# Appendix F.8

## Initial Dilution Zone Study

# Technical Memorandum

**May 20, 2022**

| | | | |
|---|---|---|---|
| **To** | Deidre Puddister | **Tel** | 519-340-4101 |
| **Copy to** | Callie Andrews | **Email** | Andrew.betts@ghd.com |
| **From** | Lisa Bowering, Rodrigo Macedo, Andrew Betts | **Ref. No.** | 11222385 |
| **Subject** | Initial Dilution Zone Study<br>Goldboro Mine Water Management Plan, Predictive Water Quality Assessment<br>Guysborough County, Nova Scotia | | |

# 1. Introduction

Anaconda Mining Inc. (Anaconda) has retained GHD Limited (GHD) to provide technical services in support of an Environmental Assessment Registration Document (EARD) for the proposed Goldboro Gold Project (the Project), located in Guysborough County, Nova Scotia (NS). GHD is working collaboratively with the Project Team, including Anaconda and other consultants, to prepare the EARD submissions. As part of this effort, GHD was requested to develop a Mine Water Management Plan (MWMP). As a part of the MWMP, GHD has completed a Predictive Water Quality Assessment (PWQA) (GHD, 2022c) and an Initial Dilution Zone (IDZ) study. The IDZ modelling uses the results from the PWQA to inform the scenario selection. Scenarios were developed for each outfall/discharge location and Project phase in which effluent Constituents of Concern (COCs) concentrations were predicted by the PWQA to exceed the allowable limit. The analyses presented herein include input from the Water Balance Analysis (GHD, 2022b), Groundwater Model (GHD, 2022d), and Hydrologic Modelling (GHD, 2022a), and informs the Surface Water Monitoring Plan (GHD, 2022e).

This memorandum is organized as follows:

- Section 1 provides the introduction and scope
- Section 2 describes the theoretical background and model selection
- Section 3 describes the characterization of the receiving environment and effluent
- Section 4 describes the model setup and sensitivity analysis
- Section 5 describes the model results
- Section 6 provides conclusions and recommendations

## 1.1 Overview

A near-field mixing zone model was created to determine the extents of the three-dimensional Initial Dilution Zone (IDZ) around the Project's points of effluent discharge where mixing of the effluent (treated mine contact water) and the receiving waters (Gold Brook Lake and Gold Brook system) occurs. This is commonly referred to as Near Field Region (NFR) or Initial Dilution Zone (IDZ). An IDZ does not encompass the entire extent, where all mixing occurs, since the effluent plume may extend beyond the edge of an IDZ before the plume is fully mixed with the receiving environment. At the edge of an IDZ, the effluent should not cause chronic toxicity in the receiving environment. Defining the allowable extent of an IDZ depends on the sensitivity and values of the receiving environment downstream from the discharge point.

It should be noted that the water quality objectives for the receiving water body as set out in the PWQA (GHD, 2022c) do not apply within the IDZ, which, as mentioned in the previous paragraph, is the initial portion of a larger effluent dilution zone. The Canadian Council of Ministers of the Environment (CCME) and The Atlantic Canada Wastewater Guidelines (ACWG) (Environment Canada, 2006) set out limits on the size of the mixing zone (i.e., IDZ). The ACWG are the same as, or more conservative than the CCME, and therefore have been adopted for this study. The ACWG state:

> "…at the boundaries or outer limits of the mixing zone, water quality objectives established by the regulatory authorities to protect beneficial water uses should be achieved."

The guidelines provide the following targets for the mixing zone extent:

- Not to exceed 25% of the cross-sectional area or volume of flow in streams/rivers for all flow regimes equal to or exceeding the 7Q20 (20-year 7-day average low streamflow) flow for the area.
- Not to exceed 1/3 of the river width at any transect in receiving stream/river.
- Not to exceed beyond a 100 m radius from the effluent outfall in a lake.

The mixing zone model was created for the IDZ using the modelling software CORMIX, which solves various equations of turbulence structure and is commonly used for the analysis, prediction, and design of an effluent discharge into a receiving water body.

The IDZ study consists of two main components: the characterization of the receiving environment and effluent (Section 3), and the CORMIX modelling of the IDZ (discussed in Sections 4 and 5). A far-field region model has not been completed at this time.

The mine development conditions used in the CORMIX modelling are the same as those used in the PWQA (GHD, 2022c), namely:

1. Mid-Extraction conditions – 8 years following start of mining activities.
2. Full Extraction conditions – conclusion of mining activities, 12 years following start of mining activities.
3. East Pit Filled conditions – once the East Pit has been filled with water and begins to discharge to the natural environment. The East Pit will be filled 19 years following start of mining activities based on average climate conditions. Year 21 was chosen as the representative year depicting the water quality of each discharge point and the receiving water body under East Pit Filled conditions
4. West Pit Filled conditions – once the West Pit has been filled with water and begins to discharge to the natural environment. The West Pit will be filled 35 years following start of mining activities based on average climate conditions. Year 37 was chosen as the representative year depicting the water quality of each discharge point and the receiving water body under West Pit Filled conditions

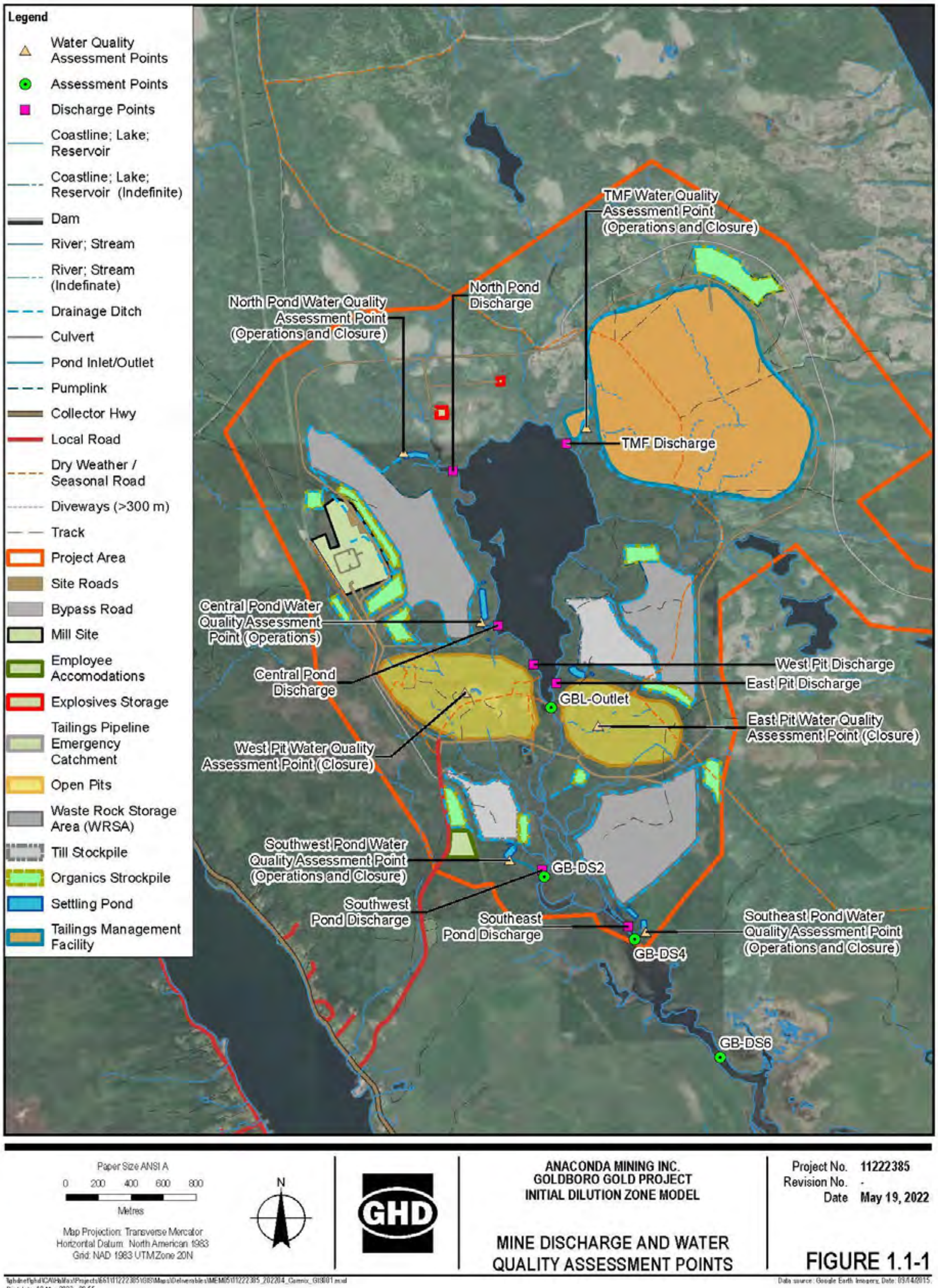
There are six effluent discharge locations, which are operating at various stages of mine development (refer to **Figure 1.1**). The Tailings Management Facility (TMF), polishing pond, north settling pond, and southeast settling pond will be discharging during Mid-Extraction conditions and continuing through West Pit Filled conditions. The East and West Pit will discharge to Gold Brook Lake once they have been filled. The central settling pond will discharge to Gold Brook Lake only during Mid-Extraction conditions and will then be directed to the West Pit. Therefore, only the Mid-Extraction conditions scenario was modelled for the central settling pond discharge location. **Table 1.1** shows the sixteen scenarios that were considered in the IDZ study. These scenarios are derived from a combination of discharge locations and mine development conditions (see list above).

*Table 1.1 CORMIX Scenarios*

| Discharge Location | Mid-Extraction | Full Extraction | East Pit Filled | West Pit Filled |
|---|---|---|---|---|
| TMF to Gold Brook Lake | X | X | X | X |
| North Pond to Gold Brook Lake | X | X | X | X |
| Central Pond to Gold Brook Lake | X | NA | NA | NA |
| West Pit to Gold Brook Lake | NA | NA | NA | X |
| East Pit to Gold Brook Lake | NA | NA | X | X |
| Southeast Pond to Gold Brook | X | X | X | X |

Notes:
X – model scenario was run at this location for the given conditions
NA – no discharge from this location for the given conditions.

*Figure 1.1-1 Mine Discharge Points*



## 1.2 DISCLAIMER

*This memorandum: has been prepared by GHD for Anaconda Mining Inc. and may only be used and relied on by Anaconda Mining Inc. for the purpose agreed between GHD and Anaconda Mining Inc. as set out in section 1 of this memorandum.*

*GHD otherwise disclaims responsibility to any person other than Anaconda Mining Inc. arising in connection with this memorandum. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this memorandum were limited to those specifically detailed in the memorandum and are subject to the scope limitations set out in the memorandum.*

*The opinions, conclusions and any recommendations in this memorandum are based on conditions encountered and information reviewed at the date of preparation of the memorandum. GHD has no responsibility or obligation to update this memorandum to account for events or changes occurring subsequent to the date that the memorandum was prepared.*

*The opinions, conclusions and any recommendations in this memorandum are based on assumptions made by GHD described in this memorandum (refer sections 1,2,3, and 4 of this memorandum). GHD disclaims liability arising from any of the assumptions being incorrect.*

# 2. Theoretical Background

A mixing zone can be characterized as the near field region and the far field region. In the immediate vicinity of a discharge point (i.e., the near field), the initial jet characteristics of momentum flux, changes in buoyancy (due to density differences and temperature differences), and outfall geometry influence the effluent trajectory and degree of mixing. Jet simply means that a higher velocity fluid is entering a slower moving receiver fluid (i.e., receiving environment), where entrainment and mixing occurs, along the boundary of the jet from the receiver into the jet, thus causing dilution. A stream discharging into another stream is a form of hydraulic jet. In this study the discharge jet, being the initial discharge from the settling ponds and pits' outlet ditches, is much slower than discharge from a typical outfall diffuser and is not under pressure. However similar hydraulics are occurring.

In the intermediate field, or near far field transition, the fluid dynamics depend more on the interaction between the near field plume mixing and the ambient flow, which can result in changes in background concentration, gravitational spreading, and may involve modifications in ambient stratification.

As the turbulent jet travels further away from the source, the initial jet characteristics become less important, and diffusion occurs as the effluent mixes with the receiving environment waters into the far field region. In the far field region, ambient environmental conditions will control trajectory and dilution of the effluent plume through a buoyant spreading motion, passive diffusion due to ambient turbulence, and passive advection by the often time varying, non uniform, ambient velocity field (i.e., currents).

Constituents of Concern (COCs) within the Project storm water runoff, Waste Rock Storage Area (WRSA) seepage, and groundwater seepage, discharge into the receiving waters of Gold Brook Lake and Gold Brook system at six discharge points over the life cycle of the Project. Once discharged, the effluent plumes will disperse in the direction of the receiving waters' ambient flow. The NFR modelling presented in this report provides a determination of the spatial extent and conformation of the effluent plume in the near field, in relation to the discharge point, for a number of different discharge scenarios. The intent is to understand the extent of the NFR effluent plume under different operational scenarios under low flow conditions, and the sensitivity of the plume to outfall geometry and placement. In the present study, low flow conditions are characterized by seasonal low flows. These are assumed to occur in August, as calculated using average climate conditions, monthly flow averages, in the Water Balance Analysis (GHD, 2022b).

## 2.1 Model Selection

The CORMIX modelling software (v12) was used to predict the near-field mixing zone from the discharge points into the receiving waters of the Gold Brook Lake and River system. This model is commonly used for the analysis, prediction, and to support the design of an effluent discharge into a receiving water body. It solves various equations of the turbulence structure, and the predictive accuracy of the model has been confirmed with numerous laboratory-scale and field-scale measurements. CORMIX has three integrated hydrodynamic models applicable to this analysis including CORMIX1 (single port discharge), CORMIX2 (multiport discharge), and CORMIX3 (surface discharge). The model is steady-state, which means that it is applicable for uniform, steady-state conditions only. CORMIX1 and CORMIX2 modules were used for this study and further described in Section 4.1.

# 3. Receiving Environment and Effluent Characterization

The NFR mixing zone model requires the characterization of the conditions within the receiving environment (Gold Brook Lake and River system, ambient) and of the effluent. Numerous datasets were used to establish the model's parameters related to the receiving environment and to the effluent (refer to **Table 3.1**). These parameters are further described in Sections 3.1 and 3.2 for the receiving environment and for the effluent, respectively.

*Table 3.1 Near Field Region Modelling Parameters*

| Receiving Environment | Effluent |
|---|---|
| Physical characteristics (bathymetry) | Outfall geometry (width, depth, roughness, angle) |
| Flows/velocity | Discharge rate/velocity |
| Temperature | Temperature |
| Sources: data collected by Anaconda Mining Inc., McCallum Environmental Limited, Water Balance Analysis (GHD, 2022b) | Sources: Hydrology Study (GHD, 2022a), Water Balance Analysis (GHD, 2022b) |

The receiving environment and effluent characterizations were undertaken with the following assumptions:

– The effluent and ambient (receiving) flows were taken from the Water Balance Analysis and are subject to the assumptions as stated in the Water Balance Analysis Summary Report (GHD, 2022b).

– August flows were selected as they are typically the seasonal low flow according to the Water Balance Analysis (GHD, 2022b).

– The 7Q20 flows referenced by the ACWG were estimated using the Water Balance Model daily flow results, as the length of monitoring record was insufficient to calculate the 7Q20 for the Project. The average 7-day flows were calculated over the model's 50 realizations, which were developed using a Monte Carlo simulation (refer to the Water Balance Analysis Summary Report (GHD, 2022b) for more details). The annual 7-day average minima were then fit to a Log-Pearson III distribution, to calculate the 20-year low flow. These calculations were performed for the ambient flows at the southeast settling pond outlet, and for the southeast pond effluent flows, to check the ACWG criteria for flow ratios in receiving river environments.

– The ambient representative cross-sections were selected to approximate non-stagnant, yet low velocity, conditions in Gold Brook Lake. A hydraulic model of Gold Brook Lake is required to fully characterize the flow velocities and directions at the discharge locations in the lake. This may be developed in the next phase of the project to better estimate the flow currents (velocity and direction), which are used in the analysis.

– The temperature of the ambient and effluent discharge is assumed to be equal, resulting in neutrally buoyant discharge. Temperature measurements of the effluent should be included in future monitoring at the Project. The modelling should be updated with the results of the temperature monitoring data, to improve the accuracy of the modelled IDZ extent.

– The central settling pond and TMF polishing pond outfalls are assumed to be directed quasi-perpendicular with respect to the ambient flow. All other outlets are assumed to be perpendicular to the ambient flow. The angle of discharge had a significant impact on the mixing zone dimensions as indicated by a sensitivity analysis presented in Section 5.1. Similarly, the height of the central settling pond outfall above the ambient surface was assumed to be 0.4 m to reduce the extent of the IDZ, while all other outfalls were set at or just below surface, to simulate surface discharge. For the central settling pond, as the height of the outfall was increased above the surface from 0 to 0.4 m, the IDZ extent was reduced. Above 0.4 m, the extent was not significantly impacted.
– Detailed design of the outfalls is outside of the scope of this study. Parameters used for the outfall geometry are consistent with the Hydrologic Modelling preliminary design, whereby the outfall ditches were sized to convey the 100-year design event as described in the Hydrologic Modelling Report (GHD, 2022a).
– The IDZ study should be verified and updated once the detailed design has been completed, should the angle of discharge, height above water surface, or ditch geometry differ from the assumptions made in this study.

## 3.1 Receiving Environment

GHD utilized results from field studies and data provided by Anaconda and McCallum Environmental Limited (MEL), as well as the results from the Water Balance Analysis (GHD, 2022b), to gain an understanding of the ambient characteristics and establish the model's parameters. The data that were considered to characterize the receiving environment are provided in **Table 3.2**.

***Table 3.2 Receiving Environment Data Sources***

| Receiving Environment Parameter | Source |
|---|---|
| Physical characteristics (bathymetry) | Bathymetric Survey of Gold Brook Lake (GIS contours, September 2021) (Anaconda)<br>Detailed Fish Habitat Assessment dataset (August 2021) (MEL[1]) (Gold Brook transects) |
| Flows/velocity[2] | Water Balance Analysis (GHD, 2022b) |
| Temperature | Detailed Fish Habitat Assessment dataset (August 2021) (MEL) (Gold Brook Temperature)<br>Flow monitoring data (GHD) (Gold Brook Lake Temperature) |
| Notes:<br>McCallum Environmental Limited<br>An estimate of low velocities in Gold Brook Lake was carried out in order to derive parameters of interest for the CORMIX modelling | |

Anaconda Mining provided bathymetry data for Gold Brook Lake, as a GIS shapefile, collected September 2021. The bathymetry data were used by GHD to characterize the ambient geometry at each outfall location on the lake. MEL collected bathymetry data along Gold Brook at multiple transect locations. Transect 64Ar7t2 was used to characterize the ambient geometry at the proposed southeast pond outfall into Gold Brook. Attachment 1 shows the bathymetry data and discharge locations.

Monthly flows within and contributing to Gold Brook Lake and Gold Brook were calculated as part of the Water Balance Analysis (GHD, 2022b). The August flows were selected for each of the representative scenario years as they were typically the lowest, non-winter, flows in the system, and correspond to the highest effluent concentration of COCs identified in the PWQA (GHD, 2022c). Winter flows were not considered as CORMIX does not model ice conditions. Low ambient flows typically produce worst-case mixing results.

Temperature data at Gold Brook Lake outfall and within Gold Brook were collected by GHD and MEL during various monitoring activities and used to inform the input parameter selection. For the purposes of this study, the typical August water temperature within the Gold Brook Lake and River system was set at 20.2°C based on the measured temperature in Gold Brook on August 3, 2021. This assumption was tested in the sensitivity analysis, described in Section 5.1.

## 3.2 Effluent

The outfall geometry and discharge rates are required inputs for the analysis. Outfall geometry for the north, central, and southeast settling ponds were assumed from the preliminary Project design performed as part of the Feasibility Study, where the ditches were initially designed to convey the 100-year 24-hour design storm event (GHD, 2022a). The TMF and Pit outfalls were assumed to have the same shape and width as the settling pond outfalls, with a 1% slope. **Table 3.3** shows the assumed discharge outfall characteristics.

***Table 3.3 Assumed Discharge Outfall Characteristics***

| Parameter | Units | TMF Outfall | North Pond | Central Pond | Southeast Pond | West Pit | East Pit |
|---|---|---|---|---|---|---|---|
| Ditch shape | n/a | Trapezoidal with 3H:1V side slopes | | | | | |
| Bottom width | m | 1 | 1 | 1 | 1 | 1 | 1 |
| Slope | m/m | 0.01 | 0.12 | 0.05 | 0.03 | 0.01 | 0.01 |
| Manning's n | n/a | 0.069 | 0.069 | 0.069 | 0.069 | 0.069 | 0.069 |

The effluent discharge was assumed to have a temperature equal to that of the receiving environment, resulting in a neutrally buoyant plume. This assumption is tested in the sensitivity analysis, in Section 5.1.

# 4. CORMIX Model Setup

The near-field mixing zone modelling was completed using CORMIX as described in Section 2.1. The modelling consisted of 5 scenarios based on various mine operations phases aligning with the PWQA scenarios. A sensitivity analysis was also performed to test the model sensitivity to the receiving environment roughness (manning's n value), and temperature differential between effluent and ambient (buoyancy). The CORMIX modelling of the IDZ was undertaken with the following assumptions:

– The concentration of the COCs in the effluent are conservatively assumed to not decay with time.
– The CORMIX1 module was used to model the locations discharging to Gold Brook Lake (TMF polishing pond, north settling pond, central settling pond, East Pit and West Pit). The CORMIX2 module was used to model the southeast settling pond which discharges to Gold Brook. The modules were selected according to the software's requirements and recommendations regarding outfall geometry, discharge, and ambient parameter ratios (further described in Section 4.1).
– CORMIX modelling is carried out under the assumption of steady-state ambient conditions and thus only the near-field results were analyzed.

## 4.1 CORMIX Model Inputs and Parameters

A list of the modelling scenarios, with the ambient and effluent flows for each model, is provided in **Table 4.1**. They have been converted from monthly average flows into cubic metres per second.

*Table 4.1 Average August Flow ($m^3/s$) from Water Balance Analysis (GHD, 2022b)*

| Outfall Location | | East Pit EOM | West Pit EOM | East Pit Discharging | West Pit Discharging |
|---|---|---|---|---|---|
| | | Year 8 | Year 12 | Year 21 | Year 37 |
| TMF | Ambient | 0.053 | 0.053 | 0.053 | 0.052 |
| | Effluent | 0.011 | 0.013 | 0.031 | 0.031 |
| Central Settling Pond | Ambient | 0.085 | n/a | n/a | n/a |
| | Effluent | 0.080 | n/a | n/a | n/a |
| North Settling Pond | Ambient | 0.070 | 0.070 | 0.069 | 0.069 |
| | Effluent | 0.005 | 0.002 | 0.002 | 0.002 |
| Southeast Settling Pond | Ambient | 0.165 | 0.132 | 0.129 | 0.148 |
| | Effluent | 0.004 | 0.004 | 0.004 | 0.004 |
| West Pit | Ambient | n/a | n/a | n/a | 0.107 |
| | Effluent | n/a | n/a | n/a | 0.014 |
| East Pit | Ambient | n/a | n/a | 0.105 | 0.121 |
| | Effluent | n/a | n/a | 0.009 | 0.009 |

The TMF polishing pond, north settling pond, and central settling pond discharge into the large (wide) Gold Brook Lake and are considered to have laterally unbounded ambient conditions. Due to this assumption, CORMIX requires that flow velocity (as opposed to flow) be provided for the receiving environment. The assumed ambient velocities (based on schematized receiving environment cross section) are listed in **Table 4.2** for these three outfall locations. Table 4.3 shows the parameters used for each model.

*Table 4.2 Assumed Ambient Velocity (m/s) in Gold Brook Lake*

| Outfall Location | East Pit EOM | West Pit EOM | East Pit Discharging | West Pit Discharging |
|---|---|---|---|---|
| | Year 8 | Year 12 | Year 21 | Year 37 |
| TMF | 0.0007 | 0.0007 | 0.0007 | 0.0007 |
| Central Pond | 0.0009 | n/a | n/a | n/a |
| North Pond | 0.0007 | 0.0007 | 0.0007 | 0.0007 |

For each outfall, the width to depth ratio exceeds five, which is the largest width-to-depth ratio allowed in the CORMIX surface-discharge module CORMIX3. Therefore, CORMIX1 and CORMIX2 modules were selected for the analysis. For the southeast settling pond outfall, the flexible CORMIX2 module was used to simulate a virtual surface discharge using the slot-discharge procedures. The discharge geometry used is a rectangular shape, or “slot”, with the same length as the outfall channel (1 m). CORMIX2 requires that the slot width be greater than the ambient depth. Since the ambient depth is greater than 1 m for all other outfalls, CORMIX1 module was used.

For reference, CORMIX input/output printouts are shown in Attachment 2. For CORMIX2 models, the geometry of the discharge (the "diffuser") is shown on the first page of each CORMIX printout under the heading "Diffuser Discharge Parameters". "LD" is the length of the discharge (1 m). NOPEN is the number of openings, chosen such that the slot discharge procedure is invoked by the program. In some circumstances, rather than modelling the discharge plume from each individual port, CORMIX “converts” the total discharge to a single rectangular shape, or “slot”. The conversion happens when the discharge ports are closely spaced. NOPEN was chosen to cause a slot discharge. The model output files have verified that the “slot” procedure was used as indicated under the “Non-dimensional Parameters” heading for FR0 (Froude number) and under “Recomputed Source Conditions for Riser Groups” heading for FR0, “slot” is shown.

For all model printouts (CORMIX1 and CORMIX2), U0 is the computed discharge velocity from each "port" which should approximately match the estimated discharge velocity at the outfall (calculated from the water balance effluent flow rates and outfall geometry). The port diameter is varied until the desired exit velocity is achieved. The ports were described in the model so that the "ports" were just below the waterline to simulate a surface channel discharge, except for the central pond. To achieve mixing within 100 m radius of the central settling pond outfall, the outlet was set at 0.4 m above the surface.

The central settling pond and TMF polishing pond outfalls are assumed to be directed at a quasi-perpendicular angle with respect to the ambient flow (90 degrees being perpendicular to the ambient flow, and 0 degrees being co-flowing). All other outlets are assumed to be perpendicular to the ambient flow. The relatively high discharge velocity at these two locations required adjustments to the outfall geometry to achieve mixing within 100 m radius of the outfall. The detailed design of these outlets is outside of the scope of this assignment; however, the designer should be aware of the sensitivity of the near field mixing to the discharge angle and height above ambient surface.

*Table 4.3 CORMIX Model Input Parameters*

| Tab | Item | Variable | Units | TMF | Central | North | Southeast | West Pit | East Pit |
|---|---|---|---|---|---|---|---|---|---|
| Discharge | 1 | Discharge Depth[1] | m | 0.052 – 0.095 | 0.1 | 0.009 – 0.016 | 0.02 | 0.060 | 0.045 |
| | 2 | Discharge Width | m | 1 | 1 | 1 | 1 | 1 | 1 |
| | 3 | Width/Depth Ratio[2] | -- | 19 – 11 | 10 | 113 – 61 | 50 | 17 | 22 |
| | 4 | Average Velocity | m/s | Varies | 0.60 | Varies | 0.18 | 0.20 | 0.17 |
| Effluent | 5 | Nearest Bank[3] | -- | Left | Right | Right | Left | Right | Left |
| | Conservative Pollutant | | | | | | | | |
| | 6 | Initial Discharge Concentration | % above ambient | 100 | 100 | 100 | 100 | 100 | 100 |
| | 7 | Effluent Flow Rate | $m^3/s$ | Refer to **Table 4.1** | | | | | |
| | Effluent Density – Fresh Water | | | | | | | | |
| | 8 | Temperature | °C | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 |
| Ambient | 9 | Density | $kg/m^3$ | Calculated by CORMIX | | | | | |
| | 10 | Average Depth | m | 1.45 | 1.8288 | 1.2192 | 0.025 – 0.029 | 1.521 | 1.2192 |
| | 11 | Depth at discharge | m | 1.45 (surface) | 1.8288 (surface) | 1.2192 (surface) | 0.025-0.029 (surface) | 1.521 (surface) | 1.2192 (surface) |
| | 12 | Wind Speed | m/s | 2 m/s (default – not significant for near-field mixing) | | | | | |
| | Ambient Velocity - Steady | | | | | | | | |
| | 13 | Velocity | m/s | Refer to **Table 4.2** | | | | | |
| | 14 | Ambient Flow | $m^3/s$ | Refer to **Table 4.1** | | | | | |
| | 15 | Bounded or Unbounded? | -- | Unbounded | Unbounded | Unbounded | Bounded | Bounded | Bounded |
| | 16 | Bounded Width | m | n/a | n/a | n/a | 24.6 | 104.8 | 64.6 |
| | 17 | Bounded Appearance | -- | n/a | n/a | n/a | Slight Meander | Uniform | Slight Meander |
| | 18 | Manning's n | -- | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| | Ambient Density – Fresh Water – Uniform | | | | | | | | |
| | 19 | Temperature | °C | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 |
| | 20 | Density | $kg/m^3$ | Calculated by CORMIX | | | | | |

| Tab | Item | Variable | Units | TMF | Central | North | Southeast | West Pit | East Pit |
|---|---|---|---|---|---|---|---|---|---|

Notes:
1. Calculated using assumed outfall geometry, hydraulic characteristics, and flow
2. A width/depth ratio greater than 5 requires CORMIX1 or CORMX2 modules. Not accepted by CORMIX3
3. Nearest bank relative to an observer looking downstream

# 5. CORMIX Model Results

The model results provide an estimate of the near-field mixing zone extents within Gold Brook Lake and Gold Brook at each discharge location for the various modelling scenarios. The model outputs are provided in a series of tables presented below. Figures showing the estimated spatial extent of the NFR for each scenario are provided in Attachment 3.

**Table 5.1** provides the extents of the NFR in Gold Brook Lake for each scenario, with the X-coordinate (downstream length of mixing) and Y-coordinate (width of the IDZ). The significant distance is the “Y” distance, which is perpendicular to the shoreline. In all cases, the model results show that the extent of the NFR in Gold Brook Lake is less than 100 m.

Table 5.2 provides the model results for the NFR in Gold Brook (southeast settling pond outfall). The effluent to ambient flow ratio is less than the required 25% in all cases. The NFR width is also less than 1/3 of the stream width in all cases, which is in accordance with the ACWG. The 7Q20 flows were estimated as described in Section 3, and the calculation should be updated once sufficient data has been gathered to calibrate the daily flows.

The model results indicate that the extent of the TMF polishing pond outfall NFR increases from East Pit EOM scenario (24.8 m) to West Pit Discharging scenario (34.3 m) due to the increase in the average monthly discharge. Conversely, the extent of the north settling pond outfall NFR decreases from an initial high point of 71.7 m at East Pit EOM to 26.9 m for all future scenarios, due to a decrease in average monthly discharge.

***Table 5.1 CORMIX Near Field Region Results for Gold Brook Lake***

| Outfall | Gold Brook Lake: Near Field Mixing Region Extent | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | East Pit EOM | | West Pit EOM | | East Pit Discharging | | West Pit Discharging | |
| | X (m) | Y (m) | X (m) | Y (m) | X (m) | Y (m) | X (m) | Y (m) |
| TMF Polishing Pond | 1.5 | 24.8 | 1.5 | 27.2 | 1.5 | 34.3 | 1.5 | 34.3 |
| North Settling Pond | 1.2 | 71.7 | 1.2 | 26.9 | 1.2 | 26.9 | 1.2 | 26.9 |
| Central Settling Pond | 1.8 | 46.2 | n/a | n/a | n/a | n/a | n/a | n/a |
| West Pit | n/a | n/a | n/a | n/a | n/a | n/a | 1.5 | 82.8 |
| East Pit | n/a | n/a | n/a | n/a | 1.2 | 28.6 | 1.2 | 24.8 |

1. ACWG requires mixing zone within 100m of outfall
2. X is in the direction along the shoreline, Y is measured perpendicular from the shoreline

*Table 5.2 CORMX Near Field Region Results for Gold Brook*

| Southeast Pond Outfall | Effluent Flow[1] (ratio) | Effluent Width[2] (ratio) | Effluent Width at Near Field Region (m)[3] |
|---|---|---|---|
| 7Q20 Flow Regime[4] | 0% of streamflow | 0% of stream width | 0 |
| East Pit EOM (Year 8) | 2% of streamflow | 5% of stream width | 1.1 |
| West Pit EOM (Year 12) | 3% of streamflow | 6% of stream width | 1.4 |
| East Pit Discharging (Year 21) | 3% of streamflow | 6% of stream width | 1.5 |
| West Pit Discharging (Year 37) | 3% of streamflow | 5% of stream width | 1.3 |

1. ACWG requires effluent flow to be less than 25% of receiving river flow, and less than 33.3% of receiving river width
2. Assumed stream width of 24.6 m at outfall
3. Effluent plume is bank attached at NFR, width is measured perpendicular to bank
4. The effluent 7Q20 flow was estimated at 0 $m^3/s$, and the ambient 7Q20 flow was estimated at 0.0014$m^3/s$

## 5.1 Sensitivity Analysis

A sensitivity analysis was performed to evaluate the significance of the assumptions made for the model's parameters, more specifically: receiving environment roughness (ambient manning's n value), and the buoyancy of the effluent plume (temperature differential between ambient and effluent). The TMF East Pit EOM model was used as a representative case for the Gold Brook Lake discharge points, and the southeast East Pit EOM model was used as a representative case for the Gold Brook discharge models (southeast settling pond).

The color-scale tables below indicate whether the NFR results of interest increased, decreased, or remained the same, with the changes to above mentioned parameters. Lighter green squares indicate a lower value, while darker green squares indicate a higher value.

**Table 5.3** shows that the Gold Brook Lake models are not sensitive to ambient roughness, however they are highly sensitive to temperature differential between the ambient and effluent, suggesting that temperature measurements should be taken in the field for the next phase of the project and used to update the current modelling. As the temperature differential increases, the mixing also increases (and the extent of the NFR is reduced). The neutral buoyancy model (selected for analysis) therefore gives a conservative result.

As previously discussed, the analysis uses the seasonal low flow conditions (i.e., August average flows). Once sufficient data has been gathered to develop the 7Q20 flows for the area, the sensitivity of the IDZ extent to each flow scenario should be tested for the Gold Brook models.

**Table 5.4** shows the results of the sensitivity analysis on the models discharging to Gold Brook. These models are not sensitive to either ambient roughness or buoyancy.

As previously mentioned, changing the outfall geometry and placement can have a significant impact on the NFR extent. This includes altering the angle of discharge, the velocity of discharge, and the height of discharge above the water surface. The design of the outfall locations is not within the scope of this analysis.

*Table 5.3 NFR Model Sensitivity to Ambient Manning's n, and Buoyancy (Temperature) (Gold Brook Lake)*

| | **Manning's n** | | | Buoyancy (Temperature) | | | | |
|---|---|---|---|---|---|---|---|---|
| NFR Parameter | Lower | Med | Higher | Negatively Buoyant | | Neutral | Positively Buoyant | |
| Manning's n | 0.03 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| Ambient T (°C) | 20.2 | 20.2 | 20.2 | 20.7 | 21.2 | 20.2 | 20.2 | 20.2 |
| Effluent T (°C) | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.7 | 21.2 |
| Dilution | | | | | | | | |
| Extent | | | | | | | | |

| | Manning's n | | | Buoyancy (Temperature) | | | | |
|---|---|---|---|---|---|---|---|---|
| NFR Parameter | Lower | Med | Higher | Negatively Buoyant | | Neutral | Positively Buoyant | |
| Manning's n | 0.03 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| Ambient T (°C) | 20.2 | 20.2 | 20.2 | 20.7 | 21.2 | 20.2 | 20.2 | 20.2 |
| Effluent T (°C) | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.7 | 21.2 |
| Contacts bottom | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Notes:<br>Light green indicates a lower value for NFR parameter (less dilution or smaller extent), while dark green indicates a higher value for NFR parameter (more dilution or larger extent) | | | | | | | | |

***Table 5.4 NFR Model Sensitivity to Ambient Manning's n, and Buoyancy (Temperature) (Gold Brook)***

| | **Manning's n** | | | **Buoyancy (Temperature)** | | | | |
|---|---|---|---|---|---|---|---|---|
| **NFR Parameter** | **Lower** | **Med** | **Higher** | **Negatively Buoyant** | | **Neutral** | **Positively Buoyant** | |
| Manning's n | 0.03 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| Ambient T (°C) | 20.2 | 20.2 | 20.2 | 20.7 | 21.2 | 20.2 | 20.2 | 20.2 |
| Effluent T (°C) | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.2 | 20.7 | 21.2 |
| Dilution | | | | | | | | |
| Extent | | | | | | | | |
| Contacts bottom | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Notes:<br>Light green indicates a lower value for NFR parameter (less dilution or smaller extent), while dark green indicates a higher value for NFR parameter (more dilution or larger extent) | | | | | | | | |

# 6. Conclusions

The IDZ modelling results indicate that:

1. All discharge locations to Gold Brook Lake have a near-field mixing zone within the ACWG requirements for discharge into a lake as per the assumptions and approximations considered in this study and presented in this technical memorandum.
2. The NFR for the southeast settling pond outfall (to Gold Brook) meets ACWG requirements for mixing zones in streams and rivers as per the assumptions and considered in this study and presented in this technical memorandum. Due to the high ambient flow relative to discharge velocity, the effluent in the NFR contacts the near (east) bank at the NFR. However, the width of the NFR is within 1/3 of the total stream width, as measured at the proposed southeast outfall location, for seasonal low flow conditions as estimated by the Water Balance Analysis (GHD, 2022b).

# 7. References

Canadian Council of Ministers of the Environment (CCME) (2009). Canada-wide Strategy for the Management of Municipal Wastewater Effluent. February 17, 2009.

