.5	0.0	0.0	0.0	0.0	0.0	2.7
2732	526092.29	5055415.40	2.00	0	DEN	A	59.2	24.8	0.0	0.0	0.0	76.3	4.3	1.8	0.0	0.0	0.0	0.0	0.0	1.5
2748	525830.09	5055679.84	2.00	0	DEN	A	59.2	23.8	0.0	0.0	0.0	75.9	4.2	2.5	0.0	0.0	0.0	0.0	0.0	0.3
2762	525804.32	5055496.08	2.00	0	DEN	A	59.2	22.8	0.0	0.0	0.0	76.7	4.5	2.5	0.0	0.0	0.0	0.0	0.0	-1.6
2774	525809.93	5055667.52	2.00	0	DEN	A	59.2	16.0	0.0	0.0	0.0	76.0	4.3	1.5	0.0	0.0	0.0	0.0	0.0	-6.7

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1658	525591.21	5055845.98	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	76.1	6.0	-2.3	0.0	0.0	0.0	0.0	0.0	34.3
1658	525591.21	5055845.98	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	76.1	6.0	-2.3	0.0	0.0	0.0	0.0	0.0	-153.7
1658	525591.21	5055845.98	3.00	0	E	A	114.2	0.0	-188.0	0.0	0.0	76.1	6.0	-2.3	0.0	0.0	0.0	0.0	0.0	-153.7

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1798	527073.46	5057385.69	2.00	0	D	A	69.0	21.0	0.0	0.0	0.0	62.3	2.1	1.0	0.0	0.0	0.0	0.0	0.0	24.5
1798	527073.46	5057385.69	2.00	0	N	A	-34.1	21.0	0.0	0.0	0.0	62.3	2.1	1.0	0.0	0.0	0.0	0.0	0.0	-78.5
1798	527073.46	5057385.69	2.00	0	E	A	69.0	21.0	0.0	0.0	0.0	62.3	2.1	1.0	0.0	0.0	0.0	0.0	0.0	24.5
1804	527199.27	5057369.13	2.00	0	D	A	69.0	21.0	0.0	0.0	0.0	63.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	23.3
1804	527199.27	5057369.13	2.00	0	N	A	-34.1	21.0	0.0	0.0	0.0	63.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-79.7
1804	527199.27	5057369.13	2.00	0	E	A	69.0	21.0	0.0	0.0	0.0	63.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	23.3
1810	527387.98	5057344.30	2.00	0	D	A	69.0	24.0	0.0	0.0	0.0	65.5	2.8	1.1	0.0	0.0	0.0	0.0	0.0	23.6
1810	527387.98	5057344.30	2.00	0	N	A	-34.1	24.0	0.0	0.0	0.0	65.5	2.8	1.1	0.0	0.0	0.0	0.0	0.0	-79.4
1810	527387.98	5057344.30	2.00	0	E	A	69.0	24.0	0.0	0.0	0.0	65.5	2.8	1.1	0.0	0.0	0.0	0.0	0.0	23.6
1907	526066.72	5057807.44	2.00	0	D	A	69.0	26.6	0.0	0.0	0.0	72.4	4.7	1.3	0.0	0.0	0.0	0.0	0.0	17.2
1907	526066.72	5057807.44	2.00	0	N	A	-34.1	26.6	0.0	0.0	0.0	72.4	4.7	1.3	0.0	0.0	0.0	0.0	0.0	-85.8
1907	526066.72	5057807.44	2.00	0	E	A	69.0	26.6	0.0	0.0	0.0	72.4	4.7	1.3	0.0	0.0	0.0	0.0	0.0	17.2
1913	526369.30	5057642.82	2.00	0	D	A	69.0	23.6	0.0	0.0	0.0	69.5	3.8	1.2	0.0	0.0	0.0	0.0	0.0	18.1
1913	526369.30	5057642.82	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	69.5	3.8	1.2	0.0	0.0	0.0	0.0	0.0	-84.9
1913	526369.30	5057642.82	2.00	0	E	A	69.0	23.6	0.0	0.0	0.0	69.5	3.8	1.2	0.0	0.0	0.0	0.0	0.0	18.1
1919	526571.02	5057533.07	2.00	0	D	A	69.0	23.6	0.0	0.0	0.0	66.9	3.1	1.1	0.0	0.0	0.0	0.0	0.0	21.4
1919	526571.02	5057533.07	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	66.9	3.1	1.1	0.0	0.0	0.0	0.0	0.0	-81.6
1919	526571.02	5057533.07	2.00	0	E	A	69.0	23.6	0.0	0.0	0.0	66.9	3.1	1.1	0.0	0.0	0.0	0.0	0.0	21.4
2385	526952.60	5057423.37	2.00	0	D	A	69.0	21.1	0.0	0.0	0.0	62.7	2.2	1.0	0.0	0.0	0.0	0.0	0.0	24.1
2385	526952.60	5057423.37	2.00	0	N	A	-34.1	21.1	0.0	0.0	0.0	62.7	2.2	1.0	0.0	0.0	0.0	0.0	0.0	-78.9
2385	526952.60	5057423.37	2.00	0	E	A	69.0	21.1	0.0	0.0	0.0	62.7	2.2	1.0	0.0	0.0	0.0	0.0	0.0	24.1
2412	526821.31	5057447.55	2.00	0	D	A	69.0	21.7	0.0	0.0	0.0	63.7	2.4	1.1	0.0	0.0	0.0	0.0	0.0	23.5
2412	526821.31	5057447.55	2.00	0	N	A	-34.1	21.7	0.0	0.0	0.0	63.7	2.4	1.1	0.0	0.0	0.0	0.0	0.0	-79.5
2412	526821.31	5057447.55	2.00	0	E	A	69.0	21.7	0.0	0.0	0.0	63.7	2.4	1.1	0.0	0.0	0.0	0.0	0.0	23.5
2468	524956.37	5057160.92	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	12.8
2468	524956.37	5057160.92	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	-90.2
2468	524956.37	5057160.92	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	77.0	6.5	1.4	0.0	0.0	0.0	0.0	0.0	12.8
2471	525493.03	5057702.88	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	15.6
2471	525493.03	5057702.88	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-87.4
2471	525493.03	5057702.88	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	15.6
2504	527711.62	5057220.91	2.00	0	D	A	69.0	23.9	0.0	0.0	0.0	68.9	3.6	1.2	0.0	0.0	0.0	0.0	0.0	19.2
2504	527711.62	5057220.91	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	68.9	3.6	1.2	0.0	0.0	0.0	0.0	0.0	-83.8
2504	527711.62	5057220.91	2.00	0	E	A	69.0	23.9	0.0	0.0	0.0	68.9	3.6	1.2	0.0	0.0	0.0	0.0	0.0	19.2
2528	526709.92	5057460.27	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	64.8	2.6	1.1	0.0	0.0	0.0	0.0	0.0	19.7
2528	526709.92	5057460.27	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	64.8	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-83.3

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2528	526709.92	5057460.27	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	64.8	2.6	1.1	0.0	0.0	0.0	0.0	0.0	19.7
2534	527917.66	5057073.64	2.00	0	D	A	69.0	24.1	0.0	0.0	0.0	70.7	4.1	1.3	0.0	0.0	0.0	0.0	0.0	17.0
2534	527917.66	5057073.64	2.00	0	N	A	-34.1	24.1	0.0	0.0	0.0	70.7	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-86.0
2534	527917.66	5057073.64	2.00	0	E	A	69.0	24.1	0.0	0.0	0.0	70.7	4.1	1.3	0.0	0.0	0.0	0.0	0.0	17.0
2604	526221.43	5055451.28	2.00	0	D	A	69.0	29.0	0.0	0.0	0.0	75.8	6.0	-0.2	0.0	0.0	0.0	0.0	0.0	16.3
2604	526221.43	5055451.28	2.00	0	N	A	-34.1	29.0	0.0	0.0	0.0	75.8	6.0	-0.2	0.0	0.0	0.0	0.0	0.0	-86.7
2604	526221.43	5055451.28	2.00	0	E	A	69.0	29.0	0.0	0.0	0.0	75.8	6.0	-0.2	0.0	0.0	0.0	0.0	0.0	16.3
2620	527561.28	5057308.73	2.00	0	D	A	69.0	20.1	0.0	0.0	0.0	67.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	17.2
2620	527561.28	5057308.73	2.00	0	N	A	-34.1	20.1	0.0	0.0	0.0	67.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	-85.8
2620	527561.28	5057308.73	2.00	0	E	A	69.0	20.1	0.0	0.0	0.0	67.5	3.2	1.2	0.0	0.0	0.0	0.0	0.0	17.2
2723	525665.68	5055700.14	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	76.4	6.2	0.5	0.0	0.0	0.0	0.0	0.0	11.4
2723	525665.68	5055700.14	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	76.4	6.2	0.5	0.0	0.0	0.0	0.0	0.0	-91.7
2723	525665.68	5055700.14	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	76.4	6.2	0.5	0.0	0.0	0.0	0.0	0.0	11.4
2726	528201.12	5056907.40	2.00	0	D	A	69.0	22.2	0.0	0.0	0.0	73.0	4.9	1.0	0.0	0.0	0.0	0.0	0.0	12.3
2726	528201.12	5056907.40	2.00	0	N	A	-34.1	22.2	0.0	0.0	0.0	73.0	4.9	1.0	0.0	0.0	0.0	0.0	0.0	-90.7
2726	528201.12	5056907.40	2.00	0	E	A	69.0	22.2	0.0	0.0	0.0	73.0	4.9	1.0	0.0	0.0	0.0	0.0	0.0	12.3
2740	528073.09	5056968.33	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	72.0	4.6	1.3	0.0	0.0	0.0	0.0	0.0	11.8
2740	528073.09	5056968.33	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	72.0	4.6	1.3	0.0	0.0	0.0	0.0	0.0	-91.2
2740	528073.09	5056968.33	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	72.0	4.6	1.3	0.0	0.0	0.0	0.0	0.0	11.8
2759	525813.18	5057945.52	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	74.3	5.4	1.4	0.0	0.0	0.0	0.0	0.0	8.7
2759	525813.18	5057945.52	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	74.3	5.4	1.4	0.0	0.0	0.0	0.0	0.0	-94.3
2759	525813.18	5057945.52	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	74.3	5.4	1.4	0.0	0.0	0.0	0.0	0.0	8.7
2765	525846.70	5055663.19	2.00	0	D	A	69.0	21.2	0.0	0.0	0.0	75.9	6.0	0.6	0.0	0.0	0.0	0.0	0.0	7.6
2765	525846.70	5055663.19	2.00	0	N	A	-34.1	21.2	0.0	0.0	0.0	75.9	6.0	0.6	0.0	0.0	0.0	0.0	0.0	-95.4
2765	525846.70	5055663.19	2.00	0	E	A	69.0	21.2	0.0	0.0	0.0	75.9	6.0	0.6	0.0	0.0	0.0	0.0	0.0	7.6

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2209	528192.89	5056995.40	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	72.9	3.8	1.7	0.0	0.0	0.0	0.0	0.0	25.1
2209	528192.89	5056995.40	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	72.9	3.8	1.7	0.0	0.0	0.0	0.0	0.0	-162.9
2209	528192.89	5056995.40	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	72.9	3.8	1.7	0.0	0.0	0.0	0.0	0.0	25.1

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2415	525527.68	5055841.75	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	76.4	4.8	-0.9	0.0	0.0	0.0	0.0	0.0	23.2
2415	525527.68	5055841.75	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	76.4	4.8	-0.9	0.0	0.0	0.0	0.0	0.0	-164.8
2415	525527.68	5055841.75	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	76.4	4.8	-0.9	0.0	0.0	0.0	0.0	0.0	23.2

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2427	526614.08	5055193.84	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	76.5	4.8	-1.7	0.0	0.0	0.0	0.0	0.0	24.0
2427	526614.08	5055193.84	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	76.5	4.8	-1.7	0.0	0.0	0.0	0.0	0.0	-164.0
2427	526614.08	5055193.84	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	76.5	4.8	-1.7	0.0	0.0	0.0	0.0	0.0	24.0

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2549	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	74.8	5.6	0.5	0.0	0.0	0.0	0.0	0.0	16.7
2549	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	74.8	5.6	0.5	0.0	0.0	0.0	0.0	0.0	-92.4
2549	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	74.8	5.6	0.5	0.0	0.0	0.0	0.0	0.0	16.7
2555	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	73.5	5.1	-0.5	0.0	0.0	0.0	0.0	0.0	18.4
2555	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	73.5	5.1	-0.5	0.0	0.0	0.0	0.0	0.0	-90.6
2555	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	73.5	5.1	-0.5	0.0	0.0	0.0	0.0	0.0	18.4
2568	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	74.2	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	17.2
2568	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	74.2	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	-91.8
2568	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	74.2	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	17.2
2608	525537.35	5055679.08	2.00	0	D	A	75.0	23.6	0.0	0.0	0.0	76.9	6.5	0.3	0.0	0.0	0.0	0.0	0.0	15.0
2608	525537.35	5055679.08	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	76.9	6.5	0.3	0.0	0.0	0.0	0.0	0.0	-94.1
2608	525537.35	5055679.08	2.00	0	E	A	75.0	23.6	0.0	0.0	0.0	76.9	6.5	0.3	0.0	0.0	0.0	0.0	0.0	15.0
2614	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	74.0	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	16.8
2614	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	74.0	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	-92.2

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2614	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	74.0	5.3	-0.3	0.0	0.0	0.0	0.0	0.0	16.8
2626	525740.64	5055713.13	2.00	0	D	A	75.0	22.7	0.0	0.0	0.0	76.1	6.1	0.6	0.0	0.0	0.0	0.0	0.0	14.9
2626	525740.64	5055713.13	2.00	0	N	A	-34.1	22.7	0.0	0.0	0.0	76.1	6.1	0.6	0.0	0.0	0.0	0.0	0.0	-94.2
2626	525740.64	5055713.13	2.00	0	E	A	75.0	22.7	0.0	0.0	0.0	76.1	6.1	0.6	0.0	0.0	0.0	0.0	0.0	14.9
2634	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	74.2	5.3	0.3	0.0	0.0	0.0	0.0	0.0	15.7
2634	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	74.2	5.3	0.3	0.0	0.0	0.0	0.0	0.0	-93.3
2634	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	74.2	5.3	0.3	0.0	0.0	0.0	0.0	0.0	15.7
2638	525898.74	5055726.86	2.00	0	D	A	75.0	21.3	0.0	0.0	0.0	75.5	5.9	0.6	0.0	0.0	0.0	0.0	0.0	14.3
2638	525898.74	5055726.86	2.00	0	N	A	-34.1	21.3	0.0	0.0	0.0	75.5	5.9	0.6	0.0	0.0	0.0	0.0	0.0	-94.7
2638	525898.74	5055726.86	2.00	0	E	A	75.0	21.3	0.0	0.0	0.0	75.5	5.9	0.6	0.0	0.0	0.0	0.0	0.0	14.3

Receiver
Name: (untitled)
ID: POR6
X: 527819.17 m
Y: 5057298.73 m
Z: 4.50 m

Point Source, ISO 9613, Name: "Impact Pile Driver", ID: "s-Pile Driver"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1347	528199.11	5056993.87	1.00	0	D	A	141.5	0.0	-7.0	0.0	0.0	64.8	0.9	8.8	0.0	0.0	0.0	0.0	0.0	60.0
1347	528199.11	5056993.87	1.00	0	N	A	129.5	0.0	-188.0	0.0	0.0	64.8	0.9	8.8	0.0	0.0	0.0	0.0	0.0	-133.0
1347	528199.11	5056993.87	1.00	0	E	A	141.5	0.0	-7.0	0.0	0.0	64.8	0.9	8.8	0.0	0.0	0.0	0.0	0.0	60.0

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1355	527781.56	5056713.22	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	66.4	1.9	-0.9	0.0	0.0	0.0	0.0	0.0	23.4
1361	527827.29	5056795.17	2.00	0	DEN	A	52.3	35.5	0.0	0.0	0.0	65.0	1.7	-0.0	0.0	0.0	0.0	0.0	0.0	21.1
1367	527895.68	5056849.53	2.00	0	DEN	A	52.3	35.5	0.0	0.0	0.0	64.2	1.5	0.4	0.0	0.0	0.0	0.0	0.0	21.6
1372	527684.74	5056659.05	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	67.3	2.0	-0.7	0.0	0.0	0.0	0.0	0.0	25.1
1378	527446.08	5056153.69	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	72.6	3.2	-1.0	0.0	0.0	0.0	0.0	0.0	17.3
1383	527639.01	5056263.41	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	71.4	2.9	-1.0	0.0	0.0	0.0	0.0	0.0	18.9
1389	527330.97	5056133.35	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	73.0	3.4	-0.7	0.0	0.0	0.0	0.0	0.0	19.5
1395	527013.61	5056020.54	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	74.6	3.8	-1.2	0.0	0.0	0.0	0.0	0.0	21.0
1401	527800.76	5056197.46	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	71.8	3.0	-1.1	0.0	0.0	0.0	0.0	0.0	24.5
1407	527666.99	5056211.63	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	71.8	3.0	-1.2	0.0	0.0	0.0	0.0	0.0	21.6
1413	527474.06	5056101.91	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	72.9	3.3	-1.2	0.0	0.0	0.0	0.0	0.0	20.2
1419	526804.30	5056457.62	2.00	0	DEN	A	52.3	47.8	0.0	0.0	0.0	73.4	3.5	-0.5	0.0	0.0	0.0	0.0	0.0	23.7
1425	526640.84	5056641.22	2.00	0	DEN	A	52.3	47.8	0.0	0.0	0.0	73.6	3.5	-0.8	0.0	0.0	0.0	0.0	0.0	23.8
1431	526727.64	5056218.07	2.00	0	DEN	A	52.3	50.8	0.0	0.0	0.0	74.7	3.9	-0.7	0.0	0.0	0.0	0.0	0.0	25.2
1437	528139.97	5056821.51	2.00	0	DEN	A	52.3	40.2	0.0	0.0	0.0	66.2	1.8	-1.0	0.0	0.0	0.0	0.0	0.0	25.5
1443	528053.88	5056849.86	2.00	0	DEN	A	52.3	40.2	0.0	0.0	0.0	65.1	1.7	-0.9	0.0	0.0	0.0	0.0	0.0	26.6
1449	527144.33	5056180.14	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	73.3	3.4	-1.0	0.0	0.0	0.0	0.0	0.0	20.2
1455	526903.69	5056046.61	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	74.8	3.9	-1.1	0.0	0.0	0.0	0.0	0.0	18.3
1461	527461.70	5056292.95	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	71.6	3.0	-0.7	0.0	0.0	0.0	0.0	0.0	19.0
1467	527644.21	5056309.83	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	71.0	2.8	-1.0	0.0	0.0	0.0	0.0	0.0	20.0
1473	527341.38	5056226.18	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	72.4	3.2	-0.5	0.0	0.0	0.0	0.0	0.0	20.9
1479	527974.71	5056668.98	2.00	0	DEN	A	52.3	39.1	0.0	0.0	0.0	67.2	2.0	-1.5	0.0	0.0	0.0	0.0	0.0	23.5
1485	527958.54	5056806.06	2.00	0	DEN	A	52.3	39.1	0.0	0.0	0.0	65.2	1.7	-1.0	0.0	0.0	0.0	0.0	0.0	25.5
1491	527910.50	5056820.03	2.00	0	DEN	A	52.3	37.4	0.0	0.0	0.0	64.8	1.6	-0.8	0.0	0.0	0.0	0.0	0.0	24.1
1496	527830.57	5056710.89	2.00	0	DEN	A	52.3	37.4	0.0	0.0	0.0	66.4	1.9	-1.1	0.0	0.0	0.0	0.0	0.0	22.4
1508	528071.65	5056357.27	2.00	0	DEN	A	52.3	45.1	0.0	0.0	0.0	70.8	2.8	-2.0	0.0	0.0	0.0	0.0	0.0	25.9
1514	528020.35	5056712.22	2.00	0	DEN	A	52.3	34.0	0.0	0.0	0.0	66.8	2.0	-1.4	0.0	0.0	0.0	0.0	0.0	18.9
1520	527992.07	5056812.57	2.00	0	DEN	A	52.3	34.0	0.0	0.0	0.0	65.3	1.7	-1.0	0.0	0.0	0.0	0.0	0.0	20.4
1526	528022.38	5056625.32	2.00	0	DEN	A	52.3	37.1	0.0	0.0	0.0	67.9	2.2	-1.5	0.0	0.0	0.0	0.0	0.0	20.8
1538	527776.69	5056798.10	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	65.0	1.7	1.8	0.0	0.0	0.0	0.0	0.0	17.0
1544	527677.48	5056705.66	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	66.7	1.9	2.0	0.0	0.0	0.0	0.0	0.0	14.9
1550	527898.07	5056887.80	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	63.4	1.4	1.8	0.0	0.0	0.0	0.0	0.0	18.9
1556	527829.68	5056833.43	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	64.4	1.6	1.4	0.0	0.0	0.0	0.0	0.0	18.1
1562	527661.88	5056065.51	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	72.9	3.3	-1.4	0.0	0.0	0.0	0.0	0.0	19.6
1568	527431.65	5056024.83	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	73.5	3.5	-1.3	0.0	0.0	0.0	0.0	0.0	18.8
1574	527228.45	5055973.03	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	74.2	3.7	-0.9	0.0	0.0	0.0	0.0	0.0	17.5
1580	526944.17	5055954.57	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	75.1	4.0	-1.2	0.0	0.0	0.0	0.0	0.0	16.6
1596	528038.35	5056784.98	2.00	0	DEN	A	52.3	38.0	0.0	0.0	0.0	65.9	1.8	-1.2	0.0	0.0	0.0	0.0	0.0	23.8
1617	526773.84	5056745.51	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	72.5	3.2	-0.4	0.0	0.0	0.0	0.0	0.0	22.9
1623	528077.03	5056907.92	2.00	0	DEN	A	52.3	33.6	0.0	0.0	0.0	64.4	1.6	1.0	0.0	0.0	0.0	0.0	0.0	18.9
1630	528163.12	5056879.58	2.00	0	DEN	A	52.3	33.6	0.0	0.0	0.0	65.7	1.8	0.2	0.0	0.0	0.0	0.0	0.0	18.3
1642	528175.65	5056754.58	2.00	0	DEN	A	52.3	39.7	0.0	0.0	0.0	67.3	2.0	-1.3	0.0	0.0	0.0	0.0	0.0	24.0
1654	527716.84	5056002.61	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	73.3	3.4	-1.4	0.0	0.0	0.0	0.0	0.0	22.2
1666	527162.96	5055909.34	2.00	0	DEN	A	52.3	43.3	0.0	0.0	0.0	74.7	3.9	-1.1	0.0	0.0	0.0	0.0	0.0	18.1
1673	526878.68	5055890.87	2.00	0	DEN	A	52.3	43.3	0.0	0.0	0.0	75.6	4.1	-1.3	0.0	0.0	0.0	0.0	0.0	17.2
1680	527965.90	5056367.24	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	70.5	2.7	-0.9	0.0	0.0	0.0	0.0	0.0	21.6

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1686	528003.75	5056320.82	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	71.0	2.8	-1.5	0.0	0.0	0.0	0.0	0.0	20.1
1693	526527.13	5056356.58	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	75.1	4.0	-1.0	0.0	0.0	0.0	0.0	0.0	20.2
1700	526894.16	5056106.12	2.00	0	DEN	A	52.3	40.9	0.0	0.0	0.0	74.6	3.8	-1.0	0.0	0.0	0.0	0.0	0.0	15.8
1707	527134.80	5056239.64	2.00	0	DEN	A	52.3	40.9	0.0	0.0	0.0	73.0	3.3	-0.9	0.0	0.0	0.0	0.0	0.0	17.7
1714	526915.98	5056188.19	2.00	0	DEN	A	52.3	44.3	0.0	0.0	0.0	74.1	3.7	-0.8	0.0	0.0	0.0	0.0	0.0	19.6
1721	527906.87	5056312.52	2.00	0	DEN	A	52.3	41.2	0.0	0.0	0.0	70.9	2.8	-1.0	0.0	0.0	0.0	0.0	0.0	20.7
1728	528011.51	5056802.06	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	65.5	1.7	-1.1	0.0	0.0	0.0	0.0	0.0	16.9
1735	528039.79	5056701.71	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	67.1	2.0	-1.5	0.0	0.0	0.0	0.0	0.0	15.4
1742	527661.51	5056372.09	2.00	0	DEN	A	52.3	40.7	0.0	0.0	0.0	70.5	2.7	1.1	0.0	0.0	0.0	0.0	0.0	18.6
1750	526827.92	5055821.88	2.00	0	DEN	A	52.3	45.4	0.0	0.0	0.0	76.0	4.3	-1.3	0.0	0.0	0.0	0.0	0.0	18.8
1766	527626.51	5056582.16	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	68.4	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	20.1
1773	528114.21	5056481.81	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	69.8	2.5	-1.4	0.0	0.0	0.0	0.0	0.0	19.0
1780	526707.85	5056917.16	2.00	0	DEN	A	52.3	41.3	0.0	0.0	0.0	72.4	3.2	-0.4	0.0	0.0	0.0	0.0	0.0	18.4
1787	527368.59	5056562.31	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	69.7	2.5	-0.3	0.0	0.0	0.0	0.0	0.0	18.8
1799	527961.71	5056629.28	2.00	0	DEN	A	52.3	34.8	dB	0.0	0.0	67.7	2.1	-1.5	0.0	0.0	0.0	0.0	0.0	18.8
1805	527249.93	5056556.41	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	70.4	2.7	-0.6	0.0	0.0	0.0	0.0	0.0	18.3
1811	527309.44	5056492.87	2.00	0	DEN	A	52.3	38.3	0.0	0.0	0.0	70.6	2.7	-0.8	0.0	0.0	0.0	0.0	0.0	18.0
1823	527307.17	5055876.20	2.00	0	DEN	A	52.3	42.5	0.0	0.0	0.0	74.6	3.8	-1.2	0.0	0.0	0.0	0.0	0.0	17.6
1829	526646.93	5056896.52	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	72.9	3.3	-0.6	0.0	0.0	0.0	0.0	0.0	16.6
1835	526858.62	5056107.80	2.00	0	DEN	A	52.3	37.3	0.0	0.0	0.0	74.7	3.8	-0.9	0.0	0.0	0.0	0.0	0.0	12.0
1841	527060.66	5056242.51	2.00	0	DEN	A	52.3	37.3	0.0	0.0	0.0	73.3	3.4	-0.8	0.0	0.0	0.0	0.0	0.0	13.8
1860	526904.81	5056675.98	2.00	0	DEN	A	52.3	38.9	0.0	0.0	0.0	71.9	3.0	1.1	0.0	0.0	0.0	0.0	0.0	15.2
1877	527991.82	5056352.77	2.00	0	DEN	A	52.3	32.0	0.0	0.0	0.0	70.7	2.7	-1.4	0.0	0.0	0.0	0.0	0.0	12.3
1881	528025.66	5056513.27	2.00	0	DEN	A	52.3	32.0	0.0	0.0	0.0	69.2	2.4	-1.8	0.0	0.0	0.0	0.0	0.0	14.5
1897	527456.17	5056326.20	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	71.3	2.9	0.7	0.0	0.0	0.0	0.0	0.0	11.3
1904	527638.69	5056343.09	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	70.8	2.8	-0.4	0.0	0.0	0.0	0.0	0.0	13.1
1910	527622.54	5056021.48	2.00	0	DEN	A	52.3	38.6	0.0	0.0	0.0	73.2	3.4	-1.4	0.0	0.0	0.0	0.0	0.0	15.7
1916	527275.93	5056519.94	2.00	0	DEN	A	52.3	35.6	0.0	0.0	0.0	70.6	2.7	-0.7	0.0	0.0	0.0	0.0	0.0	15.4
1921	527551.75	5055861.98	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.3	3.7	-1.5	0.0	0.0	0.0	0.0	0.0	15.7
1927	527613.15	5055896.44	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.0	3.6	-1.6	0.0	0.0	0.0	0.0	0.0	16.0
1935	527321.11	5056360.04	2.00	0	DEN	A	52.3	37.2	0.0	0.0	0.0	71.5	3.0	1.4	0.0	0.0	0.0	0.0	0.0	13.6
1941	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	76.1	4.3	-1.0	0.0	0.0	0.0	0.0	0.0	14.3
1981	526746.94	5056696.62	2.00	0	DEN	A	52.3	34.5	0.0	0.0	0.0	72.8	3.3	-0.6	0.0	0.0	0.0	0.0	0.0	11.4
1986	526888.06	5056540.18	2.00	0	DEN	A	52.3	34.5	0.0	0.0	0.0	72.6	3.2	1.0	0.0	0.0	0.0	0.0	0.0	10.0
1991	528119.15	5056408.72	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	70.5	2.7	-1.8	0.0	0.0	0.0	0.0	0.0	14.0
1996	526450.98	5056597.76	2.00	0	DEN	A	52.3	38.8	0.0	0.0	0.0	74.7	3.9	-1.0	0.0	0.0	0.0	0.0	0.0	13.5
2001	526691.60	5055797.09	2.00	0	DEN	A	52.3	40.8	0.0	0.0	0.0	76.5	4.4	-1.3	0.0	0.0	0.0	0.0	0.0	13.5
2035	527393.33	5056331.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	71.5	2.9	1.7	0.0	0.0	0.0	0.0	0.0	10.9
2221	527255.62	5056599.77	2.00	0	DEN	A	52.3	33.0	0.0	0.0	0.0	70.1	2.6	1.3	0.0	0.0	0.0	0.0	0.0	11.3
2227	527809.24	5055979.29	2.00	0	DEN	A	52.3	36.3	0.0	0.0	0.0	73.4	3.5	-1.3	0.0	0.0	0.0	0.0	0.0	12.9
2234	527336.73	5056490.90	2.00	0	DEN	A	52.3	32.7	0.0	0.0	0.0	70.5	2.7	-0.7	0.0	0.0	0.0	0.0	0.0	12.6
2367	526785.01	5056905.21	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	71.9	3.0	1.7	0.0	0.0	0.0	0.0	0.0	10.3
2373	528148.76	5056221.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	72.0	3.1	-2.2	0.0	0.0	0.0	0.0	0.0	14.1
2378	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	76.5	4.4	-1.1	0.0	0.0	0.0	0.0	0.0	11.0
2388	526988.60	5055781.19	2.00	0	DEN	A	52.3	37.1	0.0	0.0	0.0	75.8	4.2	-1.1	0.0	0.0	0.0	0.0	0.0	10.6
2392	526563.17	5056326.71	2.00	0	DEN	A	52.3	32.1	0.0	0.0	0.0	75.0	3.9	-0.9	0.0	0.0	0.0	0.0	0.0	6.4
2396	526558.09	5056658.06	2.00	0	DEN	A	52.3	32.1	0.0	0.0	0.0	74.0	3.6	-0.9	0.0	0.0	0.0	0.0	0.0	7.6
2399	528082.86	5056212.59	2.00	0	DEN	A	52.3	33.4	0.0	0.0	0.0	72.0	3.1	-2.1	0.0	0.0	0.0	0.0	0.0	12.7
2405	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	76.1	4.3	-1.0	0.0	0.0	0.0	0.0	0.0	9.5
2408	526632.72	5056979.09	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	72.8	3.3	1.1	0.0	0.0	0.0	0.0	0.0	8.4
2411	527848.96	5056038.84	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	73.0	3.3	-1.3	0.0	0.0	0.0	0.0	0.0	10.6
2414	528139.11	5056191.06	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	72.2	3.1	-0.6	0.0	0.0	0.0	0.0	0.0	10.6
2417	526483.47	5056564.08	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	74.7	3.8	-1.0	0.0	0.0	0.0	0.0	0.0	9.7
2420	526434.74	5056637.96	2.00	0	DEN	A	52.3	34.9	0.0	0.0	0.0	74.7	3.8	-0.9	0.0	0.0	0.0	0.0	0.0	9.5
2432	527231.18	5055827.31	2.00	0	DEN	A	52.3	35.4	0.0	0.0	0.0	75.0	3.9	-1.2	0.0	0.0	0.0	0.0	0.0	10.0
2438	527394.60	5055872.64	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	74.5	3.8	-1.4	0.0	0.0	0.0	0.0	0.0	8.6
2441	526849.99	5056572.23	2.00	0	DEN	A	52.3	25.8	0.0	0.0	0.0	72.7	3.3	-0.6	0.0	0.0	0.0	0.0	0.0	2.7
2444	526708.86	5056728.67	2.00	0	DEN	A	52.3	25.8	0.0	0.0	0.0	72.9	3.3	-0.6	0.0	0.0	0.0	0.0	0.0	2.5
2447	526942.88	5056466.85	2.00	0	DEN	A	52.3	28.8	0.0	0.0	0.0	72.6	3.2	1.2	0.0	0.0	0.0	0.0	0.0	4.0
2454	526594.14	5055830.77	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	76.6	4.5	-1.2	0.0	0.0	0.0	0.0	0.0	7.4
2457	527925.77	5056103.14	2.00	0	DEN	A	52.3	30.5	0.0	0.0	0.0	72.6	3.2	-0.8	0.0	0.0	0.0	0.0	0.0	7.8
2460	526646.93	5056873.71	2.00	0	DEN	A	52.3	29.9	0.0	0.0	0.0	72.9	3.3	-0.6	0.0	0.0	0.0	0.0	0.0	6.5
2463	526443.87	5056660.77	2.00	0	DEN	A	52.3	31.7	0.0	0.0	0.0	74.6	3.8	1.4	0.0	0.0	0.0	0.0	0.0	4.1

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2466	526507.84	5056218.61	2.00	0	DEN	A	52.3	32.5	0.0	0.0	0.0	75.6	4.1	-1.0	0.0	0.0	0.0	0.0	0.0	6.0
2469	526952.53	5056480.43	2.00	0	DEN	A	52.3	29.4	0.0	0.0	0.0	72.5	3.2	2.1	0.0	0.0	0.0	0.0	0.0	3.9
2475	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	76.5	4.4	-1.1	0.0	0.0	0.0	0.0	0.0	5.7
2478	527311.85	5056412.29	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	71.2	2.9	-0.6	0.0	0.0	0.0	0.0	0.0	6.3
2481	526548.45	5056809.61	2.00	0	DEN	A	52.3	30.0	0.0	0.0	0.0	73.7	3.5	-0.8	0.0	0.0	0.0	0.0	0.0	5.8
2484	527587.02	5055809.42	2.00	0	DEN	A	52.3	30.8	0.0	0.0	0.0	74.6	3.8	1.4	0.0	0.0	0.0	0.0	0.0	3.3
2487	527289.02	5056366.95	2.00	0	DEN	A	52.3	27.6	0.0	0.0	0.0	71.6	3.0	-0.7	0.0	0.0	0.0	0.0	0.0	6.0
2490	526893.64	5056743.34	2.00	0	DEN	A	52.3	28.0	0.0	0.0	0.0	71.7	3.0	2.4	0.0	0.0	0.0	0.0	0.0	3.2
2493	526508.85	5056621.66	2.00	0	DEN	A	52.3	30.1	0.0	0.0	0.0	74.4	3.7	-0.9	0.0	0.0	0.0	0.0	0.0	5.2
2496	526540.33	5056950.84	2.00	0	DEN	A	52.3	29.2	0.0	0.0	0.0	73.4	3.5	-0.5	0.0	0.0	0.0	0.0	0.0	5.1
2499	526940.35	5056608.63	2.00	0	DEN	A	52.3	27.2	0.0	0.0	0.0	72.0	3.1	1.0	0.0	0.0	0.0	0.0	0.0	3.4
2502	526407.32	5056556.48	2.00	0	DEN	A	52.3	30.4	0.0	0.0	0.0	75.1	4.0	-1.0	0.0	0.0	0.0	0.0	0.0	4.6
2505	527207.69	5056522.44	2.00	0	DEN	A	52.3	25.7	0.0	0.0	0.0	70.9	2.8	-0.7	0.0	0.0	0.0	0.0	0.0	5.0
2508	526524.08	5056944.32	2.00	0	DEN	A	52.3	28.1	0.0	0.0	0.0	73.6	3.5	-0.5	0.0	0.0	0.0	0.0	0.0	3.9
2511	526754.55	5055738.43	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	76.5	4.4	-1.4	0.0	0.0	0.0	0.0	0.0	3.6
2514	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	76.6	4.5	-1.1	0.0	0.0	0.0	0.0	0.0	3.3
2517	526705.82	5055738.43	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	76.7	4.5	-1.4	0.0	0.0	0.0	0.0	0.0	3.2
2520	527504.16	5055876.80	2.00	0	DEN	A	52.3	27.9	0.0	0.0	0.0	74.3	3.7	-1.4	0.0	0.0	0.0	0.0	0.0	3.6
2523	526467.22	5056405.47	2.00	0	DEN	A	52.3	29.0	0.0	0.0	0.0	75.2	4.0	-1.1	0.0	0.0	0.0	0.0	0.0	3.2
2526	527209.95	5055884.50	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	74.7	3.9	-1.1	0.0	0.0	0.0	0.0	0.0	2.3
2529	527324.42	5056404.58	2.00	0	DEN	A	52.3	24.5	0.0	0.0	0.0	71.2	2.9	2.7	0.0	0.0	0.0	0.0	0.0	0.0
2535	526800.24	5055721.04	2.00	0	DEN	A	52.3	28.9	0.0	0.0	0.0	76.5	4.4	-1.4	0.0	0.0	0.0	0.0	0.0	1.7
2545	526889.58	5056641.22	2.00	0	DEN	A	52.3	23.8	0.0	0.0	0.0	72.1	3.1	-0.4	0.0	0.0	0.0	0.0	0.0	1.2
2548	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	75.7	4.2	-1.0	0.0	0.0	0.0	0.0	0.0	0.7
2574	526602.26	5055849.24	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	76.5	4.4	-1.2	0.0	0.0	0.0	0.0	0.0	-0.2
2577	527356.53	5056374.75	2.00	0	DEN	A	52.3	21.9	0.0	0.0	0.0	71.3	2.9	2.7	0.0	0.0	0.0	0.0	0.0	-2.7
2580	526381.94	5056629.27	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	75.0	3.9	-0.8	0.0	0.0	0.0	0.0	0.0	-0.3
2583	526543.37	5056779.19	2.00	0	DEN	A	52.3	23.9	0.0	0.0	0.0	73.8	3.6	-0.6	0.0	0.0	0.0	0.0	0.0	-0.5
2586	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	75.9	4.2	-0.7	0.0	0.0	0.0	0.0	0.0	-1.9
2589	526554.54	5056837.85	2.00	0	DEN	A	52.3	23.0	0.0	0.0	0.0	73.6	3.5	-0.7	0.0	0.0	0.0	0.0	0.0	-1.1
2592	526554.54	5056771.58	2.00	0	DEN	A	52.3	20.2	0.0	0.0	0.0	73.7	3.6	-0.8	0.0	0.0	0.0	0.0	0.0	-4.0
2598	526545.40	5056845.46	2.00	0	DEN	A	52.3	19.7	0.0	0.0	0.0	73.6	3.5	-0.3	0.0	0.0	0.0	0.0	0.0	-4.8
2612	526530.17	5056954.10	2.00	0	DEN	A	52.3	19.3	0.0	0.0	0.0	73.5	3.5	-0.5	0.0	0.0	0.0	0.0	0.0	-4.9
2621	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	75.3	4.0	-0.9	0.0	0.0	0.0	0.0	0.0	-8.7

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1502	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	77.7	4.8	-1.3	0.0	0.0	0.0	0.0	0.0	25.2
1586	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	77.1	4.6	-1.3	0.0	0.0	0.0	0.0	0.0	23.8
1591	526740.61	5055502.08	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	77.4	4.7	-1.5	0.0	0.0	0.0	0.0	0.0	23.6
1636	526641.01	5055518.97	2.00	0	DEN	A	59.7	42.6	0.0	0.0	0.0	77.6	4.8	-1.5	0.0	0.0	0.0	0.0	0.0	21.4
1660	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	77.8	4.9	-0.9	0.0	0.0	0.0	0.0	0.0	20.0
1848	526793.98	5055599.46	2.00	0	DEN	A	59.7	37.1	0.0	0.0	0.0	77.0	4.6	-1.3	0.0	0.0	0.0	0.0	0.0	16.6
1891	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	77.5	4.8	-1.0	0.0	0.0	0.0	0.0	0.0	14.4

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1532	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	77.8	4.9	2.2	0.0	0.0	0.0	0.0	0.0	21.1
1610	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	77.1	4.6	2.9	0.0	0.0	0.0	0.0	0.0	18.7
1648	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	77.2	4.6	2.9	0.0	0.0	0.0	0.0	0.0	17.1
1756	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	76.4	4.4	2.7	0.0	0.0	0.0	0.0	0.0	14.9
1793	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	77.5	4.8	3.0	0.0	0.0	0.0	0.0	0.0	13.2
1817	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	76.6	4.5	2.8	0.0	0.0	0.0	0.0	0.0	13.6
1854	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	76.8	4.5	2.7	0.0	0.0	0.0	0.0	0.0	12.5
1867	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	76.4	4.4	2.7	0.0	0.0	0.0	0.0	0.0	12.2
1872	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	76.7	4.5	2.7	0.0	0.0	0.0	0.0	0.0	12.0
1886	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	76.2	4.3	2.7	0.0	0.0	0.0	0.0	0.0	11.8
1947	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	76.4	4.4	2.7	0.0	0.0	0.0	0.0	0.0	10.6
2383	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	76.2	4.3	2.6	0.0	0.0	0.0	0.0	0.0	7.2
2402	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	76.9	4.6	2.7	0.0	0.0	0.0	0.0	0.0	6.1
2435	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	76.9	4.6	2.8	0.0	0.0	0.0	0.0	0.0	4.7

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2451	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	76.3	4.4	2.7	0.0	0.0	0.0	0.0	0.0	4.1
2538	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	77.9	4.9	1.2	0.0	0.0	0.0	0.0	0.0	-2.6

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1604	528214.13	5056987.32	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	65.0	1.9	0.1	0.0	0.0	0.0	0.0	0.0	47.2
1604	528214.13	5056987.32	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	65.0	1.9	0.1	0.0	0.0	0.0	0.0	0.0	-140.8
1604	528214.13	5056987.32	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	65.0	1.9	0.1	0.0	0.0	0.0	0.0	0.0	47.2