Environment Canada (2006). Atlantic Canada Wastewater Guidelines Manual for Collection, Treatment, and Disposal.

GHD (2022a). Stormwater Management Design Hydrologic Modelling. Ref No. 11222385 Report 8. April 2022

GHD (2022b). Water Balance Analysis Summary Report. Ref No. 11222385 Report 6. April 2022

GHD (2022c). Predictive Water Quality Assessment. Ref No. 11222385 Report 7. April 2022.

GHD (2022d). Groundwater Modelling Report. Ref No. 11222385 Report 5. April 2022

GHD (2022e). Surface Water and Groundwater Monitoring Plan. Ref No. 11222385 Report 9. April 2022

Regards,

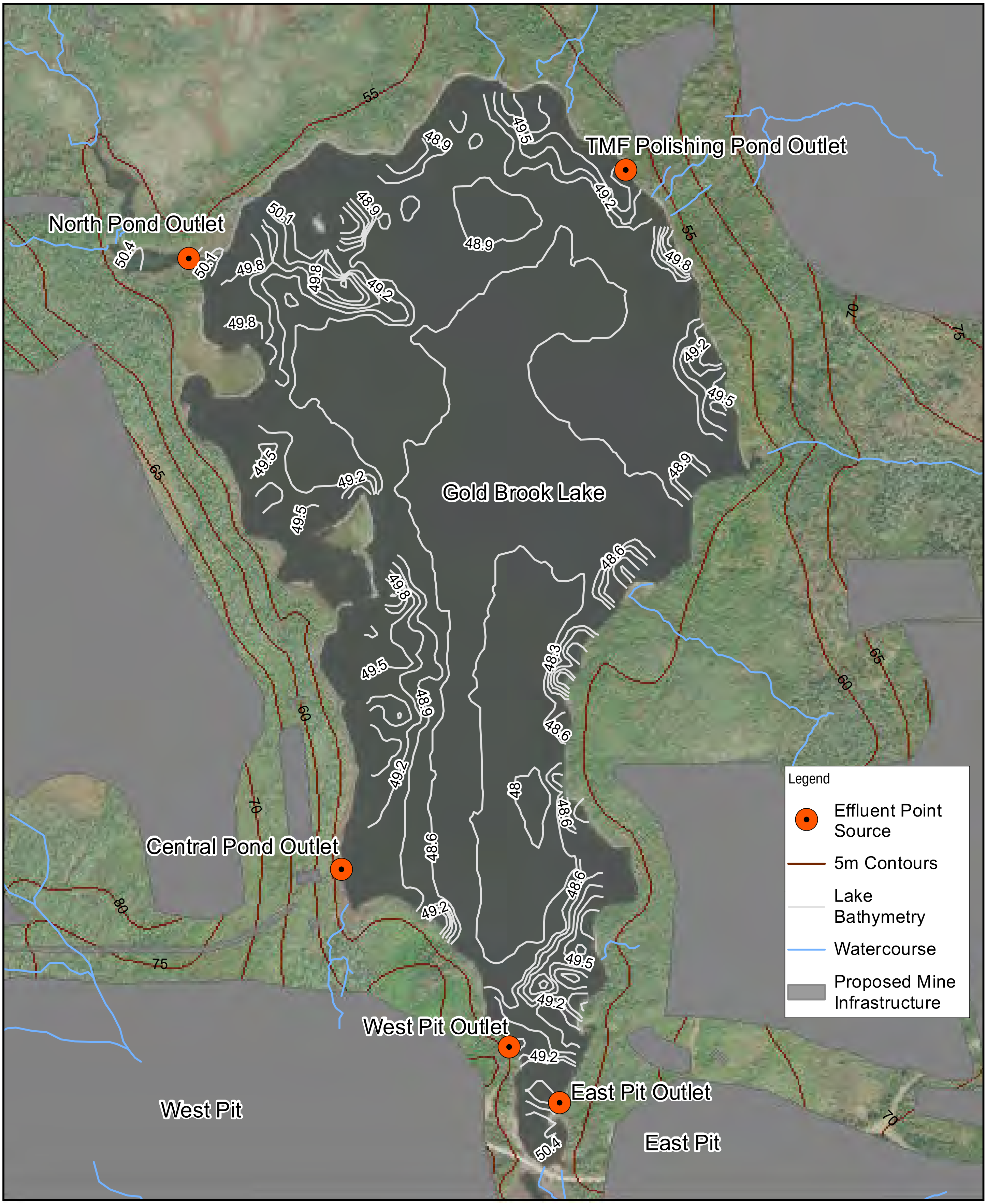
**Lisa Bowering, P.Eng. (ON)**
Water Resources Engineer

**Andrew Betts, P.Eng. (NS, ON)**
Senior Water Resources Engineer

# Attachment 1

## Gold Brook Lake and River System

## Bathymetry




Paper Size ANSI A

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
INITIAL DILUTION ZONE MODEL

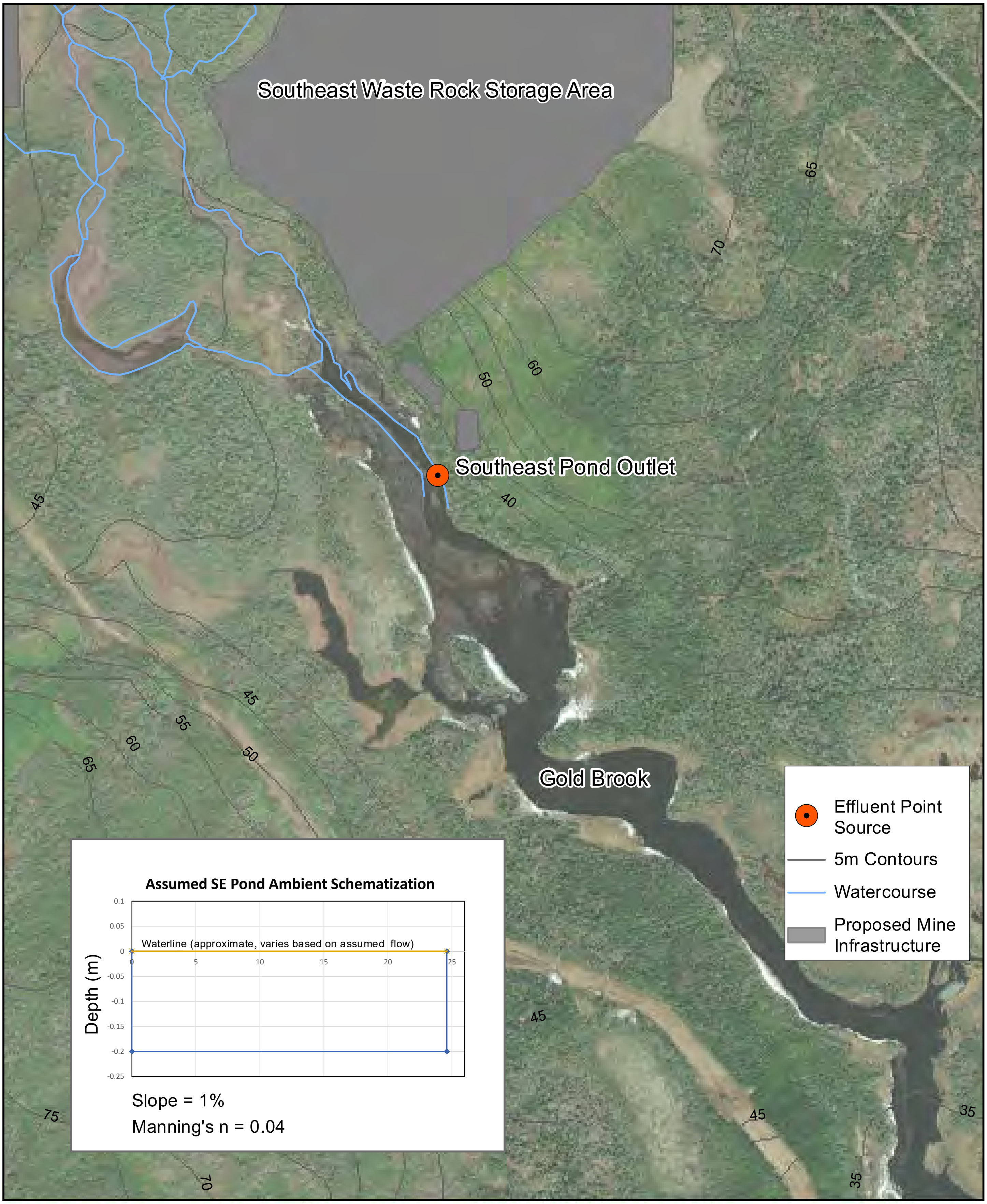
GOLD BROOK LAKE BATHYMETRY AND DISCHARGE POINTS

Project No. 11222385
Revision No. -
Date Apr 7, 2022

FIGURE 1

C:\Projects\11222385 Goldboro\GIS\CORMIX\Figure1_LakeBathymetry.mxd
Print date: 10 Apr 2022 - 14:25

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering




Paper Size ANSI A

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
INITIAL DILUTION ZONE MODEL

GOLD BROOK DISCHARGE POINT
& ASSUMED CROSS SECTION

Project No. 11222385
Revision No. -
Date Apr 7, 2022

FIGURE 2

C:\Projects\11222385 Goldboro\GIS\CORMIX\Figure2_GBtransectSE.mxd
Print date: 10 Apr 2022 - 14:50

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering

# Attachment 2

## CORMIX Model Output Files

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                    CORMIX MIXING ZONE EXPERT SYSTEM
                 Subsystem CORMIX1: Single Port Discharges
                         CORMIX Version 12.0GTD
                   HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro TMF Area
 Design case:       Year 8
 FILE NAME:         C:\... - Goldboro\Mar 2022 EARD\rev7\Y08-TMF_Outlet.prd
 Time stamp:        04/06/2022--21:44:11

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.45  HD    =      1.45
 UA    =      0.001 F     =      0.111 USTAR =0.8242E-04
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  LEFT      DISTB =      0.13
 D0    =      0.100 A0    =      0.008 H0    =      1.45  SUB0  =      0.00
 THETA =      0.00  SIGMA =    271.00
 U0    =      1.412 Q0    =      0.011       =0.1120E-01
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.1120E-01  M0    =0.1582E-01  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.09  LM    =  99999.00  Lm    =    179.67  Lb    =      0.00
                          Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2017.48