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1954	527634.49	5057272.52	2.00	0	D	A	69.0	17.9	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.2
1954	527634.49	5057272.52	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-74.8
1954	527634.49	5057272.52	2.00	0	E	A	69.0	17.9	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.2
1959	527685.91	5057238.11	2.00	0	D	A	69.0	17.9	0.0	0.0	0.0	54.3	1.1	0.9	0.0	0.0	0.0	0.0	0.0	30.6
1959	527685.91	5057238.11	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	54.3	1.1	0.9	0.0	0.0	0.0	0.0	0.0	-72.4
1959	527685.91	5057238.11	2.00	0	E	A	69.0	17.9	0.0	0.0	0.0	54.3	1.1	0.9	0.0	0.0	0.0	0.0	0.0	30.6
1964	527737.33	5057203.71	2.00	0	D	A	69.0	17.9	0.0	0.0	0.0	53.0	0.9	0.8	0.0	0.0	0.0	0.0	0.0	32.2
1964	527737.33	5057203.71	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	53.0	0.9	0.8	0.0	0.0	0.0	0.0	0.0	-70.9
1964	527737.33	5057203.71	2.00	0	E	A	69.0	17.9	0.0	0.0	0.0	53.0	0.9	0.8	0.0	0.0	0.0	0.0	0.0	32.2
1976	527788.75	5057169.31	2.00	0	D	A	69.0	17.9	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	31.6
1976	527788.75	5057169.31	2.00	0	N	A	-34.1	17.9	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	-71.4
1976	527788.75	5057169.31	2.00	0	E	A	69.0	17.9	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	31.6
2011	527840.26	5057132.49	2.00	0	D	A	69.0	18.1	0.0	0.0	0.0	55.5	1.2	0.9	0.0	0.0	0.0	0.0	0.0	29.5
2011	527840.26	5057132.49	2.00	0	N	A	-34.1	18.1	0.0	0.0	0.0	55.5	1.2	0.9	0.0	0.0	0.0	0.0	0.0	-73.5
2011	527840.26	5057132.49	2.00	0	E	A	69.0	18.1	0.0	0.0	0.0	55.5	1.2	0.9	0.0	0.0	0.0	0.0	0.0	29.5
2023	527891.86	5057093.26	2.00	0	D	A	69.0	18.1	0.0	0.0	0.0	57.8	1.5	0.9	0.0	0.0	0.0	0.0	0.0	26.9
2023	527891.86	5057093.26	2.00	0	N	A	-34.1	18.1	0.0	0.0	0.0	57.8	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-76.1
2023	527891.86	5057093.26	2.00	0	E	A	69.0	18.1	0.0	0.0	0.0	57.8	1.5	0.9	0.0	0.0	0.0	0.0	0.0	26.9
2029	527969.26	5057034.40	2.00	0	D	A	69.0	21.1	0.0	0.0	0.0	60.7	1.9	1.0	0.0	0.0	0.0	0.0	0.0	26.6
2029	527969.26	5057034.40	2.00	0	N	A	-34.1	21.1	0.0	0.0	0.0	60.7	1.9	1.0	0.0	0.0	0.0	0.0	0.0	-76.4
2029	527969.26	5057034.40	2.00	0	E	A	69.0	21.1	0.0	0.0	0.0	60.7	1.9	1.0	0.0	0.0	0.0	0.0	0.0	26.6
2423	527136.36	5057377.41	2.00	0	D	A	69.0	24.0	0.0	0.0	0.0	67.7	3.3	1.2	0.0	0.0	0.0	0.0	0.0	20.8
2423	527136.36	5057377.41	2.00	0	N	A	-34.1	24.0	0.0	0.0	0.0	67.7	3.3	1.2	0.0	0.0	0.0	0.0	0.0	-82.2
2423	527136.36	5057377.41	2.00	0	E	A	69.0	24.0	0.0	0.0	0.0	67.7	3.3	1.2	0.0	0.0	0.0	0.0	0.0	20.8
2426	527325.07	5057352.58	2.00	0	D	A	69.0	21.0	0.0	0.0	0.0	64.9	2.6	1.1	0.0	0.0	0.0	0.0	0.0	21.3
2426	527325.07	5057352.58	2.00	0	N	A	-34.1	21.0	0.0	0.0	0.0	64.9	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-81.7
2426	527325.07	5057352.58	2.00	0	E	A	69.0	21.0	0.0	0.0	0.0	64.9	2.6	1.1	0.0	0.0	0.0	0.0	0.0	21.3
2429	527450.88	5057336.02	2.00	0	D	A	69.0	21.0	0.0	0.0	0.0	62.4	2.2	1.0	0.0	0.0	0.0	0.0	0.0	24.4
2429	527450.88	5057336.02	2.00	0	N	A	-34.1	21.0	0.0	0.0	0.0	62.4	2.2	1.0	0.0	0.0	0.0	0.0	0.0	-78.6
2429	527450.88	5057336.02	2.00	0	E	A	69.0	21.0	0.0	0.0	0.0	62.4	2.2	1.0	0.0	0.0	0.0	0.0	0.0	24.4
2472	527561.28	5057308.73	2.00	0	D	A	69.0	20.1	0.0	0.0	0.0	59.2	1.7	1.0	0.0	0.0	0.0	0.0	0.0	27.2
2472	527561.28	5057308.73	2.00	0	N	A	-34.1	20.1	0.0	0.0	0.0	59.2	1.7	1.0	0.0	0.0	0.0	0.0	0.0	-75.8
2472	527561.28	5057308.73	2.00	0	E	A	69.0	20.1	0.0	0.0	0.0	59.2	1.7	1.0	0.0	0.0	0.0	0.0	0.0	27.2
2532	528073.09	5056968.33	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	63.4	2.3	1.0	0.0	0.0	0.0	0.0	0.0	22.9
2532	528073.09	5056968.33	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	63.4	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-80.1
2532	528073.09	5056968.33	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	63.4	2.3	1.0	0.0	0.0	0.0	0.0	0.0	22.9
2542	528201.12	5056907.40	2.00	0	D	A	69.0	22.2	0.0	0.0	0.0	65.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	21.5
2542	528201.12	5056907.40	2.00	0	N	A	-34.1	22.2	0.0	0.0	0.0	65.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	-81.5
2542	528201.12	5056907.40	2.00	0	E	A	69.0	22.2	0.0	0.0	0.0	65.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	21.5
2551	526066.72	5057807.44	2.00	0	D	A	69.0	26.6	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	11.8
2551	526066.72	5057807.44	2.00	0	N	A	-34.1	26.6	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	-91.2
2551	526066.72	5057807.44	2.00	0	E	A	69.0	26.6	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	11.8
2570	526470.16	5057587.94	2.00	0	D	A	69.0	26.6	0.0	0.0	0.0	73.8	5.2	1.4	0.0	0.0	0.0	0.0	0.0	15.2
2570	526470.16	5057587.94	2.00	0	N	A	-34.1	26.6	0.0	0.0	0.0	73.8	5.2	1.4	0.0	0.0	0.0	0.0	0.0	-87.8
2570	526470.16	5057587.94	2.00	0	E	A	69.0	26.6	0.0	0.0	0.0	73.8	5.2	1.4	0.0	0.0	0.0	0.0	0.0	15.2
2594	526952.60	5057423.37	2.00	0	D	A	69.0	21.1	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	15.1
2594	526952.60	5057423.37	2.00	0	N	A	-34.1	21.1	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-87.9
2594	526952.60	5057423.37	2.00	0	E	A	69.0	21.1	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	15.1
2615	526821.31	5057447.55	2.00	0	D	A	69.0	21.7	0.0	0.0	0.0	71.1	4.3	1.3	0.0	0.0	0.0	0.0	0.0	14.0
2615	526821.31	5057447.55	2.00	0	N	A	-34.1	21.7	0.0	0.0	0.0	71.1	4.3	1.3	0.0	0.0	0.0	0.0	0.0	-89.0

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2615	526821.31	5057447.55	2.00	0	E	A	69.0	21.7	0.0	0.0	0.0	71.1	4.3	1.3	0.0	0.0	0.0	0.0	0.0	14.0
2624	526709.92	5057460.27	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	72.0	4.5	1.3	0.0	0.0	0.0	0.0	0.0	10.4
2624	526709.92	5057460.27	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	72.0	4.5	1.3	0.0	0.0	0.0	0.0	0.0	-92.7
2624	526709.92	5057460.27	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	72.0	4.5	1.3	0.0	0.0	0.0	0.0	0.0	10.4

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2006	528192.89	5056995.40	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	64.6	2.0	1.2	0.0	0.0	0.0	0.0	0.0	35.6
2006	528192.89	5056995.40	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	64.6	2.0	1.2	0.0	0.0	0.0	0.0	0.0	-152.4
2006	528192.89	5056995.40	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	64.6	2.0	1.2	0.0	0.0	0.0	0.0	0.0	35.6

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2618	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	77.2	6.6	0.6	0.0	0.0	0.0	0.0	0.0	12.1
2618	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	77.2	6.6	0.6	0.0	0.0	0.0	0.0	0.0	-96.9
2618	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	77.2	6.6	0.6	0.0	0.0	0.0	0.0	0.0	12.1

Receiver
Name: (untitled)
ID: POR7
X: 529000.78 m
Y: 5055269.31 m
Z: 4.50 m

Point Source, ISO 9613, Name: "Impact Pile Driver", ID: "s-Pile Driver"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1498	528199.11	5056993.87	1.00	0	D	A	141.5	0.0	-7.0	0.0	0.0	76.6	3.7	8.8	0.0	0.0	0.0	0.0	0.0	45.4
1498	528199.11	5056993.87	1.00	0	N	A	129.5	0.0	-188.0	0.0	0.0	76.6	3.7	8.8	0.0	0.0	0.0	0.0	0.0	-147.6
1498	528199.11	5056993.87	1.00	0	E	A	141.5	0.0	-7.0	0.0	0.0	76.6	3.7	8.8	0.0	0.0	0.0	0.0	0.0	45.4

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1504	527436.76	5056170.95	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	76.1	4.3	-0.7	0.0	0.0	0.0	0.0	0.0	18.5
1510	527013.61	5056020.54	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	77.5	4.8	-0.6	0.0	0.0	0.0	0.0	0.0	16.5
1516	527685.64	5056177.11	2.00	0	DEN	A	52.3	48.9	0.0	0.0	0.0	75.1	4.0	-0.5	0.0	0.0	0.0	0.0	0.0	22.7
1522	527024.01	5056113.38	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	77.6	4.8	-0.7	0.0	0.0	0.0	0.0	0.0	17.2
1528	527447.17	5056263.79	2.00	0	DEN	A	52.3	46.6	0.0	0.0	0.0	76.3	4.4	-0.7	0.0	0.0	0.0	0.0	0.0	18.9
1534	527546.77	5056045.17	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	75.3	4.0	-0.5	0.0	0.0	0.0	0.0	0.0	18.6
1540	527086.31	5055963.80	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	77.2	4.7	-0.4	0.0	0.0	0.0	0.0	0.0	16.1
1546	528071.65	5056357.27	2.00	0	DEN	A	52.3	45.1	0.0	0.0	0.0	74.1	3.7	-0.5	0.0	0.0	0.0	0.0	0.0	20.1
1552	527716.84	5056002.61	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	74.4	3.7	-0.3	0.0	0.0	0.0	0.0	0.0	19.7
1558	527020.82	5055900.10	2.00	0	DEN	A	52.3	46.3	0.0	0.0	0.0	77.4	4.7	-0.4	0.0	0.0	0.0	0.0	0.0	16.9
1564	527753.13	5056713.41	2.00	0	DEN	A	52.3	44.5	0.0	0.0	0.0	76.6	4.5	-0.6	0.0	0.0	0.0	0.0	0.0	16.3
1570	527965.90	5056367.24	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	74.6	3.8	-0.6	0.0	0.0	0.0	0.0	0.0	16.0
1576	528096.93	5056835.69	2.00	0	DEN	A	52.3	43.2	0.0	0.0	0.0	76.1	4.3	-0.3	0.0	0.0	0.0	0.0	0.0	15.3
1582	527906.87	5056312.52	2.00	0	DEN	A	52.3	41.2	0.0	0.0	0.0	74.6	3.8	-0.5	0.0	0.0	0.0	0.0	0.0	15.6
1588	527966.63	5056737.52	2.00	0	DEN	A	52.3	42.1	0.0	0.0	0.0	76.1	4.3	-0.3	0.0	0.0	0.0	0.0	0.0	14.3
1594	527014.48	5056172.88	2.00	0	DEN	A	52.3	43.9	0.0	0.0	0.0	77.8	4.9	-0.9	0.0	0.0	0.0	0.0	0.0	14.4
1602	527307.17	5055876.20	2.00	0	DEN	A	52.3	42.5	0.0	0.0	0.0	76.1	4.3	-0.2	0.0	0.0	0.0	0.0	0.0	14.6
1618	528003.75	5056320.82	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	74.2	3.7	-0.3	0.0	0.0	0.0	0.0	0.0	14.8
1627	527613.15	5055896.44	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.7	3.8	0.1	0.0	0.0	0.0	0.0	0.0	13.6
1633	527661.51	5056372.09	2.00	0	DEN	A	52.3	40.7	0.0	0.0	0.0	75.8	4.2	-0.7	0.0	0.0	0.0	0.0	0.0	13.6
1639	527551.75	5055861.98	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.9	3.9	0.9	0.0	0.0	0.0	0.0	0.0	12.4
1645	528014.30	5056693.86	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	75.8	4.2	1.9	0.0	0.0	0.0	0.0	0.0	10.5
1651	527622.54	5056021.48	2.00	0	DEN	A	52.3	38.6	0.0	0.0	0.0	74.9	3.9	-0.4	0.0	0.0	0.0	0.0	0.0	12.5
1657	528175.65	5056754.58	2.00	0	DEN	A	52.3	39.7	0.0	0.0	0.0	75.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	11.0
1663	527870.54	5056765.46	2.00	0	DEN	A	52.3	40.4	0.0	0.0	0.0	76.5	4.4	1.3	0.0	0.0	0.0	0.0	0.0	10.5
1671	528114.21	5056481.81	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	74.5	3.8	0.4	0.0	0.0	0.0	0.0	0.0	11.2
1678	527809.24	5055979.29	2.00	0	DEN	A	52.3	36.3	0.0	0.0	0.0	73.8	3.6	3.0	0.0	0.0	0.0	0.0	0.0	8.1
1684	527795.48	5056806.25	2.00	0	DEN	A	52.3	39.2	0.0	0.0	0.0	76.8	4.5	-0.4	0.0	0.0	0.0	0.0	0.0	10.6
1691	528038.35	5056784.98	2.00	0	DEN	A	52.3	38.0	0.0	0.0	0.0	76.1	4.3	-0.1	0.0	0.0	0.0	0.0	0.0	10.0
1698	528148.76	5056221.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	73.1	3.4	2.5	0.0	0.0	0.0	0.0	0.0	8.0
1705	527547.43	5056334.65	2.00	0	DEN	A	52.3	36.9	0.0	0.0	0.0	76.1	4.3	-0.7	0.0	0.0	0.0	0.0	0.0	9.5
1712	527626.51	5056582.16	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	76.6	4.5	1.8	0.0	0.0	0.0	0.0	0.0	7.1
1719	528008.74	5056433.02	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	74.7	3.8	-0.6	0.0	0.0	0.0	0.0	0.0	9.4
1726	528120.08	5056893.75	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	76.3	4.4	-0.3	0.0	0.0	0.0	0.0	0.0	8.5
1734	527321.11	5056360.04	2.00	0	DEN	A	52.3	37.2	0.0	0.0	0.0	77.0	4.6	-0.9	0.0	0.0	0.0	0.0	0.0	8.7
1741	528139.11	5056191.06	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	73.0	3.4	2.9	0.0	0.0	0.0	0.0	0.0	6.1
1749	528082.86	5056212.59	2.00	0	DEN	A	52.3	33.4	0.0	0.0	0.0	73.4	3.5	2.7	0.0	0.0	0.0	0.0	0.0	6.2
1755	528119.15	5056408.72	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	74.2	3.7	1.2	0.0	0.0	0.0	0.0	0.0	6.3
1762	527961.71	5056629.28	2.00	0	DEN	A	52.3	34.8	0.0	0.0	0.0	75.7	4.1	-0.6	0.0	0.0	0.0	0.0	0.0	7.9
1769	527231.18	5055827.31	2.00	0	DEN	A	52.3	35.4	0.0	0.0	0.0	76.4	4.4	0.5	0.0	0.0	0.0	0.0	0.0	6.5
1777	527848.96	5056038.84	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	73.8	3.6	2.3	0.0	0.0	0.0	0.0	0.0	5.9
1784	527393.33	5056331.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	76.7	4.5	-0.8	0.0	0.0	0.0	0.0	0.0	6.7
1790	528025.65	5056751.88	2.00	0	DEN	A	52.3	33.7	0.0	0.0	0.0	76.0	4.3	0.2	0.0	0.0	0.0	0.0	0.0	5.6
1797	527394.60	5055872.64	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	75.7	4.2	2.3	0.0	0.0	0.0	0.0	0.0	3.3
1803	527925.77	5056103.14	2.00	0	DEN	A	52.3	30.5	0.0	0.0	0.0	73.7	3.5	3.0	0.0	0.0	0.0	0.0	0.0	2.5
1809	527587.02	5055809.42	2.00	0	DEN	A	52.3	30.8	0.0	0.0	0.0	74.6	3.8	3.2	0.0	0.0	0.0	0.0	0.0	1.6

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1821	527504.16	5055876.80	2.00	0	DEN	A	52.3	27.9	0.0	0.0	0.0	75.2	4.0	-0.2	0.0	0.0	0.0	0.0	0.0	1.2
1827	527209.95	5055884.50	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	76.5	4.4	-0.2	0.0	0.0	0.0	0.0	0.0	-1.0
1833	527311.85	5056412.29	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	77.2	4.7	2.1	0.0	0.0	0.0	0.0	0.0	-4.1
1839	527289.02	5056366.95	2.00	0	DEN	A	52.3	27.6	0.0	0.0	0.0	77.2	4.7	-0.9	0.0	0.0	0.0	0.0	0.0	-1.1
1847	527324.42	5056404.58	2.00	0	DEN	A	52.3	24.5	0.0	0.0	0.0	77.1	4.6	2.9	0.0	0.0	0.0	0.0	0.0	-7.9
1859	527356.53	5056374.75	2.00	0	DEN	A	52.3	21.9	0.0	0.0	0.0	76.9	4.6	2.0	0.0	0.0	0.0	0.0	0.0	-9.3

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1609	528214.13	5056987.32	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	76.5	6.3	0.4	0.0	0.0	0.0	0.0	0.0	31.0
1609	528214.13	5056987.32	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	76.5	6.3	0.4	0.0	0.0	0.0	0.0	0.0	-157.0
1609	528214.13	5056987.32	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	76.5	6.3	0.4	0.0	0.0	0.0	0.0	0.0	31.0

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1815	528192.89	5056995.40	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	76.6	4.9	2.0	0.0	0.0	0.0	0.0	0.0	20.0
1815	528192.89	5056995.40	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	76.6	4.9	2.0	0.0	0.0	0.0	0.0	0.0	-168.0
1815	528192.89	5056995.40	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	76.6	4.9	2.0	0.0	0.0	0.0	0.0	0.0	20.0

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1853	527917.66	5057073.64	2.00	0	D	A	69.0	24.1	0.0	0.0	0.0	77.5	6.7	1.1	0.0	0.0	0.0	0.0	0.0	7.8
1853	527917.66	5057073.64	2.00	0	N	A	-34.1	24.1	0.0	0.0	0.0	77.5	6.7	1.1	0.0	0.0	0.0	0.0	0.0	-95.3
1853	527917.66	5057073.64	2.00	0	E	A	69.0	24.1	0.0	0.0	0.0	77.5	6.7	1.1	0.0	0.0	0.0	0.0	0.0	7.8
1865	528201.12	5056907.40	2.00	0	D	A	69.0	22.2	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	7.4
1865	528201.12	5056907.40	2.00	0	N	A	-34.1	22.2	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	-95.6
1865	528201.12	5056907.40	2.00	0	E	A	69.0	22.2	0.0	0.0	0.0	76.2	6.2	1.4	0.0	0.0	0.0	0.0	0.0	7.4
1874	528073.09	5056968.33	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	76.7	6.4	0.9	0.0	0.0	0.0	0.0	0.0	5.6
1874	528073.09	5056968.33	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	76.7	6.4	0.9	0.0	0.0	0.0	0.0	0.0	-97.4
1874	528073.09	5056968.33	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	76.7	6.4	0.9	0.0	0.0	0.0	0.0	0.0	5.6