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4        1
 1  Applicable layer depth HS =    1.45        1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
```

XINT = 1000.00 XMAX = 1000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.13 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -83.00 SIGMAE= 271.10
LE = 0.50 XE = 0.00 YE = -0.06 ZE = 0.95

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .00000E+00 |
| 0.00 | -0.06 | 0.95 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .20662E-02 |
| 0.00 | -0.06 | 0.94 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .62535E-02 |
| 0.00 | -0.06 | 0.94 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .10514E-01 |
| 0.00 | -0.06 | 0.93 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .14848E-01 |
| 0.00 | -0.07 | 0.92 | 1.0 | 0.100E+03 | 0.05 | 1.412 | .19256E-01 |
| 0.00 | -0.07 | 0.91 | 1.0 | 0.100E+03 | 0.06 | 1.412 | .23736E-01 |
| 0.00 | -0.07 | 0.90 | 1.0 | 0.100E+03 | 0.06 | 1.412 | .28290E-01 |
| 0.00 | -0.07 | 0.90 | 1.0 | 0.100E+03 | 0.06 | 1.412 | .32918E-01 |
| 0.00 | -0.07 | 0.89 | 1.0 | 0.100E+03 | 0.06 | 1.412 | .37618E-01 |
| 0.00 | -0.07 | 0.88 | 1.0 | 0.100E+03 | 0.06 | 1.412 | .42393E-01 |
| 0.00 | -0.07 | 0.87 | 1.0 | 0.100E+03 | 0.06 | 1.412 | .47240E-01 |
| 0.00 | -0.07 | 0.86 | 1.0 | 0.994E+02 | 0.06 | 1.412 | .52161E-01 |
| 0.00 | -0.07 | 0.85 | 1.0 | 0.979E+02 | 0.06 | 1.412 | .57155E-01 |
| 0.00 | -0.07 | 0.85 | 1.0 | 0.965E+02 | 0.06 | 1.412 | .62222E-01 |
| 0.00 | -0.08 | 0.84 | 1.1 | 0.951E+02 | 0.06 | 1.412 | .67363E-01 |
| 0.00 | -0.08 | 0.83 | 1.1 | 0.938E+02 | 0.06 | 1.412 | .72577E-01 |
| 0.00 | -0.08 | 0.82 | 1.1 | 0.925E+02 | 0.07 | 1.412 | .77865E-01 |
| 0.00 | -0.08 | 0.81 | 1.1 | 0.912E+02 | 0.07 | 1.412 | .83226E-01 |
| 0.00 | -0.08 | 0.81 | 1.1 | 0.900E+02 | 0.07 | 1.412 | .88660E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.08 | 0.80 | 1.1 | 0.888E+02 | 0.07 | 1.412 | .94168E-01 |
| 0.00 | -0.08 | 0.79 | 1.1 | 0.876E+02 | 0.07 | 1.412 | .99749E-01 |
| 0.00 | -0.08 | 0.78 | 1.2 | 0.865E+02 | 0.07 | 1.412 | .10540E+00 |
| 0.00 | -0.08 | 0.77 | 1.2 | 0.854E+02 | 0.07 | 1.412 | .11113E+00 |
| 0.00 | -0.08 | 0.77 | 1.2 | 0.843E+02 | 0.07 | 1.406 | .11693E+00 |
| 0.00 | -0.09 | 0.76 | 1.2 | 0.833E+02 | 0.07 | 1.388 | .12281E+00 |
| 0.00 | -0.09 | 0.75 | 1.2 | 0.823E+02 | 0.07 | 1.371 | .12875E+00 |
| 0.00 | -0.09 | 0.74 | 1.2 | 0.813E+02 | 0.07 | 1.354 | .13477E+00 |
| 0.00 | -0.09 | 0.73 | 1.2 | 0.803E+02 | 0.07 | 1.338 | .14087E+00 |
| 0.00 | -0.09 | 0.72 | 1.3 | 0.793E+02 | 0.08 | 1.322 | .14704E+00 |
| 0.00 | -0.09 | 0.72 | 1.3 | 0.784E+02 | 0.08 | 1.307 | .15328E+00 |
| 0.00 | -0.09 | 0.71 | 1.3 | 0.775E+02 | 0.08 | 1.292 | .15959E+00 |
| 0.00 | -0.09 | 0.70 | 1.3 | 0.766E+02 | 0.08 | 1.277 | .16598E+00 |
| 0.00 | -0.09 | 0.69 | 1.3 | 0.757E+02 | 0.08 | 1.262 | .17244E+00 |
| 0.00 | -0.09 | 0.68 | 1.3 | 0.749E+02 | 0.08 | 1.248 | .17897E+00 |
| 0.00 | -0.10 | 0.68 | 1.4 | 0.741E+02 | 0.08 | 1.234 | .18558E+00 |
| 0.00 | -0.10 | 0.67 | 1.4 | 0.732E+02 | 0.08 | 1.221 | .19226E+00 |
| 0.00 | -0.10 | 0.66 | 1.4 | 0.725E+02 | 0.08 | 1.208 | .19902E+00 |
| 0.00 | -0.10 | 0.65 | 1.4 | 0.717E+02 | 0.08 | 1.195 | .20585E+00 |
| 0.00 | -0.10 | 0.64 | 1.4 | 0.709E+02 | 0.08 | 1.182 | .21275E+00 |
| 0.00 | -0.10 | 0.64 | 1.4 | 0.702E+02 | 0.09 | 1.170 | .21972E+00 |
| 0.00 | -0.10 | 0.63 | 1.4 | 0.694E+02 | 0.09 | 1.158 | .22677E+00 |
| 0.00 | -0.10 | 0.62 | 1.5 | 0.687E+02 | 0.09 | 1.146 | .23389E+00 |
| 0.00 | -0.10 | 0.61 | 1.5 | 0.680E+02 | 0.09 | 1.134 | .24109E+00 |
| 0.00 | -0.10 | 0.60 | 1.5 | 0.673E+02 | 0.09 | 1.123 | .24835E+00 |
| 0.00 | -0.10 | 0.59 | 1.5 | 0.667E+02 | 0.09 | 1.111 | .25569E+00 |
| 0.00 | -0.11 | 0.59 | 1.5 | 0.660E+02 | 0.09 | 1.100 | .26311E+00 |
| 0.00 | -0.11 | 0.58 | 1.5 | 0.654E+02 | 0.09 | 1.090 | .27060E+00 |
| 0.00 | -0.11 | 0.57 | 1.5 | 0.647E+02 | 0.09 | 1.079 | .27816E+00 |
| 0.00 | -0.11 | 0.56 | 1.6 | 0.641E+02 | 0.09 | 1.069 | .28579E+00 |
| 0.00 | -0.11 | 0.55 | 1.6 | 0.635E+02 | 0.09 | 1.059 | .29350E+00 |
| 0.00 | -0.11 | 0.55 | 1.6 | 0.629E+02 | 0.10 | 1.049 | .30128E+00 |
| 0.00 | -0.11 | 0.54 | 1.6 | 0.623E+02 | 0.10 | 1.039 | .30914E+00 |
| 0.00 | -0.11 | 0.53 | 1.6 | 0.618E+02 | 0.10 | 1.029 | .31706E+00 |
| 0.00 | -0.11 | 0.52 | 1.6 | 0.612E+02 | 0.10 | 1.020 | .32507E+00 |
| 0.00 | -0.11 | 0.51 | 1.6 | 0.606E+02 | 0.10 | 1.011 | .33314E+00 |
| 0.00 | -0.12 | 0.51 | 1.7 | 0.601E+02 | 0.10 | 1.002 | .34129E+00 |
| 0.00 | -0.12 | 0.50 | 1.7 | 0.596E+02 | 0.10 | 0.993 | .34951E+00 |
| 0.00 | -0.12 | 0.49 | 1.7 | 0.590E+02 | 0.10 | 0.984 | .35780E+00 |
| 0.00 | -0.12 | 0.48 | 1.7 | 0.585E+02 | 0.10 | 0.975 | .36617E+00 |
| 0.00 | -0.12 | 0.47 | 1.7 | 0.580E+02 | 0.10 | 0.967 | .37461E+00 |
| 0.00 | -0.12 | 0.46 | 1.7 | 0.575E+02 | 0.10 | 0.959 | .38313E+00 |
| 0.00 | -0.12 | 0.46 | 1.8 | 0.570E+02 | 0.11 | 0.950 | .39172E+00 |
| 0.00 | -0.12 | 0.45 | 1.8 | 0.565E+02 | 0.11 | 0.942 | .40038E+00 |
| 0.00 | -0.12 | 0.44 | 1.8 | 0.561E+02 | 0.11 | 0.934 | .40911E+00 |
| 0.00 | -0.12 | 0.43 | 1.8 | 0.556E+02 | 0.11 | 0.927 | .41792E+00 |
| 0.00 | -0.13 | 0.42 | 1.8 | 0.551E+02 | 0.11 | 0.919 | .42680E+00 |
| 0.00 | -0.13 | 0.42 | 1.8 | 0.547E+02 | 0.11 | 0.912 | .43576E+00 |
| 0.00 | -0.13 | 0.41 | 1.8 | 0.542E+02 | 0.11 | 0.904 | .44479E+00 |
| 0.00 | -0.13 | 0.40 | 1.9 | 0.538E+02 | 0.11 | 0.897 | .45389E+00 |
| 0.00 | -0.13 | 0.39 | 1.9 | 0.534E+02 | 0.11 | 0.890 | .46306E+00 |
| 0.00 | -0.13 | 0.38 | 1.9 | 0.530E+02 | 0.11 | 0.883 | .47231E+00 |
| 0.00 | -0.13 | 0.38 | 1.9 | 0.525E+02 | 0.11 | 0.876 | .48163E+00 |
| 0.00 | -0.13 | 0.37 | 1.9 | 0.521E+02 | 0.12 | 0.869 | .49103E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.13 | 0.36 | 1.9 | 0.517E+02 | 0.12 | 0.862 | .50050E+00 |
| 0.00 | -0.13 | 0.35 | 1.9 | 0.513E+02 | 0.12 | 0.856 | .51004E+00 |
| 0.00 | -0.14 | 0.34 | 2.0 | 0.509E+02 | 0.12 | 0.849 | .51965E+00 |
| 0.00 | -0.14 | 0.34 | 2.0 | 0.506E+02 | 0.12 | 0.843 | .52934E+00 |
| 0.00 | -0.14 | 0.33 | 2.0 | 0.502E+02 | 0.12 | 0.836 | .53910E+00 |
| 0.00 | -0.14 | 0.32 | 2.0 | 0.498E+02 | 0.12 | 0.830 | .54894E+00 |
| 0.00 | -0.14 | 0.31 | 2.0 | 0.494E+02 | 0.12 | 0.824 | .55885E+00 |
| 0.00 | -0.14 | 0.30 | 2.0 | 0.491E+02 | 0.12 | 0.818 | .56883E+00 |
| 0.00 | -0.14 | 0.29 | 2.1 | 0.487E+02 | 0.12 | 0.812 | .57888E+00 |
| 0.00 | -0.14 | 0.29 | 2.1 | 0.484E+02 | 0.12 | 0.806 | .58901E+00 |
| 0.00 | -0.14 | 0.28 | 2.1 | 0.480E+02 | 0.13 | 0.800 | .59921E+00 |
| 0.00 | -0.14 | 0.27 | 2.1 | 0.477E+02 | 0.13 | 0.795 | .60949E+00 |
| 0.00 | -0.15 | 0.26 | 2.1 | 0.473E+02 | 0.13 | 0.789 | .61984E+00 |
| 0.00 | -0.15 | 0.25 | 2.1 | 0.470E+02 | 0.13 | 0.783 | .63026E+00 |
| 0.00 | -0.15 | 0.25 | 2.1 | 0.467E+02 | 0.13 | 0.778 | .64075E+00 |
| 0.00 | -0.15 | 0.24 | 2.2 | 0.464E+02 | 0.13 | 0.773 | .65132E+00 |
| 0.00 | -0.15 | 0.23 | 2.2 | 0.460E+02 | 0.13 | 0.767 | .66196E+00 |
| 0.00 | -0.15 | 0.22 | 2.2 | 0.457E+02 | 0.13 | 0.762 | .67268E+00 |
| 0.00 | -0.15 | 0.21 | 2.2 | 0.454E+02 | 0.13 | 0.757 | .68347E+00 |
| 0.00 | -0.15 | 0.21 | 2.2 | 0.451E+02 | 0.13 | 0.752 | .69433E+00 |
| 0.00 | -0.15 | 0.20 | 2.2 | 0.448E+02 | 0.13 | 0.747 | .70526E+00 |
| 0.00 | -0.15 | 0.19 | 2.2 | 0.445E+02 | 0.14 | 0.742 | .71627E+00 |
| 0.00 | -0.16 | 0.18 | 2.3 | 0.442E+02 | 0.14 | 0.737 | .72736E+00 |
| 0.00 | -0.16 | 0.17 | 2.3 | 0.439E+02 | 0.14 | 0.732 | .73851E+00 |
| 0.00 | -0.16 | 0.16 | 2.3 | 0.436E+02 | 0.14 | 0.727 | .74974E+00 |
| 0.00 | -0.16 | 0.16 | 2.3 | 0.433E+02 | 0.14 | 0.723 | .76104E+00 |
| 0.00 | -0.16 | 0.15 | 2.3 | 0.431E+02 | 0.14 | 0.718 | .77242E+00 |
| 0.00 | -0.16 | 0.14 | 2.3 | 0.429E+02 | 0.14 | 0.716 | .77813E+00 |

Cumulative travel time = 0.7781 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | -0.16 | 0.14 | 2.3 | 0.429E+02 | 0.14 | .77813E+00 |

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.14 | -24.78 | 1.45 | 2.3 | 0.429E+02 | 0.00 | 0.00 | 1.45 | 1.45 | .77813E+00 |
| 0.02 | -24.78 | 1.45 | 2.3 | 0.429E+02 | 1.45 | 5.69 | 1.45 | 0.00 | .27635E+02 |
| 0.18 | -24.78 | 1.45 | 2.4 | 0.420E+02 | 1.45 | 8.05 | 1.45 | 0.00 | .25481E+03 |
| 0.34 | -24.78 | 1.45 | 2.5 | 0.398E+02 | 1.45 | 9.85 | 1.45 | 0.00 | .48198E+03 |
| 0.50 | -24.78 | 1.45 | 2.7 | 0.373E+02 | 1.45 | 11.38 | 1.45 | 0.00 | .70916E+03 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.66 | -24.78 | 1.45 | 2.8 | 0.351E+02 | 1.45 | 12.72 | 1.45 | 0.00 | .93633E+03 |
| 0.82 | -24.78 | 1.45 | 3.0 | 0.334E+02 | 1.45 | 13.94 | 1.45 | 0.00 | .11635E+04 |
| 0.98 | -24.78 | 1.45 | 3.1 | 0.322E+02 | 1.45 | 15.05 | 1.45 | 0.00 | .13907E+04 |
| 1.14 | -24.78 | 1.45 | 3.2 | 0.315E+02 | 1.45 | 16.09 | 1.45 | 0.00 | .16179E+04 |
| 1.29 | -24.78 | 1.45 | 3.2 | 0.310E+02 | 1.45 | 17.07 | 1.45 | 0.00 | .18450E+04 |
| 1.45 | -24.78 | 1.45 | 3.3 | 0.307E+02 | 1.45 | 17.99 | 1.45 | 0.00 | .20722E+04 |

Cumulative travel time = 2072.2068 sec ( 0.58 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.638E-03 m^2/s
Horizontal diffusivity (initial value) = 0.707E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.45 | -24.78 | 1.45 | 3.3 | 0.307E+02 | 1.45 | 17.99 | 1.45 | 0.00 | .20722E+04 |
| 1.46 | -24.78 | 1.45 | 3.3 | 0.306E+02 | 1.45 | 18.06 | 1.45 | 0.00 | .20828E+04 |
| 1.47 | -24.78 | 1.45 | 3.3 | 0.304E+02 | 1.45 | 18.12 | 1.45 | 0.00 | .20934E+04 |
| 1.48 | -24.78 | 1.45 | 3.3 | 0.303E+02 | 1.45 | 18.19 | 1.45 | 0.00 | .21039E+04 |
| 1.48 | -24.78 | 1.45 | 3.3 | 0.302E+02 | 1.45 | 18.25 | 1.45 | 0.00 | .21145E+04 |
| 1.49 | -24.78 | 1.45 | 3.3 | 0.301E+02 | 1.45 | 18.32 | 1.45 | 0.00 | .21251E+04 |
| 1.50 | -24.78 | 1.45 | 3.3 | 0.300E+02 | 1.45 | 18.39 | 1.45 | 0.00 | .21357E+04 |
| 1.51 | -24.78 | 1.45 | 3.3 | 0.299E+02 | 1.45 | 18.45 | 1.45 | 0.00 | .21462E+04 |
| 1.51 | -24.78 | 1.45 | 3.4 | 0.298E+02 | 1.45 | 18.52 | 1.45 | 0.00 | .21568E+04 |
| 1.52 | -24.78 | 1.45 | 3.4 | 0.297E+02 | 1.45 | 18.58 | 1.45 | 0.00 | .21674E+04 |
| 1.53 | -24.78 | 1.45 | 3.4 | 0.296E+02 | 1.45 | 18.65 | 1.45 | 0.00 | .21780E+04 |
| 1.53 | -24.78 | 1.45 | 3.4 | 0.295E+02 | 1.45 | 18.71 | 1.45 | 0.00 | .21886E+04 |
| 1.54 | -24.78 | 1.45 | 3.4 | 0.294E+02 | 1.45 | 18.78 | 1.45 | 0.00 | .21991E+04 |
| 1.55 | -24.78 | 1.45 | 3.4 | 0.293E+02 | 1.45 | 18.85 | 1.45 | 0.00 | .22097E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.56 | -24.78 | 1.45 | 3.4 | 0.292E+02 | 1.45 | 18.91 | 1.45 | 0.00 | .22203E+04 |
| 1.56 | -24.78 | 1.45 | 3.4 | 0.291E+02 | 1.45 | 18.98 | 1.45 | 0.00 | .22309E+04 |
| 1.57 | -24.78 | 1.45 | 3.5 | 0.290E+02 | 1.45 | 19.05 | 1.45 | 0.00 | .22414E+04 |
| 1.58 | -24.78 | 1.45 | 3.5 | 0.289E+02 | 1.45 | 19.11 | 1.45 | 0.00 | .22520E+04 |
| 1.59 | -24.78 | 1.45 | 3.5 | 0.288E+02 | 1.45 | 19.18 | 1.45 | 0.00 | .22626E+04 |
| 1.59 | -24.78 | 1.45 | 3.5 | 0.287E+02 | 1.45 | 19.25 | 1.45 | 0.00 | .22732E+04 |
| 1.60 | -24.78 | 1.45 | 3.5 | 0.286E+02 | 1.45 | 19.31 | 1.45 | 0.00 | .22837E+04 |
| 1.61 | -24.78 | 1.45 | 3.5 | 0.285E+02 | 1.45 | 19.38 | 1.45 | 0.00 | .22943E+04 |
| 1.62 | -24.78 | 1.45 | 3.5 | 0.284E+02 | 1.45 | 19.45 | 1.45 | 0.00 | .23049E+04 |
| 1.62 | -24.78 | 1.45 | 3.5 | 0.283E+02 | 1.45 | 19.51 | 1.45 | 0.00 | .23155E+04 |
| 1.63 | -24.78 | 1.45 | 3.5 | 0.282E+02 | 1.45 | 19.58 | 1.45 | 0.00 | .23261E+04 |
| 1.64 | -24.78 | 1.45 | 3.6 | 0.281E+02 | 1.45 | 19.65 | 1.45 | 0.00 | .23366E+04 |
| 1.65 | -24.78 | 1.45 | 3.6 | 0.280E+02 | 1.45 | 19.72 | 1.45 | 0.00 | .23472E+04 |
| 1.65 | -24.78 | 1.45 | 3.6 | 0.279E+02 | 1.45 | 19.78 | 1.45 | 0.00 | .23578E+04 |
| 1.66 | -24.78 | 1.45 | 3.6 | 0.278E+02 | 1.45 | 19.85 | 1.45 | 0.00 | .23684E+04 |
| 1.67 | -24.78 | 1.45 | 3.6 | 0.277E+02 | 1.45 | 19.92 | 1.45 | 0.00 | .23789E+04 |
| 1.68 | -24.78 | 1.45 | 3.6 | 0.276E+02 | 1.45 | 19.99 | 1.45 | 0.00 | .23895E+04 |
| 1.68 | -24.78 | 1.45 | 3.6 | 0.275E+02 | 1.45 | 20.05 | 1.45 | 0.00 | .24001E+04 |
| 1.69 | -24.78 | 1.45 | 3.6 | 0.274E+02 | 1.45 | 20.12 | 1.45 | 0.00 | .24107E+04 |
| 1.70 | -24.78 | 1.45 | 3.7 | 0.273E+02 | 1.45 | 20.19 | 1.45 | 0.00 | .24212E+04 |
| 1.71 | -24.78 | 1.45 | 3.7 | 0.272E+02 | 1.45 | 20.26 | 1.45 | 0.00 | .24318E+04 |
| 1.71 | -24.78 | 1.45 | 3.7 | 0.271E+02 | 1.45 | 20.33 | 1.45 | 0.00 | .24424E+04 |
| 1.72 | -24.78 | 1.45 | 3.7 | 0.271E+02 | 1.45 | 20.39 | 1.45 | 0.00 | .24530E+04 |
| 1.73 | -24.78 | 1.45 | 3.7 | 0.270E+02 | 1.45 | 20.46 | 1.45 | 0.00 | .24636E+04 |
| 1.73 | -24.78 | 1.45 | 3.7 | 0.269E+02 | 1.45 | 20.53 | 1.45 | 0.00 | .24741E+04 |
| 1.74 | -24.78 | 1.45 | 3.7 | 0.268E+02 | 1.45 | 20.60 | 1.45 | 0.00 | .24847E+04 |
| 1.75 | -24.78 | 1.45 | 3.7 | 0.267E+02 | 1.45 | 20.67 | 1.45 | 0.00 | .24953E+04 |
| 1.76 | -24.78 | 1.45 | 3.8 | 0.266E+02 | 1.45 | 20.73 | 1.45 | 0.00 | .25059E+04 |
| 1.76 | -24.78 | 1.45 | 3.8 | 0.265E+02 | 1.45 | 20.80 | 1.45 | 0.00 | .25164E+04 |
| 1.77 | -24.78 | 1.45 | 3.8 | 0.264E+02 | 1.45 | 20.87 | 1.45 | 0.00 | .25270E+04 |
| 1.78 | -24.78 | 1.45 | 3.8 | 0.263E+02 | 1.45 | 20.94 | 1.45 | 0.00 | .25376E+04 |
| 1.79 | -24.78 | 1.45 | 3.8 | 0.263E+02 | 1.45 | 21.01 | 1.45 | 0.00 | .25482E+04 |
| 1.79 | -24.78 | 1.45 | 3.8 | 0.262E+02 | 1.45 | 21.08 | 1.45 | 0.00 | .25587E+04 |
| 1.80 | -24.78 | 1.45 | 3.8 | 0.261E+02 | 1.45 | 21.15 | 1.45 | 0.00 | .25693E+04 |
| 1.81 | -24.78 | 1.45 | 3.8 | 0.260E+02 | 1.45 | 21.22 | 1.45 | 0.00 | .25799E+04 |
| 1.82 | -24.78 | 1.45 | 3.9 | 0.259E+02 | 1.45 | 21.28 | 1.45 | 0.00 | .25905E+04 |
| 1.82 | -24.78 | 1.45 | 3.9 | 0.258E+02 | 1.45 | 21.35 | 1.45 | 0.00 | .26011E+04 |
| 1.83 | -24.78 | 1.45 | 3.9 | 0.258E+02 | 1.45 | 21.42 | 1.45 | 0.00 | .26116E+04 |
| 1.84 | -24.78 | 1.45 | 3.9 | 0.257E+02 | 1.45 | 21.49 | 1.45 | 0.00 | .26222E+04 |
| 1.85 | -24.78 | 1.45 | 3.9 | 0.256E+02 | 1.45 | 21.56 | 1.45 | 0.00 | .26328E+04 |
| 1.85 | -24.78 | 1.45 | 3.9 | 0.255E+02 | 1.45 | 21.63 | 1.45 | 0.00 | .26434E+04 |
| 1.86 | -24.78 | 1.45 | 3.9 | 0.254E+02 | 1.45 | 21.70 | 1.45 | 0.00 | .26539E+04 |
| 1.87 | -24.78 | 1.45 | 3.9 | 0.253E+02 | 1.45 | 21.77 | 1.45 | 0.00 | .26645E+04 |
| 1.88 | -24.78 | 1.45 | 4.0 | 0.253E+02 | 1.45 | 21.84 | 1.45 | 0.00 | .26751E+04 |
| 1.88 | -24.78 | 1.45 | 4.0 | 0.252E+02 | 1.45 | 21.91 | 1.45 | 0.00 | .26857E+04 |
| 1.89 | -24.78 | 1.45 | 4.0 | 0.251E+02 | 1.45 | 21.98 | 1.45 | 0.00 | .26962E+04 |
| 1.90 | -24.78 | 1.45 | 4.0 | 0.250E+02 | 1.45 | 22.05 | 1.45 | 0.00 | .27068E+04 |
| 1.91 | -24.78 | 1.45 | 4.0 | 0.249E+02 | 1.45 | 22.12 | 1.45 | 0.00 | .27174E+04 |
| 1.91 | -24.78 | 1.45 | 4.0 | 0.249E+02 | 1.45 | 22.19 | 1.45 | 0.00 | .27280E+04 |
| 1.92 | -24.78 | 1.45 | 4.0 | 0.248E+02 | 1.45 | 22.26 | 1.45 | 0.00 | .27386E+04 |
| 1.93 | -24.78 | 1.45 | 4.0 | 0.247E+02 | 1.45 | 22.33 | 1.45 | 0.00 | .27491E+04 |
| 1.93 | -24.78 | 1.45 | 4.1 | 0.246E+02 | 1.45 | 22.40 | 1.45 | 0.00 | .27597E+04 |
| 1.94 | -24.78 | 1.45 | 4.1 | 0.246E+02 | 1.45 | 22.47 | 1.45 | 0.00 | .27703E+04 |
| 1.95 | -24.78 | 1.45 | 4.1 | 0.245E+02 | 1.45 | 22.54 | 1.45 | 0.00 | .27809E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.96 | -24.78 | 1.45 | 4.1 | 0.244E+02 | 1.45 | 22.61 | 1.45 | 0.00 | .27914E+04 |
| 1.96 | -24.78 | 1.45 | 4.1 | 0.243E+02 | 1.45 | 22.68 | 1.45 | 0.00 | .28020E+04 |
| 1.97 | -24.78 | 1.45 | 4.1 | 0.243E+02 | 1.45 | 22.75 | 1.45 | 0.00 | .28126E+04 |
| 1.98 | -24.78 | 1.45 | 4.1 | 0.242E+02 | 1.45 | 22.82 | 1.45 | 0.00 | .28232E+04 |
| 1.99 | -24.78 | 1.45 | 4.1 | 0.241E+02 | 1.45 | 22.89 | 1.45 | 0.00 | .28337E+04 |
| 1.99 | -24.78 | 1.45 | 4.2 | 0.240E+02 | 1.45 | 22.96 | 1.45 | 0.00 | .28443E+04 |
| 2.00 | -24.78 | 1.45 | 4.2 | 0.240E+02 | 1.45 | 23.03 | 1.45 | 0.00 | .28549E+04 |
| 2.01 | -24.78 | 1.45 | 4.2 | 0.239E+02 | 1.45 | 23.11 | 1.45 | 0.00 | .28655E+04 |
| 2.02 | -24.78 | 1.45 | 4.2 | 0.238E+02 | 1.45 | 23.18 | 1.45 | 0.00 | .28761E+04 |
| 2.02 | -24.78 | 1.45 | 4.2 | 0.237E+02 | 1.45 | 23.25 | 1.45 | 0.00 | .28866E+04 |
| 2.03 | -24.78 | 1.45 | 4.2 | 0.237E+02 | 1.45 | 23.32 | 1.45 | 0.00 | .28972E+04 |
| 2.04 | -24.78 | 1.45 | 4.2 | 0.236E+02 | 1.45 | 23.39 | 1.45 | 0.00 | .29078E+04 |
| 2.05 | -24.78 | 1.45 | 4.3 | 0.235E+02 | 1.45 | 23.46 | 1.45 | 0.00 | .29184E+04 |
| 2.05 | -24.78 | 1.45 | 4.3 | 0.234E+02 | 1.45 | 23.53 | 1.45 | 0.00 | .29289E+04 |
| 2.06 | -24.78 | 1.45 | 4.3 | 0.234E+02 | 1.45 | 23.60 | 1.45 | 0.00 | .29395E+04 |
| 2.07 | -24.78 | 1.45 | 4.3 | 0.233E+02 | 1.45 | 23.68 | 1.45 | 0.00 | .29501E+04 |
| 2.08 | -24.78 | 1.45 | 4.3 | 0.232E+02 | 1.45 | 23.75 | 1.45 | 0.00 | .29607E+04 |
| 2.08 | -24.78 | 1.45 | 4.3 | 0.232E+02 | 1.45 | 23.82 | 1.45 | 0.00 | .29712E+04 |
| 2.09 | -24.78 | 1.45 | 4.3 | 0.231E+02 | 1.45 | 23.89 | 1.45 | 0.00 | .29818E+04 |
| 2.10 | -24.78 | 1.45 | 4.3 | 0.230E+02 | 1.45 | 23.96 | 1.45 | 0.00 | .29924E+04 |
| 2.11 | -24.78 | 1.45 | 4.4 | 0.230E+02 | 1.45 | 24.03 | 1.45 | 0.00 | .30030E+04 |
| 2.11 | -24.78 | 1.45 | 4.4 | 0.229E+02 | 1.45 | 24.11 | 1.45 | 0.00 | .30136E+04 |
| 2.12 | -24.78 | 1.45 | 4.4 | 0.228E+02 | 1.45 | 24.18 | 1.45 | 0.00 | .30241E+04 |
| 2.13 | -24.78 | 1.45 | 4.4 | 0.228E+02 | 1.45 | 24.25 | 1.45 | 0.00 | .30347E+04 |
| 2.13 | -24.78 | 1.45 | 4.4 | 0.227E+02 | 1.45 | 24.32 | 1.45 | 0.00 | .30453E+04 |
| 2.14 | -24.78 | 1.45 | 4.4 | 0.226E+02 | 1.45 | 24.39 | 1.45 | 0.00 | .30559E+04 |
| 2.15 | -24.78 | 1.45 | 4.4 | 0.225E+02 | 1.45 | 24.47 | 1.45 | 0.00 | .30664E+04 |
| 2.16 | -24.78 | 1.45 | 4.4 | 0.225E+02 | 1.45 | 24.54 | 1.45 | 0.00 | .30770E+04 |
| 2.16 | -24.78 | 1.45 | 4.5 | 0.224E+02 | 1.45 | 24.61 | 1.45 | 0.00 | .30876E+04 |
| 2.17 | -24.78 | 1.45 | 4.5 | 0.224E+02 | 1.45 | 24.68 | 1.45 | 0.00 | .30982E+04 |
| 2.18 | -24.78 | 1.45 | 4.5 | 0.223E+02 | 1.45 | 24.76 | 1.45 | 0.00 | .31087E+04 |
| 2.19 | -24.78 | 1.45 | 4.5 | 0.222E+02 | 1.45 | 24.83 | 1.45 | 0.00 | .31193E+04 |
| 2.19 | -24.78 | 1.45 | 4.5 | 0.222E+02 | 1.45 | 24.90 | 1.45 | 0.00 | .31299E+04 |

Cumulative travel time = 3129.8994 sec ( 0.87 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 2.19 | 0.13 | 1.45 | 4.5 | 0.222E+02 | 1.45 | 49.80 | 1.45 | 0.00 | .31299E+04 |
| 12.17 | 0.13 | 1.45 | 19.5 | 0.512E+01 | 1.45 | 215.35 | 1.45 | 0.00 | .17384E+05 |
| 22.15 | 0.13 | 1.45 | 40.4 | 0.248E+01 | 1.45 | 445.35 | 1.45 | 0.00 | .31639E+05 |
| 32.13 | 0.13 | 1.45 | 65.7 | 0.152E+01 | 1.45 | 725.07 | 1.45 | 0.00 | .45893E+05 |
| 42.11 | 0.13 | 1.45 | 94.9 | 0.105E+01 | 1.45 | 1046.85 | 1.45 | 0.00 | .60147E+05 |
| 52.08 | 0.13 | 1.45 | 127.4 | 0.785E+00 | 1.45 | 1405.77 | 1.45 | 0.00 | .74402E+05 |
| 62.06 | 0.13 | 1.45 | 163.0 | 0.614E+00 | 1.45 | 1798.33 | 1.45 | 0.00 | .88656E+05 |
| 72.04 | 0.13 | 1.45 | 201.4 | 0.497E+00 | 1.45 | 2221.85 | 1.45 | 0.00 | .10291E+06 |
| 82.02 | 0.13 | 1.45 | 242.4 | 0.413E+00 | 1.45 | 2674.21 | 1.45 | 0.00 | .11716E+06 |
| 92.00 | 0.13 | 1.45 | 285.8 | 0.350E+00 | 1.45 | 3153.69 | 1.45 | 0.00 | .13142E+06 |
| 101.97 | 0.13 | 1.45 | 331.6 | 0.302E+00 | 1.45 | 3658.83 | 1.45 | 0.00 | .14567E+06 |
| 111.95 | 0.13 | 1.45 | 379.6 | 0.263E+00 | 1.45 | 4188.38 | 1.45 | 0.00 | .15993E+06 |
| 121.93 | 0.13 | 1.45 | 429.7 | 0.233E+00 | 1.45 | 4741.26 | 1.45 | 0.00 | .17418E+06 |
| 131.91 | 0.13 | 1.45 | 481.8 | 0.208E+00 | 1.45 | 5316.54 | 1.45 | 0.00 | .18844E+06 |
| 141.89 | 0.13 | 1.45 | 535.9 | 0.187E+00 | 1.45 | 5913.37 | 1.45 | 0.00 | .20269E+06 |
| 151.86 | 0.13 | 1.45 | 591.9 | 0.169E+00 | 1.45 | 6531.00 | 1.45 | 0.00 | .21695E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 161.84 | 0.13 | 1.45 | 649.7 | 0.154E+00 | 1.45 | 7168.75 | 1.45 | 0.00 | .23120E+06 |
| 171.82 | 0.13 | 1.45 | 709.2 | 0.141E+00 | 1.45 | 7826.01 | 1.45 | 0.00 | .24545E+06 |
| 181.80 | 0.13 | 1.45 | 770.5 | 0.130E+00 | 1.45 | 8502.20 | 1.45 | 0.00 | .25971E+06 |
| 191.78 | 0.13 | 1.45 | 833.5 | 0.120E+00 | 1.45 | 9196.83 | 1.45 | 0.00 | .27396E+06 |
| 201.76 | 0.13 | 1.45 | 898.0 | 0.111E+00 | 1.45 | 9909.40 | 1.45 | 0.00 | .28822E+06 |
| 211.73 | 0.13 | 1.45 | 964.2 | 0.104E+00 | 1.45 | 10639.48 | 1.45 | 0.00 | .30247E+06 |
| 221.71 | 0.13 | 1.45 | 1031.9 | 0.969E-01 | 1.45 | 11386.66 | 1.45 | 0.00 | .31673E+06 |
| 231.69 | 0.13 | 1.45 | 1101.1 | 0.908E-01 | 1.45 | 12150.56 | 1.45 | 0.00 | .33098E+06 |
| 241.67 | 0.13 | 1.45 | 1171.9 | 0.853E-01 | 1.45 | 12930.81 | 1.45 | 0.00 | .34523E+06 |
| 251.65 | 0.13 | 1.45 | 1244.0 | 0.804E-01 | 1.45 | 13727.08 | 1.45 | 0.00 | .35949E+06 |
| 261.62 | 0.13 | 1.45 | 1317.6 | 0.759E-01 | 1.45 | 14539.06 | 1.45 | 0.00 | .37374E+06 |
| 271.60 | 0.13 | 1.45 | 1392.6 | 0.718E-01 | 1.45 | 15366.45 | 1.45 | 0.00 | .38800E+06 |
| 281.58 | 0.13 | 1.45 | 1468.9 | 0.681E-01 | 1.45 | 16208.96 | 1.45 | 0.00 | .40225E+06 |
| 291.56 | 0.13 | 1.45 | 1546.6 | 0.647E-01 | 1.45 | 17066.33 | 1.45 | 0.00 | .41651E+06 |
| 301.54 | 0.13 | 1.45 | 1625.7 | 0.615E-01 | 1.45 | 17938.31 | 1.45 | 0.00 | .43076E+06 |
| 311.51 | 0.13 | 1.45 | 1706.0 | 0.586E-01 | 1.45 | 18824.65 | 1.45 | 0.00 | .44502E+06 |
| 321.49 | 0.13 | 1.45 | 1787.6 | 0.559E-01 | 1.45 | 19725.12 | 1.45 | 0.00 | .45927E+06 |
| 331.47 | 0.13 | 1.45 | 1870.5 | 0.535E-01 | 1.45 | 20639.52 | 1.45 | 0.00 | .47352E+06 |
| 341.45 | 0.13 | 1.45 | 1954.6 | 0.512E-01 | 1.45 | 21567.62 | 1.45 | 0.00 | .48778E+06 |
| 351.43 | 0.13 | 1.45 | 2039.9 | 0.490E-01 | 1.45 | 22509.23 | 1.45 | 0.00 | .50203E+06 |
| 361.40 | 0.13 | 1.45 | 2126.4 | 0.470E-01 | 1.45 | 23464.16 | 1.45 | 0.00 | .51629E+06 |
| 371.38 | 0.13 | 1.45 | 2214.2 | 0.452E-01 | 1.45 | 24432.22 | 1.45 | 0.00 | .53054E+06 |
| 381.36 | 0.13 | 1.45 | 2303.1 | 0.434E-01 | 1.45 | 25413.24 | 1.45 | 0.00 | .54480E+06 |
| 391.34 | 0.13 | 1.45 | 2393.1 | 0.418E-01 | 1.45 | 26407.06 | 1.45 | 0.00 | .55905E+06 |
| 401.32 | 0.13 | 1.45 | 2484.3 | 0.403E-01 | 1.45 | 27413.49 | 1.45 | 0.00 | .57330E+06 |
| 411.29 | 0.13 | 1.45 | 2576.7 | 0.388E-01 | 1.45 | 28432.41 | 1.45 | 0.00 | .58756E+06 |
| 421.27 | 0.13 | 1.45 | 2670.1 | 0.375E-01 | 1.45 | 29463.63 | 1.45 | 0.00 | .60181E+06 |
| 431.25 | 0.13 | 1.45 | 2764.7 | 0.362E-01 | 1.45 | 30507.04 | 1.45 | 0.00 | .61607E+06 |
| 441.23 | 0.13 | 1.45 | 2860.4 | 0.350E-01 | 1.45 | 31562.47 | 1.45 | 0.00 | .63032E+06 |
| 451.21 | 0.13 | 1.45 | 2957.1 | 0.338E-01 | 1.45 | 32629.81 | 1.45 | 0.00 | .64458E+06 |
| 461.18 | 0.13 | 1.45 | 3054.9 | 0.327E-01 | 1.45 | 33708.91 | 1.45 | 0.00 | .65883E+06 |
| 471.16 | 0.13 | 1.45 | 3153.7 | 0.317E-01 | 1.45 | 34799.66 | 1.45 | 0.00 | .67309E+06 |
| 481.14 | 0.13 | 1.45 | 3253.6 | 0.307E-01 | 1.45 | 35901.91 | 1.45 | 0.00 | .68734E+06 |
| 491.12 | 0.13 | 1.45 | 3354.5 | 0.298E-01 | 1.45 | 37015.58 | 1.45 | 0.00 | .70159E+06 |
| 501.10 | 0.13 | 1.45 | 3456.5 | 0.289E-01 | 1.45 | 38140.52 | 1.45 | 0.00 | .71585E+06 |
| 511.07 | 0.13 | 1.45 | 3559.4 | 0.281E-01 | 1.45 | 39276.62 | 1.45 | 0.00 | .73010E+06 |
| 521.05 | 0.13 | 1.45 | 3663.4 | 0.273E-01 | 1.45 | 40423.80 | 1.45 | 0.00 | .74436E+06 |
| 531.03 | 0.13 | 1.45 | 3768.4 | 0.265E-01 | 1.45 | 41581.94 | 1.45 | 0.00 | .75861E+06 |
| 541.01 | 0.13 | 1.45 | 3874.3 | 0.258E-01 | 1.45 | 42750.93 | 1.45 | 0.00 | .77287E+06 |
| 550.99 | 0.13 | 1.45 | 3981.2 | 0.251E-01 | 1.45 | 43930.66 | 1.45 | 0.00 | .78712E+06 |
| 560.97 | 0.13 | 1.45 | 4089.1 | 0.245E-01 | 1.45 | 45121.07 | 1.45 | 0.00 | .80137E+06 |
| 570.94 | 0.13 | 1.45 | 4197.9 | 0.238E-01 | 1.45 | 46322.02 | 1.45 | 0.00 | .81563E+06 |
| 580.92 | 0.13 | 1.45 | 4307.7 | 0.232E-01 | 1.45 | 47533.46 | 1.45 | 0.00 | .82988E+06 |
| 590.90 | 0.13 | 1.45 | 4418.4 | 0.226E-01 | 1.45 | 48755.27 | 1.45 | 0.00 | .84414E+06 |
| 600.88 | 0.13 | 1.45 | 4530.1 | 0.221E-01 | 1.45 | 49987.38 | 1.45 | 0.00 | .85839E+06 |
| 610.86 | 0.13 | 1.45 | 4642.7 | 0.215E-01 | 1.45 | 51229.68 | 1.45 | 0.00 | .87265E+06 |
| 620.83 | 0.13 | 1.45 | 4756.2 | 0.210E-01 | 1.45 | 52482.12 | 1.45 | 0.00 | .88690E+06 |
| 630.81 | 0.13 | 1.45 | 4870.6 | 0.205E-01 | 1.45 | 53744.60 | 1.45 | 0.00 | .90116E+06 |
| 640.79 | 0.13 | 1.45 | 4985.9 | 0.201E-01 | 1.45 | 55017.04 | 1.45 | 0.00 | .91541E+06 |
| 650.77 | 0.13 | 1.45 | 5102.1 | 0.196E-01 | 1.45 | 56299.37 | 1.45 | 0.00 | .92966E+06 |
| 660.75 | 0.13 | 1.45 | 5219.2 | 0.192E-01 | 1.45 | 57591.51 | 1.45 | 0.00 | .94392E+06 |
| 670.72 | 0.13 | 1.45 | 5337.2 | 0.187E-01 | 1.45 | 58893.38 | 1.45 | 0.00 | .95817E+06 |
| 680.70 | 0.13 | 1.45 | 5456.1 | 0.183E-01 | 1.45 | 60204.93 | 1.45 | 0.00 | .97243E+06 |
| 690.68 | 0.13 | 1.45 | 5575.8 | 0.179E-01 | 1.45 | 61526.06 | 1.45 | 0.00 | .98668E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 700.66 | 0.13 | 1.45 | 5696.4 | 0.176E-01 | 1.45 | 62856.71 | 1.45 | 0.00 | .10009E+07 |
| 710.64 | 0.13 | 1.45 | 5817.8 | 0.172E-01 | 1.45 | 64196.84 | 1.45 | 0.00 | .10152E+07 |
| 720.61 | 0.13 | 1.45 | 5940.1 | 0.168E-01 | 1.45 | 65546.35 | 1.45 | 0.00 | .10294E+07 |
| 730.59 | 0.13 | 1.45 | 6063.3 | 0.165E-01 | 1.45 | 66905.17 | 1.45 | 0.00 | .10437E+07 |
| 740.57 | 0.13 | 1.45 | 6187.3 | 0.162E-01 | 1.45 | 68273.27 | 1.45 | 0.00 | .10580E+07 |
| 750.55 | 0.13 | 1.45 | 6312.1 | 0.158E-01 | 1.45 | 69650.57 | 1.45 | 0.00 | .10722E+07 |
| 760.53 | 0.13 | 1.45 | 6437.7 | 0.155E-01 | 1.45 | 71037.01 | 1.45 | 0.00 | .10865E+07 |
| 770.51 | 0.13 | 1.45 | 6564.2 | 0.152E-01 | 1.45 | 72432.52 | 1.45 | 0.00 | .11007E+07 |
| 780.48 | 0.13 | 1.45 | 6691.5 | 0.149E-01 | 1.45 | 73837.05 | 1.45 | 0.00 | .11150E+07 |
| 790.46 | 0.13 | 1.45 | 6819.6 | 0.147E-01 | 1.45 | 75250.55 | 1.45 | 0.00 | .11292E+07 |
| 800.44 | 0.13 | 1.45 | 6948.5 | 0.144E-01 | 1.45 | 76672.96 | 1.45 | 0.00 | .11435E+07 |
| 810.42 | 0.13 | 1.45 | 7078.2 | 0.141E-01 | 1.45 | 78104.20 | 1.45 | 0.00 | .11577E+07 |
| 820.40 | 0.13 | 1.45 | 7208.7 | 0.139E-01 | 1.45 | 79544.26 | 1.45 | 0.00 | .11720E+07 |
| 830.37 | 0.13 | 1.45 | 7340.0 | 0.136E-01 | 1.45 | 80993.05 | 1.45 | 0.00 | .11862E+07 |
| 840.35 | 0.13 | 1.45 | 7472.1 | 0.134E-01 | 1.45 | 82450.54 | 1.45 | 0.00 | .12005E+07 |
| 850.33 | 0.13 | 1.45 | 7604.9 | 0.131E-01 | 1.45 | 83916.66 | 1.45 | 0.00 | .12148E+07 |
| 860.31 | 0.13 | 1.45 | 7738.6 | 0.129E-01 | 1.45 | 85391.38 | 1.45 | 0.00 | .12290E+07 |
| 870.29 | 0.13 | 1.45 | 7873.0 | 0.127E-01 | 1.45 | 86874.62 | 1.45 | 0.00 | .12433E+07 |
| 880.26 | 0.13 | 1.45 | 8008.2 | 0.125E-01 | 1.45 | 88366.35 | 1.45 | 0.00 | .12575E+07 |
| 890.24 | 0.13 | 1.45 | 8144.2 | 0.123E-01 | 1.45 | 89866.55 | 1.45 | 0.00 | .12718E+07 |
| 900.22 | 0.13 | 1.45 | 8280.9 | 0.121E-01 | 1.45 | 91375.12 | 1.45 | 0.00 | .12860E+07 |
| 910.20 | 0.13 | 1.45 | 8418.3 | 0.119E-01 | 1.45 | 92892.05 | 1.45 | 0.00 | .13003E+07 |
| 920.18 | 0.13 | 1.45 | 8556.6 | 0.117E-01 | 1.45 | 94417.29 | 1.45 | 0.00 | .13145E+07 |
| 930.15 | 0.13 | 1.45 | 8695.5 | 0.115E-01 | 1.45 | 95950.75 | 1.45 | 0.00 | .13288E+07 |
| 940.13 | 0.13 | 1.45 | 8835.3 | 0.113E-01 | 1.45 | 97492.47 | 1.45 | 0.00 | .13430E+07 |
| 950.11 | 0.13 | 1.45 | 8975.7 | 0.111E-01 | 1.45 | 99042.31 | 1.45 | 0.00 | .13573E+07 |
| 960.09 | 0.13 | 1.45 | 9116.9 | 0.110E-01 | 1.45 | ******** | 1.45 | 0.00 | .13716E+07 |
| 970.07 | 0.13 | 1.45 | 9258.8 | 0.108E-01 | 1.45 | ******** | 1.45 | 0.00 | .13858E+07 |
| 980.05 | 0.13 | 1.45 | 9401.5 | 0.106E-01 | 1.45 | ******** | 1.45 | 0.00 | .14001E+07 |
| 990.02 | 0.13 | 1.45 | 9544.9 | 0.105E-01 | 1.45 | ******** | 1.45 | 0.00 | .14143E+07 |
| 1000.00 | 0.13 | 1.45 | 9689.0 | 0.103E-01 | 1.45 | ******** | 1.45 | 0.00 | .14286E+07 |

Cumulative travel time = 1428567.2500 sec ( 396.82 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 1000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

CORMIX1: Single Port Discharges End of Prediction File

1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1: Single Port Discharges
CORMIX Version 12.0GTD
HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
Site name/label: Goldboro Northwest Area
Design case: Year 8
FILE NAME: C:\... - Goldboro\Mar 2022 EARD\rev7\Y08-North_Pond.prd
Time stamp: 04/06/2022--21:48:33

ENVIRONMENT PARAMETERS (metric units)
Unbounded section
HA = 1.22 HD = 1.22
UA = 0.001 F = 0.066 USTAR =0.6363E-04
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 998.1636

DISCHARGE PARAMETERS (metric units)
Above Surface Discharge:
Re-computed discharge conditions at entry point at water surface.
BANK = RIGHT DISTB = 0.14
D0 = 0.069 A0 = 0.004 H0 = 1.22 SUB0 = 0.00
THETA = 0.00 SIGMA = 90.00
U0 = 1.435 Q0 = 0.005 =0.5400E-02
RHO0 = 998.1636 DRHO0 =0.0000E+00 GP0 =0.0000E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES (metric units)
Q0 =0.5400E-02 M0 =0.7750E-02 J0 =0.0000E+00 SIGNJ0= 1.0
Associated length scales (meters)
LQ = 0.06 LM = 99999.00 Lm = 125.76 Lb = 0.00
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS
FR0 = 99999.00 R = 2050.32

FLOW CLASSIFICATION
111111111111111111111111111111111111111111111
1 Flow class (CORMIX1) = IPV4 1
1 Applicable layer depth HS = 1.22 1
111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 =0.1000E+03 CUNITS= %
NTOX = 0
NSTD = 0
REGMZ = 1

REGSPC= 1 XREG = 100.00 WREG = 0.00 AREG = 0.00
XINT = 8000.00 XMAX = 8000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.14 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.

COORDINATE SYSTEM SPECIFIED (WGS84 Decimal):
PHI = 178.00 ALPHA = 88.00
LAT = 45.2066994
LON = -61.6408005

NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.03 | 1.435 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -77.00 SIGMAE= 89.95
LE = 0.35 XE = 0.00 YE = 0.08 ZE = 0.88

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.03 | 1.435 | .00000E+00 |
| 0.00 | 0.08 | 0.88 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .19502E-02 |
| 0.00 | 0.08 | 0.88 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .39243E-02 |
| 0.00 | 0.08 | 0.87 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .79445E-02 |
| 0.00 | 0.08 | 0.86 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .12060E-01 |
| 0.00 | 0.08 | 0.86 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .16272E-01 |
| 0.00 | 0.09 | 0.85 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .20579E-01 |
| 0.00 | 0.09 | 0.84 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .24982E-01 |
| 0.00 | 0.09 | 0.83 | 1.0 | 0.100E+03 | 0.04 | 1.435 | .29481E-01 |
| 0.00 | 0.09 | 0.83 | 1.0 | 0.999E+02 | 0.04 | 1.435 | .34076E-01 |
| 0.00 | 0.09 | 0.82 | 1.0 | 0.979E+02 | 0.04 | 1.435 | .38766E-01 |
| 0.00 | 0.09 | 0.81 | 1.0 | 0.960E+02 | 0.04 | 1.435 | .43552E-01 |
| 0.00 | 0.10 | 0.80 | 1.1 | 0.941E+02 | 0.04 | 1.435 | .48434E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.10 | 0.79 | 1.1 | 0.923E+02 | 0.04 | 1.435 | .53412E-01 |
| 0.00 | 0.10 | 0.79 | 1.1 | 0.906E+02 | 0.05 | 1.435 | .58485E-01 |
| 0.00 | 0.10 | 0.78 | 1.1 | 0.889E+02 | 0.05 | 1.435 | .63654E-01 |
| 0.00 | 0.10 | 0.77 | 1.1 | 0.873E+02 | 0.05 | 1.435 | .68919E-01 |
| 0.00 | 0.10 | 0.76 | 1.2 | 0.857E+02 | 0.05 | 1.435 | .74280E-01 |
| 0.00 | 0.11 | 0.76 | 1.2 | 0.842E+02 | 0.05 | 1.427 | .79736E-01 |
| 0.00 | 0.11 | 0.75 | 1.2 | 0.828E+02 | 0.05 | 1.402 | .85288E-01 |
| 0.00 | 0.11 | 0.74 | 1.2 | 0.814E+02 | 0.05 | 1.379 | .90936E-01 |
| 0.00 | 0.11 | 0.73 | 1.2 | 0.800E+02 | 0.05 | 1.356 | .96680E-01 |
| 0.00 | 0.11 | 0.73 | 1.3 | 0.787E+02 | 0.05 | 1.334 | .10252E+00 |
| 0.00 | 0.12 | 0.72 | 1.3 | 0.775E+02 | 0.05 | 1.312 | .10845E+00 |
| 0.00 | 0.12 | 0.71 | 1.3 | 0.762E+02 | 0.05 | 1.291 | .11449E+00 |
| 0.00 | 0.12 | 0.70 | 1.3 | 0.750E+02 | 0.06 | 1.271 | .12061E+00 |
| 0.00 | 0.12 | 0.70 | 1.4 | 0.739E+02 | 0.06 | 1.252 | .12683E+00 |
| 0.00 | 0.12 | 0.69 | 1.4 | 0.728E+02 | 0.06 | 1.233 | .13315E+00 |
| 0.00 | 0.12 | 0.68 | 1.4 | 0.717E+02 | 0.06 | 1.215 | .13957E+00 |
| 0.00 | 0.13 | 0.67 | 1.4 | 0.706E+02 | 0.06 | 1.197 | .14608E+00 |
| 0.00 | 0.13 | 0.67 | 1.4 | 0.696E+02 | 0.06 | 1.180 | .15268E+00 |
| 0.00 | 0.13 | 0.66 | 1.5 | 0.686E+02 | 0.06 | 1.163 | .15938E+00 |
| 0.00 | 0.13 | 0.65 | 1.5 | 0.677E+02 | 0.06 | 1.146 | .16618E+00 |
| 0.00 | 0.13 | 0.64 | 1.5 | 0.667E+02 | 0.06 | 1.131 | .17307E+00 |
| 0.00 | 0.13 | 0.63 | 1.5 | 0.658E+02 | 0.06 | 1.115 | .18006E+00 |
| 0.00 | 0.14 | 0.63 | 1.5 | 0.649E+02 | 0.06 | 1.100 | .18715E+00 |
| 0.00 | 0.14 | 0.62 | 1.6 | 0.641E+02 | 0.06 | 1.085 | .19433E+00 |
| 0.00 | 0.14 | 0.61 | 1.6 | 0.632E+02 | 0.07 | 1.071 | .20160E+00 |
| 0.00 | 0.14 | 0.60 | 1.6 | 0.624E+02 | 0.07 | 1.057 | .20897E+00 |
| 0.00 | 0.14 | 0.60 | 1.6 | 0.616E+02 | 0.07 | 1.044 | .21644E+00 |
| 0.00 | 0.15 | 0.59 | 1.6 | 0.608E+02 | 0.07 | 1.031 | .22400E+00 |
| 0.00 | 0.15 | 0.58 | 1.7 | 0.601E+02 | 0.07 | 1.018 | .23166E+00 |
| 0.00 | 0.15 | 0.57 | 1.7 | 0.593E+02 | 0.07 | 1.005 | .23942E+00 |
| 0.00 | 0.15 | 0.57 | 1.7 | 0.586E+02 | 0.07 | 0.993 | .24727E+00 |
| 0.00 | 0.15 | 0.56 | 1.7 | 0.579E+02 | 0.07 | 0.981 | .25521E+00 |
| 0.00 | 0.15 | 0.55 | 1.7 | 0.572E+02 | 0.07 | 0.969 | .26325E+00 |
| 0.00 | 0.16 | 0.54 | 1.8 | 0.566E+02 | 0.07 | 0.958 | .27139E+00 |
| 0.00 | 0.16 | 0.54 | 1.8 | 0.559E+02 | 0.07 | 0.947 | .27962E+00 |
| 0.00 | 0.16 | 0.53 | 1.8 | 0.553E+02 | 0.08 | 0.936 | .28795E+00 |
| 0.00 | 0.16 | 0.52 | 1.8 | 0.546E+02 | 0.08 | 0.926 | .29638E+00 |
| 0.00 | 0.16 | 0.51 | 1.9 | 0.540E+02 | 0.08 | 0.915 | .30490E+00 |
| 0.00 | 0.16 | 0.51 | 1.9 | 0.534E+02 | 0.08 | 0.905 | .31352E+00 |
| 0.00 | 0.17 | 0.50 | 1.9 | 0.528E+02 | 0.08 | 0.895 | .32223E+00 |
| 0.00 | 0.17 | 0.49 | 1.9 | 0.523E+02 | 0.08 | 0.885 | .33103E+00 |
| 0.00 | 0.17 | 0.48 | 1.9 | 0.517E+02 | 0.08 | 0.876 | .33994E+00 |
| 0.00 | 0.17 | 0.47 | 2.0 | 0.512E+02 | 0.08 | 0.867 | .34894E+00 |
| 0.00 | 0.17 | 0.47 | 2.0 | 0.506E+02 | 0.08 | 0.857 | .35803E+00 |
| 0.00 | 0.18 | 0.46 | 2.0 | 0.501E+02 | 0.08 | 0.849 | .36722E+00 |
| 0.00 | 0.18 | 0.45 | 2.0 | 0.496E+02 | 0.08 | 0.840 | .37651E+00 |
| 0.00 | 0.18 | 0.44 | 2.0 | 0.491E+02 | 0.08 | 0.831 | .38589E+00 |
| 0.00 | 0.18 | 0.44 | 2.1 | 0.486E+02 | 0.09 | 0.823 | .39537E+00 |
| 0.00 | 0.18 | 0.43 | 2.1 | 0.481E+02 | 0.09 | 0.815 | .40494E+00 |
| 0.00 | 0.18 | 0.42 | 2.1 | 0.476E+02 | 0.09 | 0.807 | .41461E+00 |
| 0.00 | 0.19 | 0.41 | 2.1 | 0.472E+02 | 0.09 | 0.799 | .42438E+00 |
| 0.00 | 0.19 | 0.41 | 2.1 | 0.467E+02 | 0.09 | 0.791 | .43424E+00 |
| 0.00 | 0.19 | 0.40 | 2.2 | 0.462E+02 | 0.09 | 0.783 | .44420E+00 |
| 0.00 | 0.19 | 0.39 | 2.2 | 0.458E+02 | 0.09 | 0.776 | .45425E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.19 | 0.38 | 2.2 | 0.454E+02 | 0.09 | 0.769 | .46440E+00 |
| 0.00 | 0.19 | 0.38 | 2.2 | 0.450E+02 | 0.09 | 0.762 | .47464E+00 |
| 0.00 | 0.20 | 0.37 | 2.2 | 0.445E+02 | 0.09 | 0.755 | .48498E+00 |
| 0.00 | 0.20 | 0.36 | 2.3 | 0.441E+02 | 0.09 | 0.748 | .49542E+00 |
| 0.00 | 0.20 | 0.35 | 2.3 | 0.437E+02 | 0.09 | 0.741 | .50595E+00 |
| 0.00 | 0.20 | 0.35 | 2.3 | 0.433E+02 | 0.10 | 0.734 | .51658E+00 |
| 0.00 | 0.20 | 0.34 | 2.3 | 0.430E+02 | 0.10 | 0.728 | .52730E+00 |
| 0.00 | 0.21 | 0.33 | 2.3 | 0.426E+02 | 0.10 | 0.721 | .53812E+00 |
| 0.00 | 0.21 | 0.32 | 2.4 | 0.422E+02 | 0.10 | 0.715 | .54903E+00 |
| 0.00 | 0.21 | 0.31 | 2.4 | 0.418E+02 | 0.10 | 0.709 | .56004E+00 |
| 0.00 | 0.21 | 0.31 | 2.4 | 0.415E+02 | 0.10 | 0.703 | .57115E+00 |
| 0.00 | 0.21 | 0.30 | 2.4 | 0.411E+02 | 0.10 | 0.697 | .58235E+00 |
| 0.00 | 0.21 | 0.29 | 2.5 | 0.408E+02 | 0.10 | 0.691 | .59365E+00 |
| 0.00 | 0.22 | 0.28 | 2.5 | 0.404E+02 | 0.10 | 0.685 | .60504E+00 |
| 0.00 | 0.22 | 0.28 | 2.5 | 0.401E+02 | 0.10 | 0.679 | .61653E+00 |
| 0.00 | 0.22 | 0.27 | 2.5 | 0.398E+02 | 0.10 | 0.674 | .62811E+00 |
| 0.00 | 0.22 | 0.26 | 2.5 | 0.394E+02 | 0.11 | 0.668 | .63979E+00 |
| 0.00 | 0.22 | 0.25 | 2.6 | 0.391E+02 | 0.11 | 0.663 | .65157E+00 |
| 0.00 | 0.22 | 0.25 | 2.6 | 0.388E+02 | 0.11 | 0.657 | .66344E+00 |
| 0.00 | 0.23 | 0.24 | 2.6 | 0.385E+02 | 0.11 | 0.652 | .67541E+00 |
| 0.00 | 0.23 | 0.23 | 2.6 | 0.382E+02 | 0.11 | 0.647 | .68747E+00 |
| 0.00 | 0.23 | 0.22 | 2.6 | 0.379E+02 | 0.11 | 0.642 | .69963E+00 |
| 0.00 | 0.23 | 0.22 | 2.7 | 0.376E+02 | 0.11 | 0.637 | .71189E+00 |
| 0.00 | 0.23 | 0.21 | 2.7 | 0.373E+02 | 0.11 | 0.632 | .72424E+00 |
| 0.00 | 0.24 | 0.20 | 2.7 | 0.370E+02 | 0.11 | 0.627 | .73668E+00 |
| 0.00 | 0.24 | 0.19 | 2.7 | 0.367E+02 | 0.11 | 0.622 | .74923E+00 |
| 0.00 | 0.24 | 0.19 | 2.7 | 0.365E+02 | 0.11 | 0.618 | .76186E+00 |
| 0.00 | 0.24 | 0.18 | 2.8 | 0.362E+02 | 0.11 | 0.613 | .77460E+00 |
| 0.00 | 0.24 | 0.17 | 2.8 | 0.359E+02 | 0.12 | 0.608 | .78743E+00 |
| 0.00 | 0.24 | 0.16 | 2.8 | 0.356E+02 | 0.12 | 0.604 | .80035E+00 |
| 0.00 | 0.25 | 0.15 | 2.8 | 0.353E+02 | 0.12 | 0.597 | .81992E+00 |
| 0.00 | 0.25 | 0.14 | 2.9 | 0.350E+02 | 0.12 | 0.593 | .83308E+00 |
| 0.00 | 0.25 | 0.14 | 2.9 | 0.347E+02 | 0.12 | 0.589 | .84634E+00 |
| 0.00 | 0.25 | 0.13 | 2.9 | 0.345E+02 | 0.12 | 0.584 | .85970E+00 |
| 0.00 | 0.25 | 0.12 | 2.9 | 0.344E+02 | 0.12 | 0.582 | .86642E+00 |

Cumulative travel time = 0.8664 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | 0.25 | 0.12 | 2.9 | 0.344E+02 | 0.12 | .86642E+00 |

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.12 | 71.71 | 1.22 | 2.9 | 0.344E+02 | 0.00 | 0.00 | 1.22 | 1.22 | .86642E+00 |
| 0.01 | 71.71 | 1.22 | 2.9 | 0.344E+02 | 1.22 | 4.07 | 1.22 | 0.00 | .19953E+02 |
| 0.15 | 71.71 | 1.22 | 3.0 | 0.336E+02 | 1.22 | 5.76 | 1.22 | 0.00 | .21136E+03 |
| 0.28 | 71.71 | 1.22 | 3.1 | 0.319E+02 | 1.22 | 7.06 | 1.22 | 0.00 | .40276E+03 |
| 0.42 | 71.71 | 1.22 | 3.3 | 0.299E+02 | 1.22 | 8.15 | 1.22 | 0.00 | .59416E+03 |
| 0.55 | 71.71 | 1.22 | 3.6 | 0.281E+02 | 1.22 | 9.11 | 1.22 | 0.00 | .78557E+03 |
| 0.68 | 71.71 | 1.22 | 3.7 | 0.267E+02 | 1.22 | 9.98 | 1.22 | 0.00 | .97697E+03 |
| 0.82 | 71.71 | 1.22 | 3.9 | 0.258E+02 | 1.22 | 10.78 | 1.22 | 0.00 | .11684E+04 |
| 0.95 | 71.71 | 1.22 | 4.0 | 0.252E+02 | 1.22 | 11.52 | 1.22 | 0.00 | .13598E+04 |
| 1.09 | 71.71 | 1.22 | 4.0 | 0.249E+02 | 1.22 | 12.22 | 1.22 | 0.00 | .15512E+04 |
| 1.22 | 71.71 | 1.22 | 4.1 | 0.246E+02 | 1.22 | 12.88 | 1.22 | 0.00 | .17426E+04 |

Cumulative travel time = 1742.5808 sec ( 0.48 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING
-----------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
-----------------------------------------------------------------------------------------
BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.536E-03 m^2/s
Horizontal diffusivity (initial value) = 0.453E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.22 | 71.71 | 1.22 | 4.1 | 0.246E+02 | 1.22 | 12.88 | 1.22 | 0.00 | .17426E+04 |
| 1.27 | 71.71 | 1.22 | 4.2 | 0.238E+02 | 1.22 | 13.30 | 1.22 | 0.00 | .18176E+04 |
| 1.33 | 71.71 | 1.22 | 4.3 | 0.231E+02 | 1.22 | 13.72 | 1.22 | 0.00 | .18927E+04 |
| 1.38 | 71.71 | 1.22 | 4.5 | 0.224E+02 | 1.22 | 14.15 | 1.22 | 0.00 | .19677E+04 |
| 1.43 | 71.71 | 1.22 | 4.6 | 0.217E+02 | 1.22 | 14.58 | 1.22 | 0.00 | .20428E+04 |
| 1.48 | 71.71 | 1.22 | 4.7 | 0.211E+02 | 1.22 | 15.01 | 1.22 | 0.00 | .21178E+04 |
| 1.54 | 71.71 | 1.22 | 4.9 | 0.205E+02 | 1.22 | 15.45 | 1.22 | 0.00 | .21929E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.59 | 71.71 | 1.22 | 5.0 | 0.199E+02 | 1.22 | 15.89 | 1.22 | 0.00 | .22679E+04 |
| 1.64 | 71.71 | 1.22 | 5.2 | 0.194E+02 | 1.22 | 16.34 | 1.22 | 0.00 | .23430E+04 |
| 1.69 | 71.71 | 1.22 | 5.3 | 0.188E+02 | 1.22 | 16.79 | 1.22 | 0.00 | .24180E+04 |
| 1.75 | 71.71 | 1.22 | 5.5 | 0.183E+02 | 1.22 | 17.25 | 1.22 | 0.00 | .24931E+04 |
| 1.80 | 71.71 | 1.22 | 5.6 | 0.179E+02 | 1.22 | 17.70 | 1.22 | 0.00 | .25681E+04 |
| 1.85 | 71.71 | 1.22 | 5.7 | 0.174E+02 | 1.22 | 18.17 | 1.22 | 0.00 | .26432E+04 |
| 1.90 | 71.71 | 1.22 | 5.9 | 0.170E+02 | 1.22 | 18.63 | 1.22 | 0.00 | .27182E+04 |
| 1.96 | 71.71 | 1.22 | 6.0 | 0.166E+02 | 1.22 | 19.10 | 1.22 | 0.00 | .27933E+04 |
| 2.01 | 71.71 | 1.22 | 6.2 | 0.162E+02 | 1.22 | 19.58 | 1.22 | 0.00 | .28683E+04 |
| 2.06 | 71.71 | 1.22 | 6.3 | 0.158E+02 | 1.22 | 20.06 | 1.22 | 0.00 | .29434E+04 |
| 2.11 | 71.71 | 1.22 | 6.5 | 0.154E+02 | 1.22 | 20.54 | 1.22 | 0.00 | .30184E+04 |
| 2.17 | 71.71 | 1.22 | 6.6 | 0.150E+02 | 1.22 | 21.03 | 1.22 | 0.00 | .30935E+04 |
| 2.22 | 71.71 | 1.22 | 6.8 | 0.147E+02 | 1.22 | 21.52 | 1.22 | 0.00 | .31685E+04 |
| 2.27 | 71.71 | 1.22 | 7.0 | 0.144E+02 | 1.22 | 22.01 | 1.22 | 0.00 | .32436E+04 |
| 2.32 | 71.71 | 1.22 | 7.1 | 0.141E+02 | 1.22 | 22.51 | 1.22 | 0.00 | .33186E+04 |
| 2.38 | 71.71 | 1.22 | 7.3 | 0.138E+02 | 1.22 | 23.01 | 1.22 | 0.00 | .33937E+04 |
| 2.43 | 71.71 | 1.22 | 7.4 | 0.135E+02 | 1.22 | 23.51 | 1.22 | 0.00 | .34688E+04 |
| 2.48 | 71.71 | 1.22 | 7.6 | 0.132E+02 | 1.22 | 24.02 | 1.22 | 0.00 | .35438E+04 |
| 2.53 | 71.71 | 1.22 | 7.8 | 0.129E+02 | 1.22 | 24.53 | 1.22 | 0.00 | .36189E+04 |
| 2.59 | 71.71 | 1.22 | 7.9 | 0.126E+02 | 1.22 | 25.05 | 1.22 | 0.00 | .36939E+04 |
| 2.64 | 71.71 | 1.22 | 8.1 | 0.124E+02 | 1.22 | 25.57 | 1.22 | 0.00 | .37690E+04 |
| 2.69 | 71.71 | 1.22 | 8.2 | 0.121E+02 | 1.22 | 26.09 | 1.22 | 0.00 | .38440E+04 |
| 2.74 | 71.71 | 1.22 | 8.4 | 0.119E+02 | 1.22 | 26.62 | 1.22 | 0.00 | .39191E+04 |
| 2.80 | 71.71 | 1.22 | 8.6 | 0.117E+02 | 1.22 | 27.15 | 1.22 | 0.00 | .39941E+04 |
| 2.85 | 71.71 | 1.22 | 8.7 | 0.114E+02 | 1.22 | 27.68 | 1.22 | 0.00 | .40692E+04 |
| 2.90 | 71.71 | 1.22 | 8.9 | 0.112E+02 | 1.22 | 28.22 | 1.22 | 0.00 | .41442E+04 |
| 2.95 | 71.71 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 28.76 | 1.22 | 0.00 | .42193E+04 |
| 3.01 | 71.71 | 1.22 | 9.3 | 0.108E+02 | 1.22 | 29.30 | 1.22 | 0.00 | .42943E+04 |
| 3.06 | 71.71 | 1.22 | 9.4 | 0.106E+02 | 1.22 | 29.85 | 1.22 | 0.00 | .43694E+04 |
| 3.11 | 71.71 | 1.22 | 9.6 | 0.104E+02 | 1.22 | 30.40 | 1.22 | 0.00 | .44444E+04 |
| 3.16 | 71.71 | 1.22 | 9.8 | 0.102E+02 | 1.22 | 30.95 | 1.22 | 0.00 | .45195E+04 |
| 3.22 | 71.71 | 1.22 | 10.0 | 0.100E+02 | 1.22 | 31.51 | 1.22 | 0.00 | .45945E+04 |
| 3.27 | 71.71 | 1.22 | 10.1 | 0.987E+01 | 1.22 | 32.07 | 1.22 | 0.00 | .46696E+04 |
| 3.32 | 71.71 | 1.22 | 10.3 | 0.970E+01 | 1.22 | 32.63 | 1.22 | 0.00 | .47446E+04 |
| 3.37 | 71.71 | 1.22 | 10.5 | 0.953E+01 | 1.22 | 33.20 | 1.22 | 0.00 | .48197E+04 |
| 3.43 | 71.71 | 1.22 | 10.7 | 0.937E+01 | 1.22 | 33.77 | 1.22 | 0.00 | .48947E+04 |
| 3.48 | 71.71 | 1.22 | 10.9 | 0.921E+01 | 1.22 | 34.34 | 1.22 | 0.00 | .49698E+04 |
| 3.53 | 71.71 | 1.22 | 11.0 | 0.906E+01 | 1.22 | 34.92 | 1.22 | 0.00 | .50448E+04 |
| 3.58 | 71.71 | 1.22 | 11.2 | 0.891E+01 | 1.22 | 35.50 | 1.22 | 0.00 | .51199E+04 |
| 3.64 | 71.71 | 1.22 | 11.4 | 0.877E+01 | 1.22 | 36.08 | 1.22 | 0.00 | .51949E+04 |
| 3.69 | 71.71 | 1.22 | 11.6 | 0.863E+01 | 1.22 | 36.67 | 1.22 | 0.00 | .52700E+04 |
| 3.74 | 71.71 | 1.22 | 11.8 | 0.849E+01 | 1.22 | 37.26 | 1.22 | 0.00 | .53450E+04 |
| 3.79 | 71.71 | 1.22 | 12.0 | 0.836E+01 | 1.22 | 37.85 | 1.22 | 0.00 | .54201E+04 |
| 3.85 | 71.71 | 1.22 | 12.2 | 0.823E+01 | 1.22 | 38.44 | 1.22 | 0.00 | .54951E+04 |
| 3.90 | 71.71 | 1.22 | 12.3 | 0.810E+01 | 1.22 | 39.04 | 1.22 | 0.00 | .55702E+04 |
| 3.95 | 71.71 | 1.22 | 12.5 | 0.798E+01 | 1.22 | 39.64 | 1.22 | 0.00 | .56452E+04 |
| 4.00 | 71.71 | 1.22 | 12.7 | 0.786E+01 | 1.22 | 40.25 | 1.22 | 0.00 | .57203E+04 |
| 4.06 | 71.71 | 1.22 | 12.9 | 0.774E+01 | 1.22 | 40.85 | 1.22 | 0.00 | .57953E+04 |
| 4.11 | 71.71 | 1.22 | 13.1 | 0.763E+01 | 1.22 | 41.46 | 1.22 | 0.00 | .58704E+04 |
| 4.16 | 71.71 | 1.22 | 13.3 | 0.752E+01 | 1.22 | 42.08 | 1.22 | 0.00 | .59454E+04 |
| 4.21 | 71.71 | 1.22 | 13.5 | 0.741E+01 | 1.22 | 42.70 | 1.22 | 0.00 | .60205E+04 |
| 4.27 | 71.71 | 1.22 | 13.7 | 0.730E+01 | 1.22 | 43.31 | 1.22 | 0.00 | .60955E+04 |
| 4.32 | 71.71 | 1.22 | 13.9 | 0.720E+01 | 1.22 | 43.94 | 1.22 | 0.00 | .61706E+04 |
| 4.37 | 71.71 | 1.22 | 14.1 | 0.710E+01 | 1.22 | 44.56 | 1.22 | 0.00 | .62456E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4.42 | 71.71 | 1.22 | 14.3 | 0.700E+01 | 1.22 | 45.19 | 1.22 | 0.00 | .63207E+04 |
| 4.48 | 71.71 | 1.22 | 14.5 | 0.690E+01 | 1.22 | 45.82 | 1.22 | 0.00 | .63957E+04 |
| 4.53 | 71.71 | 1.22 | 14.7 | 0.681E+01 | 1.22 | 46.46 | 1.22 | 0.00 | .64708E+04 |
| 4.58 | 71.71 | 1.22 | 14.9 | 0.672E+01 | 1.22 | 47.09 | 1.22 | 0.00 | .65458E+04 |
| 4.63 | 71.71 | 1.22 | 15.1 | 0.663E+01 | 1.22 | 47.73 | 1.22 | 0.00 | .66209E+04 |
| 4.69 | 71.71 | 1.22 | 15.3 | 0.654E+01 | 1.22 | 48.38 | 1.22 | 0.00 | .66959E+04 |
| 4.74 | 71.71 | 1.22 | 15.5 | 0.645E+01 | 1.22 | 49.02 | 1.22 | 0.00 | .67710E+04 |
| 4.79 | 71.71 | 1.22 | 15.7 | 0.637E+01 | 1.22 | 49.67 | 1.22 | 0.00 | .68460E+04 |
| 4.85 | 71.71 | 1.22 | 15.9 | 0.629E+01 | 1.22 | 50.32 | 1.22 | 0.00 | .69211E+04 |
| 4.90 | 71.71 | 1.22 | 16.1 | 0.621E+01 | 1.22 | 50.98 | 1.22 | 0.00 | .69961E+04 |
| 4.95 | 71.71 | 1.22 | 16.3 | 0.613E+01 | 1.22 | 51.63 | 1.22 | 0.00 | .70712E+04 |
| 5.00 | 71.71 | 1.22 | 16.5 | 0.605E+01 | 1.22 | 52.29 | 1.22 | 0.00 | .71462E+04 |
| 5.06 | 71.71 | 1.22 | 16.7 | 0.597E+01 | 1.22 | 52.96 | 1.22 | 0.00 | .72213E+04 |
| 5.11 | 71.71 | 1.22 | 16.9 | 0.590E+01 | 1.22 | 53.62 | 1.22 | 0.00 | .72963E+04 |
| 5.16 | 71.71 | 1.22 | 17.2 | 0.583E+01 | 1.22 | 54.29 | 1.22 | 0.00 | .73714E+04 |
| 5.21 | 71.71 | 1.22 | 17.4 | 0.576E+01 | 1.22 | 54.96 | 1.22 | 0.00 | .74464E+04 |
| 5.27 | 71.71 | 1.22 | 17.6 | 0.569E+01 | 1.22 | 55.63 | 1.22 | 0.00 | .75215E+04 |
| 5.32 | 71.71 | 1.22 | 17.8 | 0.562E+01 | 1.22 | 56.31 | 1.22 | 0.00 | .75965E+04 |
| 5.37 | 71.71 | 1.22 | 18.0 | 0.555E+01 | 1.22 | 56.99 | 1.22 | 0.00 | .76716E+04 |
| 5.42 | 71.71 | 1.22 | 18.2 | 0.549E+01 | 1.22 | 57.67 | 1.22 | 0.00 | .77466E+04 |
| 5.48 | 71.71 | 1.22 | 18.4 | 0.542E+01 | 1.22 | 58.36 | 1.22 | 0.00 | .78217E+04 |
| 5.53 | 71.71 | 1.22 | 18.7 | 0.536E+01 | 1.22 | 59.04 | 1.22 | 0.00 | .78967E+04 |
| 5.58 | 71.71 | 1.22 | 18.9 | 0.530E+01 | 1.22 | 59.73 | 1.22 | 0.00 | .79718E+04 |
| 5.63 | 71.71 | 1.22 | 19.1 | 0.524E+01 | 1.22 | 60.43 | 1.22 | 0.00 | .80468E+04 |
| 5.69 | 71.71 | 1.22 | 19.3 | 0.518E+01 | 1.22 | 61.12 | 1.22 | 0.00 | .81219E+04 |
| 5.74 | 71.71 | 1.22 | 19.5 | 0.512E+01 | 1.22 | 61.82 | 1.22 | 0.00 | .81969E+04 |
| 5.79 | 71.71 | 1.22 | 19.8 | 0.506E+01 | 1.22 | 62.52 | 1.22 | 0.00 | .82720E+04 |
| 5.84 | 71.71 | 1.22 | 20.0 | 0.500E+01 | 1.22 | 63.22 | 1.22 | 0.00 | .83471E+04 |
| 5.90 | 71.71 | 1.22 | 20.2 | 0.495E+01 | 1.22 | 63.93 | 1.22 | 0.00 | .84221E+04 |
| 5.95 | 71.71 | 1.22 | 20.4 | 0.489E+01 | 1.22 | 64.64 | 1.22 | 0.00 | .84972E+04 |
| 6.00 | 71.71 | 1.22 | 20.7 | 0.484E+01 | 1.22 | 65.35 | 1.22 | 0.00 | .85722E+04 |
| 6.05 | 71.71 | 1.22 | 20.9 | 0.479E+01 | 1.22 | 66.06 | 1.22 | 0.00 | .86473E+04 |
| 6.11 | 71.71 | 1.22 | 21.1 | 0.474E+01 | 1.22 | 66.78 | 1.22 | 0.00 | .87223E+04 |
| 6.16 | 71.71 | 1.22 | 21.3 | 0.469E+01 | 1.22 | 67.50 | 1.22 | 0.00 | .87974E+04 |
| 6.21 | 71.71 | 1.22 | 21.6 | 0.464E+01 | 1.22 | 68.22 | 1.22 | 0.00 | .88724E+04 |
| 6.26 | 71.71 | 1.22 | 21.8 | 0.459E+01 | 1.22 | 68.94 | 1.22 | 0.00 | .89475E+04 |
| 6.32 | 71.71 | 1.22 | 22.0 | 0.454E+01 | 1.22 | 69.67 | 1.22 | 0.00 | .90225E+04 |
| 6.37 | 71.71 | 1.22 | 22.3 | 0.449E+01 | 1.22 | 70.40 | 1.22 | 0.00 | .90976E+04 |
| 6.42 | 71.71 | 1.22 | 22.5 | 0.445E+01 | 1.22 | 71.13 | 1.22 | 0.00 | .91726E+04 |
| 6.47 | 71.71 | 1.22 | 22.7 | 0.440E+01 | 1.22 | 71.86 | 1.22 | 0.00 | .92477E+04 |

Cumulative travel time = 9247.6699 sec ( 2.57 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 6.47 | -0.14 | 1.22 | 22.7 | 0.440E+01 | 1.22 | 143.72 | 1.22 | 0.00 | .92477E+04 |
| 86.41 | -0.14 | 1.22 | 470.1 | 0.213E+00 | 1.22 | 2974.17 | 1.22 | 0.00 | .12344E+06 |

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds
the regulatory value = 100.00 m.
This is the extent of the REGULATORY MIXING ZONE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 166.34 | -0.14 | 1.22 | 1199.4 | 0.834E-01 | 1.22 | 7589.20 | 1.22 | 0.00 | .23763E+06 |
| 246.28 | -0.14 | 1.22 | 2125.7 | 0.470E-01 | 1.22 | 13449.91 | 1.22 | 0.00 | .35183E+06 |
| 326.21 | -0.14 | 1.22 | 3213.3 | 0.311E-01 | 1.22 | 20331.91 | 1.22 | 0.00 | .46602E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 406.15 | -0.14 | 1.22 | 4441.3 | 0.225E-01 | 1.22 | 28101.30 | 1.22 | 0.00 | .58021E+06 |
| 486.09 | -0.14 | 1.22 | 5794.9 | 0.173E-01 | 1.22 | 36666.32 | 1.22 | 0.00 | .69441E+06 |
| 566.02 | -0.14 | 1.22 | 7263.6 | 0.138E-01 | 1.22 | 45958.92 | 1.22 | 0.00 | .80860E+06 |
| 645.96 | -0.14 | 1.22 | 8838.8 | 0.113E-01 | 1.22 | 55926.03 | 1.22 | 0.00 | .92279E+06 |
| 725.89 | -0.14 | 1.22 | 10513.9 | 0.951E-02 | 1.22 | 66524.75 | 1.22 | 0.00 | .10370E+07 |
| 805.83 | -0.14 | 1.22 | 12283.1 | 0.814E-02 | 1.22 | 77719.48 | 1.22 | 0.00 | .11512E+07 |
| 885.76 | -0.14 | 1.22 | 14141.8 | 0.707E-02 | 1.22 | 89480.03 | 1.22 | 0.00 | .12654E+07 |
| 965.70 | -0.14 | 1.22 | 16085.8 | 0.622E-02 | 1.22 | ******** | 1.22 | 0.00 | .13796E+07 |
| 1045.63 | -0.14 | 1.22 | 18111.5 | 0.552E-02 | 1.22 | ******** | 1.22 | 0.00 | .14938E+07 |
| 1125.57 | -0.14 | 1.22 | 20215.8 | 0.495E-02 | 1.22 | ******** | 1.22 | 0.00 | .16080E+07 |
| 1205.50 | -0.14 | 1.22 | 22395.8 | 0.447E-02 | 1.22 | ******** | 1.22 | 0.00 | .17221E+07 |
| 1285.44 | -0.14 | 1.22 | 24648.9 | 0.406E-02 | 1.22 | ******** | 1.22 | 0.00 | .18363E+07 |
| 1365.37 | -0.14 | 1.22 | 26973.0 | 0.371E-02 | 1.22 | ******** | 1.22 | 0.00 | .19505E+07 |
| 1445.31 | -0.14 | 1.22 | 29365.8 | 0.341E-02 | 1.22 | ******** | 1.22 | 0.00 | .20647E+07 |
| 1525.24 | -0.14 | 1.22 | 31825.4 | 0.314E-02 | 1.22 | ******** | 1.22 | 0.00 | .21789E+07 |
| 1605.18 | -0.14 | 1.22 | 34350.1 | 0.291E-02 | 1.22 | ******** | 1.22 | 0.00 | .22931E+07 |
| 1685.11 | -0.14 | 1.22 | 36938.3 | 0.271E-02 | 1.22 | ******** | 1.22 | 0.00 | .24073E+07 |
| 1765.05 | -0.14 | 1.22 | 39588.4 | 0.253E-02 | 1.22 | ******** | 1.22 | 0.00 | .25215E+07 |
| 1844.98 | -0.14 | 1.22 | 42299.0 | 0.236E-02 | 1.22 | ******** | 1.22 | 0.00 | .26357E+07 |
| 1924.92 | -0.14 | 1.22 | 45068.8 | 0.222E-02 | 1.22 | ******** | 1.22 | 0.00 | .27499E+07 |
| 2004.86 | -0.14 | 1.22 | 47896.5 | 0.209E-02 | 1.22 | ******** | 1.22 | 0.00 | .28641E+07 |
| 2084.79 | -0.14 | 1.22 | 50781.0 | 0.197E-02 | 1.22 | ******** | 1.22 | 0.00 | .29783E+07 |
| 2164.73 | -0.14 | 1.22 | 53721.2 | 0.186E-02 | 1.22 | ******** | 1.22 | 0.00 | .30925E+07 |
| 2244.66 | -0.14 | 1.22 | 56716.1 | 0.176E-02 | 1.22 | ******** | 1.22 | 0.00 | .32067E+07 |
| 2324.60 | -0.14 | 1.22 | 59764.6 | 0.167E-02 | 1.22 | ******** | 1.22 | 0.00 | .33209E+07 |
| 2404.53 | -0.14 | 1.22 | 62865.9 | 0.159E-02 | 1.22 | ******** | 1.22 | 0.00 | .34350E+07 |
| 2484.47 | -0.14 | 1.22 | 66019.0 | 0.151E-02 | 1.22 | ******** | 1.22 | 0.00 | .35492E+07 |
| 2564.40 | -0.14 | 1.22 | 69223.2 | 0.144E-02 | 1.22 | ******** | 1.22 | 0.00 | .36634E+07 |
| 2644.34 | -0.14 | 1.22 | 72477.5 | 0.138E-02 | 1.22 | ******** | 1.22 | 0.00 | .37776E+07 |
| 2724.27 | -0.14 | 1.22 | 75781.4 | 0.132E-02 | 1.22 | ******** | 1.22 | 0.00 | .38918E+07 |
| 2804.21 | -0.14 | 1.22 | 79134.0 | 0.126E-02 | 1.22 | ******** | 1.22 | 0.00 | .40060E+07 |
| 2884.14 | -0.14 | 1.22 | 82534.6 | 0.121E-02 | 1.22 | ******** | 1.22 | 0.00 | .41202E+07 |
| 2964.08 | -0.14 | 1.22 | 85982.5 | 0.116E-02 | 1.22 | ******** | 1.22 | 0.00 | .42344E+07 |
| 3044.01 | -0.14 | 1.22 | 89477.2 | 0.112E-02 | 1.22 | ******** | 1.22 | 0.00 | .43486E+07 |
| 3123.95 | -0.14 | 1.22 | 93018.0 | 0.108E-02 | 1.22 | ******** | 1.22 | 0.00 | .44628E+07 |
| 3203.89 | -0.14 | 1.22 | 96604.3 | 0.104E-02 | 1.22 | ******** | 1.22 | 0.00 | .45770E+07 |
| 3283.82 | -0.14 | 1.22 | ******* | 0.998E-03 | 1.22 | ******** | 1.22 | 0.00 | .46912E+07 |
| 3363.76 | -0.14 | 1.22 | ******* | 0.962E-03 | 1.22 | ******** | 1.22 | 0.00 | .48054E+07 |
| 3443.69 | -0.14 | 1.22 | ******* | 0.929E-03 | 1.22 | ******** | 1.22 | 0.00 | .49196E+07 |
| 3523.63 | -0.14 | 1.22 | ******* | 0.898E-03 | 1.22 | ******** | 1.22 | 0.00 | .50338E+07 |
| 3603.56 | -0.14 | 1.22 | ******* | 0.868E-03 | 1.22 | ******** | 1.22 | 0.00 | .51479E+07 |
| 3683.50 | -0.14 | 1.22 | ******* | 0.840E-03 | 1.22 | ******** | 1.22 | 0.00 | .52621E+07 |
| 3763.43 | -0.14 | 1.22 | ******* | 0.813E-03 | 1.22 | ******** | 1.22 | 0.00 | .53763E+07 |
| 3843.37 | -0.14 | 1.22 | ******* | 0.788E-03 | 1.22 | ******** | 1.22 | 0.00 | .54905E+07 |
| 3923.30 | -0.14 | 1.22 | ******* | 0.764E-03 | 1.22 | ******** | 1.22 | 0.00 | .56047E+07 |
| 4003.24 | -0.14 | 1.22 | ******* | 0.742E-03 | 1.22 | ******** | 1.22 | 0.00 | .57189E+07 |
| 4083.17 | -0.14 | 1.22 | ******* | 0.720E-03 | 1.22 | ******** | 1.22 | 0.00 | .58331E+07 |
| 4163.11 | -0.14 | 1.22 | ******* | 0.699E-03 | 1.22 | ******** | 1.22 | 0.00 | .59473E+07 |
| 4243.04 | -0.14 | 1.22 | ******* | 0.680E-03 | 1.22 | ******** | 1.22 | 0.00 | .60615E+07 |
| 4322.98 | -0.14 | 1.22 | ******* | 0.661E-03 | 1.22 | ******** | 1.22 | 0.00 | .61757E+07 |
| 4402.91 | -0.14 | 1.22 | ******* | 0.643E-03 | 1.22 | ******** | 1.22 | 0.00 | .62899E+07 |
| 4482.85 | -0.14 | 1.22 | ******* | 0.626E-03 | 1.22 | ******** | 1.22 | 0.00 | .64041E+07 |
| 4562.78 | -0.14 | 1.22 | ******* | 0.610E-03 | 1.22 | ******** | 1.22 | 0.00 | .65183E+07 |
| 4642.72 | -0.14 | 1.22 | ******* | 0.594E-03 | 1.22 | ******** | 1.22 | 0.00 | .66325E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4722.65 | -0.14 | 1.22 | ******* | 0.579E-03 | 1.22 | ******** | 1.22 | 0.00 | .67466E+07 |
| 4802.59 | -0.14 | 1.22 | ******* | 0.565E-03 | 1.22 | ******** | 1.22 | 0.00 | .68608E+07 |
| 4882.52 | -0.14 | 1.22 | ******* | 0.551E-03 | 1.22 | ******** | 1.22 | 0.00 | .69750E+07 |
| 4962.46 | -0.14 | 1.22 | ******* | 0.538E-03 | 1.22 | ******** | 1.22 | 0.00 | .70892E+07 |
| 5042.39 | -0.14 | 1.22 | ******* | 0.525E-03 | 1.22 | ******** | 1.22 | 0.00 | .72034E+07 |
| 5122.33 | -0.14 | 1.22 | ******* | 0.513E-03 | 1.22 | ******** | 1.22 | 0.00 | .73176E+07 |
| 5202.26 | -0.14 | 1.22 | ******* | 0.501E-03 | 1.22 | ******** | 1.22 | 0.00 | .74318E+07 |
| 5282.20 | -0.14 | 1.22 | ******* | 0.490E-03 | 1.22 | ******** | 1.22 | 0.00 | .75460E+07 |
| 5362.13 | -0.14 | 1.22 | ******* | 0.479E-03 | 1.22 | ******** | 1.22 | 0.00 | .76602E+07 |
| 5442.07 | -0.14 | 1.22 | ******* | 0.468E-03 | 1.22 | ******** | 1.22 | 0.00 | .77744E+07 |
| 5522.00 | -0.14 | 1.22 | ******* | 0.458E-03 | 1.22 | ******** | 1.22 | 0.00 | .78886E+07 |
| 5601.94 | -0.14 | 1.22 | ******* | 0.448E-03 | 1.22 | ******** | 1.22 | 0.00 | .80028E+07 |
| 5681.87 | -0.14 | 1.22 | ******* | 0.439E-03 | 1.22 | ******** | 1.22 | 0.00 | .81170E+07 |
| 5761.81 | -0.14 | 1.22 | ******* | 0.430E-03 | 1.22 | ******** | 1.22 | 0.00 | .82312E+07 |
| 5841.74 | -0.14 | 1.22 | ******* | 0.421E-03 | 1.22 | ******** | 1.22 | 0.00 | .83453E+07 |
| 5921.68 | -0.14 | 1.22 | ******* | 0.412E-03 | 1.22 | ******** | 1.22 | 0.00 | .84595E+07 |
| 6001.61 | -0.14 | 1.22 | ******* | 0.404E-03 | 1.22 | ******** | 1.22 | 0.00 | .85737E+07 |
| 6081.55 | -0.14 | 1.22 | ******* | 0.396E-03 | 1.22 | ******** | 1.22 | 0.00 | .86879E+07 |
| 6161.48 | -0.14 | 1.22 | ******* | 0.389E-03 | 1.22 | ******** | 1.22 | 0.00 | .88021E+07 |
| 6241.42 | -0.14 | 1.22 | ******* | 0.381E-03 | 1.22 | ******** | 1.22 | 0.00 | .89163E+07 |
| 6321.35 | -0.14 | 1.22 | ******* | 0.374E-03 | 1.22 | ******** | 1.22 | 0.00 | .90305E+07 |
| 6401.29 | -0.14 | 1.22 | ******* | 0.367E-03 | 1.22 | ******** | 1.22 | 0.00 | .91447E+07 |
| 6481.23 | -0.14 | 1.22 | ******* | 0.360E-03 | 1.22 | ******** | 1.22 | 0.00 | .92589E+07 |
| 6561.16 | -0.14 | 1.22 | ******* | 0.354E-03 | 1.22 | ******** | 1.22 | 0.00 | .93731E+07 |
| 6641.10 | -0.14 | 1.22 | ******* | 0.347E-03 | 1.22 | ******** | 1.22 | 0.00 | .94873E+07 |
| 6721.03 | -0.14 | 1.22 | ******* | 0.341E-03 | 1.22 | ******** | 1.22 | 0.00 | .96015E+07 |
| 6800.97 | -0.14 | 1.22 | ******* | 0.335E-03 | 1.22 | ******** | 1.22 | 0.00 | .97157E+07 |
| 6880.90 | -0.14 | 1.22 | ******* | 0.329E-03 | 1.22 | ******** | 1.22 | 0.00 | .98299E+07 |
| 6960.84 | -0.14 | 1.22 | ******* | 0.324E-03 | 1.22 | ******** | 1.22 | 0.00 | .99441E+07 |
| 7040.77 | -0.14 | 1.22 | ******* | 0.318E-03 | 1.22 | ******** | 1.22 | 0.00 | .10058E+08 |
| 7120.71 | -0.14 | 1.22 | ******* | 0.313E-03 | 1.22 | ******** | 1.22 | 0.00 | .10172E+08 |
| 7200.64 | -0.14 | 1.22 | ******* | 0.308E-03 | 1.22 | ******** | 1.22 | 0.00 | .10287E+08 |
| 7280.58 | -0.14 | 1.22 | ******* | 0.303E-03 | 1.22 | ******** | 1.22 | 0.00 | .10401E+08 |
| 7360.51 | -0.14 | 1.22 | ******* | 0.298E-03 | 1.22 | ******** | 1.22 | 0.00 | .10515E+08 |
| 7440.45 | -0.14 | 1.22 | ******* | 0.293E-03 | 1.22 | ******** | 1.22 | 0.00 | .10629E+08 |
| 7520.38 | -0.14 | 1.22 | ******* | 0.288E-03 | 1.22 | ******** | 1.22 | 0.00 | .10743E+08 |
| 7600.32 | -0.14 | 1.22 | ******* | 0.284E-03 | 1.22 | ******** | 1.22 | 0.00 | .10858E+08 |
| 7680.25 | -0.14 | 1.22 | ******* | 0.279E-03 | 1.22 | ******** | 1.22 | 0.00 | .10972E+08 |
| 7760.19 | -0.14 | 1.22 | ******* | 0.275E-03 | 1.22 | ******** | 1.22 | 0.00 | .11086E+08 |
| 7840.12 | -0.14 | 1.22 | ******* | 0.271E-03 | 1.22 | ******** | 1.22 | 0.00 | .11200E+08 |
| 7920.06 | -0.14 | 1.22 | ******* | 0.267E-03 | 1.22 | ******** | 1.22 | 0.00 | .11314E+08 |
| 7999.99 | -0.14 | 1.22 | ******* | 0.263E-03 | 1.22 | ******** | 1.22 | 0.00 | .11429E+08 |

Cumulative travel time = 11428572.0000 sec ( 3174.60 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 8000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges End of Prediction File
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                      CORMIX MIXING ZONE EXPERT SYSTEM
                  Subsystem CORMIX1: Single Port Discharges
                        CORMIX Version 12.0GTD
                    HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro Northwest Area
 Design case:       Year 8
 FILE NAME:         C:\... Goldboro\Mar 2022 EARD\rev7\Y08-Central_Pond.prd
 Time stamp:        04/06/2022--21:46:36

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.83  HD    =      1.83
 UA    =      0.001 F     =      0.103 USTAR =0.1020E-03
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  RIGHT     DISTB =      0.27
 D0    =      0.189 A0    =      0.028 H0    =      1.83  SUB0  =      0.00
 THETA =      0.00  SIGMA =     89.00
 U0    =      2.863 Q0    =      0.080       =0.7990E-01
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.7990E-01  M0    =0.2287E+00  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.17  LM    =  99999.00  Lm    =    531.38  Lb    =      0.00
                        Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   3180.62

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4        1
 1  Applicable layer depth HS =    1.83        1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  1
```