Receiver
Name: (untitled)
ID: POR8
X: 525383.70 m
Y: 5054209.95 m
Z: 4.50 m

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1795	525841.47	5053826.29	2.00	0	D	A	75.0	23.5	0.0	0.0	0.0	66.5	3.0	1.1	0.0	0.0	0.0	0.0	0.0	27.8
1795	525841.47	5053826.29	2.00	0	N	A	-34.1	23.5	0.0	0.0	0.0	66.5	3.0	1.1	0.0	0.0	0.0	0.0	0.0	-81.2
1795	525841.47	5053826.29	2.00	0	E	A	75.0	23.5	0.0	0.0	0.0	66.5	3.0	1.1	0.0	0.0	0.0	0.0	0.0	27.8
1801	525704.55	5053921.36	2.00	0	D	A	75.0	20.5	0.0	0.0	0.0	63.7	2.4	1.1	0.0	0.0	0.0	0.0	0.0	28.3
1801	525704.55	5053921.36	2.00	0	N	A	-34.1	20.5	0.0	0.0	0.0	63.7	2.4	1.1	0.0	0.0	0.0	0.0	0.0	-80.7
1801	525704.55	5053921.36	2.00	0	E	A	75.0	20.5	0.0	0.0	0.0	63.7	2.4	1.1	0.0	0.0	0.0	0.0	0.0	28.3
1807	525613.27	5053984.74	2.00	0	D	A	75.0	20.5	0.0	0.0	0.0	61.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	31.3
1807	525613.27	5053984.74	2.00	0	N	A	-34.1	20.5	0.0	0.0	0.0	61.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	-77.7
1807	525613.27	5053984.74	2.00	0	E	A	75.0	20.5	0.0	0.0	0.0	61.1	1.9	1.0	0.0	0.0	0.0	0.0	0.0	31.3
1813	525544.82	5054032.27	2.00	0	D	A	75.0	17.4	0.0	0.0	0.0	58.6	1.6	1.0	0.0	0.0	0.0	0.0	0.0	31.3
1813	525544.82	5054032.27	2.00	0	N	A	-34.1	17.4	0.0	0.0	0.0	58.6	1.6	1.0	0.0	0.0	0.0	0.0	0.0	-77.7
1813	525544.82	5054032.27	2.00	0	E	A	75.0	17.4	0.0	0.0	0.0	58.6	1.6	1.0	0.0	0.0	0.0	0.0	0.0	31.3
1819	525499.18	5054063.96	2.00	0	D	A	75.0	17.4	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	33.8
1819	525499.18	5054063.96	2.00	0	N	A	-34.1	17.4	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-75.2
1819	525499.18	5054063.96	2.00	0	E	A	75.0	17.4	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	33.8
1825	525453.54	5054095.65	2.00	0	D	A	75.0	17.4	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	37.1
1825	525453.54	5054095.65	2.00	0	N	A	-34.1	17.4	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	-72.0
1825	525453.54	5054095.65	2.00	0	E	A	75.0	17.4	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	37.1
1831	525419.31	5054119.42	2.00	0	D	A	75.0	14.4	0.0	0.0	0.0	50.8	0.8	0.7	0.0	0.0	0.0	0.0	0.0	37.2
1831	525419.31	5054119.42	2.00	0	N	A	-34.1	14.4	0.0	0.0	0.0	50.8	0.8	0.7	0.0	0.0	0.0	0.0	0.0	-71.9
1831	525419.31	5054119.42	2.00	0	E	A	75.0	14.4	0.0	0.0	0.0	50.8	0.8	0.7	0.0	0.0	0.0	0.0	0.0	37.2
1837	525396.49	5054135.27	2.00	0	D	A	75.0	14.4	0.0	0.0	0.0	48.6	0.6	0.7	0.0	0.0	0.0	0.0	0.0	39.5
1837	525396.49	5054135.27	2.00	0	N	A	-34.1	14.4	0.0	0.0	0.0	48.6	0.6	0.7	0.0	0.0	0.0	0.0	0.0	-69.5
1837	525396.49	5054135.27	2.00	0	E	A	75.0	14.4	0.0	0.0	0.0	48.6	0.6	0.7	0.0	0.0	0.0	0.0	0.0	39.5
1844	525373.67	5054151.11	2.00	0	D	A	75.0	14.4	0.0	0.0	0.0	46.5	0.5	0.6	0.0	0.0	0.0	0.0	0.0	41.8
1844	525373.67	5054151.11	2.00	0	N	A	-34.1	14.4	0.0	0.0	0.0	46.5	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-67.2
1844	525373.67	5054151.11	2.00	0	E	A	75.0	14.4	0.0	0.0	0.0	46.5	0.5	0.6	0.0	0.0	0.0	0.0	0.0	41.8
1849	525356.56	5054163.00	2.00	0	D	A	75.0	11.4	0.0	0.0	0.0	45.7	0.5	0.6	0.0	0.0	0.0	0.0	0.0	39.7
1849	525356.56	5054163.00	2.00	0	N	A	-34.1	11.4	0.0	0.0	0.0	45.7	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-69.3
1849	525356.56	5054163.00	2.00	0	E	A	75.0	11.4	0.0	0.0	0.0	45.7	0.5	0.6	0.0	0.0	0.0	0.0	0.0	39.7
1855	525345.15	5054170.92	2.00	0	D	A	75.0	11.4	0.0	0.0	0.0	45.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	39.6
1855	525345.15	5054170.92	2.00	0	N	A	-34.1	11.4	0.0	0.0	0.0	45.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-69.4
1855	525345.15	5054170.92	2.00	0	E	A	75.0	11.4	0.0	0.0	0.0	45.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	39.6
1861	525328.03	5054182.80	2.00	0	D	A	75.0	14.4	0.0	0.0	0.0	46.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	41.5
1861	525328.03	5054182.80	2.00	0	N	A	-34.1	14.4	0.0	0.0	0.0	46.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-67.6
1861	525328.03	5054182.80	2.00	0	E	A	75.0	14.4	0.0	0.0	0.0	46.8	0.5	0.6	0.0	0.0	0.0	0.0	0.0	41.5
1866	525305.21	5054198.65	2.00	0	D	A	75.0	14.4	0.0	0.0	0.0	49.0	0.6	0.7	0.0	0.0	0.0	0.0	0.0	39.1
1866	525305.21	5054198.65	2.00	0	N	A	-34.1	14.4	0.0	0.0	0.0	49.0	0.6	0.7	0.0	0.0	0.0	0.0	0.0	-69.9
1866	525305.21	5054198.65	2.00	0	E	A	75.0	14.4	0.0	0.0	0.0	49.0	0.6	0.7	0.0	0.0	0.0	0.0	0.0	39.1
1871	525270.98	5054222.42	2.00	0	D	A	75.0	17.4	0.0	0.0	0.0	52.1	0.9	0.8	0.0	0.0	0.0	0.0	0.0	38.7
1871	525270.98	5054222.42	2.00	0	N	A	-34.1	17.4	0.0	0.0	0.0	52.1	0.9	0.8	0.0	0.0	0.0	0.0	0.0	-70.3
1871	525270.98	5054222.42	2.00	0	E	A	75.0	17.4	0.0	0.0	0.0	52.1	0.9	0.8	0.0	0.0	0.0	0.0	0.0	38.7
1875	525225.34	5054254.11	2.00	0	D	A	75.0	17.4	0.0	0.0	0.0	55.3	1.2	0.9	0.0	0.0	0.0	0.0	0.0	35.1
1875	525225.34	5054254.11	2.00	0	N	A	-34.1	17.4	0.0	0.0	0.0	55.3	1.2	0.9	0.0	0.0	0.0	0.0	0.0	-74.0
1875	525225.34	5054254.11	2.00	0	E	A	75.0	17.4	0.0	0.0	0.0	55.3	1.2	0.9	0.0	0.0	0.0	0.0	0.0	35.1
1902	525175.53	5054296.68	2.00	0	D	A	75.0	18.8	0.0	0.0	0.0	58.1	1.5	0.9	0.0	0.0	0.0	0.0	0.0	33.3
1902	525175.53	5054296.68	2.00	0	N	A	-34.1	18.8	0.0	0.0	0.0	58.1	1.5	0.9	0.0	0.0	0.0	0.0	0.0	-75.8
1902	525175.53	5054296.68	2.00	0	E	A	75.0	18.8	0.0	0.0	0.0	58.1	1.5	0.9	0.0	0.0	0.0	0.0	0.0	33.3
1908	525121.54	5054350.14	2.00	0	D	A	75.0	18.8	0.0	0.0	0.0	60.5	1.8	1.0	0.0	0.0	0.0	0.0	0.0	30.5
1908	525121.54	5054350.14	2.00	0	N	A	-34.1	18.8	0.0	0.0	0.0	60.5	1.8	1.0	0.0	0.0	0.0	0.0	0.0	-78.5
1908	525121.54	5054350.14	2.00	0	E	A	75.0	18.8	0.0	0.0	0.0	60.5	1.8	1.0	0.0	0.0	0.0	0.0	0.0	30.5
1914	525040.56	5054430.32	2.00	0	D	A	75.0	21.8	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	30.2
1914	525040.56	5054430.32	2.00	0	N	A	-34.1	21.8	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	-78.8

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1914	525040.56	5054430.32	2.00	0	E	A	75.0	21.8	0.0	0.0	0.0	63.2	2.3	1.0	0.0	0.0	0.0	0.0	0.0	30.2
2162	524945.20	5054551.24	2.00	0	D	A	75.0	22.0	0.0	0.0	0.0	65.9	2.9	1.1	0.0	0.0	0.0	0.0	0.0	27.1
2162	524945.20	5054551.24	2.00	0	N	A	-34.1	22.0	0.0	0.0	0.0	65.9	2.9	1.1	0.0	0.0	0.0	0.0	0.0	-81.9
2162	524945.20	5054551.24	2.00	0	E	A	75.0	22.0	0.0	0.0	0.0	65.9	2.9	1.1	0.0	0.0	0.0	0.0	0.0	27.1
2183	524862.27	5054828.51	2.00	0	D	A	75.0	24.6	0.0	0.0	0.0	69.2	3.7	1.2	0.0	0.0	0.0	0.0	0.0	25.5
2183	524862.27	5054828.51	2.00	0	N	A	-34.1	24.6	0.0	0.0	0.0	69.2	3.7	1.2	0.0	0.0	0.0	0.0	0.0	-83.5
2183	524862.27	5054828.51	2.00	0	E	A	75.0	24.6	0.0	0.0	0.0	69.2	3.7	1.2	0.0	0.0	0.0	0.0	0.0	25.5
2649	526025.14	5053719.18	2.00	0	D	A	75.0	23.1	0.0	0.0	0.0	69.1	3.7	1.2	0.0	0.0	0.0	0.0	0.0	24.0
2649	526025.14	5053719.18	2.00	0	N	A	-34.1	23.1	0.0	0.0	0.0	69.1	3.7	1.2	0.0	0.0	0.0	0.0	0.0	-85.0
2649	526025.14	5053719.18	2.00	0	E	A	75.0	23.1	0.0	0.0	0.0	69.1	3.7	1.2	0.0	0.0	0.0	0.0	0.0	24.0
2675	524962.94	5055213.12	2.00	0	D	A	75.0	23.1	0.0	0.0	0.0	71.7	4.5	1.3	0.0	0.0	0.0	0.0	0.0	20.6
2675	524962.94	5055213.12	2.00	0	N	A	-34.1	23.1	0.0	0.0	0.0	71.7	4.5	1.3	0.0	0.0	0.0	0.0	0.0	-88.4
2675	524962.94	5055213.12	2.00	0	E	A	75.0	23.1	0.0	0.0	0.0	71.7	4.5	1.3	0.0	0.0	0.0	0.0	0.0	20.6
2679	524896.20	5055033.09	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	21.5
2679	524896.20	5055033.09	2.00	0	N	A	-34.1	22.5	dB	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-87.5
2679	524896.20	5055033.09	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	21.5
2683	524897.33	5054653.52	2.00	0	D	A	75.0	18.5	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	21.7
2683	524897.33	5054653.52	2.00	0	N	A	-34.1	18.5	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	-87.3
2683	524897.33	5054653.52	2.00	0	E	A	75.0	18.5	0.0	0.0	0.0	67.4	3.2	1.2	0.0	0.0	0.0	0.0	0.0	21.7
2685	524988.11	5055422.27	2.00	0	D	A	75.0	23.9	0.0	0.0	0.0	73.1	4.9	1.3	0.0	0.0	0.0	0.0	0.0	19.5
2685	524988.11	5055422.27	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	73.1	4.9	1.3	0.0	0.0	0.0	0.0	0.0	-89.5
2685	524988.11	5055422.27	2.00	0	E	A	75.0	23.9	0.0	0.0	0.0	73.1	4.9	1.3	0.0	0.0	0.0	0.0	0.0	19.5
2697	525537.35	5055679.08	2.00	0	D	A	75.0	23.6	0.0	0.0	0.0	74.4	5.4	1.2	0.0	0.0	0.0	0.0	0.0	17.6
2697	525537.35	5055679.08	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	74.4	5.4	1.2	0.0	0.0	0.0	0.0	0.0	-91.5
2697	525537.35	5055679.08	2.00	0	E	A	75.0	23.6	0.0	0.0	0.0	74.4	5.4	1.2	0.0	0.0	0.0	0.0	0.0	17.6
2703	525121.99	5055577.58	2.00	0	D	A	75.0	22.6	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	17.1
2703	525121.99	5055577.58	2.00	0	N	A	-34.1	22.6	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	-91.9
2703	525121.99	5055577.58	2.00	0	E	A	75.0	22.6	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	17.1
2718	525740.64	5055713.13	2.00	0	D	A	75.0	22.7	0.0	0.0	0.0	74.8	5.6	-0.2	0.0	0.0	0.0	0.0	0.0	17.5
2718	525740.64	5055713.13	2.00	0	N	A	-34.1	22.7	0.0	0.0	0.0	74.8	5.6	-0.2	0.0	0.0	0.0	0.0	0.0	-91.5
2718	525740.64	5055713.13	2.00	0	E	A	75.0	22.7	0.0	0.0	0.0	74.8	5.6	-0.2	0.0	0.0	0.0	0.0	0.0	17.5
2736	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	75.7	5.9	1.3	0.0	0.0	0.0	0.0	0.0	14.7
2736	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	75.7	5.9	1.3	0.0	0.0	0.0	0.0	0.0	-94.4
2736	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	75.7	5.9	1.3	0.0	0.0	0.0	0.0	0.0	14.7
2766	525366.60	5055646.19	2.00	0	D	A	75.0	20.8	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	15.0
2766	525366.60	5055646.19	2.00	0	N	A	-34.1	20.8	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	-94.0
2766	525366.60	5055646.19	2.00	0	E	A	75.0	20.8	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	15.0
2769	525898.74	5055726.86	2.00	0	D	A	75.0	21.3	0.0	0.0	0.0	75.1	5.7	-0.0	0.0	0.0	0.0	0.0	0.0	15.5
2769	525898.74	5055726.86	2.00	0	N	A	-34.1	21.3	0.0	0.0	0.0	75.1	5.7	-0.0	0.0	0.0	0.0	0.0	0.0	-93.5
2769	525898.74	5055726.86	2.00	0	E	A	75.0	21.3	0.0	0.0	0.0	75.1	5.7	-0.0	0.0	0.0	0.0	0.0	0.0	15.5
2775	525254.39	5055625.82	2.00	0	D	A	75.0	20.3	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	14.6
2775	525254.39	5055625.82	2.00	0	N	A	-34.1	20.3	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	-94.4
2775	525254.39	5055625.82	2.00	0	E	A	75.0	20.3	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	14.6
2788	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	76.1	6.1	-1.6	0.0	0.0	0.0	0.0	0.0	15.8
2788	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	76.1	6.1	-1.6	0.0	0.0	0.0	0.0	0.0	-93.2
2788	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	76.1	6.1	-1.6	0.0	0.0	0.0	0.0	0.0	15.8
2797	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	76.6	6.4	1.1	0.0	0.0	0.0	0.0	0.0	12.4
2797	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	76.6	6.4	1.1	0.0	0.0	0.0	0.0	0.0	-96.7
2797	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	76.6	6.4	1.1	0.0	0.0	0.0	0.0	0.0	12.4
2800	524975.80	5055106.32	2.00	0	D	A	75.0	15.9	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	14.5
2800	524975.80	5055106.32	2.00	0	N	A	-34.1	15.9	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	-94.5
2800	524975.80	5055106.32	2.00	0	E	A	75.0	15.9	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	14.5
2803	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	76.2	6.2	1.1	0.0	0.0	0.0	0.0	0.0	12.2
2803	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	76.2	6.2	1.1	0.0	0.0	0.0	0.0	0.0	-96.9
2803	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	76.2	6.2	1.1	0.0	0.0	0.0	0.0	0.0	12.2
2809	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	76.1	6.1	-0.3	0.0	0.0	0.0	0.0	0.0	13.6
2809	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	76.1	6.1	-0.3	0.0	0.0	0.0	0.0	0.0	-95.5
2809	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	76.1	6.1	-0.3	0.0	0.0	0.0	0.0	0.0	13.6

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1880	525803.20	5055038.91	2.00	0	DEN	A	59.2	44.7	0.0	0.0	0.0	70.4	2.7	2.6	0.0	0.0	0.0	0.0	0.0	28.3

Area Source, ISO 9613, Name: "Dredging Area 2", ID: "s-Dredge2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1885	525885.00	5055059.08	2.00	0	DEN	A	59.2	42.9	0.0	0.0	0.0	70.9	2.8	2.6	0.0	0.0	0.0	0.0	0.0	25.8
1890	525609.35	5055488.24	2.00	0	DEN	A	59.2	44.4	0.0	0.0	0.0	73.3	3.4	-0.5	0.0	0.0	0.0	0.0	0.0	27.4
1924	525827.85	5055368.34	2.00	0	DEN	A	59.2	42.1	0.0	0.0	0.0	72.9	3.3	2.9	0.0	0.0	0.0	0.0	0.0	22.2
1943	526169.61	5055362.74	2.00	0	DEN	A	59.2	43.5	0.0	0.0	0.0	73.9	3.6	3.1	0.0	0.0	0.0	0.0	0.0	22.2
1951	526103.50	5055297.75	2.00	0	DEN	A	59.2	42.5	0.0	0.0	0.0	73.3	3.4	3.0	0.0	0.0	0.0	0.0	0.0	21.9
1966	525693.39	5055435.57	2.00	0	DEN	A	59.2	41.3	0.0	0.0	0.0	73.0	3.4	-0.4	0.0	0.0	0.0	0.0	0.0	24.5
1969	525918.61	5055233.88	2.00	0	DEN	A	59.2	39.9	0.0	0.0	0.0	72.3	3.1	2.8	0.0	0.0	0.0	0.0	0.0	20.9
1972	525753.90	5055424.37	2.00	0	DEN	A	59.2	40.6	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	20.5
1975	526158.40	5055231.64	2.00	0	DEN	A	59.2	40.8	0.0	0.0	0.0	73.2	3.4	2.9	0.0	0.0	0.0	0.0	0.0	20.5
1999	525948.87	5055345.93	2.00	0	DEN	A	59.2	39.6	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	19.5
2004	525933.18	5054948.15	2.00	0	DEN	A	59.2	36.1	0.0	0.0	0.0	70.3	2.7	2.6	0.0	0.0	0.0	0.0	0.0	19.8
2009	525763.98	5055137.52	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	71.0	2.8	2.6	0.0	0.0	0.0	0.0	0.0	18.6
2037	525926.46	5054869.71	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	69.6	2.5	2.5	0.0	0.0	0.0	0.0	0.0	19.1
2043	525942.15	5054912.29	2.00	0	DEN	A	59.2	34.5	0.0	0.0	0.0	70.1	2.6	2.5	0.0	0.0	0.0	0.0	0.0	18.5
2063	525581.34	5055582.36	2.00	0	DEN	A	59.2	37.6	0.0	0.0	0.0	73.8	3.6	-0.6	0.0	0.0	0.0	0.0	0.0	20.0
2079	525963.44	5054860.75	2.00	0	DEN	A	59.2	32.8	0.0	0.0	0.0	69.8	2.5	2.5	0.0	0.0	0.0	0.0	0.0	17.1
2089	526224.51	5055201.39	2.00	0	DEN	A	59.2	36.0	0.0	0.0	0.0	73.3	3.4	3.0	0.0	0.0	0.0	0.0	0.0	15.5
2099	525908.53	5055128.55	2.00	0	DEN	A	59.2	33.8	0.0	0.0	0.0	71.5	2.9	2.7	0.0	0.0	0.0	0.0	0.0	15.9
2104	525863.71	5055240.60	2.00	0	DEN	A	59.2	31.2	0.0	0.0	0.0	72.1	3.1	2.8	0.0	0.0	0.0	0.0	0.0	12.3
2109	525778.55	5055426.61	2.00	0	DEN	A	59.2	31.2	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	10.9
2114	525989.21	5054994.09	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	70.9	2.8	2.6	0.0	0.0	0.0	0.0	0.0	16.4
2117	525928.70	5055298.87	2.00	0	DEN	A	59.2	35.2	0.0	0.0	0.0	72.7	3.3	2.9	0.0	0.0	0.0	0.0	0.0	15.5
2132	525524.19	5055442.30	2.00	0	DEN	A	59.2	35.0	0.0	0.0	0.0	72.9	3.3	0.7	0.0	0.0	0.0	0.0	0.0	17.2
2144	526018.34	5054970.56	2.00	0	DEN	A	59.2	32.4	0.0	0.0	0.0	70.9	2.8	2.6	0.0	0.0	0.0	0.0	0.0	15.3
2148	525807.68	5054912.29	2.00	0	DEN	A	59.2	30.9	0.0	0.0	0.0	69.3	2.4	2.4	0.0	0.0	0.0	0.0	0.0	16.0
2172	526071.00	5055213.71	2.00	0	DEN	A	59.2	33.2	0.0	0.0	0.0	72.7	3.3	2.9	0.0	0.0	0.0	0.0	0.0	13.5
2177	525753.90	5055673.12	2.00	0	DEN	A	59.2	34.9	0.0	0.0	0.0	74.6	3.8	-0.8	0.0	0.0	0.0	0.0	0.0	16.5
2189	525514.11	5055557.71	2.00	0	DEN	A	59.2	33.5	0.0	0.0	0.0	73.6	3.5	2.2	0.0	0.0	0.0	0.0	0.0	13.3
2195	525766.23	5055537.54	2.00	0	DEN	A	59.2	33.6	0.0	0.0	0.0	73.8	3.6	3.0	0.0	0.0	0.0	0.0	0.0	12.5
2201	525845.78	5055137.52	2.00	0	DEN	A	59.2	29.5	0.0	0.0	0.0	71.3	2.9	2.7	0.0	0.0	0.0	0.0	0.0	11.7
2219	525767.35	5055654.07	2.00	0	DEN	A	59.2	34.0	0.0	0.0	0.0	74.5	3.8	2.2	0.0	0.0	0.0	0.0	0.0	12.8
2238	525956.71	5055150.96	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	71.8	3.0	2.8	0.0	0.0	0.0	0.0	0.0	12.2
2244	526307.43	5055299.99	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	74.1	3.7	3.1	0.0	0.0	0.0	0.0	0.0	11.4
2250	525741.57	5055618.22	2.00	0	DEN	A	59.2	33.1	0.0	0.0	0.0	74.2	3.7	-0.7	0.0	0.0	0.0	0.0	0.0	15.1
2651	525612.72	5055358.26	2.00	0	DEN	A	59.2	30.6	0.0	0.0	0.0	72.4	3.2	1.8	0.0	0.0	0.0	0.0	0.0	12.4
2659	525744.94	5055584.60	2.00	0	DEN	A	59.2	31.7	0.0	0.0	0.0	74.1	3.6	-0.7	0.0	0.0	0.0	0.0	0.0	13.9
2665	526252.53	5055352.65	2.00	0	DEN	A	59.2	30.7	0.0	0.0	0.0	74.1	3.7	3.1	0.0	0.0	0.0	0.0	0.0	9.0
2669	526104.62	5055261.89	2.00	0	DEN	A	59.2	29.1	0.0	0.0	0.0	73.1	3.4	2.9	0.0	0.0	0.0	0.0	0.0	8.9
2671	526221.15	5055407.56	2.00	0	DEN	A	59.2	30.0	0.0	0.0	0.0	74.3	3.7	3.1	0.0	0.0	0.0	0.0	0.0	8.1
2677	525788.64	5055492.72	2.00	0	DEN	A	59.2	28.8	0.0	0.0	0.0	73.6	3.5	3.0	0.0	0.0	0.0	0.0	0.0	7.9
2695	525621.68	5055623.82	2.00	0	DEN	A	59.2	27.6	0.0	0.0	0.0	74.1	3.7	0.2	0.0	0.0	0.0	0.0	0.0	8.8
2721	525790.88	5055696.65	2.00	0	DEN	A	59.2	26.2	0.0	0.0	0.0	74.8	3.9	0.7	0.0	0.0	0.0	0.0	0.0	6.1
2727	526092.29	5055415.40	2.00	0	DEN	A	59.2	24.8	0.0	0.0	0.0	73.9	3.6	3.1	0.0	0.0	0.0	0.0	0.0	3.4
2733	525573.50	5055412.04	2.00	0	DEN	A	59.2	23.1	0.0	0.0	0.0	72.7	3.3	0.2	0.0	0.0	0.0	0.0	0.0	6.1
2782	525804.32	5055496.08	2.00	0	DEN	A	59.2	22.8	0.0	0.0	0.0	73.6	3.5	3.0	0.0	0.0	0.0	0.0	0.0	1.9
2785	525830.09	5055679.84	2.00	0	DEN	A	59.2	23.8	0.0	0.0	0.0	74.7	3.9	3.2	0.0	0.0	0.0	0.0	0.0	1.2
2825	525809.93	5055667.52	2.00	0	DEN	A	59.2	16.0	0.0	0.0	0.0	74.6	3.8	2.5	0.0	0.0	0.0	0.0	0.0	-5.8