REGSPC= 1 XREG = 100.00 WREG = 0.00 AREG = 0.00
XINT = 4000.00 XMAX = 4000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.27 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.

COORDINATE SYSTEM SPECIFIED (WGS84 Decimal):
PHI = 178.00 ALPHA = 88.00
LAT = 45.2066994
LON = -61.6408005

NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.83 | 1.0 | 0.100E+03 | 0.09 | 2.863 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -78.00 SIGMAE= 88.96
LE = 0.94 XE = 0.00 YE = 0.20 ZE = 0.91

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.83 | 1.0 | 0.100E+03 | 0.09 | 2.863 | .00000E+00 |
| 0.00 | 0.20 | 0.91 | 1.0 | 0.100E+03 | 0.09 | 2.863 | .92737E-03 |
| 0.00 | 0.20 | 0.90 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .27942E-02 |
| 0.00 | 0.20 | 0.89 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .46771E-02 |
| 0.00 | 0.20 | 0.89 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .65762E-02 |
| 0.00 | 0.20 | 0.88 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .84914E-02 |
| 0.00 | 0.20 | 0.87 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .10423E-01 |
| 0.00 | 0.21 | 0.86 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .12370E-01 |
| 0.00 | 0.21 | 0.86 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .14334E-01 |
| 0.00 | 0.21 | 0.85 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .16313E-01 |
| 0.00 | 0.21 | 0.84 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .18309E-01 |
| 0.00 | 0.21 | 0.83 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .20321E-01 |
| 0.00 | 0.21 | 0.83 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .22349E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.21 | 0.82 | 1.0 | 0.100E+03 | 0.10 | 2.863 | .24393E-01 |
| 0.00 | 0.22 | 0.81 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .26453E-01 |
| 0.00 | 0.22 | 0.81 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .28529E-01 |
| 0.00 | 0.22 | 0.80 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .30622E-01 |
| 0.00 | 0.22 | 0.79 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .32730E-01 |
| 0.00 | 0.22 | 0.78 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .34855E-01 |
| 0.00 | 0.22 | 0.78 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .36995E-01 |
| 0.00 | 0.23 | 0.77 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .39152E-01 |
| 0.00 | 0.23 | 0.76 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .41325E-01 |
| 0.00 | 0.23 | 0.75 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .43514E-01 |
| 0.00 | 0.23 | 0.75 | 1.0 | 0.100E+03 | 0.11 | 2.863 | .45719E-01 |
| 0.00 | 0.23 | 0.74 | 1.0 | 0.994E+02 | 0.11 | 2.863 | .47941E-01 |
| 0.00 | 0.23 | 0.73 | 1.0 | 0.987E+02 | 0.11 | 2.863 | .50178E-01 |
| 0.00 | 0.23 | 0.72 | 1.0 | 0.980E+02 | 0.12 | 2.863 | .52431E-01 |
| 0.00 | 0.24 | 0.72 | 1.0 | 0.973E+02 | 0.12 | 2.863 | .54701E-01 |
| 0.00 | 0.24 | 0.71 | 1.0 | 0.966E+02 | 0.12 | 2.863 | .56987E-01 |
| 0.00 | 0.24 | 0.70 | 1.0 | 0.960E+02 | 0.12 | 2.863 | .59289E-01 |
| 0.00 | 0.24 | 0.70 | 1.0 | 0.953E+02 | 0.12 | 2.863 | .61607E-01 |
| 0.00 | 0.24 | 0.69 | 1.1 | 0.946E+02 | 0.12 | 2.863 | .63941E-01 |
| 0.00 | 0.24 | 0.68 | 1.1 | 0.940E+02 | 0.12 | 2.863 | .66291E-01 |
| 0.00 | 0.25 | 0.67 | 1.1 | 0.933E+02 | 0.12 | 2.863 | .68657E-01 |
| 0.00 | 0.25 | 0.67 | 1.1 | 0.927E+02 | 0.12 | 2.863 | .71039E-01 |
| 0.00 | 0.25 | 0.66 | 1.1 | 0.921E+02 | 0.12 | 2.863 | .73438E-01 |
| 0.00 | 0.25 | 0.65 | 1.1 | 0.915E+02 | 0.12 | 2.863 | .75853E-01 |
| 0.00 | 0.25 | 0.64 | 1.1 | 0.909E+02 | 0.12 | 2.863 | .78283E-01 |
| 0.00 | 0.25 | 0.64 | 1.1 | 0.903E+02 | 0.13 | 2.863 | .80730E-01 |
| 0.00 | 0.25 | 0.63 | 1.1 | 0.897E+02 | 0.13 | 2.863 | .83193E-01 |
| 0.00 | 0.26 | 0.62 | 1.1 | 0.891E+02 | 0.13 | 2.863 | .85672E-01 |
| 0.00 | 0.26 | 0.62 | 1.1 | 0.885E+02 | 0.13 | 2.863 | .88167E-01 |
| 0.00 | 0.26 | 0.61 | 1.1 | 0.880E+02 | 0.13 | 2.863 | .90679E-01 |
| 0.00 | 0.26 | 0.60 | 1.1 | 0.874E+02 | 0.13 | 2.863 | .93206E-01 |
| 0.00 | 0.26 | 0.59 | 1.2 | 0.869E+02 | 0.13 | 2.863 | .95750E-01 |
| 0.00 | 0.26 | 0.59 | 1.2 | 0.863E+02 | 0.13 | 2.863 | .98309E-01 |
| 0.00 | 0.27 | 0.58 | 1.2 | 0.858E+02 | 0.13 | 2.863 | .10088E+00 |
| 0.00 | 0.27 | 0.57 | 1.2 | 0.852E+02 | 0.13 | 2.863 | .10348E+00 |
| 0.00 | 0.27 | 0.56 | 1.2 | 0.847E+02 | 0.13 | 2.862 | .10608E+00 |
| 0.00 | 0.27 | 0.56 | 1.2 | 0.842E+02 | 0.13 | 2.845 | .10871E+00 |
| 0.00 | 0.27 | 0.55 | 1.2 | 0.837E+02 | 0.13 | 2.827 | .11135E+00 |
| 0.00 | 0.27 | 0.54 | 1.2 | 0.832E+02 | 0.14 | 2.810 | .11401E+00 |
| 0.00 | 0.28 | 0.53 | 1.2 | 0.827E+02 | 0.14 | 2.793 | .11668E+00 |
| 0.00 | 0.28 | 0.53 | 1.2 | 0.822E+02 | 0.14 | 2.777 | .11937E+00 |
| 0.01 | 0.28 | 0.52 | 1.2 | 0.817E+02 | 0.14 | 2.760 | .12207E+00 |
| 0.01 | 0.28 | 0.51 | 1.2 | 0.812E+02 | 0.14 | 2.744 | .12479E+00 |
| 0.01 | 0.28 | 0.51 | 1.2 | 0.807E+02 | 0.14 | 2.728 | .12753E+00 |
| 0.01 | 0.28 | 0.50 | 1.2 | 0.803E+02 | 0.14 | 2.712 | .13028E+00 |
| 0.01 | 0.28 | 0.49 | 1.3 | 0.798E+02 | 0.14 | 2.696 | .13305E+00 |
| 0.01 | 0.29 | 0.48 | 1.3 | 0.793E+02 | 0.14 | 2.680 | .13584E+00 |
| 0.01 | 0.29 | 0.48 | 1.3 | 0.789E+02 | 0.14 | 2.665 | .13864E+00 |
| 0.01 | 0.29 | 0.47 | 1.3 | 0.784E+02 | 0.14 | 2.650 | .14145E+00 |
| 0.01 | 0.29 | 0.46 | 1.3 | 0.780E+02 | 0.14 | 2.635 | .14429E+00 |
| 0.01 | 0.29 | 0.45 | 1.3 | 0.775E+02 | 0.15 | 2.620 | .14714E+00 |
| 0.01 | 0.29 | 0.45 | 1.3 | 0.771E+02 | 0.15 | 2.605 | .15000E+00 |
| 0.01 | 0.30 | 0.44 | 1.3 | 0.767E+02 | 0.15 | 2.591 | .15288E+00 |
| 0.01 | 0.30 | 0.43 | 1.3 | 0.762E+02 | 0.15 | 2.576 | .15578E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.01 | 0.30 | 0.43 | 1.3 | 0.758E+02 | 0.15 | 2.562 | .15870E+00 |
| 0.01 | 0.30 | 0.42 | 1.3 | 0.754E+02 | 0.15 | 2.548 | .16163E+00 |
| 0.01 | 0.30 | 0.41 | 1.3 | 0.750E+02 | 0.15 | 2.534 | .16457E+00 |
| 0.01 | 0.30 | 0.40 | 1.3 | 0.746E+02 | 0.15 | 2.520 | .16754E+00 |
| 0.01 | 0.30 | 0.40 | 1.3 | 0.742E+02 | 0.15 | 2.507 | .17051E+00 |
| 0.01 | 0.31 | 0.39 | 1.4 | 0.738E+02 | 0.15 | 2.493 | .17351E+00 |
| 0.01 | 0.31 | 0.38 | 1.4 | 0.734E+02 | 0.15 | 2.480 | .17652E+00 |
| 0.01 | 0.31 | 0.37 | 1.4 | 0.730E+02 | 0.15 | 2.467 | .17955E+00 |
| 0.01 | 0.31 | 0.37 | 1.4 | 0.726E+02 | 0.16 | 2.454 | .18259E+00 |
| 0.01 | 0.31 | 0.36 | 1.4 | 0.722E+02 | 0.16 | 2.441 | .18565E+00 |
| 0.01 | 0.31 | 0.35 | 1.4 | 0.719E+02 | 0.16 | 2.428 | .18872E+00 |
| 0.01 | 0.32 | 0.34 | 1.4 | 0.715E+02 | 0.16 | 2.415 | .19181E+00 |
| 0.01 | 0.32 | 0.34 | 1.4 | 0.711E+02 | 0.16 | 2.403 | .19492E+00 |
| 0.01 | 0.32 | 0.33 | 1.4 | 0.707E+02 | 0.16 | 2.390 | .19805E+00 |
| 0.01 | 0.32 | 0.32 | 1.4 | 0.704E+02 | 0.16 | 2.378 | .20119E+00 |
| 0.01 | 0.32 | 0.32 | 1.4 | 0.700E+02 | 0.16 | 2.366 | .20434E+00 |
| 0.01 | 0.32 | 0.31 | 1.4 | 0.697E+02 | 0.16 | 2.354 | .20751E+00 |
| 0.01 | 0.32 | 0.30 | 1.4 | 0.693E+02 | 0.16 | 2.342 | .21070E+00 |
| 0.01 | 0.33 | 0.29 | 1.4 | 0.690E+02 | 0.16 | 2.330 | .21390E+00 |
| 0.01 | 0.33 | 0.29 | 1.5 | 0.686E+02 | 0.16 | 2.319 | .21712E+00 |
| 0.01 | 0.33 | 0.28 | 1.5 | 0.683E+02 | 0.17 | 2.307 | .22036E+00 |
| 0.01 | 0.33 | 0.27 | 1.5 | 0.679E+02 | 0.17 | 2.296 | .22361E+00 |
| 0.01 | 0.33 | 0.26 | 1.5 | 0.676E+02 | 0.17 | 2.284 | .22688E+00 |
| 0.01 | 0.33 | 0.26 | 1.5 | 0.673E+02 | 0.17 | 2.273 | .23017E+00 |
| 0.01 | 0.34 | 0.25 | 1.5 | 0.670E+02 | 0.17 | 2.262 | .23347E+00 |
| 0.01 | 0.34 | 0.24 | 1.5 | 0.666E+02 | 0.17 | 2.251 | .23678E+00 |
| 0.01 | 0.34 | 0.23 | 1.5 | 0.663E+02 | 0.17 | 2.240 | .24012E+00 |
| 0.01 | 0.34 | 0.23 | 1.5 | 0.660E+02 | 0.17 | 2.230 | .24347E+00 |
| 0.01 | 0.34 | 0.22 | 1.5 | 0.657E+02 | 0.17 | 2.219 | .24683E+00 |
| 0.01 | 0.34 | 0.21 | 1.5 | 0.654E+02 | 0.17 | 2.208 | .25021E+00 |
| 0.01 | 0.34 | 0.21 | 1.5 | 0.650E+02 | 0.17 | 2.198 | .25361E+00 |
| 0.01 | 0.35 | 0.20 | 1.5 | 0.647E+02 | 0.17 | 2.188 | .25702E+00 |
| 0.01 | 0.35 | 0.19 | 1.6 | 0.644E+02 | 0.18 | 2.177 | .26045E+00 |
| 0.01 | 0.35 | 0.18 | 1.6 | 0.641E+02 | 0.18 | 2.167 | .26390E+00 |
| 0.01 | 0.35 | 0.18 | 1.6 | 0.640E+02 | 0.18 | 2.162 | .26563E+00 |

Cumulative travel time = 0.2656 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.01 | 0.35 | 0.18 | 1.6 | 0.640E+02 | 0.18 | .26563E+00 |

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.17 | 46.19 | 1.83 | 1.6 | 0.640E+02 | 0.00 | 0.00 | 1.83 | 1.83 | .26563E+00 |
| 0.03 | 46.19 | 1.83 | 1.6 | 0.640E+02 | 1.83 | 16.79 | 1.83 | 0.00 | .26972E+02 |
| 0.23 | 46.19 | 1.83 | 1.6 | 0.625E+02 | 1.83 | 23.75 | 1.83 | 0.00 | .24978E+03 |
| 0.43 | 46.19 | 1.83 | 1.7 | 0.594E+02 | 1.83 | 29.09 | 1.83 | 0.00 | .47259E+03 |
| 0.63 | 46.19 | 1.83 | 1.8 | 0.557E+02 | 1.83 | 33.59 | 1.83 | 0.00 | .69540E+03 |
| 0.83 | 46.19 | 1.83 | 1.9 | 0.523E+02 | 1.83 | 37.55 | 1.83 | 0.00 | .91821E+03 |
| 1.03 | 46.19 | 1.83 | 2.0 | 0.497E+02 | 1.83 | 41.13 | 1.83 | 0.00 | .11410E+04 |
| 1.23 | 46.19 | 1.83 | 2.1 | 0.480E+02 | 1.83 | 44.43 | 1.83 | 0.00 | .13638E+04 |
| 1.43 | 46.19 | 1.83 | 2.1 | 0.469E+02 | 1.83 | 47.50 | 1.83 | 0.00 | .15866E+04 |
| 1.63 | 46.19 | 1.83 | 2.2 | 0.463E+02 | 1.83 | 50.38 | 1.83 | 0.00 | .18095E+04 |
| 1.84 | 46.19 | 1.83 | 2.2 | 0.457E+02 | 1.83 | 53.10 | 1.83 | 0.00 | .20323E+04 |

Cumulative travel time = 2032.2656 sec ( 0.56 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

In this design case, the discharge is located CLOSE TO BANK/SHORE.
Some lateral boundary interaction occurs at end of the near-field.
This may be related to a design case with a very LOW AMBIENT VELOCITY.
The dilution values in one or more of the preceding zones may be too high.
Carefully evaluate results in near-field and check degree of interaction.

Consider locating outfall further away from bank or shore.
In the next prediction module, the plume centerline will be set
to follow the bank/shore.

-----------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Plume is ATTACHED to RIGHT bank/shore.
Plume width is now determined from RIGHT bank/shore.

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.804E-03 m^2/s
Horizontal diffusivity (initial value) = 0.754E+00 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)

S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.84 | -0.27 | 1.83 | 2.2 | 0.457E+02 | 1.83 | 106.21 | 1.83 | 0.00 | .20323E+04 |
| 41.82 | -0.27 | 1.83 | 18.2 | 0.548E+01 | 1.83 | 885.43 | 1.83 | 0.00 | .46456E+05 |
| 81.80 | -0.27 | 1.83 | 42.5 | 0.235E+01 | 1.83 | 2061.72 | 1.83 | 0.00 | .90880E+05 |

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds
the regulatory value = 100.00 m.
This is the extent of the REGULATORY MIXING ZONE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 121.78 | -0.27 | 1.83 | 72.7 | 0.138E+01 | 1.83 | 3528.48 | 1.83 | 0.00 | .13530E+06 |
| 161.76 | -0.27 | 1.83 | 107.9 | 0.927E+00 | 1.83 | 5236.52 | 1.83 | 0.00 | .17973E+06 |
| 201.74 | -0.27 | 1.83 | 147.4 | 0.678E+00 | 1.83 | 7155.59 | 1.83 | 0.00 | .22415E+06 |
| 241.73 | -0.27 | 1.83 | 190.8 | 0.524E+00 | 1.83 | 9264.59 | 1.83 | 0.00 | .26858E+06 |
| 281.71 | -0.27 | 1.83 | 237.9 | 0.420E+00 | 1.83 | 11547.76 | 1.83 | 0.00 | .31300E+06 |
| 321.69 | -0.27 | 1.83 | 288.2 | 0.347E+00 | 1.83 | 13992.69 | 1.83 | 0.00 | .35742E+06 |
| 361.67 | -0.27 | 1.83 | 341.7 | 0.293E+00 | 1.83 | 16589.32 | 1.83 | 0.00 | .40185E+06 |
| 401.65 | -0.27 | 1.83 | 398.2 | 0.251E+00 | 1.83 | 19329.24 | 1.83 | 0.00 | .44627E+06 |
| 441.63 | -0.27 | 1.83 | 457.4 | 0.219E+00 | 1.83 | 22205.33 | 1.83 | 0.00 | .49070E+06 |
| 481.62 | -0.27 | 1.83 | 519.3 | 0.193E+00 | 1.83 | 25211.40 | 1.83 | 0.00 | .53512E+06 |
| 521.60 | -0.27 | 1.83 | 583.8 | 0.171E+00 | 1.83 | 28342.09 | 1.83 | 0.00 | .57954E+06 |
| 561.58 | -0.27 | 1.83 | 650.8 | 0.154E+00 | 1.83 | 31592.59 | 1.83 | 0.00 | .62397E+06 |
| 601.56 | -0.27 | 1.83 | 720.1 | 0.139E+00 | 1.83 | 34958.65 | 1.83 | 0.00 | .66839E+06 |
| 641.54 | -0.27 | 1.83 | 791.8 | 0.126E+00 | 1.83 | 38436.43 | 1.83 | 0.00 | .71282E+06 |
| 681.52 | -0.27 | 1.83 | 865.7 | 0.116E+00 | 1.83 | 42022.46 | 1.83 | 0.00 | .75724E+06 |
| 721.50 | -0.27 | 1.83 | 941.7 | 0.106E+00 | 1.83 | 45713.55 | 1.83 | 0.00 | .80167E+06 |
| 761.49 | -0.27 | 1.83 | 1019.8 | 0.981E-01 | 1.83 | 49506.80 | 1.83 | 0.00 | .84609E+06 |
| 801.47 | -0.27 | 1.83 | 1100.0 | 0.909E-01 | 1.83 | 53399.53 | 1.83 | 0.00 | .89051E+06 |
| 841.45 | -0.27 | 1.83 | 1182.2 | 0.846E-01 | 1.83 | 57389.25 | 1.83 | 0.00 | .93494E+06 |
| 881.43 | -0.27 | 1.83 | 1266.3 | 0.790E-01 | 1.83 | 61473.66 | 1.83 | 0.00 | .97936E+06 |
| 921.41 | -0.27 | 1.83 | 1352.4 | 0.739E-01 | 1.83 | 65650.62 | 1.83 | 0.00 | .10238E+07 |
| 961.39 | -0.27 | 1.83 | 1440.3 | 0.694E-01 | 1.83 | 69918.13 | 1.83 | 0.00 | .10682E+07 |
| 1001.38 | -0.27 | 1.83 | 1530.0 | 0.654E-01 | 1.83 | 74274.30 | 1.83 | 0.00 | .11126E+07 |
| 1041.36 | -0.27 | 1.83 | 1621.6 | 0.617E-01 | 1.83 | 78717.36 | 1.83 | 0.00 | .11571E+07 |
| 1081.34 | -0.27 | 1.83 | 1714.8 | 0.583E-01 | 1.83 | 83245.65 | 1.83 | 0.00 | .12015E+07 |
| 1121.32 | -0.27 | 1.83 | 1809.8 | 0.553E-01 | 1.83 | 87857.56 | 1.83 | 0.00 | .12459E+07 |
| 1161.30 | -0.27 | 1.83 | 1906.5 | 0.525E-01 | 1.83 | 92551.66 | 1.83 | 0.00 | .12903E+07 |
| 1201.28 | -0.27 | 1.83 | 2004.9 | 0.499E-01 | 1.83 | 97326.49 | 1.83 | 0.00 | .13348E+07 |
| 1241.27 | -0.27 | 1.83 | 2104.9 | 0.475E-01 | 1.83 | ******** | 1.83 | 0.00 | .13792E+07 |
| 1281.25 | -0.27 | 1.83 | 2206.5 | 0.453E-01 | 1.83 | ******** | 1.83 | 0.00 | .14236E+07 |
| 1321.23 | -0.27 | 1.83 | 2309.7 | 0.433E-01 | 1.83 | ******** | 1.83 | 0.00 | .14680E+07 |
| 1361.21 | -0.27 | 1.83 | 2414.4 | 0.414E-01 | 1.83 | ******** | 1.83 | 0.00 | .15125E+07 |
| 1401.19 | -0.27 | 1.83 | 2520.7 | 0.397E-01 | 1.83 | ******** | 1.83 | 0.00 | .15569E+07 |
| 1441.17 | -0.27 | 1.83 | 2628.5 | 0.380E-01 | 1.83 | ******** | 1.83 | 0.00 | .16013E+07 |
| 1481.16 | -0.27 | 1.83 | 2737.8 | 0.365E-01 | 1.83 | ******** | 1.83 | 0.00 | .16457E+07 |
| 1521.14 | -0.27 | 1.83 | 2848.6 | 0.351E-01 | 1.83 | ******** | 1.83 | 0.00 | .16901E+07 |
| 1561.12 | -0.27 | 1.83 | 2960.8 | 0.338E-01 | 1.83 | ******** | 1.83 | 0.00 | .17346E+07 |
| 1601.10 | -0.27 | 1.83 | 3074.5 | 0.325E-01 | 1.83 | ******** | 1.83 | 0.00 | .17790E+07 |
| 1641.08 | -0.27 | 1.83 | 3189.6 | 0.314E-01 | 1.83 | ******** | 1.83 | 0.00 | .18234E+07 |
| 1681.06 | -0.27 | 1.83 | 3306.0 | 0.302E-01 | 1.83 | ******** | 1.83 | 0.00 | .18678E+07 |
| 1721.05 | -0.27 | 1.83 | 3423.9 | 0.292E-01 | 1.83 | ******** | 1.83 | 0.00 | .19123E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1761.03 | -0.27 | 1.83 | 3543.2 | 0.282E-01 | 1.83 | ******** | 1.83 | 0.00 | .19567E+07 |
| 1801.01 | -0.27 | 1.83 | 3663.7 | 0.273E-01 | 1.83 | ******** | 1.83 | 0.00 | .20011E+07 |
| 1840.99 | -0.27 | 1.83 | 3785.7 | 0.264E-01 | 1.83 | ******** | 1.83 | 0.00 | .20455E+07 |
| 1880.97 | -0.27 | 1.83 | 3908.9 | 0.256E-01 | 1.83 | ******** | 1.83 | 0.00 | .20900E+07 |
| 1920.96 | -0.27 | 1.83 | 4033.5 | 0.248E-01 | 1.83 | ******** | 1.83 | 0.00 | .21344E+07 |
| 1960.94 | -0.27 | 1.83 | 4159.3 | 0.240E-01 | 1.83 | ******** | 1.83 | 0.00 | .21788E+07 |
| 2000.92 | -0.27 | 1.83 | 4286.5 | 0.233E-01 | 1.83 | ******** | 1.83 | 0.00 | .22232E+07 |
| 2040.90 | -0.27 | 1.83 | 4414.9 | 0.227E-01 | 1.83 | ******** | 1.83 | 0.00 | .22677E+07 |
| 2080.88 | -0.27 | 1.83 | 4544.5 | 0.220E-01 | 1.83 | ******** | 1.83 | 0.00 | .23121E+07 |
| 2120.86 | -0.27 | 1.83 | 4675.4 | 0.214E-01 | 1.83 | ******** | 1.83 | 0.00 | .23565E+07 |
| 2160.85 | -0.27 | 1.83 | 4807.6 | 0.208E-01 | 1.83 | ******** | 1.83 | 0.00 | .24009E+07 |
| 2200.83 | -0.27 | 1.83 | 4940.9 | 0.202E-01 | 1.83 | ******** | 1.83 | 0.00 | .24454E+07 |
| 2240.81 | -0.27 | 1.83 | 5075.5 | 0.197E-01 | 1.83 | ******** | 1.83 | 0.00 | .24898E+07 |
| 2280.79 | -0.27 | 1.83 | 5211.3 | 0.192E-01 | 1.83 | ******** | 1.83 | 0.00 | .25342E+07 |
| 2320.77 | -0.27 | 1.83 | 5348.2 | 0.187E-01 | 1.83 | ******** | 1.83 | 0.00 | .25786E+07 |
| 2360.75 | -0.27 | 1.83 | 5486.4 | 0.182E-01 | 1.83 | ******** | 1.83 | 0.00 | .26231E+07 |
| 2400.74 | -0.27 | 1.83 | 5625.7 | 0.178E-01 | 1.83 | ******** | 1.83 | 0.00 | .26675E+07 |
| 2440.72 | -0.27 | 1.83 | 5766.2 | 0.173E-01 | 1.83 | ******** | 1.83 | 0.00 | .27119E+07 |
| 2480.70 | -0.27 | 1.83 | 5907.8 | 0.169E-01 | 1.83 | ******** | 1.83 | 0.00 | .27563E+07 |
| 2520.68 | -0.27 | 1.83 | 6050.6 | 0.165E-01 | 1.83 | ******** | 1.83 | 0.00 | .28007E+07 |
| 2560.66 | -0.27 | 1.83 | 6194.4 | 0.161E-01 | 1.83 | ******** | 1.83 | 0.00 | .28452E+07 |
| 2600.64 | -0.27 | 1.83 | 6339.5 | 0.158E-01 | 1.83 | ******** | 1.83 | 0.00 | .28896E+07 |
| 2640.63 | -0.27 | 1.83 | 6485.6 | 0.154E-01 | 1.83 | ******** | 1.83 | 0.00 | .29340E+07 |
| 2680.61 | -0.27 | 1.83 | 6632.8 | 0.151E-01 | 1.83 | ******** | 1.83 | 0.00 | .29784E+07 |
| 2720.59 | -0.27 | 1.83 | 6781.2 | 0.147E-01 | 1.83 | ******** | 1.83 | 0.00 | .30229E+07 |
| 2760.57 | -0.27 | 1.83 | 6930.6 | 0.144E-01 | 1.83 | ******** | 1.83 | 0.00 | .30673E+07 |
| 2800.55 | -0.27 | 1.83 | 7081.1 | 0.141E-01 | 1.83 | ******** | 1.83 | 0.00 | .31117E+07 |
| 2840.53 | -0.27 | 1.83 | 7232.7 | 0.138E-01 | 1.83 | ******** | 1.83 | 0.00 | .31561E+07 |
| 2880.52 | -0.27 | 1.83 | 7385.3 | 0.135E-01 | 1.83 | ******** | 1.83 | 0.00 | .32006E+07 |
| 2920.50 | -0.27 | 1.83 | 7539.0 | 0.133E-01 | 1.83 | ******** | 1.83 | 0.00 | .32450E+07 |
| 2960.48 | -0.27 | 1.83 | 7693.8 | 0.130E-01 | 1.83 | ******** | 1.83 | 0.00 | .32894E+07 |
| 3000.46 | -0.27 | 1.83 | 7849.6 | 0.127E-01 | 1.83 | ******** | 1.83 | 0.00 | .33338E+07 |
| 3040.44 | -0.27 | 1.83 | 8006.4 | 0.125E-01 | 1.83 | ******** | 1.83 | 0.00 | .33783E+07 |
| 3080.42 | -0.27 | 1.83 | 8164.3 | 0.122E-01 | 1.83 | ******** | 1.83 | 0.00 | .34227E+07 |
| 3120.41 | -0.27 | 1.83 | 8323.2 | 0.120E-01 | 1.83 | ******** | 1.83 | 0.00 | .34671E+07 |
| 3160.39 | -0.27 | 1.83 | 8483.1 | 0.118E-01 | 1.83 | ******** | 1.83 | 0.00 | .35115E+07 |
| 3200.37 | -0.27 | 1.83 | 8644.0 | 0.116E-01 | 1.83 | ******** | 1.83 | 0.00 | .35560E+07 |
| 3240.35 | -0.27 | 1.83 | 8806.0 | 0.114E-01 | 1.83 | ******** | 1.83 | 0.00 | .36004E+07 |
| 3280.33 | -0.27 | 1.83 | 8968.9 | 0.111E-01 | 1.83 | ******** | 1.83 | 0.00 | .36448E+07 |
| 3320.31 | -0.27 | 1.83 | 9132.8 | 0.109E-01 | 1.83 | ******** | 1.83 | 0.00 | .36892E+07 |
| 3360.30 | -0.27 | 1.83 | 9297.7 | 0.108E-01 | 1.83 | ******** | 1.83 | 0.00 | .37337E+07 |
| 3400.28 | -0.27 | 1.83 | 9463.6 | 0.106E-01 | 1.83 | ******** | 1.83 | 0.00 | .37781E+07 |
| 3440.26 | -0.27 | 1.83 | 9630.5 | 0.104E-01 | 1.83 | ******** | 1.83 | 0.00 | .38225E+07 |
| 3480.24 | -0.27 | 1.83 | 9798.3 | 0.102E-01 | 1.83 | ******** | 1.83 | 0.00 | .38669E+07 |
| 3520.22 | -0.27 | 1.83 | 9967.1 | 0.100E-01 | 1.83 | ******** | 1.83 | 0.00 | .39114E+07 |
| 3560.20 | -0.27 | 1.83 | 10136.8 | 0.986E-02 | 1.83 | ******** | 1.83 | 0.00 | .39558E+07 |
| 3600.19 | -0.27 | 1.83 | 10307.6 | 0.970E-02 | 1.83 | ******** | 1.83 | 0.00 | .40002E+07 |
| 3640.17 | -0.27 | 1.83 | 10479.2 | 0.954E-02 | 1.83 | ******** | 1.83 | 0.00 | .40446E+07 |
| 3680.15 | -0.27 | 1.83 | 10651.8 | 0.939E-02 | 1.83 | ******** | 1.83 | 0.00 | .40890E+07 |
| 3720.13 | -0.27 | 1.83 | 10825.3 | 0.924E-02 | 1.83 | ******** | 1.83 | 0.00 | .41335E+07 |
| 3760.11 | -0.27 | 1.83 | 10999.8 | 0.909E-02 | 1.83 | ******** | 1.83 | 0.00 | .41779E+07 |
| 3800.09 | -0.27 | 1.83 | 11175.2 | 0.895E-02 | 1.83 | ******** | 1.83 | 0.00 | .42223E+07 |
| 3840.08 | -0.27 | 1.83 | 11351.5 | 0.881E-02 | 1.83 | ******** | 1.83 | 0.00 | .42667E+07 |
| 3880.06 | -0.27 | 1.83 | 11528.7 | 0.867E-02 | 1.83 | ******** | 1.83 | 0.00 | .43112E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3920.04 | -0.27 | 1.83 | 11706.9 | 0.854E-02 | 1.83 | ******** | 1.83 | 0.00 | .43556E+07 |
| 3960.02 | -0.27 | 1.83 | 11886.0 | 0.841E-02 | 1.83 | ******** | 1.83 | 0.00 | .44000E+07 |
| 4000.00 | -0.27 | 1.83 | 12065.9 | 0.829E-02 | 1.83 | ******** | 1.83 | 0.00 | .44444E+07 |

Cumulative travel time = 4444438.0000 sec ( 1234.57 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 4000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

CORMIX1: Single Port Discharges End of Prediction File

1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORMIX MIXING ZONE EXPERT SYSTEM
             Subsystem CORMIX2: Multiport Diffuser Discharges
                         CORMIX Version 12.0GTD
                   HYDRO2 Version 12.0.0.0 December 2020
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro Southeast Area
 Design case:       Year 8
 FILE NAME:         C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y08-SE_Pond.prd
 Time stamp:        04/06/2022--21:51:16

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =     24.60  AS    =      0.71  QA    =      0.17  ICHREG= 2
 HA    =      0.03  HD    =      0.03
 UA    =      0.234 F     =      0.410 USTAR =0.5296E-01
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U        RHOAM =  998.1636

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  LEFT      DISTB =      0.00  YB1   =      0.10  YB2   =      0.10
 LD    =      1.00  NOPEN =  100       NRISER=  100       SPAC  =      0.01    NPPERR =    1
 D0    =      0.016 A0    =      0.000 H0    =      0.03  SUB0  =      0.00
 D0INP =      0.016 CR0   =      1.000 B0    =0.2117E-01
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =      0.00  THETA =      0.00  SIGMA =    270.00  BETA  =     90.00
 U0    =      0.178 Q0    =      0.004 Q0A   =0.3800E-02
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1        KS    =0.0000E+00  KD    =0.0000E+00

DIFFUSER PARAMETERS WITH IMAGE EFFECTS (metric units)
 The bank/shore proximity effect is accounted for by the following flow
 variables and definitions of length scales and parameters.
 LD    =      1.00  Q0    =      0.008 Q0A    =0.3800E-02

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1520E-01        SIGNJ0=      1.0
 m0 =U0^2*B0 =0.6686E-03   j0 =U0*GP0*B0 =0.0000E+00   (based on slot width B0)
 m0 =U0*q0   =0.2701E-02   j0 =q0*GP0    =0.0000E+00   (based on volume flux q0)
 Associated 2-d length scales (meters)
 lQ=B  =      0.086 lM    =  99999.00  lm    =      0.02
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.7600E-02  M0    =0.6686E-03  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.01  LM    =  99999.00  Lm    =      0.16  Lb    =      0.00
```

```
                         Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      0.76  PL    =  140.00
 (slot)            (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.178 D0    =      0.016 A0    =      0.000 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      0.76
 (slot)            (riser group)

FLOW CLASSIFICATION
 222222222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    IMPU9        2
 2  Applicable layer depth HS =     0.03        2
 2  Limiting Dilution S=QA/Q0 + 1=    22.74     2
 222222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =    500.00  XMAX  =    500.00

X-Y-Z COORDINATE SYSTEM:
  because of bank/shore proximity, the ORIGIN is located directly
   at the LEFT  bank/shore.
  the bank/shore acts as a plane of symmetry for the predicted
  plume geometry.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y       Z        S       C       BV       BH       Uc        TT
     0.00     0.00    0.03     1.0 0.100E+03   0.02     0.50     0.178   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
```

The diffuser near-field dilution is REDUCED because of the PROXIMITY
of the shoreline.
Because of the strong ambient current the diffuser plume of this crossflowing
discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
layer depth. Full mixing is achieved at a downstream distance of about
2.5 times (for alternating designs) to 5 times(for unidirectional and staged designsd) the layer depth.

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, measured horizontally in Y-direction
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.03 | 1.0 | 0.100E+03 | 0.02 | 0.50 | .00000E+00 |
| 0.00 | -0.00 | 0.03 | 1.0 | 0.960E+02 | 0.02 | 0.51 | .61285E-02 |
| 0.00 | -0.01 | 0.03 | 1.1 | 0.945E+02 | 0.02 | 0.51 | .12257E-01 |
| 0.00 | -0.01 | 0.03 | 1.1 | 0.933E+02 | 0.02 | 0.52 | .18386E-01 |
| 0.01 | -0.02 | 0.03 | 1.1 | 0.923E+02 | 0.02 | 0.53 | .24514E-01 |
| 0.01 | -0.02 | 0.03 | 1.1 | 0.915E+02 | 0.02 | 0.53 | .30643E-01 |
| 0.01 | -0.03 | 0.03 | 1.1 | 0.908E+02 | 0.02 | 0.54 | .36771E-01 |
| 0.01 | -0.03 | 0.03 | 1.1 | 0.901E+02 | 0.02 | 0.54 | .42900E-01 |
| 0.01 | -0.03 | 0.03 | 1.1 | 0.895E+02 | 0.02 | 0.55 | .49028E-01 |
| 0.01 | -0.04 | 0.03 | 1.1 | 0.889E+02 | 0.02 | 0.56 | .55157E-01 |
| 0.01 | -0.04 | 0.03 | 1.1 | 0.884E+02 | 0.02 | 0.56 | .61285E-01 |
| 0.02 | -0.05 | 0.03 | 1.1 | 0.879E+02 | 0.02 | 0.57 | .67414E-01 |
| 0.02 | -0.05 | 0.03 | 1.1 | 0.875E+02 | 0.02 | 0.58 | .73542E-01 |
| 0.02 | -0.06 | 0.03 | 1.1 | 0.870E+02 | 0.02 | 0.58 | .79671E-01 |
| 0.02 | -0.06 | 0.03 | 1.2 | 0.866E+02 | 0.02 | 0.59 | .85799E-01 |
| 0.02 | -0.06 | 0.03 | 1.2 | 0.862E+02 | 0.02 | 0.59 | .91928E-01 |
| 0.02 | -0.07 | 0.03 | 1.2 | 0.858E+02 | 0.02 | 0.60 | .98056E-01 |
| 0.02 | -0.07 | 0.03 | 1.2 | 0.854E+02 | 0.02 | 0.61 | .10418E+00 |
| 0.03 | -0.08 | 0.03 | 1.2 | 0.851E+02 | 0.02 | 0.61 | .11031E+00 |
| 0.03 | -0.08 | 0.03 | 1.2 | 0.847E+02 | 0.02 | 0.62 | .11644E+00 |
| 0.03 | -0.09 | 0.03 | 1.2 | 0.844E+02 | 0.02 | 0.63 | .12257E+00 |
| 0.03 | -0.09 | 0.03 | 1.2 | 0.840E+02 | 0.02 | 0.63 | .12870E+00 |
| 0.03 | -0.09 | 0.03 | 1.2 | 0.837E+02 | 0.02 | 0.64 | .13483E+00 |
| 0.03 | -0.10 | 0.03 | 1.2 | 0.834E+02 | 0.02 | 0.65 | .14096E+00 |
| 0.03 | -0.10 | 0.03 | 1.2 | 0.831E+02 | 0.02 | 0.65 | .14708E+00 |
| 0.04 | -0.11 | 0.03 | 1.2 | 0.828E+02 | 0.02 | 0.66 | .15321E+00 |
| 0.04 | -0.11 | 0.03 | 1.2 | 0.826E+02 | 0.02 | 0.66 | .15934E+00 |
| 0.04 | -0.12 | 0.03 | 1.2 | 0.823E+02 | 0.02 | 0.67 | .16547E+00 |
| 0.04 | -0.12 | 0.03 | 1.2 | 0.820E+02 | 0.02 | 0.68 | .17160E+00 |
| 0.04 | -0.12 | 0.03 | 1.2 | 0.818E+02 | 0.02 | 0.68 | .17773E+00 |
| 0.04 | -0.13 | 0.03 | 1.2 | 0.815E+02 | 0.02 | 0.69 | .18386E+00 |
| 0.04 | -0.13 | 0.03 | 1.2 | 0.813E+02 | 0.02 | 0.70 | .18998E+00 |
| 0.05 | -0.14 | 0.03 | 1.2 | 0.810E+02 | 0.02 | 0.70 | .19611E+00 |
| 0.05 | -0.14 | 0.03 | 1.2 | 0.808E+02 | 0.02 | 0.71 | .20224E+00 |
| 0.05 | -0.15 | 0.03 | 1.2 | 0.805E+02 | 0.02 | 0.71 | .20837E+00 |
| 0.05 | -0.15 | 0.03 | 1.2 | 0.803E+02 | 0.02 | 0.72 | .21450E+00 |
| 0.05 | -0.15 | 0.03 | 1.2 | 0.801E+02 | 0.02 | 0.73 | .22063E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | -0.16 | 0.03 | 1.3 | 0.799E+02 | 0.02 | 0.73 | .22676E+00 |
| 0.05 | -0.16 | 0.03 | 1.3 | 0.797E+02 | 0.02 | 0.74 | .23288E+00 |
| 0.06 | -0.17 | 0.03 | 1.3 | 0.794E+02 | 0.02 | 0.75 | .23901E+00 |
| 0.06 | -0.17 | 0.03 | 1.3 | 0.792E+02 | 0.02 | 0.75 | .24514E+00 |
| 0.06 | -0.18 | 0.03 | 1.3 | 0.790E+02 | 0.02 | 0.76 | .25127E+00 |
| 0.06 | -0.18 | 0.03 | 1.3 | 0.788E+02 | 0.02 | 0.77 | .25740E+00 |
| 0.06 | -0.18 | 0.03 | 1.3 | 0.786E+02 | 0.02 | 0.77 | .26353E+00 |
| 0.06 | -0.19 | 0.03 | 1.3 | 0.784E+02 | 0.02 | 0.78 | .26966E+00 |
| 0.06 | -0.19 | 0.03 | 1.3 | 0.783E+02 | 0.02 | 0.78 | .27578E+00 |
| 0.07 | -0.20 | 0.03 | 1.3 | 0.781E+02 | 0.02 | 0.79 | .28191E+00 |
| 0.07 | -0.20 | 0.03 | 1.3 | 0.779E+02 | 0.02 | 0.80 | .28804E+00 |
| 0.07 | -0.21 | 0.03 | 1.3 | 0.777E+02 | 0.02 | 0.80 | .29417E+00 |
| 0.07 | -0.21 | 0.03 | 1.3 | 0.775E+02 | 0.02 | 0.81 | .30030E+00 |
| 0.07 | -0.21 | 0.03 | 1.3 | 0.773E+02 | 0.02 | 0.82 | .30643E+00 |
| 0.07 | -0.22 | 0.03 | 1.3 | 0.772E+02 | 0.02 | 0.82 | .31255E+00 |
| 0.07 | -0.22 | 0.03 | 1.3 | 0.770E+02 | 0.02 | 0.83 | .31868E+00 |
| 0.08 | -0.23 | 0.03 | 1.3 | 0.768E+02 | 0.02 | 0.83 | .32481E+00 |
| 0.08 | -0.23 | 0.03 | 1.3 | 0.767E+02 | 0.02 | 0.84 | .33094E+00 |
| 0.08 | -0.24 | 0.03 | 1.3 | 0.765E+02 | 0.02 | 0.85 | .33707E+00 |
| 0.08 | -0.24 | 0.03 | 1.3 | 0.763E+02 | 0.02 | 0.85 | .34320E+00 |
| 0.08 | -0.24 | 0.03 | 1.3 | 0.762E+02 | 0.02 | 0.86 | .34933E+00 |
| 0.08 | -0.25 | 0.03 | 1.3 | 0.760E+02 | 0.02 | 0.87 | .35545E+00 |
| 0.08 | -0.25 | 0.03 | 1.3 | 0.759E+02 | 0.02 | 0.87 | .36158E+00 |
| 0.09 | -0.26 | 0.03 | 1.3 | 0.757E+02 | 0.02 | 0.88 | .36771E+00 |
| 0.09 | -0.26 | 0.03 | 1.3 | 0.756E+02 | 0.02 | 0.89 | .37384E+00 |
| 0.09 | -0.27 | 0.03 | 1.3 | 0.754E+02 | 0.02 | 0.89 | .37997E+00 |
| 0.09 | -0.27 | 0.03 | 1.3 | 0.753E+02 | 0.02 | 0.90 | .38610E+00 |
| 0.09 | -0.27 | 0.03 | 1.3 | 0.751E+02 | 0.02 | 0.90 | .39223E+00 |
| 0.09 | -0.28 | 0.03 | 1.3 | 0.750E+02 | 0.02 | 0.91 | .39835E+00 |
| 0.09 | -0.28 | 0.03 | 1.3 | 0.748E+02 | 0.02 | 0.92 | .40448E+00 |
| 0.10 | -0.29 | 0.03 | 1.3 | 0.747E+02 | 0.02 | 0.92 | .41061E+00 |
| 0.10 | -0.29 | 0.03 | 1.3 | 0.745E+02 | 0.02 | 0.93 | .41674E+00 |
| 0.10 | -0.30 | 0.03 | 1.3 | 0.744E+02 | 0.03 | 0.94 | .42287E+00 |
| 0.10 | -0.30 | 0.03 | 1.3 | 0.743E+02 | 0.03 | 0.94 | .42900E+00 |
| 0.10 | -0.31 | 0.03 | 1.3 | 0.741E+02 | 0.03 | 0.95 | .43513E+00 |
| 0.10 | -0.31 | 0.03 | 1.4 | 0.740E+02 | 0.03 | 0.95 | .44125E+00 |
| 0.10 | -0.31 | 0.03 | 1.4 | 0.739E+02 | 0.03 | 0.96 | .44738E+00 |
| 0.11 | -0.32 | 0.03 | 1.4 | 0.737E+02 | 0.03 | 0.97 | .45351E+00 |
| 0.11 | -0.32 | 0.03 | 1.4 | 0.736E+02 | 0.03 | 0.97 | .45964E+00 |
| 0.11 | -0.33 | 0.03 | 1.4 | 0.735E+02 | 0.03 | 0.98 | .46577E+00 |
| 0.11 | -0.33 | 0.03 | 1.4 | 0.733E+02 | 0.03 | 0.99 | .47190E+00 |
| 0.11 | -0.34 | 0.03 | 1.4 | 0.732E+02 | 0.03 | 0.99 | .47802E+00 |
| 0.11 | -0.34 | 0.03 | 1.4 | 0.731E+02 | 0.03 | 1.00 | .48415E+00 |
| 0.11 | -0.34 | 0.03 | 1.4 | 0.730E+02 | 0.03 | 1.01 | .49028E+00 |
| 0.12 | -0.35 | 0.03 | 1.4 | 0.728E+02 | 0.03 | 1.01 | .49641E+00 |
| 0.12 | -0.35 | 0.03 | 1.4 | 0.727E+02 | 0.03 | 1.02 | .50254E+00 |
| 0.12 | -0.36 | 0.03 | 1.4 | 0.726E+02 | 0.03 | 1.02 | .50867E+00 |
| 0.12 | -0.36 | 0.03 | 1.4 | 0.725E+02 | 0.03 | 1.03 | .51480E+00 |
| 0.12 | -0.37 | 0.03 | 1.4 | 0.724E+02 | 0.03 | 1.04 | .52092E+00 |
| 0.12 | -0.37 | 0.03 | 1.4 | 0.722E+02 | 0.03 | 1.04 | .52705E+00 |
| 0.12 | -0.37 | 0.03 | 1.4 | 0.721E+02 | 0.03 | 1.05 | .53318E+00 |
| 0.13 | -0.38 | 0.03 | 1.4 | 0.720E+02 | 0.03 | 1.06 | .53931E+00 |
| 0.13 | -0.38 | 0.03 | 1.4 | 0.719E+02 | 0.03 | 1.06 | .54544E+00 |
| 0.13 | -0.39 | 0.03 | 1.4 | 0.718E+02 | 0.03 | 1.07 | .55157E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.13 | -0.39 | 0.03 | 1.4 | 0.717E+02 | 0.03 | 1.07 | .55770E+00 |
| 0.13 | -0.40 | 0.03 | 1.4 | 0.716E+02 | 0.03 | 1.08 | .56382E+00 |
| 0.13 | -0.40 | 0.03 | 1.4 | 0.715E+02 | 0.03 | 1.09 | .56995E+00 |
| 0.13 | -0.40 | 0.03 | 1.4 | 0.713E+02 | 0.03 | 1.09 | .57608E+00 |
| 0.14 | -0.41 | 0.03 | 1.4 | 0.712E+02 | 0.03 | 1.10 | .58221E+00 |
| 0.14 | -0.41 | 0.03 | 1.4 | 0.711E+02 | 0.03 | 1.11 | .58834E+00 |
| 0.14 | -0.42 | 0.03 | 1.4 | 0.710E+02 | 0.03 | 1.11 | .59447E+00 |
| 0.14 | -0.42 | 0.03 | 1.4 | 0.709E+02 | 0.03 | 1.12 | .60060E+00 |
| 0.14 | -0.43 | 0.03 | 1.4 | 0.708E+02 | 0.03 | 1.13 | .60672E+00 |
| 0.14 | -0.43 | 0.03 | 1.4 | 0.707E+02 | 0.03 | 1.13 | .61285E+00 |

Cumulative travel time = 0.6129 sec ( 0.00 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

WAKE FLOW CONDITIONS: The discharge velocity (U0) is less than or equal to the
ambient velocity (Ua) and results in wake flow conditions. There is no discharge
momentum induced mixing. The mixing characteristics are UNDESIRABLE.

Recall that the plume is symmetric to the bank/shore on which the centerline
(X-axis) is located.
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

Plume is ATTACHED to LEFT bank/shore.
Plume width is now determined from LEFT bank/shore.

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.304E-03 m^2/s
Horizontal diffusivity (initial value) = 0.760E-03 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|

|  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|
| 0.14 | 0.00 | 0.03 | 1.4 | 0.707E+02 | 0.02 | 1.56 | 0.03 | 0.01 | .61285E+00 |

Plume interacts with BOTTOM.
The passive diffusion plume becomes VERTICALLY FULLY MIXED within this prediction interval.

|  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|
| 5.14 | 0.00 | 0.03 | 2.0 | 0.507E+02 | 0.03 | 1.58 | 0.03 | 0.00 | .21488E+02 |
| 10.14 | 0.00 | 0.03 | 2.0 | 0.502E+02 | 0.03 | 1.59 | 0.03 | 0.00 | .42363E+02 |
| 15.14 | 0.00 | 0.03 | 2.0 | 0.498E+02 | 0.03 | 1.61 | 0.03 | 0.00 | .63238E+02 |
| 20.14 | 0.00 | 0.03 | 2.0 | 0.493E+02 | 0.03 | 1.62 | 0.03 | 0.00 | .84112E+02 |
| 25.14 | 0.00 | 0.03 | 2.0 | 0.488E+02 | 0.03 | 1.64 | 0.03 | 0.00 | .10499E+03 |
| 30.13 | 0.00 | 0.03 | 2.1 | 0.484E+02 | 0.03 | 1.65 | 0.03 | 0.00 | .12586E+03 |
| 35.13 | 0.00 | 0.03 | 2.1 | 0.479E+02 | 0.03 | 1.67 | 0.03 | 0.00 | .14674E+03 |
| 40.13 | 0.00 | 0.03 | 2.1 | 0.475E+02 | 0.03 | 1.68 | 0.03 | 0.00 | .16761E+03 |
| 45.13 | 0.00 | 0.03 | 2.1 | 0.471E+02 | 0.03 | 1.70 | 0.03 | 0.00 | .18849E+03 |
| 50.13 | 0.00 | 0.03 | 2.1 | 0.467E+02 | 0.03 | 1.71 | 0.03 | 0.00 | .20936E+03 |
| 55.13 | 0.00 | 0.03 | 2.2 | 0.463E+02 | 0.03 | 1.73 | 0.03 | 0.00 | .23024E+03 |
| 60.13 | 0.00 | 0.03 | 2.2 | 0.459E+02 | 0.03 | 1.74 | 0.03 | 0.00 | .25111E+03 |
| 65.12 | 0.00 | 0.03 | 2.2 | 0.456E+02 | 0.03 | 1.76 | 0.03 | 0.00 | .27199E+03 |
| 70.12 | 0.00 | 0.03 | 2.2 | 0.452E+02 | 0.03 | 1.77 | 0.03 | 0.00 | .29286E+03 |
| 75.12 | 0.00 | 0.03 | 2.2 | 0.448E+02 | 0.03 | 1.78 | 0.03 | 0.00 | .31374E+03 |
| 80.12 | 0.00 | 0.03 | 2.2 | 0.445E+02 | 0.03 | 1.80 | 0.03 | 0.00 | .33461E+03 |
| 85.12 | 0.00 | 0.03 | 2.3 | 0.442E+02 | 0.03 | 1.81 | 0.03 | 0.00 | .35549E+03 |
| 90.12 | 0.00 | 0.03 | 2.3 | 0.438E+02 | 0.03 | 1.83 | 0.03 | 0.00 | .37636E+03 |
| 95.12 | 0.00 | 0.03 | 2.3 | 0.435E+02 | 0.03 | 1.84 | 0.03 | 0.00 | .39724E+03 |
| 100.11 | 0.00 | 0.03 | 2.3 | 0.432E+02 | 0.03 | 1.85 | 0.03 | 0.00 | .41811E+03 |
| 105.11 | 0.00 | 0.03 | 2.3 | 0.429E+02 | 0.03 | 1.87 | 0.03 | 0.00 | .43899E+03 |
| 110.11 | 0.00 | 0.03 | 2.3 | 0.426E+02 | 0.03 | 1.88 | 0.03 | 0.00 | .45986E+03 |
| 115.11 | 0.00 | 0.03 | 2.4 | 0.423E+02 | 0.03 | 1.89 | 0.03 | 0.00 | .48074E+03 |
| 120.11 | 0.00 | 0.03 | 2.4 | 0.420E+02 | 0.03 | 1.91 | 0.03 | 0.00 | .50161E+03 |
| 125.11 | 0.00 | 0.03 | 2.4 | 0.417E+02 | 0.03 | 1.92 | 0.03 | 0.00 | .52249E+03 |
| 130.11 | 0.00 | 0.03 | 2.4 | 0.414E+02 | 0.03 | 1.93 | 0.03 | 0.00 | .54336E+03 |
| 135.10 | 0.00 | 0.03 | 2.4 | 0.411E+02 | 0.03 | 1.95 | 0.03 | 0.00 | .56424E+03 |
| 140.10 | 0.00 | 0.03 | 2.4 | 0.409E+02 | 0.03 | 1.96 | 0.03 | 0.00 | .58511E+03 |
| 145.10 | 0.00 | 0.03 | 2.5 | 0.406E+02 | 0.03 | 1.97 | 0.03 | 0.00 | .60598E+03 |
| 150.10 | 0.00 | 0.03 | 2.5 | 0.404E+02 | 0.03 | 1.98 | 0.03 | 0.00 | .62686E+03 |
| 155.10 | 0.00 | 0.03 | 2.5 | 0.401E+02 | 0.03 | 2.00 | 0.03 | 0.00 | .64773E+03 |
| 160.10 | 0.00 | 0.03 | 2.5 | 0.399E+02 | 0.03 | 2.01 | 0.03 | 0.00 | .66861E+03 |
| 165.10 | 0.00 | 0.03 | 2.5 | 0.396E+02 | 0.03 | 2.02 | 0.03 | 0.00 | .68948E+03 |
| 170.09 | 0.00 | 0.03 | 2.5 | 0.394E+02 | 0.03 | 2.03 | 0.03 | 0.00 | .71036E+03 |
| 175.09 | 0.00 | 0.03 | 2.6 | 0.391E+02 | 0.03 | 2.05 | 0.03 | 0.00 | .73123E+03 |
| 180.09 | 0.00 | 0.03 | 2.6 | 0.389E+02 | 0.03 | 2.06 | 0.03 | 0.00 | .75211E+03 |
| 185.09 | 0.00 | 0.03 | 2.6 | 0.387E+02 | 0.03 | 2.07 | 0.03 | 0.00 | .77298E+03 |
| 190.09 | 0.00 | 0.03 | 2.6 | 0.384E+02 | 0.03 | 2.08 | 0.03 | 0.00 | .79386E+03 |
| 195.09 | 0.00 | 0.03 | 2.6 | 0.382E+02 | 0.03 | 2.09 | 0.03 | 0.00 | .81473E+03 |
| 200.09 | 0.00 | 0.03 | 2.6 | 0.380E+02 | 0.03 | 2.11 | 0.03 | 0.00 | .83561E+03 |
| 205.08 | 0.00 | 0.03 | 2.6 | 0.378E+02 | 0.03 | 2.12 | 0.03 | 0.00 | .85648E+03 |
| 210.08 | 0.00 | 0.03 | 2.7 | 0.376E+02 | 0.03 | 2.13 | 0.03 | 0.00 | .87736E+03 |
| 215.08 | 0.00 | 0.03 | 2.7 | 0.374E+02 | 0.03 | 2.14 | 0.03 | 0.00 | .89823E+03 |
| 220.08 | 0.00 | 0.03 | 2.7 | 0.372E+02 | 0.03 | 2.15 | 0.03 | 0.00 | .91911E+03 |
| 225.08 | 0.00 | 0.03 | 2.7 | 0.370E+02 | 0.03 | 2.16 | 0.03 | 0.00 | .93998E+03 |
| 230.08 | 0.00 | 0.03 | 2.7 | 0.368E+02 | 0.03 | 2.17 | 0.03 | 0.00 | .96086E+03 |
| 235.08 | 0.00 | 0.03 | 2.7 | 0.366E+02 | 0.03 | 2.19 | 0.03 | 0.00 | .98173E+03 |
| 240.07 | 0.00 | 0.03 | 2.7 | 0.364E+02 | 0.03 | 2.20 | 0.03 | 0.00 | .10026E+04 |
| 245.07 | 0.00 | 0.03 | 2.8 | 0.362E+02 | 0.03 | 2.21 | 0.03 | 0.00 | .10235E+04 |
| 250.07 | 0.00 | 0.03 | 2.8 | 0.360E+02 | 0.03 | 2.22 | 0.03 | 0.00 | .10444E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 255.07 | 0.00 | 0.03 | 2.8 | 0.359E+02 | 0.03 | 2.23 | 0.03 | 0.00 | .10652E+04 |
| 260.07 | 0.00 | 0.03 | 2.8 | 0.357E+02 | 0.03 | 2.24 | 0.03 | 0.00 | .10861E+04 |
| 265.07 | 0.00 | 0.03 | 2.8 | 0.355E+02 | 0.03 | 2.25 | 0.03 | 0.00 | .11070E+04 |
| 270.07 | 0.00 | 0.03 | 2.8 | 0.353E+02 | 0.03 | 2.26 | 0.03 | 0.00 | .11279E+04 |
| 275.06 | 0.00 | 0.03 | 2.8 | 0.352E+02 | 0.03 | 2.28 | 0.03 | 0.00 | .11487E+04 |
| 280.06 | 0.00 | 0.03 | 2.9 | 0.350E+02 | 0.03 | 2.29 | 0.03 | 0.00 | .11696E+04 |
| 285.06 | 0.00 | 0.03 | 2.9 | 0.348E+02 | 0.03 | 2.30 | 0.03 | 0.00 | .11905E+04 |
| 290.06 | 0.00 | 0.03 | 2.9 | 0.347E+02 | 0.03 | 2.31 | 0.03 | 0.00 | .12114E+04 |
| 295.06 | 0.00 | 0.03 | 2.9 | 0.345E+02 | 0.03 | 2.32 | 0.03 | 0.00 | .12322E+04 |
| 300.06 | 0.00 | 0.03 | 2.9 | 0.343E+02 | 0.03 | 2.33 | 0.03 | 0.00 | .12531E+04 |
| 305.06 | 0.00 | 0.03 | 2.9 | 0.342E+02 | 0.03 | 2.34 | 0.03 | 0.00 | .12740E+04 |
| 310.05 | 0.00 | 0.03 | 2.9 | 0.340E+02 | 0.03 | 2.35 | 0.03 | 0.00 | .12949E+04 |
| 315.05 | 0.00 | 0.03 | 3.0 | 0.339E+02 | 0.03 | 2.36 | 0.03 | 0.00 | .13157E+04 |
| 320.05 | 0.00 | 0.03 | 3.0 | 0.337E+02 | 0.03 | 2.37 | 0.03 | 0.00 | .13366E+04 |
| 325.05 | 0.00 | 0.03 | 3.0 | 0.336E+02 | 0.03 | 2.38 | 0.03 | 0.00 | .13575E+04 |
| 330.05 | 0.00 | 0.03 | 3.0 | 0.334E+02 | 0.03 | 2.39 | 0.03 | 0.00 | .13784E+04 |
| 335.05 | 0.00 | 0.03 | 3.0 | 0.333E+02 | 0.03 | 2.40 | 0.03 | 0.00 | .13992E+04 |
| 340.05 | 0.00 | 0.03 | 3.0 | 0.332E+02 | 0.03 | 2.41 | 0.03 | 0.00 | .14201E+04 |
| 345.04 | 0.00 | 0.03 | 3.0 | 0.330E+02 | 0.03 | 2.42 | 0.03 | 0.00 | .14410E+04 |
| 350.04 | 0.00 | 0.03 | 3.0 | 0.329E+02 | 0.03 | 2.43 | 0.03 | 0.00 | .14619E+04 |
| 355.04 | 0.00 | 0.03 | 3.1 | 0.327E+02 | 0.03 | 2.44 | 0.03 | 0.00 | .14827E+04 |
| 360.04 | 0.00 | 0.03 | 3.1 | 0.326E+02 | 0.03 | 2.45 | 0.03 | 0.00 | .15036E+04 |
| 365.04 | 0.00 | 0.03 | 3.1 | 0.325E+02 | 0.03 | 2.46 | 0.03 | 0.00 | .15245E+04 |
| 370.04 | 0.00 | 0.03 | 3.1 | 0.323E+02 | 0.03 | 2.48 | 0.03 | 0.00 | .15454E+04 |
| 375.04 | 0.00 | 0.03 | 3.1 | 0.322E+02 | 0.03 | 2.49 | 0.03 | 0.00 | .15662E+04 |
| 380.03 | 0.00 | 0.03 | 3.1 | 0.321E+02 | 0.03 | 2.50 | 0.03 | 0.00 | .15871E+04 |
| 385.03 | 0.00 | 0.03 | 3.1 | 0.319E+02 | 0.03 | 2.51 | 0.03 | 0.00 | .16080E+04 |
| 390.03 | 0.00 | 0.03 | 3.1 | 0.318E+02 | 0.03 | 2.51 | 0.03 | 0.00 | .16289E+04 |
| 395.03 | 0.00 | 0.03 | 3.2 | 0.317E+02 | 0.03 | 2.52 | 0.03 | 0.00 | .16497E+04 |
| 400.03 | 0.00 | 0.03 | 3.2 | 0.316E+02 | 0.03 | 2.53 | 0.03 | 0.00 | .16706E+04 |
| 405.03 | 0.00 | 0.03 | 3.2 | 0.314E+02 | 0.03 | 2.54 | 0.03 | 0.00 | .16915E+04 |
| 410.03 | 0.00 | 0.03 | 3.2 | 0.313E+02 | 0.03 | 2.55 | 0.03 | 0.00 | .17124E+04 |
| 415.02 | 0.00 | 0.03 | 3.2 | 0.312E+02 | 0.03 | 2.56 | 0.03 | 0.00 | .17332E+04 |
| 420.02 | 0.00 | 0.03 | 3.2 | 0.311E+02 | 0.03 | 2.57 | 0.03 | 0.00 | .17541E+04 |
| 425.02 | 0.00 | 0.03 | 3.2 | 0.310E+02 | 0.03 | 2.58 | 0.03 | 0.00 | .17750E+04 |
| 430.02 | 0.00 | 0.03 | 3.2 | 0.309E+02 | 0.03 | 2.59 | 0.03 | 0.00 | .17959E+04 |
| 435.02 | 0.00 | 0.03 | 3.3 | 0.307E+02 | 0.03 | 2.60 | 0.03 | 0.00 | .18167E+04 |
| 440.02 | 0.00 | 0.03 | 3.3 | 0.306E+02 | 0.03 | 2.61 | 0.03 | 0.00 | .18376E+04 |
| 445.02 | 0.00 | 0.03 | 3.3 | 0.305E+02 | 0.03 | 2.62 | 0.03 | 0.00 | .18585E+04 |
| 450.01 | 0.00 | 0.03 | 3.3 | 0.304E+02 | 0.03 | 2.63 | 0.03 | 0.00 | .18794E+04 |
| 455.01 | 0.00 | 0.03 | 3.3 | 0.303E+02 | 0.03 | 2.64 | 0.03 | 0.00 | .19002E+04 |
| 460.01 | 0.00 | 0.03 | 3.3 | 0.302E+02 | 0.03 | 2.65 | 0.03 | 0.00 | .19211E+04 |
| 465.01 | 0.00 | 0.03 | 3.3 | 0.301E+02 | 0.03 | 2.66 | 0.03 | 0.00 | .19420E+04 |
| 470.01 | 0.00 | 0.03 | 3.3 | 0.300E+02 | 0.03 | 2.67 | 0.03 | 0.00 | .19629E+04 |
| 475.01 | 0.00 | 0.03 | 3.3 | 0.299E+02 | 0.03 | 2.68 | 0.03 | 0.00 | .19837E+04 |
| 480.01 | 0.00 | 0.03 | 3.4 | 0.298E+02 | 0.03 | 2.69 | 0.03 | 0.00 | .20046E+04 |
| 485.00 | 0.00 | 0.03 | 3.4 | 0.297E+02 | 0.03 | 2.70 | 0.03 | 0.00 | .20255E+04 |
| 490.00 | 0.00 | 0.03 | 3.4 | 0.296E+02 | 0.03 | 2.71 | 0.03 | 0.00 | .20464E+04 |
| 495.00 | 0.00 | 0.03 | 3.4 | 0.295E+02 | 0.03 | 2.72 | 0.03 | 0.00 | .20672E+04 |
| 500.00 | 0.00 | 0.03 | 3.4 | 0.294E+02 | 0.03 | 2.72 | 0.03 | 0.00 | .20881E+04 |

Cumulative travel time = 2088.1025 sec ( 0.58 hrs)

Simulation limit based on maximum specified distance = 500.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                    CORMIX MIXING ZONE EXPERT SYSTEM
                 Subsystem CORMIX1: Single Port Discharges
                         CORMIX Version 12.0GTD
                   HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro TMF Area
 Design case:       Year 11
 FILE NAME:         C:\... - Goldboro\Mar 2022 EARD\rev7\Y11-TMF_Outlet.prd
 Time stamp:        04/06/2022--21:54:03

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.45  HD    =      1.45
 UA    =      0.001 F     =      0.111 USTAR =0.8242E-04
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U        RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  LEFT      DISTB =      0.13
 D0    =      0.109 A0    =      0.009 H0    =      1.45  SUB0  =      0.00
 THETA =      0.00  SIGMA =    271.00
 U0    =      1.414 Q0    =      0.013       =0.1310E-01
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1        KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.1310E-01  M0    =0.1853E-01  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.10  LM    =  99999.00  Lm    =    194.46  Lb    =      0.00
                          Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2020.64

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4        1
 1  Applicable layer depth HS =    1.45        1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
```

XINT = 7000.00 XMAX = 7000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.13 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.05 | 1.414 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -82.00 SIGMAE= 271.08
LE = 0.54 XE = 0.00 YE = -0.08 ZE = 0.91