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1896	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	76.0	4.2	-0.2	0.0	0.0	0.0	0.0	0.0	26.4
1931	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	75.1	4.0	0.5	0.0	0.0	0.0	0.0	0.0	24.7
1956	526740.61	5055502.08	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.5	4.4	-0.0	0.0	0.0	0.0	0.0	0.0	23.4
1961	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.6	4.5	-0.4	0.0	0.0	0.0	0.0	0.0	23.6
1984	526641.01	5055518.97	2.00	0	DEN	A	59.7	42.6	0.0	0.0	0.0	76.2	4.3	1.3	0.0	0.0	0.0	0.0	0.0	20.6
1989	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	75.9	4.2	-0.3	0.0	0.0	0.0	0.0	0.0	22.0
2025	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	75.6	4.1	-0.4	0.0	0.0	0.0	0.0	0.0	20.7
2048	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	74.9	3.9	3.0	0.0	0.0	0.0	0.0	0.0	16.3
2074	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	75.3	4.0	-0.3	0.0	0.0	0.0	0.0	0.0	18.6
2084	526528.50	5055398.47	2.00	0	DEN	A	59.7	37.9	0.0	0.0	0.0	75.4	4.0	3.3	0.0	0.0	0.0	0.0	0.0	15.0
2152	526538.73	5055431.82	2.00	0	DEN	A	59.7	36.4	0.0	0.0	0.0	75.5	4.1	3.3	0.0	0.0	0.0	0.0	0.0	13.3
2157	526793.98	5055599.46	2.00	0	DEN	A	59.7	37.1	0.0	0.0	0.0	76.9	4.6	-0.2	0.0	0.0	0.0	0.0	0.0	15.6

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2167	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	76.2	4.3	-0.4	0.0	0.0	0.0	0.0	0.0	15.6
2207	526578.75	5055444.27	2.00	0	DEN	A	59.7	35.2	0.0	0.0	0.0	75.7	4.2	3.4	0.0	0.0	0.0	0.0	0.0	11.7
2225	525977.99	5055643.04	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	74.8	3.9	-0.3	0.0	0.0	0.0	0.0	0.0	14.8
2256	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	76.0	4.2	-0.5	0.0	0.0	0.0	0.0	0.0	14.0
2271	525942.86	5055649.71	2.00	0	DEN	A	59.7	32.6	0.0	0.0	0.0	74.8	3.9	-0.3	0.0	0.0	0.0	0.0	0.0	14.0
2653	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	75.9	4.2	-0.4	0.0	0.0	0.0	0.0	0.0	13.5
2663	525922.85	5055637.70	2.00	0	DEN	A	59.7	30.9	0.0	0.0	0.0	74.7	3.8	0.2	0.0	0.0	0.0	0.0	0.0	11.9
2681	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	75.3	4.0	2.7	0.0	0.0	0.0	0.0	0.0	7.1
2687	526730.39	5055412.70	2.00	0	DEN	A	59.7	29.9	0.0	0.0	0.0	76.1	4.3	1.8	0.0	0.0	0.0	0.0	0.0	7.4
2689	526497.82	5055471.84	2.00	0	DEN	A	59.7	29.4	0.0	0.0	0.0	75.5	4.1	3.3	0.0	0.0	0.0	0.0	0.0	6.2
2706	526587.20	5055466.95	2.00	0	DEN	A	59.7	27.2	0.0	0.0	0.0	75.8	4.2	3.4	0.0	0.0	0.0	0.0	0.0	3.6
2730	525949.09	5055683.50	2.00	0	DEN	A	59.7	25.3	0.0	0.0	0.0	75.0	3.9	1.2	0.0	0.0	0.0	0.0	0.0	5.0
2757	526045.14	5055566.55	2.00	0	DEN	A	59.7	24.5	0.0	0.0	0.0	74.6	3.8	3.2	0.0	0.0	0.0	0.0	0.0	2.7
2821	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	76.0	4.3	-0.2	0.0	0.0	0.0	0.0	0.0	-2.4

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1937	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	77.1	4.6	-0.2	0.0	0.0	0.0	0.0	0.0	24.4
1994	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	77.5	4.8	3.6	0.0	0.0	0.0	0.0	0.0	17.4
2014	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	77.3	4.7	2.1	0.0	0.0	0.0	0.0	0.0	18.0
2019	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	77.4	4.7	3.6	0.0	0.0	0.0	0.0	0.0	16.2
2031	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	76.5	4.4	-0.6	0.0	0.0	0.0	0.0	0.0	20.7
2053	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	76.5	4.4	-0.1	0.0	0.0	0.0	0.0	0.0	19.1
2068	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	77.0	4.6	3.4	0.0	0.0	0.0	0.0	0.0	15.0
2094	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	76.3	4.3	0.8	0.0	0.0	0.0	0.0	0.0	17.1
2122	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	77.1	4.6	3.5	0.0	0.0	0.0	0.0	0.0	13.3
2126	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	77.4	4.7	3.5	0.0	0.0	0.0	0.0	0.0	12.8
2136	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	76.2	4.3	1.6	0.0	0.0	0.0	0.0	0.0	15.1
2140	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	76.9	4.6	3.3	0.0	0.0	0.0	0.0	0.0	13.2
2213	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	76.7	4.5	-0.2	0.0	0.0	0.0	0.0	0.0	14.6
2231	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	76.4	4.4	2.7	0.0	0.0	0.0	0.0	0.0	11.6
2364	525743.96	5056017.73	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	76.3	4.4	2.8	0.0	0.0	0.0	0.0	0.0	10.6
2655	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	76.0	4.3	2.5	0.0	0.0	0.0	0.0	0.0	10.4
2657	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	76.3	4.3	1.3	0.0	0.0	0.0	0.0	0.0	11.6
2673	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	76.4	4.4	1.0	0.0	0.0	0.0	0.0	0.0	9.5
2691	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	76.3	4.4	2.2	0.0	0.0	0.0	0.0	0.0	6.8
2693	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	77.2	4.7	3.5	0.0	0.0	0.0	0.0	0.0	4.7
2700	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	77.1	4.6	2.9	0.0	0.0	0.0	0.0	0.0	3.6
2715	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	76.2	4.3	2.3	0.0	0.0	0.0	0.0	0.0	4.5
2724	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	76.5	4.4	2.8	0.0	0.0	0.0	0.0	0.0	3.4
2760	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	76.5	4.4	2.8	0.0	0.0	0.0	0.0	0.0	2.4
2817	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	77.0	4.6	-0.6	0.0	0.0	0.0	0.0	0.0	0.4

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1979	526650.08	5055183.13	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	75.1	5.4	-1.4	0.0	0.0	0.0	0.0	0.0	35.1
1979	526650.08	5055183.13	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	75.1	5.4	-1.4	0.0	0.0	0.0	0.0	0.0	-152.9
1979	526650.08	5055183.13	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	75.1	5.4	-1.4	0.0	0.0	0.0	0.0	0.0	35.1

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2058	525591.21	5055845.98	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	75.3	5.6	-1.8	0.0	0.0	0.0	0.0	0.0	35.1
2058	525591.21	5055845.98	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	75.3	5.6	-1.8	0.0	0.0	0.0	0.0	0.0	-152.9
2058	525591.21	5055845.98	3.00	0	E	A	114.2	0.0	-188.0	0.0	0.0	75.3	5.6	-1.8	0.0	0.0	0.0	0.0	0.0	-152.9

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2661	526614.08	5055193.84	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	74.9	4.4	-0.4	0.0	0.0	0.0	0.0	0.0	24.6
2661	526614.08	5055193.84	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	74.9	4.4	-0.4	0.0	0.0	0.0	0.0	0.0	-163.4
2661	526614.08	5055193.84	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	74.9	4.4	-0.4	0.0	0.0	0.0	0.0	0.0	24.6

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2667	525527.68	5055841.75	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	75.3	4.5	-0.5	0.0	0.0	0.0	0.0	0.0	24.3
2667	525527.68	5055841.75	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	75.3	4.5	-0.5	0.0	0.0	0.0	0.0	0.0	-163.7
2667	525527.68	5055841.75	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	75.3	4.5	-0.5	0.0	0.0	0.0	0.0	0.0	24.3

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2709	526406.62	5055378.34	2.00	0	D	A	69.0	26.0	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	13.2
2709	526406.62	5055378.34	2.00	0	N	A	-34.1	26.0	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	-89.8
2709	526406.62	5055378.34	2.00	0	E	A	69.0	26.0	0.0	0.0	0.0	74.8	5.6	1.4	0.0	0.0	0.0	0.0	0.0	13.2
2712	526036.24	5055524.23	2.00	0	D	A	69.0	26.0	0.0	0.0	0.0	74.3	5.4	1.4	0.0	0.0	0.0	0.0	0.0	13.9
2712	526036.24	5055524.23	2.00	0	N	A	-34.1	26.0	0.0	0.0	0.0	74.3	5.4	1.4	0.0	0.0	0.0	0.0	0.0	-89.1
2712	526036.24	5055524.23	2.00	0	E	A	69.0	26.0	0.0	0.0	0.0	74.3	5.4	1.4	0.0	0.0	0.0	0.0	0.0	13.9
2754	524789.13	5055078.59	2.00	0	D	A	69.0	23.7	0.0	0.0	0.0	71.4	4.4	1.3	0.0	0.0	0.0	0.0	0.0	15.6
2754	524789.13	5055078.59	2.00	0	N	A	-34.1	23.7	0.0	0.0	0.0	71.4	4.4	1.3	0.0	0.0	0.0	0.0	0.0	-87.4
2754	524789.13	5055078.59	2.00	0	E	A	69.0	23.7	0.0	0.0	0.0	71.4	4.4	1.3	0.0	0.0	0.0	0.0	0.0	15.6
2763	524624.63	5055303.68	2.00	0	D	A	69.0	25.2	0.0	0.0	0.0	73.5	5.1	1.3	0.0	0.0	0.0	0.0	0.0	14.3
2763	524624.63	5055303.68	2.00	0	N	A	-34.1	25.2	0.0	0.0	0.0	73.5	5.1	1.3	0.0	0.0	0.0	0.0	0.0	-88.8
2763	524624.63	5055303.68	2.00	0	E	A	69.0	25.2	0.0	0.0	0.0	73.5	5.1	1.3	0.0	0.0	0.0	0.0	0.0	14.3
2772	524964.31	5055214.69	2.00	0	D	A	69.0	23.2	0.0	0.0	0.0	71.7	4.5	1.3	0.0	0.0	0.0	0.0	0.0	14.6
2772	524964.31	5055214.69	2.00	0	N	A	-34.1	23.2	0.0	0.0	0.0	71.7	4.5	1.3	0.0	0.0	0.0	0.0	0.0	-88.4
2772	524964.31	5055214.69	2.00	0	E	A	69.0	23.2	0.0	0.0	0.0	71.7	4.5	1.3	0.0	0.0	0.0	0.0	0.0	14.6
2777	524899.01	5055034.30	2.00	0	D	A	69.0	22.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	15.4
2777	524899.01	5055034.30	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-87.6
2777	524899.01	5055034.30	2.00	0	E	A	69.0	22.5	0.0	0.0	0.0	70.6	4.1	1.3	0.0	0.0	0.0	0.0	0.0	15.4
2791	524989.48	5055425.89	2.00	0	D	A	69.0	23.9	0.0	0.0	0.0	73.1	4.9	1.3	0.0	0.0	0.0	0.0	0.0	13.5
2791	524989.48	5055425.89	2.00	0	N	A	-34.1	23.9	0.0	0.0	0.0	73.1	4.9	1.3	0.0	0.0	0.0	0.0	0.0	-89.5
2791	524989.48	5055425.89	2.00	0	E	A	69.0	23.9	0.0	0.0	0.0	73.1	4.9	1.3	0.0	0.0	0.0	0.0	0.0	13.5
2794	525665.68	5055700.14	2.00	0	D	A	69.0	25.5	0.0	0.0	0.0	74.6	5.5	0.9	0.0	0.0	0.0	0.0	0.0	13.4
2794	525665.68	5055700.14	2.00	0	N	A	-34.1	25.5	0.0	0.0	0.0	74.6	5.5	0.9	0.0	0.0	0.0	0.0	0.0	-89.6
2794	525665.68	5055700.14	2.00	0	E	A	69.0	25.5	0.0	0.0	0.0	74.6	5.5	0.9	0.0	0.0	0.0	0.0	0.0	13.4
2806	525342.09	5055645.00	2.00	0	D	A	69.0	24.7	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	12.9
2806	525342.09	5055645.00	2.00	0	N	A	-34.1	24.7	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	-90.1
2806	525342.09	5055645.00	2.00	0	E	A	69.0	24.7	0.0	0.0	0.0	74.1	5.3	1.4	0.0	0.0	0.0	0.0	0.0	12.9
2811	524400.73	5055517.25	2.00	0	D	A	69.0	24.6	0.0	0.0	0.0	75.3	5.8	1.4	0.0	0.0	0.0	0.0	0.0	11.1
2811	524400.73	5055517.25	2.00	0	N	A	-34.1	24.6	0.0	0.0	0.0	75.3	5.8	1.4	0.0	0.0	0.0	0.0	0.0	-91.9
2811	524400.73	5055517.25	2.00	0	E	A	69.0	24.6	0.0	0.0	0.0	75.3	5.8	1.4	0.0	0.0	0.0	0.0	0.0	11.1
2813	524207.68	5055774.03	2.00	0	D	A	69.0	25.6	0.0	0.0	0.0	76.8	6.4	1.4	0.0	0.0	0.0	0.0	0.0	9.9
2813	524207.68	5055774.03	2.00	0	N	A	-34.1	25.6	0.0	0.0	0.0	76.8	6.4	1.4	0.0	0.0	0.0	0.0	0.0	-93.1
2813	524207.68	5055774.03	2.00	0	E	A	69.0	25.6	0.0	0.0	0.0	76.8	6.4	1.4	0.0	0.0	0.0	0.0	0.0	9.9
2815	525119.36	5055578.25	2.00	0	D	A	69.0	22.4	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	10.9
2815	525119.36	5055578.25	2.00	0	N	A	-34.1	22.4	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	-92.2
2815	525119.36	5055578.25	2.00	0	E	A	69.0	22.4	0.0	0.0	0.0	73.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	10.9
2819	525846.70	5055663.19	2.00	0	D	A	69.0	21.2	0.0	0.0	0.0	74.7	5.5	1.4	0.0	0.0	0.0	0.0	0.0	8.6
2819	525846.70	5055663.19	2.00	0	N	A	-34.1	21.2	0.0	0.0	0.0	74.7	5.5	1.4	0.0	0.0	0.0	0.0	0.0	-94.4
2819	525846.70	5055663.19	2.00	0	E	A	69.0	21.2	0.0	0.0	0.0	74.7	5.5	1.4	0.0	0.0	0.0	0.0	0.0	8.6
2823	524977.05	5055106.24	2.00	0	D	A	69.0	15.7	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	8.3
2823	524977.05	5055106.24	2.00	0	N	A	-34.1	15.7	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	-94.7
2823	524977.05	5055106.24	2.00	0	E	A	69.0	15.7	0.0	0.0	0.0	70.9	4.2	1.3	0.0	0.0	0.0	0.0	0.0	8.3

Receiver
Name: (untitled)
ID: POR9
X: 527286.14 m
Y: 5057335.18 m
Z: 4.50 m

Point Source, ISO 9613, Name: "Impact Pile Driver", ID: "s-Pile Driver"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1893	528199.11	5056993.87	1.00	0	D	A	141.5	0.0	-7.0	0.0	0.0	70.8	1.9	8.8	0.0	0.0	0.0	0.0	0.0	53.0
1893	528199.11	5056993.87	1.00	0	N	A	129.5	0.0	-188.0	0.0	0.0	70.8	1.9	8.8	0.0	0.0	0.0	0.0	0.0	-140.0
1893	528199.11	5056993.87	1.00	0	E	A	141.5	0.0	-7.0	0.0	0.0	70.8	1.9	8.8	0.0	0.0	0.0	0.0	0.0	53.0

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1899	527042.01	5057389.83	2.00	0	D	A	69.0	18.0	0.0	0.0	0.0	59.0	1.6	1.0	0.0	0.0	0.0	0.0	0.0	25.4
1899	527042.01	5057389.83	2.00	0	N	A	-34.1	18.0	0.0	0.0	0.0	59.0	1.6	1.0	0.0	0.0	0.0	0.0	0.0	-77.6
1899	527042.01	5057389.83	2.00	0	E	A	69.0	18.0	0.0	0.0	0.0	59.0	1.6	1.0	0.0	0.0	0.0	0.0	0.0	25.4
1906	527104.91	5057381.55	2.00	0	D	A	69.0	18.0	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.3
1906	527104.91	5057381.55	2.00	0	N	A	-34.1	18.0	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-74.7
1906	527104.91	5057381.55	2.00	0	E	A	69.0	18.0	0.0	0.0	0.0	56.4	1.3	0.9	0.0	0.0	0.0	0.0	0.0	28.3
1911	527152.09	5057375.34	2.00	0	D	A	69.0	15.0	0.0	0.0	0.0	53.9	1.0	0.8	0.0	0.0	0.0	0.0	0.0	28.2
1911	527152.09	5057375.34	2.00	0	N	A	-34.1	15.0	0.0	0.0	0.0	53.9	1.0	0.8	0.0	0.0	0.0	0.0	0.0	-74.8
1911	527152.09	5057375.34	2.00	0	E	A	69.0	15.0	0.0	0.0	0.0	53.9	1.0	0.8	0.0	0.0	0.0	0.0	0.0	28.2
1917	527183.54	5057371.20	2.00	0	D	A	69.0	15.0	0.0	0.0	0.0	51.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	30.6
1917	527183.54	5057371.20	2.00	0	N	A	-34.1	15.0	0.0	0.0	0.0	51.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	-72.4
1917	527183.54	5057371.20	2.00	0	E	A	69.0	15.0	0.0	0.0	0.0	51.7	0.8	0.8	0.0	0.0	0.0	0.0	0.0	30.6
1922	527214.99	5057367.06	2.00	0	D	A	69.0	15.0	0.0	0.0	0.0	48.8	0.6	0.7	0.0	0.0	0.0	0.0	0.0	33.8
1922	527214.99	5057367.06	2.00	0	N	A	-34.1	15.0	0.0	0.0	0.0	48.8	0.6	0.7	0.0	0.0	0.0	0.0	0.0	-69.2
1922	527214.99	5057367.06	2.00	0	E	A	69.0	15.0	0.0	0.0	0.0	48.8	0.6	0.7	0.0	0.0	0.0	0.0	0.0	33.8
1928	527238.58	5057363.96	2.00	0	D	A	69.0	12.0	0.0	0.0	0.0	45.9	0.5	0.6	0.0	0.0	0.0	0.0	0.0	34.0
1928	527238.58	5057363.96	2.00	0	N	A	-34.1	12.0	0.0	0.0	0.0	45.9	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-69.0
1928	527238.58	5057363.96	2.00	0	E	A	69.0	12.0	0.0	0.0	0.0	45.9	0.5	0.6	0.0	0.0	0.0	0.0	0.0	34.0
1933	527254.31	5057361.89	2.00	0	D	A	69.0	12.0	0.0	0.0	0.0	43.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	36.7
1933	527254.31	5057361.89	2.00	0	N	A	-34.1	12.0	0.0	0.0	0.0	43.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-66.3
1933	527254.31	5057361.89	2.00	0	E	A	69.0	12.0	0.0	0.0	0.0	43.4	0.4	0.5	0.0	0.0	0.0	0.0	0.0	36.7
1939	527266.10	5057360.34	2.00	0	D	A	69.0	9.0	0.0	0.0	0.0	41.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	36.1
1939	527266.10	5057360.34	2.00	0	N	A	-34.1	9.0	0.0	0.0	0.0	41.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-66.9
1939	527266.10	5057360.34	2.00	0	E	A	69.0	9.0	0.0	0.0	0.0	41.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	36.1
1945	527273.96	5057359.30	2.00	0	D	A	69.0	9.0	0.0	0.0	0.0	39.7	0.2	0.3	0.0	0.0	0.0	0.0	0.0	37.7
1945	527273.96	5057359.30	2.00	0	N	A	-34.1	9.0	0.0	0.0	0.0	39.7	0.2	0.3	0.0	0.0	0.0	0.0	0.0	-65.3
1945	527273.96	5057359.30	2.00	0	E	A	69.0	9.0	0.0	0.0	0.0	39.7	0.2	0.3	0.0	0.0	0.0	0.0	0.0	37.7
1953	527281.83	5057358.27	2.00	0	D	A	69.0	9.0	0.0	0.0	0.0	38.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	39.0
1953	527281.83	5057358.27	2.00	0	N	A	-34.1	9.0	0.0	0.0	0.0	38.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	-64.0
1953	527281.83	5057358.27	2.00	0	E	A	69.0	9.0	0.0	0.0	0.0	38.5	0.2	0.3	0.0	0.0	0.0	0.0	0.0	39.0
1958	527289.69	5057357.23	2.00	0	D	A	69.0	9.0	0.0	0.0	0.0	38.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	39.4
1958	527289.69	5057357.23	2.00	0	N	A	-34.1	9.0	0.0	0.0	0.0	38.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	-63.6
1958	527289.69	5057357.23	2.00	0	E	A	69.0	9.0	0.0	0.0	0.0	38.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	39.4
1963	527297.55	5057356.20	2.00	0	D	A	69.0	9.0	0.0	0.0	0.0	38.6	0.2	0.3	0.0	0.0	0.0	0.0	0.0	38.8
1963	527297.55	5057356.20	2.00	0	N	A	-34.1	9.0	0.0	0.0	0.0	38.6	0.2	0.3	0.0	0.0	0.0	0.0	0.0	-64.2
1963	527297.55	5057356.20	2.00	0	E	A	69.0	9.0	0.0	0.0	0.0	38.6	0.2	0.3	0.0	0.0	0.0	0.0	0.0	38.8
1980	527305.42	5057355.16	2.00	0	D	A	69.0	9.0	0.0	0.0	0.0	39.9	0.2	0.4	0.0	0.0	0.0	0.0	0.0	37.4
1980	527305.42	5057355.16	2.00	0	N	A	-34.1	9.0	0.0	0.0	0.0	39.9	0.2	0.4	0.0	0.0	0.0	0.0	0.0	-65.6
1980	527305.42	5057355.16	2.00	0	E	A	69.0	9.0	0.0	0.0	0.0	39.9	0.2	0.4	0.0	0.0	0.0	0.0	0.0	37.4
1985	527317.21	5057353.61	2.00	0	D	A	69.0	12.0	0.0	0.0	0.0	42.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	38.0
1985	527317.21	5057353.61	2.00	0	N	A	-34.1	12.0	0.0	0.0	0.0	42.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	-65.0
1985	527317.21	5057353.61	2.00	0	E	A	69.0	12.0	0.0	0.0	0.0	42.2	0.3	0.4	0.0	0.0	0.0	0.0	0.0	38.0
1990	527332.94	5057351.54	2.00	0	D	A	69.0	12.0	0.0	0.0	0.0	44.9	0.4	0.5	0.0	0.0	0.0	0.0	0.0	35.1
1990	527332.94	5057351.54	2.00	0	N	A	-34.1	12.0	0.0	0.0	0.0	44.9	0.4	0.5	0.0	0.0	0.0	0.0	0.0	-67.9
1990	527332.94	5057351.54	2.00	0	E	A	69.0	12.0	0.0	0.0	0.0	44.9	0.4	0.5	0.0	0.0	0.0	0.0	0.0	35.1
1995	527348.66	5057349.47	2.00	0	D	A	69.0	12.0	0.0	0.0	0.0	47.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	32.7

Line Source, ISO 9613, Name: "Dam Construction On-Site Haul Route", ID: "s-TR2"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
1995	527348.66	5057349.47	2.00	0	N	A	-34.1	12.0	0.0	0.0	0.0	47.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	-70.3
1995	527348.66	5057349.47	2.00	0	E	A	69.0	12.0	0.0	0.0	0.0	47.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	32.7
2000	527372.25	5057346.37	2.00	0	D	A	69.0	15.0	0.0	0.0	0.0	49.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	32.8
2000	527372.25	5057346.37	2.00	0	N	A	-34.1	15.0	0.0	0.0	0.0	49.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	-70.2
2000	527372.25	5057346.37	2.00	0	E	A	69.0	15.0	0.0	0.0	0.0	49.8	0.7	0.7	0.0	0.0	0.0	0.0	0.0	32.8
2005	527419.43	5057340.16	2.00	0	D	A	69.0	18.0	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	31.7
2005	527419.43	5057340.16	2.00	0	N	A	-34.1	18.0	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	-71.3
2005	527419.43	5057340.16	2.00	0	E	A	69.0	18.0	0.0	0.0	0.0	53.5	1.0	0.8	0.0	0.0	0.0	0.0	0.0	31.7
2010	527482.33	5057331.88	2.00	0	D	A	69.0	18.0	0.0	0.0	0.0	56.9	1.3	0.9	0.0	0.0	0.0	0.0	0.0	27.9
2010	527482.33	5057331.88	2.00	0	N	A	-34.1	18.0	0.0	0.0	0.0	56.9	1.3	0.9	0.0	0.0	0.0	0.0	0.0	-75.2
2010	527482.33	5057331.88	2.00	0	E	A	69.0	18.0	0.0	0.0	0.0	56.9	1.3	0.9	0.0	0.0	0.0	0.0	0.0	27.9
2790	527660.20	5057255.32	2.00	0	D	A	69.0	20.9	0.0	0.0	0.0	62.7	2.2	1.0	0.0	0.0	0.0	0.0	0.0	24.0
2790	527660.20	5057255.32	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	62.7	2.2	1.0	0.0	0.0	0.0	0.0	0.0	-79.0
2790	527660.20	5057255.32	2.00	0	E	A	69.0	20.9	0.0	0.0	0.0	62.7	2.2	1.0	0.0	0.0	0.0	0.0	0.0	24.0
2793	527763.04	5057186.51	2.00	0	D	A	69.0	20.9	0.0	0.0	0.0	65.0	2.7	1.1	0.0	0.0	0.0	0.0	0.0	21.2
2793	527763.04	5057186.51	2.00	0	N	A	-34.1	20.9	0.0	0.0	0.0	65.0	2.7	1.1	0.0	0.0	0.0	0.0	0.0	-81.8
2793	527763.04	5057186.51	2.00	0	E	A	69.0	20.9	0.0	0.0	0.0	65.0	2.7	1.1	0.0	0.0	0.0	0.0	0.0	21.2
2796	526066.72	5057807.44	2.00	0	D	A	69.0	26.6	0.0	0.0	0.0	73.3	5.0	1.3	0.0	0.0	0.0	0.0	0.0	15.9
2796	526066.72	5057807.44	2.00	0	N	A	-34.1	26.6	0.0	0.0	0.0	73.3	5.0	1.3	0.0	0.0	0.0	0.0	0.0	-87.1
2796	526066.72	5057807.44	2.00	0	E	A	69.0	26.6	0.0	0.0	0.0	73.3	5.0	1.3	0.0	0.0	0.0	0.0	0.0	15.9
2799	526369.30	5057642.82	2.00	0	D	A	69.0	23.6	0.0	0.0	0.0	70.7	4.1	1.3	0.0	0.0	0.0	0.0	0.0	16.5
2799	526369.30	5057642.82	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	70.7	4.1	1.3	0.0	0.0	0.0	0.0	0.0	-86.6
2799	526369.30	5057642.82	2.00	0	E	A	69.0	23.6	0.0	0.0	0.0	70.7	4.1	1.3	0.0	0.0	0.0	0.0	0.0	16.5
2802	526571.02	5057533.07	2.00	0	D	A	69.0	23.6	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	19.5
2802	526571.02	5057533.07	2.00	0	N	A	-34.1	23.6	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	-83.5
2802	526571.02	5057533.07	2.00	0	E	A	69.0	23.6	0.0	0.0	0.0	68.4	3.5	1.2	0.0	0.0	0.0	0.0	0.0	19.5
2812	527561.28	5057308.73	2.00	0	D	A	69.0	20.1	0.0	0.0	0.0	59.8	1.7	1.0	0.0	0.0	0.0	0.0	0.0	26.5
2812	527561.28	5057308.73	2.00	0	N	A	-34.1	20.1	0.0	0.0	0.0	59.8	1.7	1.0	0.0	0.0	0.0	0.0	0.0	-76.5
2812	527561.28	5057308.73	2.00	0	E	A	69.0	20.1	0.0	0.0	0.0	59.8	1.7	1.0	0.0	0.0	0.0	0.0	0.0	26.5
2822	526952.60	5057423.37	2.00	0	D	A	69.0	21.1	0.0	0.0	0.0	61.8	2.0	1.0	0.0	0.0	0.0	0.0	0.0	25.3
2822	526952.60	5057423.37	2.00	0	N	A	-34.1	21.1	0.0	0.0	0.0	61.8	2.0	1.0	0.0	0.0	0.0	0.0	0.0	-77.7
2822	526952.60	5057423.37	2.00	0	E	A	69.0	21.1	0.0	0.0	0.0	61.8	2.0	1.0	0.0	0.0	0.0	0.0	0.0	25.3
2847	526821.31	5057447.55	2.00	0	D	A	69.0	21.7	0.0	0.0	0.0	64.6	2.6	1.1	0.0	0.0	0.0	0.0	0.0	22.4
2847	526821.31	5057447.55	2.00	0	N	A	-34.1	21.7	0.0	0.0	0.0	64.6	2.6	1.1	0.0	0.0	0.0	0.0	0.0	-80.6
2847	526821.31	5057447.55	2.00	0	E	A	69.0	21.7	0.0	0.0	0.0	64.6	2.6	1.1	0.0	0.0	0.0	0.0	0.0	22.4
2850	527917.66	5057073.64	2.00	0	D	A	69.0	24.1	0.0	0.0	0.0	67.7	3.3	1.2	0.0	0.0	0.0	0.0	0.0	20.9
2850	527917.66	5057073.64	2.00	0	N	A	-34.1	24.1	0.0	0.0	0.0	67.7	3.3	1.2	0.0	0.0	0.0	0.0	0.0	-82.1
2850	527917.66	5057073.64	2.00	0	E	A	69.0	24.1	0.0	0.0	0.0	67.7	3.3	1.2	0.0	0.0	0.0	0.0	0.0	20.9
2858	524956.37	5057160.92	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	78.4	7.2	1.4	0.0	0.0	0.0	0.0	0.0	10.9
2858	524956.37	5057160.92	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	78.4	7.2	1.4	0.0	0.0	0.0	0.0	0.0	-92.2
2858	524956.37	5057160.92	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	78.4	7.2	1.4	0.0	0.0	0.0	0.0	0.0	10.9
2859	525493.03	5057702.88	2.00	0	D	A	69.0	28.8	0.0	0.0	0.0	76.3	6.2	1.4	0.0	0.0	0.0	0.0	0.0	14.0
2859	525493.03	5057702.88	2.00	0	N	A	-34.1	28.8	0.0	0.0	0.0	76.3	6.2	1.4	0.0	0.0	0.0	0.0	0.0	-89.1
2859	525493.03	5057702.88	2.00	0	E	A	69.0	28.8	0.0	0.0	0.0	76.3	6.2	1.4	0.0	0.0	0.0	0.0	0.0	14.0
2872	526709.92	5057460.27	2.00	0	D	A	69.0	19.2	0.0	0.0	0.0	66.4	3.0	1.1	0.0	0.0	0.0	0.0	0.0	17.7
2872	526709.92	5057460.27	2.00	0	N	A	-34.1	19.2	0.0	0.0	0.0	66.4	3.0	1.1	0.0	0.0	0.0	0.0	0.0	-85.3
2872	526709.92	5057460.27	2.00	0	E	A	69.0	19.2	0.0	0.0	0.0	66.4	3.0	1.1	0.0	0.0	0.0	0.0	0.0	17.7
2877	528201.12	5056907.40	2.00	0	D	A	69.0	22.2	0.0	0.0	0.0	71.1	4.3	1.3	0.0	0.0	0.0	0.0	0.0	14.5
2877	528201.12	5056907.40	2.00	0	N	A	-34.1	22.2	0.0	0.0	0.0	71.1	4.3	1.3	0.0	0.0	0.0	0.0	0.0	-88.5
2877	528201.12	5056907.40	2.00	0	E	A	69.0	22.2	0.0	0.0	0.0	71.1	4.3	1.3	0.0	0.0	0.0	0.0	0.0	14.5
2879	528073.09	5056968.33	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	14.8
2879	528073.09	5056968.33	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	-88.2
2879	528073.09	5056968.33	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	69.8	3.9	1.2	0.0	0.0	0.0	0.0	0.0	14.8
2887	525813.18	5057945.52	2.00	0	D	A	69.0	20.7	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	7.6
2887	525813.18	5057945.52	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	-95.4
2887	525813.18	5057945.52	2.00	0	E	A	69.0	20.7	0.0	0.0	0.0	75.1	5.7	1.4	0.0	0.0	0.0	0.0	0.0	7.6

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2016	526804.30	5056457.62	2.00	0	DEN	A	52.3	47.8	0.0	0.0	0.0	71.0	2.8	-1.0	0.0	0.0	0.0	0.0	0.0	27.3
2021	526642.11	5056558.38	2.00	0	DEN	A	52.3	44.8	0.0	0.0	0.0	71.1	2.8	-1.3	0.0	0.0	0.0	0.0	0.0	24.4
2027	526639.57	5056724.06	2.00	0	DEN	A	52.3	44.8	0.0	0.0	0.0	70.0	2.6	-1.1	0.0	0.0	0.0	0.0	0.0	25.6

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2033	526806.84	5056291.94	2.00	0	DEN	A	52.3	47.8	0.0	0.0	0.0	72.2	3.1	-1.0	0.0	0.0	0.0	0.0	0.0	25.8
2039	526648.45	5056144.19	2.00	0	DEN	A	52.3	47.8	0.0	0.0	0.0	73.6	3.5	-1.5	0.0	0.0	0.0	0.0	0.0	24.5
2044	527446.08	5056153.69	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	72.5	3.2	-0.9	0.0	0.0	0.0	0.0	0.0	17.4
2049	527639.01	5056263.41	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	72.0	3.1	-0.5	0.0	0.0	0.0	0.0	0.0	17.6
2054	527330.97	5056133.35	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	72.6	3.2	-1.4	0.0	0.0	0.0	0.0	0.0	20.8
2059	527128.72	5056040.88	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	73.3	3.4	-0.9	0.0	0.0	0.0	0.0	0.0	19.4
2064	526898.49	5056000.19	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	73.9	3.6	-1.1	0.0	0.0	0.0	0.0	0.0	18.8
2069	527800.76	5056197.46	2.00	0	DEN	A	52.3	45.9	0.0	0.0	0.0	72.9	3.3	-0.9	0.0	0.0	0.0	0.0	0.0	22.9
2075	527666.99	5056211.63	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	72.5	3.2	-0.7	0.0	0.0	0.0	0.0	0.0	20.2
2080	527474.06	5056101.91	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	72.9	3.3	-0.9	0.0	0.0	0.0	0.0	0.0	19.9
2090	527144.33	5056180.14	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	72.3	3.2	-0.7	0.0	0.0	0.0	0.0	0.0	21.1
2095	527009.48	5056084.22	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	73.2	3.4	-0.8	0.0	0.0	0.0	0.0	0.0	17.1
2100	526797.91	5056009.01	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	74.0	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	16.4
2105	527461.70	5056292.95	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	71.5	2.9	-0.5	0.0	0.0	0.0	0.0	0.0	18.9
2120	527644.21	5056309.83	2.00	0	DEN	A	52.3	40.6	0.0	0.0	0.0	71.7	3.0	-0.5	0.0	0.0	0.0	0.0	0.0	18.6
2125	527341.38	5056226.18	2.00	0	DEN	A	52.3	43.6	0.0	0.0	0.0	71.9	3.1	-1.2	0.0	0.0	0.0	0.0	0.0	22.1
2135	526713.94	5056807.44	2.00	0	DEN	A	52.3	42.8	0.0	0.0	0.0	68.8	2.3	-0.9	0.0	0.0	0.0	0.0	0.0	24.8
2139	526833.74	5056683.59	2.00	0	DEN	A	52.3	42.8	0.0	0.0	0.0	69.0	2.4	-0.6	0.0	0.0	0.0	0.0	0.0	24.4
2153	527781.56	5056713.22	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	69.0	2.4	-0.5	0.0	0.0	0.0	0.0	0.0	19.9
2158	527861.49	5056822.35	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	68.7	2.3	0.5	0.0	0.0	0.0	0.0	0.0	19.2
2163	527684.74	5056659.05	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	68.9	2.4	0.3	0.0	0.0	0.0	0.0	0.0	22.2
2178	526530.17	5056228.39	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	73.5	3.5	-1.6	0.0	0.0	0.0	0.0	0.0	19.8
2184	526524.08	5056484.78	2.00	0	DEN	A	52.3	42.9	0.0	0.0	0.0	72.2	3.1	-1.5	0.0	0.0	0.0	0.0	0.0	21.4
2190	527661.88	5056065.51	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	73.4	3.5	-0.9	0.0	0.0	0.0	0.0	0.0	18.5
2196	527431.65	5056024.83	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	73.4	3.5	-1.2	0.0	0.0	0.0	0.0	0.0	18.8
2202	527228.45	5055973.03	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	73.7	3.5	-1.1	0.0	0.0	0.0	0.0	0.0	18.3
2208	526944.17	5055954.57	2.00	0	DEN	A	52.3	42.2	0.0	0.0	0.0	74.1	3.6	-1.0	0.0	0.0	0.0	0.0	0.0	17.8
2226	528096.93	5056835.69	2.00	0	DEN	A	52.3	43.2	0.0	0.0	0.0	70.6	2.7	-0.7	0.0	0.0	0.0	0.0	0.0	22.9
2239	526707.85	5056917.16	2.00	0	DEN	A	52.3	41.3	0.0	0.0	0.0	68.1	2.2	-0.6	0.0	0.0	0.0	0.0	0.0	24.0
2251	528071.65	5056357.27	2.00	0	DEN	A	52.3	45.1	0.0	0.0	0.0	73.0	3.3	-0.8	0.0	0.0	0.0	0.0	0.0	21.9
2263	526823.08	5056120.29	2.00	0	DEN	A	52.3	41.3	0.0	0.0	0.0	73.3	3.4	-1.1	0.0	0.0	0.0	0.0	0.0	18.0
2268	527008.88	5056256.09	2.00	0	DEN	A	52.3	41.3	0.0	0.0	0.0	71.9	3.1	-0.6	0.0	0.0	0.0	0.0	0.0	19.1
2274	527966.63	5056737.52	2.00	0	DEN	A	52.3	42.1	0.0	0.0	0.0	70.1	2.6	-0.8	0.0	0.0	0.0	0.0	0.0	22.4
2279	526995.18	5056173.48	2.00	0	DEN	A	52.3	37.9	0.0	0.0	0.0	72.6	3.2	-0.7	0.0	0.0	0.0	0.0	0.0	15.1
2283	526793.14	5056038.76	2.00	0	DEN	A	52.3	37.9	0.0	0.0	0.0	73.8	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	13.9
2288	527134.80	5056239.64	2.00	0	DEN	A	52.3	40.9	0.0	0.0	0.0	71.9	3.0	-0.5	0.0	0.0	0.0	0.0	0.0	18.7
2295	527162.96	5055909.34	2.00	0	DEN	A	52.3	43.3	0.0	0.0	0.0	74.1	3.7	-1.2	0.0	0.0	0.0	0.0	0.0	19.1
2301	526878.68	5055890.87	2.00	0	DEN	A	52.3	43.3	0.0	0.0	0.0	74.5	3.8	-1.2	0.0	0.0	0.0	0.0	0.0	18.5
2319	526646.93	5056896.52	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	68.8	2.3	-0.8	0.0	0.0	0.0	0.0	0.0	21.9
2331	527716.84	5056002.61	2.00	0	DEN	A	52.3	45.2	0.0	0.0	0.0	73.9	3.6	-1.0	0.0	0.0	0.0	0.0	0.0	21.0
2337	527870.54	5056765.46	2.00	0	DEN	A	52.3	40.4	0.0	0.0	0.0	69.2	2.4	-0.6	0.0	0.0	0.0	0.0	0.0	21.6
2355	526904.81	5056675.98	2.00	0	DEN	A	52.3	38.9	0.0	0.0	0.0	68.6	2.3	0.5	0.0	0.0	0.0	0.0	0.0	19.7
2371	528014.30	5056693.86	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	70.7	2.8	-0.9	0.0	0.0	0.0	0.0	0.0	19.8
2376	527776.69	5056798.10	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	68.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	12.8
2381	527677.48	5056705.66	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	68.4	2.2	2.2	0.0	0.0	0.0	0.0	0.0	12.6
2386	527863.87	5056860.62	2.00	0	DEN	A	52.3	36.2	0.0	0.0	0.0	68.5	2.3	2.1	0.0	0.0	0.0	0.0	0.0	15.7
2395	526827.92	5055821.88	2.00	0	DEN	A	52.3	45.4	0.0	0.0	0.0	75.0	3.9	-1.3	0.0	0.0	0.0	0.0	0.0	20.1
2401	527249.93	5056556.41	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	68.8	2.3	-0.6	0.0	0.0	0.0	0.0	0.0	20.2
2404	527368.59	5056562.31	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	68.8	2.3	-0.6	0.0	0.0	0.0	0.0	0.0	20.3
2410	527309.44	5056492.87	2.00	0	DEN	A	52.3	38.3	0.0	0.0	0.0	69.5	2.5	-0.8	0.0	0.0	0.0	0.0	0.0	19.4
2413	527661.51	5056372.09	2.00	0	DEN	A	52.3	40.7	0.0	0.0	0.0	71.3	2.9	1.3	0.0	0.0	0.0	0.0	0.0	17.4
2419	527965.90	5056367.24	2.00	0	DEN	A	52.3	41.5	0.0	0.0	0.0	72.5	3.2	-0.6	0.0	0.0	0.0	0.0	0.0	18.8
2428	527906.87	5056312.52	2.00	0	DEN	A	52.3	41.2	0.0	0.0	0.0	72.6	3.2	-0.7	0.0	0.0	0.0	0.0	0.0	18.4
2434	526951.51	5056175.70	2.00	0	DEN	A	52.3	34.3	0.0	0.0	0.0	72.6	3.2	-0.8	0.0	0.0	0.0	0.0	0.0	11.5
2437	526765.72	5056039.90	2.00	0	DEN	A	52.3	34.3	0.0	0.0	0.0	73.9	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	10.4
2440	527060.66	5056242.51	2.00	0	DEN	A	52.3	37.3	0.0	0.0	0.0	72.0	3.1	-0.5	0.0	0.0	0.0	0.0	0.0	15.1
2443	528038.35	5056784.98	2.00	0	DEN	A	52.3	38.0	0.0	0.0	0.0	70.4	2.7	-0.8	0.0	0.0	0.0	0.0	0.0	18.0
2452	528003.75	5056320.82	2.00	0	DEN	A	52.3	40.1	0.0	0.0	0.0	72.9	3.3	-0.8	0.0	0.0	0.0	0.0	0.0	17.0
2455	527626.51	5056582.16	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	69.3	2.4	-0.6	0.0	0.0	0.0	0.0	0.0	18.7
2458	527307.17	5055876.20	2.00	0	DEN	A	52.3	42.5	0.0	0.0	0.0	74.3	3.7	-1.6	0.0	0.0	0.0	0.0	0.0	18.5
2467	528175.65	5056754.58	2.00	0	DEN	A	52.3	39.7	0.0	0.0	0.0	71.5	3.0	-1.1	0.0	0.0	0.0	0.0	0.0	18.6
2473	526806.84	5056634.70	2.00	0	DEN	A	52.3	31.5	0.0	0.0	0.0	69.6	2.5	-0.9	0.0	0.0	0.0	0.0	0.0	12.6
2476	526687.03	5056758.55	2.00	0	DEN	A	52.3	31.5	0.0	0.0	0.0	69.4	2.5	-0.9	0.0	0.0	0.0	0.0	0.0	12.9