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.05 | 1.414 | .00000E+00 |
| 0.00 | -0.08 | 0.91 | 1.0 | 0.100E+03 | 0.05 | 1.414 | .19667E-02 |
| 0.00 | -0.08 | 0.91 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .39487E-02 |
| 0.00 | -0.08 | 0.90 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .79592E-02 |
| 0.00 | -0.08 | 0.89 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .12031E-01 |
| 0.00 | -0.08 | 0.89 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .16165E-01 |
| 0.00 | -0.08 | 0.88 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .20361E-01 |
| 0.00 | -0.08 | 0.87 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .24618E-01 |
| 0.00 | -0.08 | 0.86 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .28937E-01 |
| 0.00 | -0.08 | 0.86 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .33318E-01 |
| 0.00 | -0.08 | 0.85 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .37760E-01 |
| 0.00 | -0.09 | 0.84 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .42265E-01 |
| 0.00 | -0.09 | 0.83 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .46830E-01 |
| 0.00 | -0.09 | 0.82 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .51458E-01 |
| 0.00 | -0.09 | 0.82 | 1.0 | 0.994E+02 | 0.07 | 1.414 | .56147E-01 |
| 0.00 | -0.09 | 0.81 | 1.0 | 0.981E+02 | 0.07 | 1.414 | .60898E-01 |
| 0.00 | -0.09 | 0.80 | 1.0 | 0.968E+02 | 0.07 | 1.414 | .65711E-01 |
| 0.00 | -0.09 | 0.79 | 1.0 | 0.956E+02 | 0.07 | 1.414 | .70586E-01 |
| 0.00 | -0.09 | 0.79 | 1.1 | 0.944E+02 | 0.07 | 1.414 | .75522E-01 |
| 0.00 | -0.09 | 0.78 | 1.1 | 0.933E+02 | 0.07 | 1.414 | .80520E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.10 | 0.77 | 1.1 | 0.921E+02 | 0.07 | 1.414 | .85579E-01 |
| 0.00 | -0.10 | 0.76 | 1.1 | 0.910E+02 | 0.07 | 1.414 | .90701E-01 |
| 0.00 | -0.10 | 0.75 | 1.1 | 0.899E+02 | 0.07 | 1.414 | .95884E-01 |
| 0.00 | -0.10 | 0.75 | 1.1 | 0.889E+02 | 0.07 | 1.414 | .10113E+00 |
| 0.00 | -0.10 | 0.74 | 1.1 | 0.879E+02 | 0.07 | 1.414 | .10644E+00 |
| 0.00 | -0.10 | 0.73 | 1.2 | 0.869E+02 | 0.07 | 1.414 | .11180E+00 |
| 0.00 | -0.10 | 0.72 | 1.2 | 0.859E+02 | 0.08 | 1.414 | .11723E+00 |
| 0.00 | -0.10 | 0.72 | 1.2 | 0.849E+02 | 0.08 | 1.414 | .12272E+00 |
| 0.00 | -0.10 | 0.71 | 1.2 | 0.840E+02 | 0.08 | 1.402 | .12828E+00 |
| 0.00 | -0.11 | 0.70 | 1.2 | 0.830E+02 | 0.08 | 1.386 | .13389E+00 |
| 0.00 | -0.11 | 0.69 | 1.2 | 0.821E+02 | 0.08 | 1.371 | .13957E+00 |
| 0.00 | -0.11 | 0.69 | 1.2 | 0.813E+02 | 0.08 | 1.357 | .14531E+00 |
| 0.00 | -0.11 | 0.68 | 1.2 | 0.804E+02 | 0.08 | 1.342 | .15111E+00 |
| 0.00 | -0.11 | 0.67 | 1.3 | 0.796E+02 | 0.08 | 1.328 | .15697E+00 |
| 0.00 | -0.11 | 0.66 | 1.3 | 0.787E+02 | 0.08 | 1.314 | .16289E+00 |
| 0.00 | -0.11 | 0.65 | 1.3 | 0.779E+02 | 0.08 | 1.301 | .16888E+00 |
| 0.00 | -0.11 | 0.65 | 1.3 | 0.771E+02 | 0.08 | 1.288 | .17493E+00 |
| 0.00 | -0.11 | 0.64 | 1.3 | 0.763E+02 | 0.09 | 1.275 | .18104E+00 |
| 0.00 | -0.12 | 0.63 | 1.3 | 0.756E+02 | 0.09 | 1.262 | .18721E+00 |
| 0.00 | -0.12 | 0.62 | 1.3 | 0.748E+02 | 0.09 | 1.249 | .19344E+00 |
| 0.00 | -0.12 | 0.62 | 1.3 | 0.741E+02 | 0.09 | 1.237 | .19973E+00 |
| 0.00 | -0.12 | 0.61 | 1.4 | 0.734E+02 | 0.09 | 1.225 | .20609E+00 |
| 0.00 | -0.12 | 0.60 | 1.4 | 0.727E+02 | 0.09 | 1.213 | .21251E+00 |
| 0.00 | -0.12 | 0.59 | 1.4 | 0.720E+02 | 0.09 | 1.202 | .21898E+00 |
| 0.00 | -0.12 | 0.58 | 1.4 | 0.713E+02 | 0.09 | 1.191 | .22553E+00 |
| 0.00 | -0.12 | 0.58 | 1.4 | 0.707E+02 | 0.09 | 1.180 | .23213E+00 |
| 0.00 | -0.12 | 0.57 | 1.4 | 0.700E+02 | 0.09 | 1.169 | .23879E+00 |
| 0.00 | -0.12 | 0.56 | 1.4 | 0.694E+02 | 0.09 | 1.158 | .24552E+00 |
| 0.00 | -0.13 | 0.55 | 1.5 | 0.687E+02 | 0.09 | 1.147 | .25231E+00 |
| 0.00 | -0.13 | 0.55 | 1.5 | 0.681E+02 | 0.10 | 1.137 | .25916E+00 |
| 0.00 | -0.13 | 0.54 | 1.5 | 0.675E+02 | 0.10 | 1.127 | .26607E+00 |
| 0.00 | -0.13 | 0.53 | 1.5 | 0.669E+02 | 0.10 | 1.117 | .27304E+00 |
| 0.00 | -0.13 | 0.52 | 1.5 | 0.663E+02 | 0.10 | 1.107 | .28007E+00 |
| 0.00 | -0.13 | 0.52 | 1.5 | 0.657E+02 | 0.10 | 1.098 | .28717E+00 |
| 0.00 | -0.13 | 0.51 | 1.5 | 0.652E+02 | 0.10 | 1.088 | .29433E+00 |
| 0.00 | -0.13 | 0.50 | 1.5 | 0.646E+02 | 0.10 | 1.079 | .30155E+00 |
| 0.00 | -0.13 | 0.49 | 1.6 | 0.641E+02 | 0.10 | 1.070 | .30883E+00 |
| 0.00 | -0.14 | 0.48 | 1.6 | 0.635E+02 | 0.10 | 1.061 | .31617E+00 |
| 0.00 | -0.14 | 0.48 | 1.6 | 0.630E+02 | 0.10 | 1.052 | .32358E+00 |
| 0.00 | -0.14 | 0.47 | 1.6 | 0.625E+02 | 0.10 | 1.043 | .33104E+00 |
| 0.00 | -0.14 | 0.46 | 1.6 | 0.620E+02 | 0.10 | 1.035 | .33857E+00 |
| 0.00 | -0.14 | 0.45 | 1.6 | 0.615E+02 | 0.11 | 1.026 | .34616E+00 |
| 0.00 | -0.14 | 0.45 | 1.6 | 0.610E+02 | 0.11 | 1.018 | .35381E+00 |
| 0.00 | -0.14 | 0.44 | 1.7 | 0.605E+02 | 0.11 | 1.010 | .36153E+00 |
| 0.00 | -0.14 | 0.43 | 1.7 | 0.600E+02 | 0.11 | 1.002 | .36930E+00 |
| 0.00 | -0.14 | 0.42 | 1.7 | 0.593E+02 | 0.11 | 0.990 | .38108E+00 |
| 0.00 | -0.15 | 0.41 | 1.7 | 0.589E+02 | 0.11 | 0.983 | .38901E+00 |
| 0.00 | -0.15 | 0.40 | 1.7 | 0.584E+02 | 0.11 | 0.975 | .39700E+00 |
| 0.00 | -0.15 | 0.40 | 1.7 | 0.580E+02 | 0.11 | 0.968 | .40505E+00 |
| 0.00 | -0.15 | 0.39 | 1.7 | 0.575E+02 | 0.11 | 0.960 | .41317E+00 |
| 0.00 | -0.15 | 0.38 | 1.8 | 0.571E+02 | 0.11 | 0.953 | .42134E+00 |
| 0.00 | -0.15 | 0.37 | 1.8 | 0.567E+02 | 0.11 | 0.946 | .42958E+00 |
| 0.00 | -0.15 | 0.36 | 1.8 | 0.562E+02 | 0.12 | 0.939 | .43788E+00 |
| 0.00 | -0.15 | 0.36 | 1.8 | 0.558E+02 | 0.12 | 0.932 | .44624E+00 |

```
     0.00    -0.15    0.35      1.8 0.554E+02   0.12     0.925   .45467E+00
     0.00    -0.16    0.34      1.8 0.550E+02   0.12     0.918   .46315E+00
     0.00    -0.16    0.33      1.8 0.546E+02   0.12     0.912   .47170E+00
     0.00    -0.16    0.33      1.8 0.542E+02   0.12     0.905   .48031E+00
     0.00    -0.16    0.32      1.9 0.538E+02   0.12     0.899   .48898E+00
     0.00    -0.16    0.31      1.9 0.535E+02   0.12     0.892   .49771E+00
     0.00    -0.16    0.30      1.9 0.531E+02   0.12     0.886   .50650E+00
     0.00    -0.16    0.29      1.9 0.527E+02   0.12     0.880   .51536E+00
     0.00    -0.16    0.29      1.9 0.523E+02   0.12     0.874   .52427E+00
     0.00    -0.16    0.28      1.9 0.520E+02   0.13     0.868   .53325E+00
     0.00    -0.17    0.27      1.9 0.516E+02   0.13     0.862   .54229E+00
     0.00    -0.17    0.26      1.9 0.513E+02   0.13     0.856   .55140E+00
     0.00    -0.17    0.26      2.0 0.509E+02   0.13     0.850   .56056E+00
     0.00    -0.17    0.25      2.0 0.506E+02   0.13     0.845   .56978E+00
     0.00    -0.17    0.24      2.0 0.503E+02   0.13     0.839   .57907E+00
     0.00    -0.17    0.23      2.0 0.499E+02   0.13     0.834   .58842E+00
     0.00    -0.17    0.23      2.0 0.496E+02   0.13     0.828   .59783E+00
     0.00    -0.17    0.22      2.0 0.493E+02   0.13     0.823   .60730E+00
     0.00    -0.17    0.21      2.0 0.490E+02   0.13     0.817   .61684E+00
     0.00    -0.18    0.20      2.1 0.486E+02   0.13     0.812   .62643E+00
     0.00    -0.18    0.19      2.1 0.483E+02   0.13     0.807   .63609E+00
     0.00    -0.18    0.19      2.1 0.480E+02   0.14     0.802   .64581E+00
     0.00    -0.18    0.18      2.1 0.477E+02   0.14     0.797   .65559E+00
     0.00    -0.18    0.17      2.1 0.474E+02   0.14     0.792   .66543E+00
     0.00    -0.18    0.16      2.1 0.471E+02   0.14     0.787   .67534E+00
     0.00    -0.18    0.16      2.1 0.468E+02   0.14     0.782   .68530E+00
     0.00    -0.18    0.15      2.1 0.466E+02   0.14     0.777   .69533E+00
     0.00    -0.18    0.14      2.2 0.464E+02   0.14     0.775   .70037E+00
 Cumulative travel time =           0.7004 sec  (     0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

  Control volume inflow:
      X        Y       Z        S        C        B         TT
     0.00    -0.18    0.14      2.2 0.464E+02   0.14 .70037E+00

 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)
   TT = Cumulative travel time

      X        Y       Z        S        C        BV       BH      ZU      ZL        TT
    -0.14    -27.15    1.45      2.2 0.464E+02   0.00     0.00    1.45    1.45 .70037E+00
     0.02    -27.15    1.45      2.2 0.464E+02   1.45     6.16    1.45    0.00 .27632E+02
     0.18    -27.15    1.45      2.2 0.454E+02   1.45     8.71    1.45    0.00 .25480E+03
     0.34    -27.15    1.45      2.3 0.431E+02   1.45    10.66    1.45    0.00 .48196E+03
     0.50    -27.15    1.45      2.5 0.404E+02   1.45    12.31    1.45    0.00 .70913E+03
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.66 | -27.15 | 1.45 | 2.6 | 0.379E+02 | 1.45 | 13.76 | 1.45 | 0.00 | .93630E+03 |
| 0.82 | -27.15 | 1.45 | 2.8 | 0.361E+02 | 1.45 | 15.08 | 1.45 | 0.00 | .11635E+04 |
| 0.98 | -27.15 | 1.45 | 2.9 | 0.348E+02 | 1.45 | 16.29 | 1.45 | 0.00 | .13906E+04 |
| 1.14 | -27.15 | 1.45 | 2.9 | 0.340E+02 | 1.45 | 17.41 | 1.45 | 0.00 | .16178E+04 |
| 1.29 | -27.15 | 1.45 | 3.0 | 0.336E+02 | 1.45 | 18.47 | 1.45 | 0.00 | .18450E+04 |
| 1.45 | -27.15 | 1.45 | 3.0 | 0.332E+02 | 1.45 | 19.47 | 1.45 | 0.00 | .20721E+04 |

Cumulative travel time = 2072.1292 sec ( 0.58 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.638E-03 m^2/s
Horizontal diffusivity (initial value) = 0.785E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.45 | -27.15 | 1.45 | 3.0 | 0.332E+02 | 1.45 | 19.47 | 1.45 | 0.00 | .20721E+04 |
| 1.46 | -27.15 | 1.45 | 3.0 | 0.330E+02 | 1.45 | 19.54 | 1.45 | 0.00 | .20837E+04 |
| 1.47 | -27.15 | 1.45 | 3.0 | 0.329E+02 | 1.45 | 19.61 | 1.45 | 0.00 | .20954E+04 |
| 1.48 | -27.15 | 1.45 | 3.1 | 0.328E+02 | 1.45 | 19.69 | 1.45 | 0.00 | .21070E+04 |
| 1.49 | -27.15 | 1.45 | 3.1 | 0.327E+02 | 1.45 | 19.76 | 1.45 | 0.00 | .21186E+04 |
| 1.49 | -27.15 | 1.45 | 3.1 | 0.325E+02 | 1.45 | 19.83 | 1.45 | 0.00 | .21302E+04 |
| 1.50 | -27.15 | 1.45 | 3.1 | 0.324E+02 | 1.45 | 19.91 | 1.45 | 0.00 | .21418E+04 |
| 1.51 | -27.15 | 1.45 | 3.1 | 0.323E+02 | 1.45 | 19.98 | 1.45 | 0.00 | .21535E+04 |
| 1.52 | -27.15 | 1.45 | 3.1 | 0.322E+02 | 1.45 | 20.06 | 1.45 | 0.00 | .21651E+04 |
| 1.53 | -27.15 | 1.45 | 3.1 | 0.321E+02 | 1.45 | 20.13 | 1.45 | 0.00 | .21767E+04 |
| 1.54 | -27.15 | 1.45 | 3.1 | 0.319E+02 | 1.45 | 20.21 | 1.45 | 0.00 | .21883E+04 |
| 1.54 | -27.15 | 1.45 | 3.1 | 0.318E+02 | 1.45 | 20.28 | 1.45 | 0.00 | .21999E+04 |
| 1.55 | -27.15 | 1.45 | 3.2 | 0.317E+02 | 1.45 | 20.36 | 1.45 | 0.00 | .22115E+04 |
| 1.56 | -27.15 | 1.45 | 3.2 | 0.316E+02 | 1.45 | 20.43 | 1.45 | 0.00 | .22232E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.57 | -27.15 | 1.45 | 3.2 | 0.315E+02 | 1.45 | 20.51 | 1.45 | 0.00 | .22348E+04 |
| 1.58 | -27.15 | 1.45 | 3.2 | 0.314E+02 | 1.45 | 20.58 | 1.45 | 0.00 | .22464E+04 |
| 1.58 | -27.15 | 1.45 | 3.2 | 0.312E+02 | 1.45 | 20.66 | 1.45 | 0.00 | .22580E+04 |
| 1.59 | -27.15 | 1.45 | 3.2 | 0.311E+02 | 1.45 | 20.73 | 1.45 | 0.00 | .22696E+04 |
| 1.60 | -27.15 | 1.45 | 3.2 | 0.310E+02 | 1.45 | 20.81 | 1.45 | 0.00 | .22812E+04 |
| 1.61 | -27.15 | 1.45 | 3.2 | 0.309E+02 | 1.45 | 20.88 | 1.45 | 0.00 | .22929E+04 |
| 1.62 | -27.15 | 1.45 | 3.2 | 0.308E+02 | 1.45 | 20.96 | 1.45 | 0.00 | .23045E+04 |
| 1.62 | -27.15 | 1.45 | 3.3 | 0.307E+02 | 1.45 | 21.03 | 1.45 | 0.00 | .23161E+04 |
| 1.63 | -27.15 | 1.45 | 3.3 | 0.306E+02 | 1.45 | 21.11 | 1.45 | 0.00 | .23277E+04 |
| 1.64 | -27.15 | 1.45 | 3.3 | 0.305E+02 | 1.45 | 21.18 | 1.45 | 0.00 | .23393E+04 |
| 1.65 | -27.15 | 1.45 | 3.3 | 0.304E+02 | 1.45 | 21.26 | 1.45 | 0.00 | .23510E+04 |
| 1.66 | -27.15 | 1.45 | 3.3 | 0.302E+02 | 1.45 | 21.34 | 1.45 | 0.00 | .23626E+04 |
| 1.67 | -27.15 | 1.45 | 3.3 | 0.301E+02 | 1.45 | 21.41 | 1.45 | 0.00 | .23742E+04 |
| 1.67 | -27.15 | 1.45 | 3.3 | 0.300E+02 | 1.45 | 21.49 | 1.45 | 0.00 | .23858E+04 |
| 1.68 | -27.15 | 1.45 | 3.3 | 0.299E+02 | 1.45 | 21.56 | 1.45 | 0.00 | .23974E+04 |
| 1.69 | -27.15 | 1.45 | 3.4 | 0.298E+02 | 1.45 | 21.64 | 1.45 | 0.00 | .24090E+04 |
| 1.70 | -27.15 | 1.45 | 3.4 | 0.297E+02 | 1.45 | 21.72 | 1.45 | 0.00 | .24207E+04 |
| 1.71 | -27.15 | 1.45 | 3.4 | 0.296E+02 | 1.45 | 21.79 | 1.45 | 0.00 | .24323E+04 |
| 1.71 | -27.15 | 1.45 | 3.4 | 0.295E+02 | 1.45 | 21.87 | 1.45 | 0.00 | .24439E+04 |
| 1.72 | -27.15 | 1.45 | 3.4 | 0.294E+02 | 1.45 | 21.95 | 1.45 | 0.00 | .24555E+04 |
| 1.73 | -27.15 | 1.45 | 3.4 | 0.293E+02 | 1.45 | 22.02 | 1.45 | 0.00 | .24671E+04 |
| 1.74 | -27.15 | 1.45 | 3.4 | 0.292E+02 | 1.45 | 22.10 | 1.45 | 0.00 | .24788E+04 |
| 1.75 | -27.15 | 1.45 | 3.4 | 0.291E+02 | 1.45 | 22.18 | 1.45 | 0.00 | .24904E+04 |
| 1.75 | -27.15 | 1.45 | 3.4 | 0.290E+02 | 1.45 | 22.25 | 1.45 | 0.00 | .25020E+04 |
| 1.76 | -27.15 | 1.45 | 3.5 | 0.289E+02 | 1.45 | 22.33 | 1.45 | 0.00 | .25136E+04 |
| 1.77 | -27.15 | 1.45 | 3.5 | 0.288E+02 | 1.45 | 22.41 | 1.45 | 0.00 | .25252E+04 |
| 1.78 | -27.15 | 1.45 | 3.5 | 0.287E+02 | 1.45 | 22.48 | 1.45 | 0.00 | .25368E+04 |
| 1.79 | -27.15 | 1.45 | 3.5 | 0.286E+02 | 1.45 | 22.56 | 1.45 | 0.00 | .25485E+04 |
| 1.80 | -27.15 | 1.45 | 3.5 | 0.285E+02 | 1.45 | 22.64 | 1.45 | 0.00 | .25601E+04 |
| 1.80 | -27.15 | 1.45 | 3.5 | 0.284E+02 | 1.45 | 22.72 | 1.45 | 0.00 | .25717E+04 |
| 1.81 | -27.15 | 1.45 | 3.5 | 0.283E+02 | 1.45 | 22.79 | 1.45 | 0.00 | .25833E+04 |
| 1.82 | -27.15 | 1.45 | 3.5 | 0.282E+02 | 1.45 | 22.87 | 1.45 | 0.00 | .25949E+04 |
| 1.83 | -27.15 | 1.45 | 3.6 | 0.281E+02 | 1.45 | 22.95 | 1.45 | 0.00 | .26065E+04 |
| 1.84 | -27.15 | 1.45 | 3.6 | 0.280E+02 | 1.45 | 23.03 | 1.45 | 0.00 | .26182E+04 |
| 1.84 | -27.15 | 1.45 | 3.6 | 0.279E+02 | 1.45 | 23.10 | 1.45 | 0.00 | .26298E+04 |
| 1.85 | -27.15 | 1.45 | 3.6 | 0.278E+02 | 1.45 | 23.18 | 1.45 | 0.00 | .26414E+04 |
| 1.86 | -27.15 | 1.45 | 3.6 | 0.277E+02 | 1.45 | 23.26 | 1.45 | 0.00 | .26530E+04 |
| 1.87 | -27.15 | 1.45 | 3.6 | 0.276E+02 | 1.45 | 23.34 | 1.45 | 0.00 | .26646E+04 |
| 1.88 | -27.15 | 1.45 | 3.6 | 0.276E+02 | 1.45 | 23.42 | 1.45 | 0.00 | .26763E+04 |
| 1.88 | -27.15 | 1.45 | 3.6 | 0.275E+02 | 1.45 | 23.50 | 1.45 | 0.00 | .26879E+04 |
| 1.89 | -27.15 | 1.45 | 3.7 | 0.274E+02 | 1.45 | 23.57 | 1.45 | 0.00 | .26995E+04 |
| 1.90 | -27.15 | 1.45 | 3.7 | 0.273E+02 | 1.45 | 23.65 | 1.45 | 0.00 | .27111E+04 |
| 1.91 | -27.15 | 1.45 | 3.7 | 0.272E+02 | 1.45 | 23.73 | 1.45 | 0.00 | .27227E+04 |
| 1.92 | -27.15 | 1.45 | 3.7 | 0.271E+02 | 1.45 | 23.81 | 1.45 | 0.00 | .27343E+04 |
| 1.93 | -27.15 | 1.45 | 3.7 | 0.270E+02 | 1.45 | 23.89 | 1.45 | 0.00 | .27460E+04 |
| 1.93 | -27.15 | 1.45 | 3.7 | 0.269E+02 | 1.45 | 23.97 | 1.45 | 0.00 | .27576E+04 |
| 1.94 | -27.15 | 1.45 | 3.7 | 0.268E+02 | 1.45 | 24.05 | 1.45 | 0.00 | .27692E+04 |
| 1.95 | -27.15 | 1.45 | 3.7 | 0.267E+02 | 1.45 | 24.13 | 1.45 | 0.00 | .27808E+04 |
| 1.96 | -27.15 | 1.45 | 3.8 | 0.267E+02 | 1.45 | 24.20 | 1.45 | 0.00 | .27924E+04 |
| 1.97 | -27.15 | 1.45 | 3.8 | 0.266E+02 | 1.45 | 24.28 | 1.45 | 0.00 | .28041E+04 |
| 1.97 | -27.15 | 1.45 | 3.8 | 0.265E+02 | 1.45 | 24.36 | 1.45 | 0.00 | .28157E+04 |
| 1.98 | -27.15 | 1.45 | 3.8 | 0.264E+02 | 1.45 | 24.44 | 1.45 | 0.00 | .28273E+04 |
| 1.99 | -27.15 | 1.45 | 3.8 | 0.263E+02 | 1.45 | 24.52 | 1.45 | 0.00 | .28389E+04 |
| 2.00 | -27.15 | 1.45 | 3.8 | 0.262E+02 | 1.45 | 24.60 | 1.45 | 0.00 | .28505E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2.01 | -27.15 | 1.45 | 3.8 | 0.261E+02 | 1.45 | 24.68 | 1.45 | 0.00 | .28621E+04 |
| 2.02 | -27.15 | 1.45 | 3.8 | 0.261E+02 | 1.45 | 24.76 | 1.45 | 0.00 | .28738E+04 |
| 2.02 | -27.15 | 1.45 | 3.8 | 0.260E+02 | 1.45 | 24.84 | 1.45 | 0.00 | .28854E+04 |
| 2.03 | -27.15 | 1.45 | 3.9 | 0.259E+02 | 1.45 | 24.92 | 1.45 | 0.00 | .28970E+04 |
| 2.04 | -27.15 | 1.45 | 3.9 | 0.258E+02 | 1.45 | 25.00 | 1.45 | 0.00 | .29086E+04 |
| 2.05 | -27.15 | 1.45 | 3.9 | 0.257E+02 | 1.45 | 25.08 | 1.45 | 0.00 | .29202E+04 |
| 2.06 | -27.15 | 1.45 | 3.9 | 0.256E+02 | 1.45 | 25.16 | 1.45 | 0.00 | .29318E+04 |
| 2.06 | -27.15 | 1.45 | 3.9 | 0.256E+02 | 1.45 | 25.24 | 1.45 | 0.00 | .29435E+04 |
| 2.07 | -27.15 | 1.45 | 3.9 | 0.255E+02 | 1.45 | 25.32 | 1.45 | 0.00 | .29551E+04 |
| 2.08 | -27.15 | 1.45 | 3.9 | 0.254E+02 | 1.45 | 25.40 | 1.45 | 0.00 | .29667E+04 |
| 2.09 | -27.15 | 1.45 | 3.9 | 0.253E+02 | 1.45 | 25.48 | 1.45 | 0.00 | .29783E+04 |
| 2.10 | -27.15 | 1.45 | 4.0 | 0.252E+02 | 1.45 | 25.56 | 1.45 | 0.00 | .29899E+04 |
| 2.10 | -27.15 | 1.45 | 4.0 | 0.252E+02 | 1.45 | 25.64 | 1.45 | 0.00 | .30016E+04 |
| 2.11 | -27.15 | 1.45 | 4.0 | 0.251E+02 | 1.45 | 25.72 | 1.45 | 0.00 | .30132E+04 |
| 2.12 | -27.15 | 1.45 | 4.0 | 0.250E+02 | 1.45 | 25.81 | 1.45 | 0.00 | .30248E+04 |
| 2.13 | -27.15 | 1.45 | 4.0 | 0.249E+02 | 1.45 | 25.89 | 1.45 | 0.00 | .30364E+04 |
| 2.14 | -27.15 | 1.45 | 4.0 | 0.249E+02 | 1.45 | 25.97 | 1.45 | 0.00 | .30480E+04 |
| 2.15 | -27.15 | 1.45 | 4.0 | 0.248E+02 | 1.45 | 26.05 | 1.45 | 0.00 | .30596E+04 |
| 2.15 | -27.15 | 1.45 | 4.0 | 0.247E+02 | 1.45 | 26.13 | 1.45 | 0.00 | .30713E+04 |
| 2.16 | -27.15 | 1.45 | 4.1 | 0.246E+02 | 1.45 | 26.21 | 1.45 | 0.00 | .30829E+04 |
| 2.17 | -27.15 | 1.45 | 4.1 | 0.245E+02 | 1.45 | 26.29 | 1.45 | 0.00 | .30945E+04 |
| 2.18 | -27.15 | 1.45 | 4.1 | 0.245E+02 | 1.45 | 26.37 | 1.45 | 0.00 | .31061E+04 |
| 2.19 | -27.15 | 1.45 | 4.1 | 0.244E+02 | 1.45 | 26.46 | 1.45 | 0.00 | .31177E+04 |
| 2.19 | -27.15 | 1.45 | 4.1 | 0.243E+02 | 1.45 | 26.54 | 1.45 | 0.00 | .31293E+04 |
| 2.20 | -27.15 | 1.45 | 4.1 | 0.242E+02 | 1.45 | 26.62 | 1.45 | 0.00 | .31410E+04 |
| 2.21 | -27.15 | 1.45 | 4.1 | 0.242E+02 | 1.45 | 26.70 | 1.45 | 0.00 | .31526E+04 |
| 2.22 | -27.15 | 1.45 | 4.2 | 0.241E+02 | 1.45 | 26.78 | 1.45 | 0.00 | .31642E+04 |
| 2.23 | -27.15 | 1.45 | 4.2 | 0.240E+02 | 1.45 | 26.86 | 1.45 | 0.00 | .31758E+04 |
| 2.23 | -27.15 | 1.45 | 4.2 | 0.239E+02 | 1.45 | 26.95 | 1.45 | 0.00 | .31874E+04 |
| 2.24 | -27.15 | 1.45 | 4.2 | 0.239E+02 | 1.45 | 27.03 | 1.45 | 0.00 | .31991E+04 |
| 2.25 | -27.15 | 1.45 | 4.2 | 0.238E+02 | 1.45 | 27.11 | 1.45 | 0.00 | .32107E+04 |
| 2.26 | -27.15 | 1.45 | 4.2 | 0.237E+02 | 1.45 | 27.19 | 1.45 | 0.00 | .32223E+04 |
| 2.27 | -27.15 | 1.45 | 4.2 | 0.237E+02 | 1.45 | 27.28 | 1.45 | 0.00 | .32339E+04 |

Cumulative travel time = 3233.9104 sec ( 0.90 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 2.27 | 0.13 | 1.45 | 4.2 | 0.237E+02 | 1.45 | 54.55 | 1.45 | 0.00 | .32339E+04 |
| 72.24 | 0.13 | 1.45 | 173.9 | 0.575E+00 | 1.45 | 2244.21 | 1.45 | 0.00 | .10320E+06 |
| 142.22 | 0.13 | 1.45 | 461.2 | 0.217E+00 | 1.45 | 5952.32 | 1.45 | 0.00 | .20317E+06 |
| 212.20 | 0.13 | 1.45 | 828.8 | 0.121E+00 | 1.45 | 10696.54 | 1.45 | 0.00 | .30314E+06 |
| 282.18 | 0.13 | 1.45 | 1261.8 | 0.792E-01 | 1.45 | 16285.77 | 1.45 | 0.00 | .40310E+06 |
| 352.15 | 0.13 | 1.45 | 1751.6 | 0.571E-01 | 1.45 | 22607.37 | 1.45 | 0.00 | .50307E+06 |
| 422.13 | 0.13 | 1.45 | 2292.2 | 0.436E-01 | 1.45 | 29584.60 | 1.45 | 0.00 | .60304E+06 |
| 492.11 | 0.13 | 1.45 | 2879.3 | 0.347E-01 | 1.45 | 37160.80 | 1.45 | 0.00 | .70301E+06 |
| 562.09 | 0.13 | 1.45 | 3509.3 | 0.285E-01 | 1.45 | 45291.89 | 1.45 | 0.00 | .80297E+06 |
| 632.06 | 0.13 | 1.45 | 4179.5 | 0.239E-01 | 1.45 | 53942.27 | 1.45 | 0.00 | .90294E+06 |
| 702.04 | 0.13 | 1.45 | 4887.7 | 0.205E-01 | 1.45 | 63082.48 | 1.45 | 0.00 | .10029E+07 |
| 772.02 | 0.13 | 1.45 | 5631.9 | 0.178E-01 | 1.45 | 72687.55 | 1.45 | 0.00 | .11029E+07 |
| 841.99 | 0.13 | 1.45 | 6410.5 | 0.156E-01 | 1.45 | 82735.98 | 1.45 | 0.00 | .12028E+07 |
| 911.97 | 0.13 | 1.45 | 7221.9 | 0.138E-01 | 1.45 | 93208.99 | 1.45 | 0.00 | .13028E+07 |
| 981.95 | 0.13 | 1.45 | 8065.0 | 0.124E-01 | 1.45 | ******** | 1.45 | 0.00 | .14028E+07 |
| 1051.93 | 0.13 | 1.45 | 8938.5 | 0.112E-01 | 1.45 | ******** | 1.45 | 0.00 | .15027E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1121.90 | 0.13 | 1.45 | 9841.5 | 0.102E-01 | 1.45 | ******** | 1.45 | 0.00 | .16027E+07 |
| 1191.88 | 0.13 | 1.45 | 10773.0 | 0.928E-02 | 1.45 | ******** | 1.45 | 0.00 | .17027E+07 |
| 1261.86 | 0.13 | 1.45 | 11732.2 | 0.852E-02 | 1.45 | ******** | 1.45 | 0.00 | .18027E+07 |
| 1331.84 | 0.13 | 1.45 | 12718.2 | 0.786E-02 | 1.45 | ******** | 1.45 | 0.00 | .19026E+07 |
| 1401.81 | 0.13 | 1.45 | 13730.5 | 0.728E-02 | 1.45 | ******** | 1.45 | 0.00 | .20026E+07 |
| 1471.79 | 0.13 | 1.45 | 14768.2 | 0.677E-02 | 1.45 | ******** | 1.45 | 0.00 | .21026E+07 |
| 1541.77 | 0.13 | 1.45 | 15830.8 | 0.632E-02 | 1.45 | ******** | 1.45 | 0.00 | .22025E+07 |
| 1611.75 | 0.13 | 1.45 | 16917.8 | 0.591E-02 | 1.45 | ******** | 1.45 | 0.00 | .23025E+07 |
| 1681.72 | 0.13 | 1.45 | 18028.6 | 0.555E-02 | 1.45 | ******** | 1.45 | 0.00 | .24025E+07 |
| 1751.70 | 0.13 | 1.45 | 19162.7 | 0.522E-02 | 1.45 | ******** | 1.45 | 0.00 | .25024E+07 |
| 1821.68 | 0.13 | 1.45 | 20319.6 | 0.492E-02 | 1.45 | ******** | 1.45 | 0.00 | .26024E+07 |
| 1891.65 | 0.13 | 1.45 | 21498.9 | 0.465E-02 | 1.45 | ******** | 1.45 | 0.00 | .27024E+07 |
| 1961.63 | 0.13 | 1.45 | 22700.1 | 0.441E-02 | 1.45 | ******** | 1.45 | 0.00 | .28023E+07 |
| 2031.61 | 0.13 | 1.45 | 23923.0 | 0.418E-02 | 1.45 | ******** | 1.45 | 0.00 | .29023E+07 |
| 2101.59 | 0.13 | 1.45 | 25167.0 | 0.397E-02 | 1.45 | ******** | 1.45 | 0.00 | .30023E+07 |
| 2171.56 | 0.13 | 1.45 | 26431.9 | 0.378E-02 | 1.45 | ******** | 1.45 | 0.00 | .31022E+07 |
| 2241.54 | 0.13 | 1.45 | 27717.3 | 0.361E-02 | 1.45 | ******** | 1.45 | 0.00 | .32022E+07 |
| 2311.52 | 0.13 | 1.45 | 29022.9 | 0.345E-02 | 1.45 | ******** | 1.45 | 0.00 | .33022E+07 |
| 2381.50 | 0.13 | 1.45 | 30348.3 | 0.330E-02 | 1.45 | ******** | 1.45 | 0.00 | .34021E+07 |
| 2451.47 | 0.13 | 1.45 | 31693.4 | 0.316E-02 | 1.45 | ******** | 1.45 | 0.00 | .35021E+07 |
| 2521.45 | 0.13 | 1.45 | 33057.7 | 0.303E-02 | 1.45 | ******** | 1.45 | 0.00 | .36021E+07 |
| 2591.43 | 0.13 | 1.45 | 34441.1 | 0.290E-02 | 1.45 | ******** | 1.45 | 0.00 | .37020E+07 |
| 2661.40 | 0.13 | 1.45 | 35843.2 | 0.279E-02 | 1.45 | ******** | 1.45 | 0.00 | .38020E+07 |
| 2731.38 | 0.13 | 1.45 | 37263.9 | 0.268E-02 | 1.45 | ******** | 1.45 | 0.00 | .39020E+07 |
| 2801.36 | 0.13 | 1.45 | 38702.9 | 0.258E-02 | 1.45 | ******** | 1.45 | 0.00 | .40019E+07 |
| 2871.34 | 0.13 | 1.45 | 40159.9 | 0.249E-02 | 1.45 | ******** | 1.45 | 0.00 | .41019E+07 |
| 2941.31 | 0.13 | 1.45 | 41634.8 | 0.240E-02 | 1.45 | ******** | 1.45 | 0.00 | .42019E+07 |
| 3011.29 | 0.13 | 1.45 | 43127.3 | 0.232E-02 | 1.45 | ******** | 1.45 | 0.00 | .43018E+07 |
| 3081.27 | 0.13 | 1.45 | 44637.2 | 0.224E-02 | 1.45 | ******** | 1.45 | 0.00 | .44018E+07 |
| 3151.25 | 0.13 | 1.45 | 46164.4 | 0.217E-02 | 1.45 | ******** | 1.45 | 0.00 | .45018E+07 |
| 3221.22 | 0.13 | 1.45 | 47708.5 | 0.210E-02 | 1.45 | ******** | 1.45 | 0.00 | .46017E+07 |
| 3291.20 | 0.13 | 1.45 | 49269.6 | 0.203E-02 | 1.45 | ******** | 1.45 | 0.00 | .47017E+07 |
| 3361.18 | 0.13 | 1.45 | 50847.2 | 0.197E-02 | 1.45 | ******** | 1.45 | 0.00 | .48017E+07 |
| 3431.15 | 0.13 | 1.45 | 52441.4 | 0.191E-02 | 1.45 | ******** | 1.45 | 0.00 | .49016E+07 |
| 3501.13 | 0.13 | 1.45 | 54051.9 | 0.185E-02 | 1.45 | ******** | 1.45 | 0.00 | .50016E+07 |
| 3571.11 | 0.13 | 1.45 | 55678.5 | 0.180E-02 | 1.45 | ******** | 1.45 | 0.00 | .51016E+07 |
| 3641.09 | 0.13 | 1.45 | 57321.2 | 0.174E-02 | 1.45 | ******** | 1.45 | 0.00 | .52015E+07 |
| 3711.06 | 0.13 | 1.45 | 58979.6 | 0.170E-02 | 1.45 | ******** | 1.45 | 0.00 | .53015E+07 |
| 3781.04 | 0.13 | 1.45 | 60653.8 | 0.165E-02 | 1.45 | ******** | 1.45 | 0.00 | .54015E+07 |
| 3851.02 | 0.13 | 1.45 | 62343.5 | 0.160E-02 | 1.45 | ******** | 1.45 | 0.00 | .55015E+07 |
| 3921.00 | 0.13 | 1.45 | 64048.7 | 0.156E-02 | 1.45 | ******** | 1.45 | 0.00 | .56014E+07 |
| 3990.97 | 0.13 | 1.45 | 65769.1 | 0.152E-02 | 1.45 | ******** | 1.45 | 0.00 | .57014E+07 |
| 4060.95 | 0.13 | 1.45 | 67504.6 | 0.148E-02 | 1.45 | ******** | 1.45 | 0.00 | .58014E+07 |
| 4130.93 | 0.13 | 1.45 | 69255.1 | 0.144E-02 | 1.45 | ******** | 1.45 | 0.00 | .59013E+07 |
| 4200.91 | 0.13 | 1.45 | 71020.6 | 0.141E-02 | 1.45 | ******** | 1.45 | 0.00 | .60013E+07 |
| 4270.88 | 0.13 | 1.45 | 72800.7 | 0.137E-02 | 1.45 | ******** | 1.45 | 0.00 | .61013E+07 |
| 4340.86 | 0.13 | 1.45 | 74595.5 | 0.134E-02 | 1.45 | ******** | 1.45 | 0.00 | .62012E+07 |
| 4410.84 | 0.13 | 1.45 | 76404.8 | 0.131E-02 | 1.45 | ******** | 1.45 | 0.00 | .63012E+07 |
| 4480.82 | 0.13 | 1.45 | 78228.6 | 0.128E-02 | 1.45 | ******** | 1.45 | 0.00 | .64012E+07 |
| 4550.79 | 0.13 | 1.45 | 80066.5 | 0.125E-02 | 1.45 | ******** | 1.45 | 0.00 | .65011E+07 |
| 4620.77 | 0.13 | 1.45 | 81918.7 | 0.122E-02 | 1.45 | ******** | 1.45 | 0.00 | .66011E+07 |
| 4690.75 | 0.13 | 1.45 | 83784.9 | 0.119E-02 | 1.45 | ******** | 1.45 | 0.00 | .67011E+07 |
| 4760.73 | 0.13 | 1.45 | 85665.1 | 0.117E-02 | 1.45 | ******** | 1.45 | 0.00 | .68010E+07 |
| 4830.70 | 0.13 | 1.45 | 87559.2 | 0.114E-02 | 1.45 | ******** | 1.45 | 0.00 | .69010E+07 |

```
  4900.68     0.13    1.45 89467.0 0.112E-02   1.45 ********    1.45    0.00 .70010E+07
  4970.66     0.13    1.45 91388.4 0.109E-02   1.45 ********    1.45    0.00 .71009E+07
  5040.64     0.13    1.45 93323.5 0.107E-02   1.45 ********    1.45    0.00 .72009E+07
  5110.61     0.13    1.45 95272.0 0.105E-02   1.45 ********    1.45    0.00 .73009E+07
  5180.59     0.13    1.45 97233.8 0.103E-02   1.45 ********    1.45    0.00 .74008E+07
  5250.57     0.13    1.45 99209.0 0.101E-02   1.45 ********    1.45    0.00 .75008E+07
  5320.55     0.13    1.45 ******* 0.988E-03   1.45 ********    1.45    0.00 .76008E+07
  5390.52     0.13    1.45 ******* 0.969E-03   1.45 ********    1.45    0.00 .77007E+07
  5460.50     0.13    1.45 ******* 0.950E-03   1.45 ********    1.45    0.00 .78007E+07
  5530.48     0.13    1.45 ******* 0.932E-03   1.45 ********    1.45    0.00 .79007E+07
  5600.46     0.13    1.45 ******* 0.915E-03   1.45 ********    1.45    0.00 .80006E+07
  5670.43     0.13    1.45 ******* 0.898E-03   1.45 ********    1.45    0.00 .81006E+07
  5740.41     0.13    1.45 ******* 0.882E-03   1.45 ********    1.45    0.00 .82006E+07
  5810.39     0.13    1.45 ******* 0.866E-03   1.45 ********    1.45    0.00 .83006E+07
  5880.37     0.13    1.45 ******* 0.851E-03   1.45 ********    1.45    0.00 .84005E+07
  5950.34     0.13    1.45 ******* 0.836E-03   1.45 ********    1.45    0.00 .85005E+07
  6020.32     0.13    1.45 ******* 0.821E-03   1.45 ********    1.45    0.00 .86005E+07
  6090.30     0.13    1.45 ******* 0.807E-03   1.45 ********    1.45    0.00 .87004E+07
  6160.28     0.13    1.45 ******* 0.793E-03   1.45 ********    1.45    0.00 .88004E+07
  6230.25     0.13    1.45 ******* 0.780E-03   1.45 ********    1.45    0.00 .89004E+07
  6300.23     0.13    1.45 ******* 0.767E-03   1.45 ********    1.45    0.00 .90003E+07
  6370.21     0.13    1.45 ******* 0.754E-03   1.45 ********    1.45    0.00 .91003E+07
  6440.19     0.13    1.45 ******* 0.742E-03   1.45 ********    1.45    0.00 .92003E+07
  6510.16     0.13    1.45 ******* 0.730E-03   1.45 ********    1.45    0.00 .93002E+07
  6580.14     0.13    1.45 ******* 0.719E-03   1.45 ********    1.45    0.00 .94002E+07
  6650.12     0.13    1.45 ******* 0.707E-03   1.45 ********    1.45    0.00 .95002E+07
  6720.10     0.13    1.45 ******* 0.696E-03   1.45 ********    1.45    0.00 .96001E+07
  6790.07     0.13    1.45 ******* 0.686E-03   1.45 ********    1.45    0.00 .97001E+07
  6860.05     0.13    1.45 ******* 0.675E-03   1.45 ********    1.45    0.00 .98001E+07
  6930.03     0.13    1.45 ******* 0.665E-03   1.45 ********    1.45    0.00 .99000E+07
  7000.01     0.13    1.45 ******* 0.655E-03   1.45 ********    1.45    0.00 .10000E+08
 Cumulative travel time =     9999996.0000 sec  ( 2777.78 hrs)
```

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance =   7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

```
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges            End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
```

```
CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                    CORMIX MIXING ZONE EXPERT SYSTEM
                 Subsystem CORMIX1: Single Port Discharges
                         CORMIX Version 12.0GTD
                   HYDRO1 Version 12.0.0.0 December 2020
------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro Northwest Area
 Design case:       Year 11
 FILE NAME:         C:\... - Goldboro\Mar 2022 EARD\rev7\Y11-North_Pond.prd
 Time stamp:        04/06/2022--21:55:35

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.22  HD    =      1.22
 UA    =      0.001 F     =      0.066 USTAR =0.6363E-04
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  RIGHT     DISTB =      0.13
 D0    =      0.041 A0    =      0.001 H0    =      1.22  SUB0  =      0.00
 THETA =      0.00  SIGMA =     90.00
 U0    =      1.418 Q0    =      0.002       =0.1900E-02
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.1900E-02  M0    =0.2693E-02  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =     74.14  Lb    =      0.00
                    Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2025.09