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"																					
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2479	526888.06	5056540.18	2.00	0	DEN	A	52.3	34.5	0.0	0.0	0.0	70.0	2.6	-0.8	0.0	0.0	0.0	0.0	0.0	15.1
2482	526493.62	5056087.16	2.00	0	DEN	A	52.3	41.4	0.0	0.0	0.0	74.4	3.7	-1.6	0.0	0.0	0.0	0.0	0.0	17.2
2488	526450.98	5056597.76	2.00	0	DEN	A	52.3	38.8	0.0	0.0	0.0	71.9	3.1	-1.4	0.0	0.0	0.0	0.0	0.0	17.5
2491	528120.08	5056893.75	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	70.5	2.7	-0.5	0.0	0.0	0.0	0.0	0.0	16.2
2494	526785.01	5056905.21	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	67.4	2.1	1.3	0.0	0.0	0.0	0.0	0.0	16.2
2500	527275.93	5056519.94	2.00	0	DEN	A	52.3	35.6	0.0	0.0	0.0	69.2	2.4	-0.7	0.0	0.0	0.0	0.0	0.0	17.0
2509	527321.11	5056360.04	2.00	0	DEN	A	52.3	37.2	0.0	0.0	0.0	70.8	2.8	-1.1	0.0	0.0	0.0	0.0	0.0	17.1
2512	528114.21	5056481.81	2.00	0	DEN	A	52.3	37.6	0.0	0.0	0.0	72.5	3.2	-1.1	0.0	0.0	0.0	0.0	0.0	15.3
2515	527551.75	5055861.98	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.5	3.8	-1.1	0.0	0.0	0.0	0.0	0.0	15.0
2518	527613.15	5055896.44	2.00	0	DEN	A	52.3	39.9	0.0	0.0	0.0	74.4	3.7	-1.1	0.0	0.0	0.0	0.0	0.0	15.1
2524	527456.17	5056326.20	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	71.2	2.9	0.8	0.0	0.0	0.0	0.0	0.0	11.3
2527	527638.69	5056343.09	2.00	0	DEN	A	52.3	33.9	0.0	0.0	0.0	71.4	2.9	-0.2	0.0	0.0	0.0	0.0	0.0	12.0
2530	526632.72	5056979.09	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	68.4	2.3	1.2	0.0	0.0	0.0	0.0	0.0	13.7
2536	526691.60	5055797.09	2.00	0	DEN	A	52.3	40.8	0.0	0.0	0.0	75.3	4.0	-1.4	0.0	0.0	0.0	0.0	0.0	15.1
2539	526560.12	5056454.90	2.00	0	DEN	A	52.3	29.1	0.0	0.0	0.0	72.1	3.1	-1.5	0.0	0.0	0.0	0.0	0.0	7.6
2541	526566.21	5056198.51	2.00	0	DEN	A	52.3	29.1	0.0	0.0	0.0	73.6	3.5	-1.6	0.0	0.0	0.0	0.0	0.0	5.9
2544	526558.09	5056658.06	2.00	0	DEN	A	52.3	32.1	0.0	0.0	0.0	71.0	2.8	-1.3	0.0	0.0	0.0	0.0	0.0	12.0
2547	527961.71	5056629.28	2.00	0	DEN	A	52.3	34.8	0.0	0.0	0.0	70.8	2.8	1.1	0.0	0.0	0.0	0.0	0.0	12.4
2550	527622.54	5056021.48	2.00	0	DEN	A	52.3	38.6	0.0	0.0	0.0	73.6	3.5	-0.9	0.0	0.0	0.0	0.0	0.0	14.7
2554	527255.62	5056599.77	2.00	0	DEN	A	52.3	33.0	0.0	0.0	0.0	68.3	2.2	1.6	0.0	0.0	0.0	0.0	0.0	13.2
2556	528025.65	5056751.88	2.00	0	DEN	A	52.3	33.7	0.0	0.0	0.0	70.5	2.7	-0.9	0.0	0.0	0.0	0.0	0.0	13.8
2560	527336.73	5056490.90	2.00	0	DEN	A	52.3	32.7	0.0	0.0	0.0	69.5	2.5	-0.8	0.0	0.0	0.0	0.0	0.0	13.8
2571	526483.47	5056564.08	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	71.9	3.1	-1.4	0.0	0.0	0.0	0.0	0.0	13.7
2575	526476.36	5055982.87	2.00	0	DEN	A	52.3	38.5	0.0	0.0	0.0	75.0	3.9	-1.7	0.0	0.0	0.0	0.0	0.0	13.7
2581	526434.74	5056637.96	2.00	0	DEN	A	52.3	34.9	0.0	0.0	0.0	71.8	3.0	-0.5	0.0	0.0	0.0	0.0	0.0	12.8
2585	527393.33	5056331.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	71.1	2.8	1.5	0.0	0.0	0.0	0.0	0.0	11.6
2588	528008.74	5056433.02	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	72.3	3.1	-0.6	0.0	0.0	0.0	0.0	0.0	12.5
2595	526537.28	5056025.23	2.00	0	DEN	A	52.3	36.6	0.0	0.0	0.0	74.6	3.8	-1.7	0.0	0.0	0.0	0.0	0.0	12.2
2602	526988.60	5055781.19	2.00	0	DEN	A	52.3	37.1	0.0	0.0	0.0	75.0	3.9	-1.1	0.0	0.0	0.0	0.0	0.0	11.6
2609	526849.99	5056572.23	2.00	0	DEN	A	52.3	25.8	0.0	0.0	0.0	69.9	2.6	-0.8	0.0	0.0	0.0	0.0	0.0	6.5
2779	526708.86	5056728.67	2.00	0	DEN	A	52.3	25.8	0.0	0.0	0.0	69.5	2.5	-1.0	0.0	0.0	0.0	0.0	0.0	7.2
2781	526942.88	5056466.85	2.00	0	DEN	A	52.3	28.8	0.0	0.0	0.0	70.4	2.7	0.9	0.0	0.0	0.0	0.0	0.0	7.1
2784	527809.24	5055979.29	2.00	0	DEN	A	52.3	36.3	0.0	0.0	0.0	74.2	3.7	-1.1	0.0	0.0	0.0	0.0	0.0	11.7
2787	526646.93	5056873.71	2.00	0	DEN	A	52.3	29.9	0.0	0.0	0.0	68.9	2.4	-0.9	0.0	0.0	0.0	0.0	0.0	11.7
2808	528119.15	5056408.72	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	72.9	3.3	-0.9	0.0	0.0	0.0	0.0	0.0	10.0
2816	527231.18	5055827.31	2.00	0	DEN	A	52.3	35.4	0.0	0.0	0.0	74.6	3.8	-1.4	0.0	0.0	0.0	0.0	0.0	10.7
2818	528148.76	5056221.98	2.00	0	DEN	A	52.3	34.7	0.0	0.0	0.0	74.0	3.6	-1.1	0.0	0.0	0.0	0.0	0.0	10.5
2824	526443.87	5056660.77	2.00	0	DEN	A	52.3	31.7	0.0	0.0	0.0	71.7	3.0	1.2	0.0	0.0	0.0	0.0	0.0	8.1
2828	526893.64	5056743.34	2.00	0	DEN	A	52.3	28.0	0.0	0.0	0.0	68.0	2.2	1.9	0.0	0.0	0.0	0.0	0.0	8.2
2829	526548.45	5056809.61	2.00	0	DEN	A	52.3	30.0	0.0	0.0	0.0	70.1	2.6	-1.1	0.0	0.0	0.0	0.0	0.0	10.7
2831	526507.84	5056218.61	2.00	0	DEN	A	52.3	32.5	0.0	0.0	0.0	73.7	3.5	-1.6	0.0	0.0	0.0	0.0	0.0	9.2
2833	526540.33	5056950.84	2.00	0	DEN	A	52.3	29.2	0.0	0.0	0.0	69.5	2.5	-0.7	0.0	0.0	0.0	0.0	0.0	10.2
2834	526594.14	5055830.77	2.00	0	DEN	A	52.3	35.0	0.0	0.0	0.0	75.4	4.1	-1.5	0.0	0.0	0.0	0.0	0.0	9.4
2835	528082.86	5056212.59	2.00	0	DEN	A	52.3	33.4	0.0	0.0	0.0	73.8	3.6	-1.0	0.0	0.0	0.0	0.0	0.0	9.4
2836	527848.96	5056038.84	2.00	0	DEN	A	52.3	33.3	0.0	0.0	0.0	74.0	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	9.1
2837	526952.53	5056480.43	2.00	0	DEN	A	52.3	29.4	0.0	0.0	0.0	70.3	2.6	1.8	0.0	0.0	0.0	0.0	0.0	7.1
2838	527394.60	5055872.64	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	74.3	3.7	-1.5	0.0	0.0	0.0	0.0	0.0	8.8
2839	528139.11	5056191.06	2.00	0	DEN	A	52.3	33.1	0.0	0.0	0.0	74.1	3.7	0.8	0.0	0.0	0.0	0.0	0.0	6.9
2840	526508.85	5056621.66	2.00	0	DEN	A	52.3	30.1	0.0	0.0	0.0	71.5	2.9	-1.4	0.0	0.0	0.0	0.0	0.0	9.4
2841	526432.71	5056013.28	2.00	0	DEN	A	52.3	33.2	0.0	0.0	0.0	74.9	3.9	-1.7	0.0	0.0	0.0	0.0	0.0	8.4
2842	526524.08	5056944.32	2.00	0	DEN	A	52.3	28.1	0.0	0.0	0.0	69.7	2.5	-0.6	0.0	0.0	0.0	0.0	0.0	8.9
2844	526940.35	5056608.63	2.00	0	DEN	A	52.3	27.2	0.0	0.0	0.0	69.1	2.4	0.3	0.0	0.0	0.0	0.0	0.0	7.7
2845	526407.32	5056556.48	2.00	0	DEN	A	52.3	30.4	0.0	0.0	0.0	72.4	3.2	-1.4	0.0	0.0	0.0	0.0	0.0	8.5
2849	527311.85	5056412.29	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	70.3	2.7	-1.0	0.0	0.0	0.0	0.0	0.0	7.9
2851	527289.02	5056366.95	2.00	0	DEN	A	52.3	27.6	0.0	0.0	0.0	70.7	2.8	-0.2	0.0	0.0	0.0	0.0	0.0	6.6
2852	527207.69	5056522.44	2.00	0	DEN	A	52.3	25.7	0.0	0.0	0.0	69.2	2.4	-0.7	0.0	0.0	0.0	0.0	0.0	7.0
2854	527925.77	5056103.14	2.00	0	DEN	A	52.3	30.5	0.0	0.0	0.0	73.8	3.6	-0.6	0.0	0.0	0.0	0.0	0.0	6.0
2855	526467.22	5056405.47	2.00	0	DEN	A	52.3	29.0	0.0	0.0	0.0	72.9	3.3	-1.5	0.0	0.0	0.0	0.0	0.0	6.7
2856	526889.58	5056641.22	2.00	0	DEN	A	52.3	23.8	0.0	0.0	0.0	69.1	2.4	-0.6	0.0	0.0	0.0	0.0	0.0	5.2
2857	527587.02	5055809.42	2.00	0	DEN	A	52.3	30.8	0.0	0.0	0.0	74.8	3.9	1.0	0.0	0.0	0.0	0.0	0.0	3.4
2860	526484.48	5055924.20	2.00	0	DEN	A	52.3	31.0	0.0	0.0	0.0	75.2	4.0	-1.7	0.0	0.0	0.0	0.0	0.0	5.8
2861	526754.55	5055738.43	2.00	0	DEN	A	52.3	30.9	0.0	0.0	0.0	75.5	4.1	-1.4	0.0	0.0	0.0	0.0	0.0	4.9
2862	526705.82	5055738.43	2.00	0	DEN	A	52.3	30.7	0.0	0.0	0.0	75.6	4.1	-1.4	0.0	0.0	0.0	0.0	0.0	4.6

Area Source, ISO 9613, Name: "Dredging Area 4", ID: "s-Dredge4"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2863	527324.42	5056404.58	2.00	0	DEN	A	52.3	24.5	0.0	0.0	0.0	70.4	2.7	0.1	0.0	0.0	0.0	0.0	0.0	3.6
2865	527504.16	5055876.80	2.00	0	DEN	A	52.3	27.9	0.0	0.0	0.0	74.4	3.7	1.1	0.0	0.0	0.0	0.0	0.0	1.0
2866	526475.35	5056215.35	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	73.8	3.6	-1.6	0.0	0.0	0.0	0.0	0.0	3.9
2867	526543.37	5056779.19	2.00	0	DEN	A	52.3	23.9	0.0	0.0	0.0	70.3	2.7	-1.1	0.0	0.0	0.0	0.0	0.0	4.3
2868	527209.95	5055884.50	2.00	0	DEN	A	52.3	27.5	0.0	0.0	0.0	74.2	3.7	-1.3	0.0	0.0	0.0	0.0	0.0	3.2
2869	526381.94	5056629.27	2.00	0	DEN	A	52.3	25.5	0.0	0.0	0.0	72.2	3.1	-1.2	0.0	0.0	0.0	0.0	0.0	3.7
2870	526800.24	5055721.04	2.00	0	DEN	A	52.3	28.9	0.0	0.0	0.0	75.5	4.1	-1.2	0.0	0.0	0.0	0.0	0.0	2.8
2871	526554.54	5056837.85	2.00	0	DEN	A	52.3	23.0	0.0	0.0	0.0	69.9	2.6	-1.1	0.0	0.0	0.0	0.0	0.0	3.9
2873	526602.26	5055849.24	2.00	0	DEN	A	52.3	27.3	0.0	0.0	0.0	75.3	4.0	-1.5	0.0	0.0	0.0	0.0	0.0	1.8
2874	526466.21	5056172.98	2.00	0	DEN	A	52.3	25.3	0.0	0.0	0.0	74.1	3.6	-1.2	0.0	0.0	0.0	0.0	0.0	1.1
2875	527356.53	5056374.75	2.00	0	DEN	A	52.3	21.9	0.0	0.0	0.0	70.7	2.7	2.1	0.0	0.0	0.0	0.0	0.0	-1.3
2880	526554.54	5056771.58	2.00	0	DEN	A	52.3	20.2	0.0	0.0	0.0	70.3	2.7	-1.2	0.0	0.0	0.0	0.0	0.0	0.7
2883	526545.40	5056845.46	2.00	0	DEN	A	52.3	19.7	0.0	0.0	0.0	70.0	2.6	-0.7	0.0	0.0	0.0	0.0	0.0	0.2
2884	526530.17	5056954.10	2.00	0	DEN	A	52.3	19.3	0.0	0.0	0.0	69.6	2.5	0.9	0.0	0.0	0.0	0.0	0.0	-1.4
2888	526478.39	5056359.84	2.00	0	DEN	A	52.3	17.4	0.0	0.0	0.0	73.1	3.4	-1.4	0.0	0.0	0.0	0.0	0.0	-5.3

Area Source, ISO 9613, Name: "Dredging Area 1", ID: "s-Dredge1"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2085	525978.75	5056126.68	2.00	0	DEN	A	62.6	43.3	0.0	0.0	0.0	76.0	4.3	1.4	0.0	0.0	0.0	0.0	0.0	24.2
2147	526135.72	5056188.04	2.00	0	DEN	A	62.6	40.7	0.0	0.0	0.0	75.2	4.0	2.4	0.0	0.0	0.0	0.0	0.0	21.8
2214	526148.61	5056144.02	2.00	0	DEN	A	62.6	39.2	0.0	0.0	0.0	75.3	4.0	2.4	0.0	0.0	0.0	0.0	0.0	20.1
2220	525955.63	5056188.49	2.00	0	DEN	A	62.6	39.5	0.0	0.0	0.0	75.9	4.2	2.6	0.0	0.0	0.0	0.0	0.0	19.3
2307	525868.91	5056027.96	2.00	0	DEN	A	62.6	38.4	0.0	0.0	0.0	76.7	4.5	-1.1	0.0	0.0	0.0	0.0	0.0	20.9
2313	526147.28	5056059.09	2.00	0	DEN	A	62.6	37.5	0.0	0.0	0.0	75.7	4.1	2.4	0.0	0.0	0.0	0.0	0.0	17.8
2325	526227.77	5056317.89	2.00	0	DEN	A	62.6	35.9	0.0	0.0	0.0	74.3	3.7	2.1	0.0	0.0	0.0	0.0	0.0	18.3
2343	525938.28	5056000.84	2.00	0	DEN	A	62.6	37.3	0.0	0.0	0.0	76.6	4.4	-0.2	0.0	0.0	0.0	0.0	0.0	19.1
2349	526021.88	5056197.38	2.00	0	DEN	A	62.6	35.8	0.0	0.0	0.0	75.6	4.1	2.5	0.0	0.0	0.0	0.0	0.0	16.2
2391	526125.94	5056087.99	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	75.6	4.1	2.4	0.0	0.0	0.0	0.0	0.0	16.4
2398	526201.09	5056273.42	2.00	0	DEN	A	62.6	34.9	0.0	0.0	0.0	74.6	3.8	2.2	0.0	0.0	0.0	0.0	0.0	16.9
2407	526154.84	5056033.30	2.00	0	DEN	A	62.6	35.3	0.0	0.0	0.0	75.7	4.2	2.4	0.0	0.0	0.0	0.0	0.0	15.6
2416	525934.73	5055961.70	2.00	0	DEN	A	62.6	36.0	0.0	0.0	0.0	76.7	4.5	0.3	0.0	0.0	0.0	0.0	0.0	17.0
2422	526244.22	5056139.13	2.00	0	DEN	A	62.6	34.0	0.0	0.0	0.0	75.0	3.9	2.2	0.0	0.0	0.0	0.0	0.0	15.4
2425	526207.31	5056375.70	2.00	0	DEN	A	62.6	33.1	0.0	0.0	0.0	74.2	3.7	2.1	0.0	0.0	0.0	0.0	0.0	15.7
2431	526234.88	5056181.82	2.00	0	DEN	A	62.6	33.4	0.0	0.0	0.0	74.9	3.9	2.2	0.0	0.0	0.0	0.0	0.0	15.0
2449	526259.78	5056354.35	2.00	0	DEN	A	62.6	32.5	0.0	0.0	0.0	74.0	3.6	2.0	0.0	0.0	0.0	0.0	0.0	15.3
2470	525892.04	5055948.36	2.00	0	DEN	A	62.6	34.7	0.0	0.0	0.0	76.9	4.6	-0.9	0.0	0.0	0.0	0.0	0.0	16.7
2485	526250.89	5056312.11	2.00	0	DEN	A	62.6	31.5	0.0	0.0	0.0	74.3	3.7	2.1	0.0	0.0	0.0	0.0	0.0	14.0
2503	526011.21	5056249.85	2.00	0	DEN	A	62.6	32.3	0.0	0.0	0.0	75.5	4.1	2.5	0.0	0.0	0.0	0.0	0.0	12.8
2506	525924.50	5056052.86	2.00	0	DEN	A	62.6	33.0	0.0	0.0	0.0	76.4	4.4	-1.0	0.0	0.0	0.0	0.0	0.0	15.7
2533	525770.20	5056028.40	2.00	0	DEN	A	62.6	32.4	0.0	0.0	0.0	77.0	4.6	3.0	0.0	0.0	0.0	0.0	0.0	10.4
2558	526000.54	5055937.25	2.00	0	DEN	A	62.6	30.9	0.0	0.0	0.0	76.6	4.4	2.7	0.0	0.0	0.0	0.0	0.0	9.8
2567	526278.46	5056333.90	2.00	0	DEN	A	62.6	27.8	0.0	0.0	0.0	74.0	3.6	2.0	0.0	0.0	0.0	0.0	0.0	10.6
2578	525845.79	5055937.69	2.00	0	DEN	A	62.6	30.6	0.0	0.0	0.0	77.1	4.6	-0.9	0.0	0.0	0.0	0.0	0.0	12.4
2599	526254.00	5056105.78	2.00	0	DEN	A	62.6	27.7	0.0	0.0	0.0	75.1	4.0	2.2	0.0	0.0	0.0	0.0	0.0	8.9
2606	526122.82	5056104.00	2.00	0	DEN	A	62.6	27.5	0.0	0.0	0.0	75.6	4.1	2.4	0.0	0.0	0.0	0.0	0.0	7.9
2805	525792.87	5056031.07	2.00	0	DEN	A	62.6	28.7	0.0	0.0	0.0	76.9	4.6	2.9	0.0	0.0	0.0	0.0	0.0	6.9
2810	526233.99	5056119.12	2.00	0	DEN	A	62.6	26.3	0.0	0.0	0.0	75.1	4.0	2.2	0.0	0.0	0.0	0.0	0.0	7.6
2814	526210.87	5056410.83	2.00	0	DEN	A	62.6	24.9	0.0	0.0	0.0	74.0	3.6	2.1	0.0	0.0	0.0	0.0	0.0	7.6
2826	526224.65	5056060.42	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	75.4	4.1	2.3	0.0	0.0	0.0	0.0	0.0	6.4
2827	525781.31	5056009.73	2.00	0	DEN	A	62.6	27.1	0.0	0.0	0.0	77.0	4.6	0.6	0.0	0.0	0.0	0.0	0.0	7.4
2830	525887.59	5056154.25	2.00	0	DEN	A	62.6	25.6	0.0	0.0	0.0	76.3	4.3	2.8	0.0	0.0	0.0	0.0	0.0	4.9
2843	526009.43	5055913.68	2.00	0	DEN	A	62.6	24.7	0.0	0.0	0.0	76.6	4.5	2.7	0.0	0.0	0.0	0.0	0.0	3.5
2848	525743.96	5056053.75	2.00	0	DEN	A	62.6	24.5	0.0	0.0	0.0	77.0	4.6	3.0	0.0	0.0	0.0	0.0	0.0	2.5
2853	525732.40	5056058.20	2.00	0	DEN	A	62.6	23.6	0.0	0.0	0.0	77.1	4.6	3.0	0.0	0.0	0.0	0.0	0.0	1.4
2864	525923.16	5056134.24	2.00	0	DEN	A	62.6	18.9	0.0	0.0	0.0	76.2	4.3	1.2	0.0	0.0	0.0	0.0	0.0	-0.3

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"

Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	I/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2129	526445.79	5055628.81	2.00	0	DEN	A	59.7	46.7	0.0	0.0	0.0	76.6	4.5	-1.6	0.0	0.0	0.0	0.0	0.0	27.0
2143	526526.72	5055740.42	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	75.9	4.2	-1.6	0.0	0.0	0.0	0.0	0.0	25.7
2168	526740.61	5055502.08	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	76.6	4.5	-1.4	0.0	0.0	0.0	0.0	0.0	24.6

Area Source, ISO 9613, Name: "Dredging Area 3", ID: "s-Dredge3"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2173	526176.76	5055599.46	2.00	0	DEN	A	59.7	44.5	0.0	0.0	0.0	77.3	4.7	-1.4	0.0	0.0	0.0	0.0	0.0	23.7
2232	526641.01	5055518.97	2.00	0	DEN	A	59.7	42.6	0.0	0.0	0.0	76.7	4.5	-1.5	0.0	0.0	0.0	0.0	0.0	22.7
2258	526325.73	5055695.51	2.00	0	DEN	A	59.7	42.0	0.0	0.0	0.0	76.6	4.4	-0.1	0.0	0.0	0.0	0.0	0.0	20.9
2361	526109.62	5055755.54	2.00	0	DEN	A	59.7	40.3	0.0	0.0	0.0	76.9	4.6	-1.1	0.0	0.0	0.0	0.0	0.0	19.7
2446	526178.99	5055559.44	2.00	0	DEN	A	59.7	38.4	0.0	0.0	0.0	77.4	4.7	-1.4	0.0	0.0	0.0	0.0	0.0	17.4
2461	526793.98	5055599.46	2.00	0	DEN	A	59.7	37.1	0.0	0.0	0.0	76.1	4.3	-1.3	0.0	0.0	0.0	0.0	0.0	17.8
2464	526214.12	5055633.26	2.00	0	DEN	A	59.7	38.0	0.0	0.0	0.0	77.1	4.6	-1.4	0.0	0.0	0.0	0.0	0.0	17.4
2497	526414.67	5055708.41	2.00	0	DEN	A	59.7	36.0	0.0	0.0	0.0	76.3	4.4	-1.6	0.0	0.0	0.0	0.0	0.0	16.6
2521	526578.75	5055444.27	2.00	0	DEN	A	59.7	35.2	0.0	0.0	0.0	77.1	4.6	2.2	0.0	0.0	0.0	0.0	0.0	11.1
2552	526166.98	5055800.01	2.00	0	DEN	A	59.7	33.9	0.0	0.0	0.0	76.6	4.4	-0.0	0.0	0.0	0.0	0.0	0.0	12.7
2564	526134.52	5055805.35	2.00	0	DEN	A	59.7	33.5	0.0	0.0	0.0	76.6	4.5	-0.5	0.0	0.0	0.0	0.0	0.0	12.7
2820	526730.39	5055412.70	2.00	0	DEN	A	59.7	29.9	0.0	0.0	0.0	77.0	4.6	-1.4	0.0	0.0	0.0	0.0	0.0	9.4
2832	526319.95	5055554.99	2.00	0	DEN	A	59.7	29.3	0.0	0.0	0.0	77.1	4.6	-1.6	0.0	0.0	0.0	0.0	0.0	8.9
2846	526587.20	5055466.95	2.00	0	DEN	A	59.7	27.2	0.0	0.0	0.0	77.0	4.6	1.1	0.0	0.0	0.0	0.0	0.0	4.3
2886	526096.28	5055842.25	2.00	0	DEN	A	59.7	17.9	0.0	0.0	0.0	76.6	4.5	2.6	0.0	0.0	0.0	0.0	0.0	-6.1

Point Source, ISO 9613, Name: "Bulldozer", ID: "s-Bull Dozer"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2245	528214.13	5056987.32	3.00	0	D	A	114.2	0.0	0.0	0.0	0.0	70.9	3.5	0.2	0.0	0.0	0.0	0.0	0.0	39.5
2245	528214.13	5056987.32	3.00	0	N	A	114.2	0.0	-188.0	0.0	0.0	70.9	3.5	0.2	0.0	0.0	0.0	0.0	0.0	-148.5
2245	528214.13	5056987.32	3.00	0	E	A	114.2	0.0	0.0	0.0	0.0	70.9	3.5	0.2	0.0	0.0	0.0	0.0	0.0	39.5

Point Source, ISO 9613, Name: "Excavator", ID: "s-ex"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2591	528192.89	5056995.40	3.00	0	D	A	103.5	0.0	0.0	0.0	0.0	70.7	3.3	1.6	0.0	0.0	0.0	0.0	0.0	28.0
2591	528192.89	5056995.40	3.00	0	N	A	103.5	0.0	-188.0	0.0	0.0	70.7	3.3	1.6	0.0	0.0	0.0	0.0	0.0	-160.0
2591	528192.89	5056995.40	3.00	0	E	A	103.5	0.0	0.0	0.0	0.0	70.7	3.3	1.6	0.0	0.0	0.0	0.0	0.0	28.0

Line Source, ISO 9613, Name: "Construction On-Site Haul Route", ID: "s-TR1"																				
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	l/a	Optime	K0	Di	Adiv	Aatm	Agr	Afol	Ahous	Abar	Cmet	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	dB	dB	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
2876	526012.21	5055800.03	2.00	0	D	A	75.0	22.5	0.0	0.0	0.0	77.0	6.5	0.7	0.0	0.0	0.0	0.0	0.0	13.3
2876	526012.21	5055800.03	2.00	0	N	A	-34.1	22.5	0.0	0.0	0.0	77.0	6.5	0.7	0.0	0.0	0.0	0.0	0.0	-95.8
2876	526012.21	5055800.03	2.00	0	E	A	75.0	22.5	0.0	0.0	0.0	77.0	6.5	0.7	0.0	0.0	0.0	0.0	0.0	13.3
2878	526437.72	5055810.00	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	75.8	6.0	0.2	0.0	0.0	0.0	0.0	0.0	14.5
2878	526437.72	5055810.00	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	75.8	6.0	0.2	0.0	0.0	0.0	0.0	0.0	-94.6
2878	526437.72	5055810.00	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	75.8	6.0	0.2	0.0	0.0	0.0	0.0	0.0	14.5
2881	526218.23	5055798.25	2.00	0	D	A	75.0	21.5	0.0	0.0	0.0	76.4	6.3	0.1	0.0	0.0	0.0	0.0	0.0	13.7
2881	526218.23	5055798.25	2.00	0	N	A	-34.1	21.5	0.0	0.0	0.0	76.4	6.3	0.1	0.0	0.0	0.0	0.0	0.0	-95.4
2881	526218.23	5055798.25	2.00	0	E	A	75.0	21.5	0.0	0.0	0.0	76.4	6.3	0.1	0.0	0.0	0.0	0.0	0.0	13.7
2882	526317.35	5055780.50	2.00	0	D	A	75.0	20.7	0.0	0.0	0.0	76.3	6.2	0.2	0.0	0.0	0.0	0.0	0.0	13.0
2882	526317.35	5055780.50	2.00	0	N	A	-34.1	20.7	0.0	0.0	0.0	76.3	6.2	0.2	0.0	0.0	0.0	0.0	0.0	-96.0
2882	526317.35	5055780.50	2.00	0	E	A	75.0	20.7	0.0	0.0	0.0	76.3	6.2	0.2	0.0	0.0	0.0	0.0	0.0	13.0
2885	526113.78	5055862.57	2.00	0	D	A	75.0	20.6	0.0	0.0	0.0	76.5	6.3	0.7	0.0	0.0	0.0	0.0	0.0	12.1
2885	526113.78	5055862.57	2.00	0	N	A	-34.1	20.6	0.0	0.0	0.0	76.5	6.3	0.7	0.0	0.0	0.0	0.0	0.0	-96.9
2885	526113.78	5055862.57	2.00	0	E	A	75.0	20.6	0.0	0.0	0.0	76.5	6.3	0.7	0.0	0.0	0.0	0.0	0.0	12.1

Appendix I

Letter from NSE Regarding Approved Facilities

NOVA SCOTIA
Environment

36 Inglis Place
Truro, NS
B2N 4B4
(902)893-5880 T
(902)893-0282 F

July 12, 2018

Nova Scotia Lands
1672 Granville Street
PO Box 186
Halifax, NS
B3J 2N2

Attn: Mr. Ken Swain
Project Lead, Boat Harbour Remediation

Dear Mr. Swain:

Re: Facilities Approved to Accept Dioxin and Furan Impacted Sediments

Further to your request regarding facilities Approved for the disposal of dioxin and furan impacted sediments, the Department has completed a review of our files. It has been determined the Boat Harbour Landfill is the only facility currently Approved for such disposal.

New or existing facilities seeking Approval to dispose of dioxin and furan impacted sediments would be required to undertake an Environmental Assessment in addition to obtaining a new or amended Industrial Approval prior to acceptance to any such material. It is also recommended a proponent contact the Canadian Environmental Assessment Agency to determine if this activity is subject to the Canadian Environmental Assessment process.

Should you have any questions or concerns regarding this information, please do not hesitate to contact me at 902-890-5880.

Regards,

Kathleen Johnson

Kathleen Johnson, P.Eng.
Regulatory Engineer

cc: Paul Keats, A/Regional Director
Tanya MacKenzie, A/ District Manager
Marc Theriault, Inspector Specialist

Appendix J

Summary of Community Sessions 2015

PICTOU LANDING FIRST NATION

Boat Harbour Focus Groups

Conducted by – Michelle Francis-Denny

Submitted on July 8, 2015

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PROJECT OVERVIEW

The purpose of these focus groups was to talk about the community vision for Boat Harbour, establish a comfort level in discussing the possibilities post remediation and generate ideas in how the community would like to be involved with the remediation process. Provide General information such as "What does remediation and return to tidal actually mean?" and an update on what is happening now. Information was provided to community members regarding the potential for a service road being put in and potential for testing on the identified coves.

Five Focus groups were conducted and an on-line forum for input was created. There were 3 opportunities for youth; North Nova Education Centre (Grades 9 -12), Trenton Middle School (Grades 7, 8) and Community youth, One Elders Session and One Community Session. The following were the Focus Group Objectives;

- Create an opportunity for PLFN Community members to express their ideas and vision of Boat Harbour post remediation.
- Establish a comfort level and support through discussions with community members so that they come to understand that Boat Harbour will be cleaned up.
- Identify how the community would like to be involved in the remediation process.
- Identify the level of community knowledge on Boat Harbour that will help identify gaps in communication.
- Capture any questions to take back to the committee for answers to be provided at "findings meeting".

FOCUS GROUP SESSIONS LOGISTICS

Five (5) sessions were held and each session followed the same format. The sessions were held, as follows:

Sessions were advertised with a flyer outlining dates, locations and times of each session, hand delivered to each house in the community as well as the on-line community newsletter and shared on personal Facebook groups. Michelle Francis-Denny also made her personal contact information available for home visits.

YOUTH SESSION

- June 4, 10 ,11 2015
- NNEC, TMS , Health Centre
- Total - 28

ELDERS SESSION

- June 11, 2015
- PLFN Health Centre
- 4

GENERAL COMMUNITY SESSION

- June 17
- PLFN Gym
- Total - 12 (includes 1 youth, 3 elders)

On-Line Forum

- June 26 - July 2, 2015
- Facebook
- Total - 45 people engaged

Summary of Topics

The following is a summary of each question explored in each session.

What do you know about Boat Harbour and happenings within the last year?

Elders Session	Youth Session	General Community Session
• Not much • Don’t know why 2020 • PLFN settled for 35 Mil • It will close “when pigs fly” • What do C&C know? Can they answer questions from the community? • Environmental racism	• Stinky • Gross • No visitors • They might clean it up • Polluted • Evil • Garbage • Making us sick and causes cancer • Bubbles in the water	• Nothing • PLFN protested • Not as much as they like to • An agreement was signed • PLFN wants to close the mill • Poor communication • Misinformation because of media and Facebook

What do you remember about Boat Harbour before it was polluted?

Elders Session	Youth N/A	General Community Session
• Clear water • A lot of fish • Streams • Swimming • Estuary – boats in the harbour to protect from storms “that is why it was called “Boat Harbour” • Making fires and digging clams • Low tide (beach smell) • Deer and Rabbits • Clean sand and pebbles • Cranberries • Buckets of smelts (grab by hand) • Gathering place with friends and family to swim, fish, hunt • Regular low tide smell	•	• Swimming (salmon, bass, lobster) • Fishing • Cranberries everywhere • Smelled like nature • Boats • Ash and evergreen trees • Fresh water springs • Beach brought people from all over • Toll booth at the beach • Change houses at the beach • BH froze in the winter (Ice fishing) • Hangout

What do you want Boat Harbour to look like after it is cleaned up and what do you want to be able to do there? (Vision)

Elders Session	Youth Sessions	General Community Session
• Nature restored • PLFN running out of land, would like to see houses and development • Pow wow grounds • Ball field • Cabins to rent • Fill all the land in (opinion was changed when heard that scientists believe not all contaminants can be removed) • Back to the way it used to be; it is the future for our kids and grandkids.	• Visualization Exercise (See attached drawings)	• Set up a non-Profit organization / use the land and water to help restore traditional Mi'kmaq culture and teachings • Traditional medicine • All NS Mi'kmaq have access to traditional teachings • Economic development • A place to heal • Returned to tidal • Fishing industry • " It was salt water when I got here, it should be salt water when I leave this world" • Beach must be a part of remediation, it was also lost because of pollution • Tourism attractions • More recreational activities • Use it for community driven projects • Jobs • Vegetation restored

How do you think PLFN should be involved in clean up and opportunities?

Elders Session	Youth Session	General Community Session
• It should encourage youth to engage in engineering and sciences • Excavation, Machine operation, cutting • Construction • Bid on contracts • Mentorship • "Involve community, don't just tell us last minute" • Communicate	• Mentorship • Work alongside scientists • Work	• Constructing the road • Surveying • Testing the air and water • Training and education • Summer jobs • Community members can document the process (videos , photos of changes) • More $ for programs • Volunteers

		• Have our own (PLFN) companies for bidding on work

WHAT ARE SOME METHODS OF COMMUNICATION THAT CAN BE USED WITH THE COMMUNITY

Elders Session	Youth Session	General Community Session
• More meetings • Know more about scientific versions of happenings • Hand delivered notices • Social media • More copies of "FACT SHEET" • Have open meetings • Include a rep from community groups on committee (Youth, Elders, women, men, etc.)	• Youth group formed • Flyer of BH history	• Surveys with PLFN • Website • Boat Harbour Newsletter • Chief and Council lead meetings about happenings • Weed through the misinformation • Make it someone's job to communicate about Boat Harbour

WHAT ARE YOUR FEARS AND CONCERNS?

Elders Session	Youth Session	General Community Session
• It will never be like it used to be • It will be cleaned up "when pigs fly" • BH is making us sick	• Be eaten by a bear • Skunks • People won't come back because of stigma • The dirt will still be contaminated all over • Where they going to put it (all the stuff they dig out) • They won't get it all (contaminants) • Dangerous gasses will be released into the air when soil and water are disturbed • It will still stink	• People chosen to work on site will get sick • Will never look the same • PLFN is not compensated enough for damage done

ON-LINE FORUM – BOAT HARBOUR

QUESTION #1 – 38 PEOPLE READ/ 5 RESPONDED
WHAT DO YOU KNOW ABOUT BOAT HARBOUR IN REGARDS TO CURRENT HAPPENINGS WITHIN THE LAST YEAR AND HOW CAN COMMUNICATION BE IMPROVED?

- A monthly report to the community delivered house to house with the committee and councils input on the hard work ahead
- Communication has been great
- Not much, attending the focus group helped me to better understand
- Communication is getting better and slowly improved, more focus groups and community involvement and bringing back hope in community members eyes in the beginning, notices delivered house to house as well as a community potluck.

QUESTION #2 – 34 PEOPLE READ / 5 RESPONDED
WHEN BOAT HARBOUR IS CLEANED UP WHAT DO YOU WANT IT TO LOOK LIKE? WHAT DO YOU WANT TO BE ABLE TO DO THERE? WHAT IS YOUR VISION?

- After it is habitable again have roads and infrastructure put in so the reserve can extend its boundaries.
- Homes and Economic development
- See it back to its original state, a fun place that children can tell their children about
- Want to be among the living to see a positive change and have peace of mind
- Back to tidal estuary, to its original state
- Land around BH be community owned to embrace and live off the land we were meant to
- Look like it does now minus pollution
- Aesthetically look beautiful serene and peaceful
- Our people and visitors to have access but maintain beauty
- Be nice to be able to swim or fish there again
- Beautiful homes built around

QUESTION #3 – 40 PEOPLE READ / 7 RESPONDED
WHAT ARE YOUR QUESTIONS/CONCERNS/FEARS REGARDING THE REMEDIATION OF BOAT HARBOUR?

- Once remediation begins, there may be a realization that this can't happen
- Sediment becoming dust
- Doesn't seem as simple as " extract water and dig up sludge"
- Want PLFN community members(especially those involved with sciences and environmental studies) be a part of remediation
- The de-watering process – how will the remaining sediment impact the health of humans, plants, animals, etc.
- Need a human health study before this begins and through the process.
- Fear is money set aside for remediation is not enough, where will the rest come from?
- Money will not be properly used and be all spent before the project is finished

- Who is in charge of the money for remediation?
- Work will not be completed and they (the province) will try to take short cuts.
- When dredging starts, what harmful gasses and material will be in the air around the community?
- Fear that remediation is just a smoke screen
- Is it safe to tap the trees for sap?
- Fear is that the health and safety of the community members is just another lie being told.

QUESTION #4 – 30 PEOPLE READ / 4 RESPONDED
WHAT KINDS OF OPPORTUNITIES WOULD YOU LIKE TO SEE FOR PLFN DURING THE REMEDIATION PROCESS? HOW DO YOU WANT TO BE INVOLVED?

- Community members employed with some of the remediation process.
- Need to know what sorts of trades people will be needed so we can train community members
- Employment and training
- Attend more focus groups, give feedback
- Pass out flyers
- Initiate communication
- PLFN employed and involved in the whole process
- Preparation to gain experience in trades
- Continuation of current process that has begun
- Great opportunity for students in health and environmental studies to be involved (even credit courses)
- Community members participate in remediation from cutting trees to road construction and clean-up crew
- Hire someone from the community to be a liaison between members, Chief and Council, Steering Committee and Province.
- Like to see the history and progress being recorded so that future generations have the information and the story comes from us.

QUESTION #5 –
WOULD THE COMMUNITY MEMBERS OF PLFN LIKE TO SEE BOAT HARBOUR RETURNED TO TIDAL? (LIKE IF YES, COMMENT IF NO)

- 121 people read this post
- 16 people “liked” this post
- 9 people commented (YES)

QUESTIONS

AS A PART OF THE FOCUS GROUPS THE COMMUNITY WAS ASKED IF THEY HAD ANY QUESTIONS THEY WOULD LIKE ADDRESSED AND WERE TOLD THAT THEY WILL BE ANSWERED AND BROUGHT BACK TO THE COMMUNITY "FINDINGS" SESSION. THE FOLLOWING IS A LIST OF QUESTIONS THAT AROSE THROUGHOUT THE 5 FOCUS GROUP SESSIONS AND ON-LINE FORUM.

1. If BH is returned to Tidal how will it impact other animals and migration?
    - Will you take animals from other areas?
    - How do we know fish and animals aren't infected and won't spread anything? Has there been any testing on animals? Will there be?
    - If clams are sick, how will we know they won't re-infect?
2. What will prevent people from polluting (using it as a dumping ground) once it is cleaned up?
3. What will the province do to help eliminate the negative stigma around BH and surrounding areas?
4. Who is researching the health impact?
5. How will we know if it is "truly "cleaned up?
6. Where will they move the contaminants the dig up?
    a. How will they get rid of it?
    b. If it's being put somewhere, will it be far away from here?
7. Where will the effluent go if it isn't going into BH, "Will it be a problem for someone else?"
8. Will there be any more compensation for continued suffering till close?
9. Why close in 2020? Why not sooner?
10. How will our community be protected when chemicals such as mercury are being disturbed and Gasses are released?
11. Will the beach be a part of clean up?
    a. How will contaminated sand and other soil around Boat Harbour be cleaned up to ensure safety

12. How will it smell when water flow stops?
13. Is our pond contaminated? (streams from BH)
14. Is it even possible to dig deep enough to get all the contaminants, How will you know?
15. After it is clean, how do we prevent people from developing?
    a. What parts of BH does PLFN own?
    b. Does our vision for Boat Harbour even matter if we don't own it?
    c. How will the province help us own the land at BH?
16. Are there any other successful similar examples of remediation nationally to compare?
17. How does PLFN become eligible for the bidding process for contracts?
18. How and when will clean up commence?
19. What did PLFN actually agree to in terms of remediation?
20. How do we get correct information? Too much misinformation out there, even Media spins their stories.
21. How do you create more opportunities for youth who are interested in environment/ sciences/ engineering during this process?
22. What is happening right now? How can we be involved?
23. How long will clean up take once remediation starts?
24. Will the province be involved and do the testing to ensure contaminants are removed?
25. When jobs are posted - what are the safety courses required to ensure safety from contaminants and toxins?
26. What happens to the pipeline underground from the mill? Will it be sealed off?
27. What happened to the research about possible clean up that was done years ago?

NEXT STEPS AND RECOMMENDATIONS

- Report completed and submitted to Chief and Council on July 8, 2015 for review.
- Chief and Council to discuss the findings of the report and who they would like to share the report with.
- Chief and Council will determine a date for a community meeting. the goal of the community meeting will be to:
  - Begin the communication process
  - Formally introduce the representatives from the province who is working on the remediation project.
  - Give the Province an opportunity to answer the questions generated by the community.
  - Allow the province to formally give an update on what is currently happening with the remediation project and what is projected.
  - Any other relevant information Chief and Council could like to discuss at this session.

VISUAL OF AERIAL VIEW OF BOAT HARBOUR USED IN FOCUS GROUP

USED TO IDENTIFY THE COVES IN WHICH TESTING AND POTENTIAL WORK MAY BEGIN.

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The Power of Commitment