FLOW CLASSIFICATION
 1111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4         1
 1  Applicable layer depth HS =    1.22         1
 1111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  1
```

REGSPC= 1 XREG = 100.00 WREG = 0.00 AREG = 0.00
XINT = 8000.00 XMAX = 8000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.13 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.

COORDINATE SYSTEM SPECIFIED (WGS84 Decimal):
PHI = 178.00 ALPHA = 88.00
LAT = 45.2066994
LON = -61.6408005

NSTEP = 100 display intervals per module

---

---

BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE

---

---

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -81.00 SIGMAE= 89.93
LE = 0.21 XE = 0.00 YE = 0.03 ZE = 1.02

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .00000E+00 |
| 0.00 | 0.03 | 1.02 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .23150E-02 |
| 0.00 | 0.03 | 1.01 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .46846E-02 |
| 0.00 | 0.03 | 1.00 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .95874E-02 |
| 0.00 | 0.04 | 0.99 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .14708E-01 |
| 0.00 | 0.04 | 0.98 | 1.0 | 0.100E+03 | 0.02 | 1.418 | .20048E-01 |
| 0.00 | 0.04 | 0.98 | 1.0 | 0.965E+02 | 0.03 | 1.418 | .25605E-01 |
| 0.00 | 0.04 | 0.97 | 1.1 | 0.929E+02 | 0.03 | 1.418 | .31381E-01 |
| 0.00 | 0.04 | 0.96 | 1.1 | 0.896E+02 | 0.03 | 1.418 | .37374E-01 |
| 0.00 | 0.04 | 0.95 | 1.2 | 0.864E+02 | 0.03 | 1.418 | .43586E-01 |
| 0.00 | 0.04 | 0.94 | 1.2 | 0.835E+02 | 0.03 | 1.398 | .50017E-01 |
| 0.00 | 0.05 | 0.93 | 1.2 | 0.808E+02 | 0.03 | 1.352 | .56665E-01 |
| 0.00 | 0.05 | 0.92 | 1.3 | 0.783E+02 | 0.03 | 1.309 | .63532E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.05 | 0.91 | 1.3 | 0.759E+02 | 0.03 | 1.269 | .70617E-01 |
| 0.00 | 0.05 | 0.90 | 1.4 | 0.736E+02 | 0.03 | 1.232 | .77920E-01 |
| 0.00 | 0.05 | 0.89 | 1.4 | 0.715E+02 | 0.03 | 1.196 | .85441E-01 |
| 0.00 | 0.05 | 0.89 | 1.4 | 0.695E+02 | 0.04 | 1.163 | .93180E-01 |
| 0.00 | 0.05 | 0.88 | 1.5 | 0.676E+02 | 0.04 | 1.131 | .10114E+00 |
| 0.00 | 0.06 | 0.87 | 1.5 | 0.658E+02 | 0.04 | 1.101 | .10931E+00 |
| 0.00 | 0.06 | 0.86 | 1.6 | 0.641E+02 | 0.04 | 1.073 | .11771E+00 |
| 0.00 | 0.06 | 0.85 | 1.6 | 0.625E+02 | 0.04 | 1.046 | .12632E+00 |
| 0.00 | 0.06 | 0.84 | 1.6 | 0.610E+02 | 0.04 | 1.020 | .13515E+00 |
| 0.00 | 0.06 | 0.83 | 1.7 | 0.595E+02 | 0.04 | 0.996 | .14420E+00 |
| 0.00 | 0.06 | 0.82 | 1.7 | 0.581E+02 | 0.04 | 0.972 | .15347E+00 |
| 0.00 | 0.06 | 0.81 | 1.8 | 0.568E+02 | 0.04 | 0.950 | .16295E+00 |
| 0.00 | 0.07 | 0.81 | 1.8 | 0.555E+02 | 0.04 | 0.929 | .17266E+00 |
| 0.00 | 0.07 | 0.80 | 1.8 | 0.543E+02 | 0.05 | 0.908 | .18258E+00 |
| 0.00 | 0.07 | 0.79 | 1.9 | 0.531E+02 | 0.05 | 0.889 | .19272E+00 |
| 0.00 | 0.07 | 0.78 | 1.9 | 0.520E+02 | 0.05 | 0.870 | .20307E+00 |
| 0.00 | 0.07 | 0.77 | 2.0 | 0.510E+02 | 0.05 | 0.853 | .21365E+00 |
| 0.00 | 0.07 | 0.76 | 2.0 | 0.499E+02 | 0.05 | 0.835 | .22444E+00 |
| 0.00 | 0.07 | 0.75 | 2.0 | 0.489E+02 | 0.05 | 0.819 | .23546E+00 |
| 0.00 | 0.08 | 0.74 | 2.1 | 0.480E+02 | 0.05 | 0.803 | .24669E+00 |
| 0.00 | 0.08 | 0.73 | 2.1 | 0.471E+02 | 0.05 | 0.788 | .25814E+00 |
| 0.00 | 0.08 | 0.72 | 2.2 | 0.462E+02 | 0.05 | 0.773 | .26980E+00 |
| 0.00 | 0.08 | 0.72 | 2.2 | 0.454E+02 | 0.05 | 0.759 | .28169E+00 |
| 0.00 | 0.08 | 0.71 | 2.2 | 0.446E+02 | 0.06 | 0.745 | .29379E+00 |
| 0.00 | 0.08 | 0.70 | 2.3 | 0.438E+02 | 0.06 | 0.732 | .30612E+00 |
| 0.00 | 0.08 | 0.69 | 2.3 | 0.430E+02 | 0.06 | 0.720 | .31866E+00 |
| 0.00 | 0.09 | 0.68 | 2.4 | 0.423E+02 | 0.06 | 0.707 | .33141E+00 |
| 0.00 | 0.09 | 0.67 | 2.4 | 0.416E+02 | 0.06 | 0.696 | .34439E+00 |
| 0.00 | 0.09 | 0.66 | 2.4 | 0.409E+02 | 0.06 | 0.684 | .35758E+00 |
| 0.00 | 0.09 | 0.65 | 2.5 | 0.402E+02 | 0.06 | 0.673 | .37100E+00 |
| 0.00 | 0.09 | 0.64 | 2.5 | 0.396E+02 | 0.06 | 0.662 | .38463E+00 |
| 0.00 | 0.09 | 0.64 | 2.6 | 0.390E+02 | 0.06 | 0.652 | .39848E+00 |
| 0.00 | 0.09 | 0.63 | 2.6 | 0.384E+02 | 0.06 | 0.642 | .41255E+00 |
| 0.00 | 0.10 | 0.62 | 2.6 | 0.378E+02 | 0.07 | 0.632 | .42683E+00 |
| 0.00 | 0.10 | 0.61 | 2.7 | 0.372E+02 | 0.07 | 0.623 | .44134E+00 |
| 0.00 | 0.10 | 0.60 | 2.7 | 0.367E+02 | 0.07 | 0.613 | .45606E+00 |
| 0.00 | 0.10 | 0.59 | 2.8 | 0.361E+02 | 0.07 | 0.604 | .47100E+00 |
| 0.00 | 0.10 | 0.58 | 2.8 | 0.356E+02 | 0.07 | 0.596 | .48616E+00 |
| 0.00 | 0.10 | 0.57 | 2.8 | 0.351E+02 | 0.07 | 0.587 | .50153E+00 |
| 0.00 | 0.10 | 0.56 | 2.9 | 0.346E+02 | 0.07 | 0.579 | .51713E+00 |
| 0.00 | 0.11 | 0.55 | 2.9 | 0.341E+02 | 0.07 | 0.571 | .53294E+00 |
| 0.00 | 0.11 | 0.55 | 3.0 | 0.337E+02 | 0.07 | 0.563 | .54897E+00 |
| 0.00 | 0.11 | 0.54 | 3.0 | 0.332E+02 | 0.07 | 0.556 | .56522E+00 |
| 0.00 | 0.11 | 0.53 | 3.1 | 0.328E+02 | 0.08 | 0.549 | .58169E+00 |
| 0.00 | 0.11 | 0.52 | 3.1 | 0.324E+02 | 0.08 | 0.541 | .59838E+00 |
| 0.00 | 0.11 | 0.51 | 3.1 | 0.319E+02 | 0.08 | 0.534 | .61528E+00 |
| 0.00 | 0.11 | 0.50 | 3.2 | 0.315E+02 | 0.08 | 0.528 | .63240E+00 |
| 0.00 | 0.12 | 0.49 | 3.2 | 0.311E+02 | 0.08 | 0.521 | .64974E+00 |
| 0.00 | 0.12 | 0.48 | 3.3 | 0.308E+02 | 0.08 | 0.515 | .66730E+00 |
| 0.00 | 0.12 | 0.47 | 3.3 | 0.304E+02 | 0.08 | 0.508 | .68508E+00 |
| 0.00 | 0.12 | 0.46 | 3.3 | 0.300E+02 | 0.08 | 0.502 | .70308E+00 |
| 0.00 | 0.12 | 0.46 | 3.4 | 0.297E+02 | 0.08 | 0.496 | .72129E+00 |
| 0.00 | 0.12 | 0.45 | 3.4 | 0.293E+02 | 0.08 | 0.490 | .73972E+00 |
| 0.00 | 0.12 | 0.44 | 3.5 | 0.290E+02 | 0.09 | 0.485 | .75837E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.13 | 0.43 | 3.5 | 0.286E+02 | 0.09 | 0.479 | .77724E+00 |
| 0.00 | 0.13 | 0.42 | 3.5 | 0.283E+02 | 0.09 | 0.473 | .79633E+00 |
| 0.00 | 0.13 | 0.41 | 3.6 | 0.280E+02 | 0.09 | 0.468 | .81563E+00 |
| 0.00 | 0.13 | 0.40 | 3.6 | 0.277E+02 | 0.09 | 0.463 | .83515E+00 |
| 0.00 | 0.13 | 0.39 | 3.7 | 0.274E+02 | 0.09 | 0.458 | .85489E+00 |
| 0.00 | 0.13 | 0.38 | 3.7 | 0.271E+02 | 0.09 | 0.453 | .87485E+00 |
| 0.00 | 0.13 | 0.38 | 3.7 | 0.268E+02 | 0.09 | 0.448 | .89503E+00 |
| 0.00 | 0.14 | 0.37 | 3.8 | 0.265E+02 | 0.09 | 0.443 | .91543E+00 |
| 0.00 | 0.14 | 0.36 | 3.8 | 0.262E+02 | 0.09 | 0.439 | .93604E+00 |
| 0.00 | 0.14 | 0.35 | 3.9 | 0.259E+02 | 0.10 | 0.434 | .95687E+00 |
| 0.00 | 0.14 | 0.34 | 3.9 | 0.257E+02 | 0.10 | 0.429 | .97792E+00 |
| 0.00 | 0.14 | 0.33 | 3.9 | 0.254E+02 | 0.10 | 0.425 | .99919E+00 |
| 0.00 | 0.14 | 0.32 | 4.0 | 0.251E+02 | 0.10 | 0.421 | .10207E+01 |
| 0.00 | 0.14 | 0.31 | 4.0 | 0.249E+02 | 0.10 | 0.417 | .10424E+01 |
| 0.00 | 0.14 | 0.30 | 4.1 | 0.246E+02 | 0.10 | 0.412 | .10643E+01 |
| 0.00 | 0.15 | 0.29 | 4.1 | 0.244E+02 | 0.10 | 0.408 | .10864E+01 |
| 0.00 | 0.15 | 0.29 | 4.1 | 0.242E+02 | 0.10 | 0.404 | .11088E+01 |
| 0.00 | 0.15 | 0.28 | 4.2 | 0.239E+02 | 0.10 | 0.400 | .11314E+01 |
| 0.00 | 0.15 | 0.27 | 4.2 | 0.237E+02 | 0.10 | 0.397 | .11542E+01 |
| 0.00 | 0.15 | 0.26 | 4.3 | 0.235E+02 | 0.11 | 0.393 | .11772E+01 |
| 0.00 | 0.15 | 0.25 | 4.3 | 0.233E+02 | 0.11 | 0.389 | .12004E+01 |
| 0.00 | 0.15 | 0.24 | 4.3 | 0.230E+02 | 0.11 | 0.386 | .12239E+01 |
| 0.00 | 0.16 | 0.23 | 4.4 | 0.228E+02 | 0.11 | 0.382 | .12475E+01 |
| 0.00 | 0.16 | 0.22 | 4.4 | 0.226E+02 | 0.11 | 0.379 | .12714E+01 |
| 0.00 | 0.16 | 0.21 | 4.5 | 0.224E+02 | 0.11 | 0.375 | .12955E+01 |
| 0.00 | 0.16 | 0.21 | 4.5 | 0.222E+02 | 0.11 | 0.372 | .13199E+01 |
| 0.00 | 0.16 | 0.20 | 4.5 | 0.220E+02 | 0.11 | 0.368 | .13444E+01 |
| 0.00 | 0.16 | 0.19 | 4.6 | 0.218E+02 | 0.11 | 0.365 | .13692E+01 |
| 0.00 | 0.16 | 0.18 | 4.6 | 0.216E+02 | 0.11 | 0.362 | .13941E+01 |
| 0.00 | 0.17 | 0.17 | 4.7 | 0.215E+02 | 0.12 | 0.359 | .14193E+01 |
| 0.00 | 0.17 | 0.16 | 4.7 | 0.213E+02 | 0.12 | 0.356 | .14448E+01 |
| 0.00 | 0.17 | 0.15 | 4.7 | 0.211E+02 | 0.12 | 0.353 | .14704E+01 |
| 0.00 | 0.17 | 0.14 | 4.8 | 0.209E+02 | 0.12 | 0.350 | .14962E+01 |
| 0.00 | 0.17 | 0.13 | 4.8 | 0.207E+02 | 0.12 | 0.347 | .15223E+01 |
| 0.00 | 0.17 | 0.12 | 4.9 | 0.206E+02 | 0.12 | 0.344 | .15486E+01 |

Cumulative travel time = 1.5486 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | 0.17 | 0.12 | 4.9 | 0.206E+02 | 0.12 | .15486E+01 |

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.12 | 26.88 | 1.22 | 4.9 | 0.206E+02 | 0.00 | 0.00 | 1.22 | 1.22 | .15486E+01 |
| 0.02 | 26.88 | 1.22 | 4.9 | 0.206E+02 | 1.22 | 2.40 | 1.22 | 0.00 | .20982E+02 |
| 0.15 | 26.88 | 1.22 | 5.0 | 0.201E+02 | 1.22 | 3.39 | 1.22 | 0.00 | .21235E+03 |
| 0.28 | 26.88 | 1.22 | 5.2 | 0.191E+02 | 1.22 | 4.15 | 1.22 | 0.00 | .40371E+03 |
| 0.42 | 26.88 | 1.22 | 5.6 | 0.179E+02 | 1.22 | 4.79 | 1.22 | 0.00 | .59508E+03 |
| 0.55 | 26.88 | 1.22 | 5.9 | 0.168E+02 | 1.22 | 5.36 | 1.22 | 0.00 | .78644E+03 |
| 0.69 | 26.88 | 1.22 | 6.3 | 0.160E+02 | 1.22 | 5.87 | 1.22 | 0.00 | .97780E+03 |
| 0.82 | 26.88 | 1.22 | 6.5 | 0.154E+02 | 1.22 | 6.34 | 1.22 | 0.00 | .11692E+04 |
| 0.95 | 26.88 | 1.22 | 6.6 | 0.151E+02 | 1.22 | 6.78 | 1.22 | 0.00 | .13605E+04 |
| 1.09 | 26.88 | 1.22 | 6.7 | 0.149E+02 | 1.22 | 7.19 | 1.22 | 0.00 | .15519E+04 |
| 1.22 | 26.88 | 1.22 | 6.8 | 0.147E+02 | 1.22 | 7.58 | 1.22 | 0.00 | .17433E+04 |

Cumulative travel time = 1743.2629 sec ( 0.48 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.536E-03 m^2/s
Horizontal diffusivity (initial value) = 0.223E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.22 | 26.88 | 1.22 | 6.8 | 0.147E+02 | 1.22 | 7.58 | 1.22 | 0.00 | .17433E+04 |
| 1.24 | 26.88 | 1.22 | 6.9 | 0.144E+02 | 1.22 | 7.73 | 1.22 | 0.00 | .17760E+04 |
| 1.27 | 26.88 | 1.22 | 7.1 | 0.141E+02 | 1.22 | 7.88 | 1.22 | 0.00 | .18088E+04 |
| 1.29 | 26.88 | 1.22 | 7.2 | 0.138E+02 | 1.22 | 8.04 | 1.22 | 0.00 | .18415E+04 |
| 1.31 | 26.88 | 1.22 | 7.4 | 0.136E+02 | 1.22 | 8.19 | 1.22 | 0.00 | .18743E+04 |
| 1.34 | 26.88 | 1.22 | 7.5 | 0.133E+02 | 1.22 | 8.35 | 1.22 | 0.00 | .19070E+04 |
| 1.36 | 26.88 | 1.22 | 7.6 | 0.131E+02 | 1.22 | 8.51 | 1.22 | 0.00 | .19398E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.38 | 26.88 | 1.22 | 7.8 | 0.128E+02 | 1.22 | 8.66 | 1.22 | 0.00 | .19725E+04 |
| 1.40 | 26.88 | 1.22 | 7.9 | 0.126E+02 | 1.22 | 8.82 | 1.22 | 0.00 | .20053E+04 |
| 1.43 | 26.88 | 1.22 | 8.1 | 0.124E+02 | 1.22 | 8.98 | 1.22 | 0.00 | .20380E+04 |
| 1.45 | 26.88 | 1.22 | 8.2 | 0.122E+02 | 1.22 | 9.14 | 1.22 | 0.00 | .20707E+04 |
| 1.47 | 26.88 | 1.22 | 8.4 | 0.120E+02 | 1.22 | 9.31 | 1.22 | 0.00 | .21035E+04 |
| 1.50 | 26.88 | 1.22 | 8.5 | 0.118E+02 | 1.22 | 9.47 | 1.22 | 0.00 | .21362E+04 |
| 1.52 | 26.88 | 1.22 | 8.7 | 0.116E+02 | 1.22 | 9.63 | 1.22 | 0.00 | .21690E+04 |
| 1.54 | 26.88 | 1.22 | 8.8 | 0.114E+02 | 1.22 | 9.80 | 1.22 | 0.00 | .22017E+04 |
| 1.56 | 26.88 | 1.22 | 8.9 | 0.112E+02 | 1.22 | 9.96 | 1.22 | 0.00 | .22345E+04 |
| 1.59 | 26.88 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 10.13 | 1.22 | 0.00 | .22672E+04 |
| 1.61 | 26.88 | 1.22 | 9.2 | 0.108E+02 | 1.22 | 10.30 | 1.22 | 0.00 | .23000E+04 |
| 1.63 | 26.88 | 1.22 | 9.4 | 0.106E+02 | 1.22 | 10.46 | 1.22 | 0.00 | .23327E+04 |
| 1.66 | 26.88 | 1.22 | 9.6 | 0.105E+02 | 1.22 | 10.63 | 1.22 | 0.00 | .23655E+04 |
| 1.68 | 26.88 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 10.80 | 1.22 | 0.00 | .23982E+04 |
| 1.70 | 26.88 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 10.97 | 1.22 | 0.00 | .24310E+04 |
| 1.73 | 26.88 | 1.22 | 10.0 | 0.999E+01 | 1.22 | 11.15 | 1.22 | 0.00 | .24637E+04 |
| 1.75 | 26.88 | 1.22 | 10.2 | 0.983E+01 | 1.22 | 11.32 | 1.22 | 0.00 | .24965E+04 |
| 1.77 | 26.88 | 1.22 | 10.3 | 0.969E+01 | 1.22 | 11.49 | 1.22 | 0.00 | .25292E+04 |
| 1.79 | 26.88 | 1.22 | 10.5 | 0.954E+01 | 1.22 | 11.67 | 1.22 | 0.00 | .25620E+04 |
| 1.82 | 26.88 | 1.22 | 10.6 | 0.940E+01 | 1.22 | 11.84 | 1.22 | 0.00 | .25947E+04 |
| 1.84 | 26.88 | 1.22 | 10.8 | 0.926E+01 | 1.22 | 12.02 | 1.22 | 0.00 | .26275E+04 |
| 1.86 | 26.88 | 1.22 | 11.0 | 0.913E+01 | 1.22 | 12.20 | 1.22 | 0.00 | .26602E+04 |
| 1.89 | 26.88 | 1.22 | 11.1 | 0.900E+01 | 1.22 | 12.37 | 1.22 | 0.00 | .26930E+04 |
| 1.91 | 26.88 | 1.22 | 11.3 | 0.887E+01 | 1.22 | 12.55 | 1.22 | 0.00 | .27257E+04 |
| 1.93 | 26.88 | 1.22 | 11.4 | 0.874E+01 | 1.22 | 12.73 | 1.22 | 0.00 | .27585E+04 |
| 1.95 | 26.88 | 1.22 | 11.6 | 0.862E+01 | 1.22 | 12.91 | 1.22 | 0.00 | .27912E+04 |
| 1.98 | 26.88 | 1.22 | 11.8 | 0.850E+01 | 1.22 | 13.10 | 1.22 | 0.00 | .28240E+04 |
| 2.00 | 26.88 | 1.22 | 11.9 | 0.838E+01 | 1.22 | 13.28 | 1.22 | 0.00 | .28567E+04 |
| 2.02 | 26.88 | 1.22 | 12.1 | 0.827E+01 | 1.22 | 13.46 | 1.22 | 0.00 | .28895E+04 |
| 2.05 | 26.88 | 1.22 | 12.3 | 0.816E+01 | 1.22 | 13.65 | 1.22 | 0.00 | .29222E+04 |
| 2.07 | 26.88 | 1.22 | 12.4 | 0.805E+01 | 1.22 | 13.83 | 1.22 | 0.00 | .29550E+04 |
| 2.09 | 26.88 | 1.22 | 12.6 | 0.794E+01 | 1.22 | 14.02 | 1.22 | 0.00 | .29877E+04 |
| 2.11 | 26.88 | 1.22 | 12.8 | 0.784E+01 | 1.22 | 14.20 | 1.22 | 0.00 | .30205E+04 |
| 2.14 | 26.88 | 1.22 | 12.9 | 0.774E+01 | 1.22 | 14.39 | 1.22 | 0.00 | .30532E+04 |
| 2.16 | 26.88 | 1.22 | 13.1 | 0.764E+01 | 1.22 | 14.58 | 1.22 | 0.00 | .30860E+04 |
| 2.18 | 26.88 | 1.22 | 13.3 | 0.754E+01 | 1.22 | 14.77 | 1.22 | 0.00 | .31187E+04 |
| 2.21 | 26.88 | 1.22 | 13.4 | 0.744E+01 | 1.22 | 14.96 | 1.22 | 0.00 | .31515E+04 |
| 2.23 | 26.88 | 1.22 | 13.6 | 0.735E+01 | 1.22 | 15.15 | 1.22 | 0.00 | .31842E+04 |
| 2.25 | 26.88 | 1.22 | 13.8 | 0.726E+01 | 1.22 | 15.34 | 1.22 | 0.00 | .32170E+04 |
| 2.28 | 26.88 | 1.22 | 14.0 | 0.717E+01 | 1.22 | 15.53 | 1.22 | 0.00 | .32497E+04 |
| 2.30 | 26.88 | 1.22 | 14.1 | 0.708E+01 | 1.22 | 15.72 | 1.22 | 0.00 | .32824E+04 |
| 2.32 | 26.88 | 1.22 | 14.3 | 0.699E+01 | 1.22 | 15.92 | 1.22 | 0.00 | .33152E+04 |
| 2.34 | 26.88 | 1.22 | 14.5 | 0.691E+01 | 1.22 | 16.11 | 1.22 | 0.00 | .33479E+04 |
| 2.37 | 26.88 | 1.22 | 14.6 | 0.683E+01 | 1.22 | 16.31 | 1.22 | 0.00 | .33807E+04 |
| 2.39 | 26.88 | 1.22 | 14.8 | 0.675E+01 | 1.22 | 16.50 | 1.22 | 0.00 | .34134E+04 |
| 2.41 | 26.88 | 1.22 | 15.0 | 0.667E+01 | 1.22 | 16.70 | 1.22 | 0.00 | .34462E+04 |
| 2.44 | 26.88 | 1.22 | 15.2 | 0.659E+01 | 1.22 | 16.90 | 1.22 | 0.00 | .34789E+04 |
| 2.46 | 26.88 | 1.22 | 15.4 | 0.651E+01 | 1.22 | 17.10 | 1.22 | 0.00 | .35117E+04 |
| 2.48 | 26.88 | 1.22 | 15.5 | 0.644E+01 | 1.22 | 17.29 | 1.22 | 0.00 | .35444E+04 |
| 2.50 | 26.88 | 1.22 | 15.7 | 0.636E+01 | 1.22 | 17.49 | 1.22 | 0.00 | .35772E+04 |
| 2.53 | 26.88 | 1.22 | 15.9 | 0.629E+01 | 1.22 | 17.69 | 1.22 | 0.00 | .36099E+04 |
| 2.55 | 26.88 | 1.22 | 16.1 | 0.622E+01 | 1.22 | 17.90 | 1.22 | 0.00 | .36427E+04 |
| 2.57 | 26.88 | 1.22 | 16.3 | 0.615E+01 | 1.22 | 18.10 | 1.22 | 0.00 | .36754E+04 |
| 2.60 | 26.88 | 1.22 | 16.4 | 0.608E+01 | 1.22 | 18.30 | 1.22 | 0.00 | .37082E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2.62 | 26.88 | 1.22 | 16.6 | 0.602E+01 | 1.22 | 18.51 | 1.22 | 0.00 | .37409E+04 |
| 2.64 | 26.88 | 1.22 | 16.8 | 0.595E+01 | 1.22 | 18.71 | 1.22 | 0.00 | .37737E+04 |
| 2.67 | 26.88 | 1.22 | 17.0 | 0.589E+01 | 1.22 | 18.91 | 1.22 | 0.00 | .38064E+04 |
| 2.69 | 26.88 | 1.22 | 17.2 | 0.582E+01 | 1.22 | 19.12 | 1.22 | 0.00 | .38392E+04 |
| 2.71 | 26.88 | 1.22 | 17.4 | 0.576E+01 | 1.22 | 19.33 | 1.22 | 0.00 | .38719E+04 |
| 2.73 | 26.88 | 1.22 | 17.5 | 0.570E+01 | 1.22 | 19.53 | 1.22 | 0.00 | .39047E+04 |
| 2.76 | 26.88 | 1.22 | 17.7 | 0.564E+01 | 1.22 | 19.74 | 1.22 | 0.00 | .39374E+04 |
| 2.78 | 26.88 | 1.22 | 17.9 | 0.558E+01 | 1.22 | 19.95 | 1.22 | 0.00 | .39702E+04 |
| 2.80 | 26.88 | 1.22 | 18.1 | 0.552E+01 | 1.22 | 20.16 | 1.22 | 0.00 | .40029E+04 |
| 2.83 | 26.88 | 1.22 | 18.3 | 0.546E+01 | 1.22 | 20.37 | 1.22 | 0.00 | .40357E+04 |
| 2.85 | 26.88 | 1.22 | 18.5 | 0.541E+01 | 1.22 | 20.58 | 1.22 | 0.00 | .40684E+04 |
| 2.87 | 26.88 | 1.22 | 18.7 | 0.535E+01 | 1.22 | 20.80 | 1.22 | 0.00 | .41012E+04 |
| 2.89 | 26.88 | 1.22 | 18.9 | 0.530E+01 | 1.22 | 21.01 | 1.22 | 0.00 | .41339E+04 |
| 2.92 | 26.88 | 1.22 | 19.1 | 0.525E+01 | 1.22 | 21.22 | 1.22 | 0.00 | .41667E+04 |
| 2.94 | 26.88 | 1.22 | 19.3 | 0.519E+01 | 1.22 | 21.43 | 1.22 | 0.00 | .41994E+04 |
| 2.96 | 26.88 | 1.22 | 19.4 | 0.514E+01 | 1.22 | 21.65 | 1.22 | 0.00 | .42322E+04 |
| 2.99 | 26.88 | 1.22 | 19.6 | 0.509E+01 | 1.22 | 21.86 | 1.22 | 0.00 | .42649E+04 |
| 3.01 | 26.88 | 1.22 | 19.8 | 0.504E+01 | 1.22 | 22.08 | 1.22 | 0.00 | .42977E+04 |
| 3.03 | 26.88 | 1.22 | 20.0 | 0.499E+01 | 1.22 | 22.30 | 1.22 | 0.00 | .43304E+04 |
| 3.05 | 26.88 | 1.22 | 20.2 | 0.494E+01 | 1.22 | 22.52 | 1.22 | 0.00 | .43631E+04 |
| 3.08 | 26.88 | 1.22 | 20.4 | 0.490E+01 | 1.22 | 22.73 | 1.22 | 0.00 | .43959E+04 |
| 3.10 | 26.88 | 1.22 | 20.6 | 0.485E+01 | 1.22 | 22.95 | 1.22 | 0.00 | .44286E+04 |
| 3.12 | 26.88 | 1.22 | 20.8 | 0.480E+01 | 1.22 | 23.17 | 1.22 | 0.00 | .44614E+04 |
| 3.15 | 26.88 | 1.22 | 21.0 | 0.476E+01 | 1.22 | 23.39 | 1.22 | 0.00 | .44941E+04 |
| 3.17 | 26.88 | 1.22 | 21.2 | 0.471E+01 | 1.22 | 23.61 | 1.22 | 0.00 | .45269E+04 |
| 3.19 | 26.88 | 1.22 | 21.4 | 0.467E+01 | 1.22 | 23.84 | 1.22 | 0.00 | .45596E+04 |
| 3.22 | 26.88 | 1.22 | 21.6 | 0.463E+01 | 1.22 | 24.06 | 1.22 | 0.00 | .45924E+04 |
| 3.24 | 26.88 | 1.22 | 21.8 | 0.458E+01 | 1.22 | 24.28 | 1.22 | 0.00 | .46251E+04 |
| 3.26 | 26.88 | 1.22 | 22.0 | 0.454E+01 | 1.22 | 24.50 | 1.22 | 0.00 | .46579E+04 |
| 3.28 | 26.88 | 1.22 | 22.2 | 0.450E+01 | 1.22 | 24.73 | 1.22 | 0.00 | .46906E+04 |
| 3.31 | 26.88 | 1.22 | 22.4 | 0.446E+01 | 1.22 | 24.95 | 1.22 | 0.00 | .47234E+04 |
| 3.33 | 26.88 | 1.22 | 22.6 | 0.442E+01 | 1.22 | 25.18 | 1.22 | 0.00 | .47561E+04 |
| 3.35 | 26.88 | 1.22 | 22.8 | 0.438E+01 | 1.22 | 25.41 | 1.22 | 0.00 | .47889E+04 |
| 3.38 | 26.88 | 1.22 | 23.0 | 0.434E+01 | 1.22 | 25.63 | 1.22 | 0.00 | .48216E+04 |
| 3.40 | 26.88 | 1.22 | 23.2 | 0.430E+01 | 1.22 | 25.86 | 1.22 | 0.00 | .48544E+04 |
| 3.42 | 26.88 | 1.22 | 23.4 | 0.427E+01 | 1.22 | 26.09 | 1.22 | 0.00 | .48871E+04 |
| 3.44 | 26.88 | 1.22 | 23.6 | 0.423E+01 | 1.22 | 26.32 | 1.22 | 0.00 | .49199E+04 |
| 3.47 | 26.88 | 1.22 | 23.9 | 0.419E+01 | 1.22 | 26.55 | 1.22 | 0.00 | .49526E+04 |
| 3.49 | 26.88 | 1.22 | 24.1 | 0.416E+01 | 1.22 | 26.78 | 1.22 | 0.00 | .49854E+04 |
| 3.51 | 26.88 | 1.22 | 24.3 | 0.412E+01 | 1.22 | 27.01 | 1.22 | 0.00 | .50181E+04 |

Cumulative travel time = 5018.1235 sec ( 1.39 hrs)

-----------------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 3.51 | -0.13 | 1.22 | 24.3 | 0.412E+01 | 1.22 | 54.02 | 1.22 | 0.00 | .50181E+04 |
| 83.48 | -0.13 | 1.22 | 1211.2 | 0.826E-01 | 1.22 | 2696.49 | 1.22 | 0.00 | .11925E+06 |

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds
the regulatory value = 100.00 m.
This is the extent of the REGULATORY MIXING ZONE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 163.44 | -0.13 | 1.22 | 3238.0 | 0.309E-01 | 1.22 | 7208.81 | 1.22 | 0.00 | .23349E+06 |
| 243.41 | -0.13 | 1.22 | 5835.1 | 0.171E-01 | 1.22 | 12990.67 | 1.22 | 0.00 | .34772E+06 |
| 323.37 | -0.13 | 1.22 | 8896.8 | 0.112E-01 | 1.22 | 19806.80 | 1.22 | 0.00 | .46196E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 403.34 | -0.13 | 1.22 | 12360.9 | 0.809E-02 | 1.22 | 27518.89 | 1.22 | 0.00 | .57620E+06 |
| 483.30 | -0.13 | 1.22 | 16185.2 | 0.618E-02 | 1.22 | 36032.84 | 1.22 | 0.00 | .69043E+06 |
| 563.27 | -0.13 | 1.22 | 20338.4 | 0.492E-02 | 1.22 | 45279.16 | 1.22 | 0.00 | .80467E+06 |
| 643.23 | -0.13 | 1.22 | 24796.4 | 0.403E-02 | 1.22 | 55203.89 | 1.22 | 0.00 | .91890E+06 |
| 723.20 | -0.13 | 1.22 | 29539.6 | 0.339E-02 | 1.22 | 65763.45 | 1.22 | 0.00 | .10331E+07 |
| 803.16 | -0.13 | 1.22 | 34551.6 | 0.289E-02 | 1.22 | 76921.75 | 1.22 | 0.00 | .11474E+07 |
| 883.13 | -0.13 | 1.22 | 39818.9 | 0.251E-02 | 1.22 | 88648.23 | 1.22 | 0.00 | .12616E+07 |
| 963.09 | -0.13 | 1.22 | 45329.6 | 0.221E-02 | 1.22 | ******** | 1.22 | 0.00 | .13758E+07 |
| 1043.06 | -0.13 | 1.22 | 51073.4 | 0.196E-02 | 1.22 | ******** | 1.22 | 0.00 | .14901E+07 |
| 1123.02 | -0.13 | 1.22 | 57041.2 | 0.175E-02 | 1.22 | ******** | 1.22 | 0.00 | .16043E+07 |
| 1202.99 | -0.13 | 1.22 | 63224.8 | 0.158E-02 | 1.22 | ******** | 1.22 | 0.00 | .17186E+07 |
| 1282.95 | -0.13 | 1.22 | 69617.0 | 0.144E-02 | 1.22 | ******** | 1.22 | 0.00 | .18328E+07 |
| 1362.92 | -0.13 | 1.22 | 76211.2 | 0.131E-02 | 1.22 | ******** | 1.22 | 0.00 | .19470E+07 |
| 1442.88 | -0.13 | 1.22 | 83001.4 | 0.120E-02 | 1.22 | ******** | 1.22 | 0.00 | .20613E+07 |
| 1522.85 | -0.13 | 1.22 | 89982.1 | 0.111E-02 | 1.22 | ******** | 1.22 | 0.00 | .21755E+07 |
| 1602.81 | -0.13 | 1.22 | 97148.2 | 0.103E-02 | 1.22 | ******** | 1.22 | 0.00 | .22897E+07 |
| 1682.78 | -0.13 | 1.22 | ******* | 0.957E-03 | 1.22 | ******** | 1.22 | 0.00 | .24040E+07 |
| 1762.74 | -0.13 | 1.22 | ******* | 0.893E-03 | 1.22 | ******** | 1.22 | 0.00 | .25182E+07 |
| 1842.70 | -0.13 | 1.22 | ******* | 0.835E-03 | 1.22 | ******** | 1.22 | 0.00 | .26324E+07 |
| 1922.67 | -0.13 | 1.22 | ******* | 0.784E-03 | 1.22 | ******** | 1.22 | 0.00 | .27467E+07 |
| 2002.63 | -0.13 | 1.22 | ******* | 0.737E-03 | 1.22 | ******** | 1.22 | 0.00 | .28609E+07 |
| 2082.60 | -0.13 | 1.22 | ******* | 0.695E-03 | 1.22 | ******** | 1.22 | 0.00 | .29751E+07 |
| 2162.56 | -0.13 | 1.22 | ******* | 0.657E-03 | 1.22 | ******** | 1.22 | 0.00 | .30894E+07 |
| 2242.53 | -0.13 | 1.22 | ******* | 0.622E-03 | 1.22 | ******** | 1.22 | 0.00 | .32036E+07 |
| 2322.49 | -0.13 | 1.22 | ******* | 0.591E-03 | 1.22 | ******** | 1.22 | 0.00 | .33178E+07 |
| 2402.46 | -0.13 | 1.22 | ******* | 0.561E-03 | 1.22 | ******** | 1.22 | 0.00 | .34321E+07 |
| 2482.42 | -0.13 | 1.22 | ******* | 0.535E-03 | 1.22 | ******** | 1.22 | 0.00 | .35463E+07 |
| 2562.39 | -0.13 | 1.22 | ******* | 0.510E-03 | 1.22 | ******** | 1.22 | 0.00 | .36606E+07 |
| 2642.35 | -0.13 | 1.22 | ******* | 0.487E-03 | 1.22 | ******** | 1.22 | 0.00 | .37748E+07 |
| 2722.32 | -0.13 | 1.22 | ******* | 0.466E-03 | 1.22 | ******** | 1.22 | 0.00 | .38890E+07 |
| 2802.28 | -0.13 | 1.22 | ******* | 0.446E-03 | 1.22 | ******** | 1.22 | 0.00 | .40033E+07 |
| 2882.25 | -0.13 | 1.22 | ******* | 0.427E-03 | 1.22 | ******** | 1.22 | 0.00 | .41175E+07 |
| 2962.21 | -0.13 | 1.22 | ******* | 0.410E-03 | 1.22 | ******** | 1.22 | 0.00 | .42317E+07 |
| 3042.18 | -0.13 | 1.22 | ******* | 0.394E-03 | 1.22 | ******** | 1.22 | 0.00 | .43460E+07 |
| 3122.14 | -0.13 | 1.22 | ******* | 0.379E-03 | 1.22 | ******** | 1.22 | 0.00 | .44602E+07 |
| 3202.11 | -0.13 | 1.22 | ******* | 0.365E-03 | 1.22 | ******** | 1.22 | 0.00 | .45744E+07 |
| 3282.07 | -0.13 | 1.22 | ******* | 0.352E-03 | 1.22 | ******** | 1.22 | 0.00 | .46887E+07 |
| 3362.04 | -0.13 | 1.22 | ******* | 0.339E-03 | 1.22 | ******** | 1.22 | 0.00 | .48029E+07 |
| 3442.00 | -0.13 | 1.22 | ******* | 0.328E-03 | 1.22 | ******** | 1.22 | 0.00 | .49171E+07 |
| 3521.97 | -0.13 | 1.22 | ******* | 0.316E-03 | 1.22 | ******** | 1.22 | 0.00 | .50314E+07 |
| 3601.93 | -0.13 | 1.22 | ******* | 0.306E-03 | 1.22 | ******** | 1.22 | 0.00 | .51456E+07 |
| 3681.90 | -0.13 | 1.22 | ******* | 0.296E-03 | 1.22 | ******** | 1.22 | 0.00 | .52599E+07 |
| 3761.86 | -0.13 | 1.22 | ******* | 0.287E-03 | 1.22 | ******** | 1.22 | 0.00 | .53741E+07 |
| 3841.83 | -0.13 | 1.22 | ******* | 0.278E-03 | 1.22 | ******** | 1.22 | 0.00 | .54883E+07 |
| 3921.79 | -0.13 | 1.22 | ******* | 0.269E-03 | 1.22 | ******** | 1.22 | 0.00 | .56026E+07 |
| 4001.76 | -0.13 | 1.22 | ******* | 0.261E-03 | 1.22 | ******** | 1.22 | 0.00 | .57168E+07 |
| 4081.72 | -0.13 | 1.22 | ******* | 0.254E-03 | 1.22 | ******** | 1.22 | 0.00 | .58310E+07 |
| 4161.69 | -0.13 | 1.22 | ******* | 0.246E-03 | 1.22 | ******** | 1.22 | 0.00 | .59453E+07 |
| 4241.65 | -0.13 | 1.22 | ******* | 0.240E-03 | 1.22 | ******** | 1.22 | 0.00 | .60595E+07 |
| 4321.62 | -0.13 | 1.22 | ******* | 0.233E-03 | 1.22 | ******** | 1.22 | 0.00 | .61737E+07 |
| 4401.58 | -0.13 | 1.22 | ******* | 0.227E-03 | 1.22 | ******** | 1.22 | 0.00 | .62880E+07 |
| 4481.54 | -0.13 | 1.22 | ******* | 0.221E-03 | 1.22 | ******** | 1.22 | 0.00 | .64022E+07 |
| 4561.51 | -0.13 | 1.22 | ******* | 0.215E-03 | 1.22 | ******** | 1.22 | 0.00 | .65164E+07 |
| 4641.47 | -0.13 | 1.22 | ******* | 0.209E-03 | 1.22 | ******** | 1.22 | 0.00 | .66307E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4721.44 | -0.13 | 1.22 | ******* | 0.204E-03 | 1.22 | ******** | 1.22 | 0.00 | .67449E+07 |
| 4801.40 | -0.13 | 1.22 | ******* | 0.199E-03 | 1.22 | ******** | 1.22 | 0.00 | .68591E+07 |
| 4881.37 | -0.13 | 1.22 | ******* | 0.194E-03 | 1.22 | ******** | 1.22 | 0.00 | .69734E+07 |
| 4961.33 | -0.13 | 1.22 | ******* | 0.189E-03 | 1.22 | ******** | 1.22 | 0.00 | .70876E+07 |
| 5041.30 | -0.13 | 1.22 | ******* | 0.185E-03 | 1.22 | ******** | 1.22 | 0.00 | .72019E+07 |
| 5121.26 | -0.13 | 1.22 | ******* | 0.181E-03 | 1.22 | ******** | 1.22 | 0.00 | .73161E+07 |
| 5201.23 | -0.13 | 1.22 | ******* | 0.176E-03 | 1.22 | ******** | 1.22 | 0.00 | .74303E+07 |
| 5281.19 | -0.13 | 1.22 | ******* | 0.172E-03 | 1.22 | ******** | 1.22 | 0.00 | .75446E+07 |
| 5361.16 | -0.13 | 1.22 | ******* | 0.169E-03 | 1.22 | ******** | 1.22 | 0.00 | .76588E+07 |
| 5441.12 | -0.13 | 1.22 | ******* | 0.165E-03 | 1.22 | ******** | 1.22 | 0.00 | .77730E+07 |
| 5521.09 | -0.13 | 1.22 | ******* | 0.161E-03 | 1.22 | ******** | 1.22 | 0.00 | .78873E+07 |
| 5601.05 | -0.13 | 1.22 | ******* | 0.158E-03 | 1.22 | ******** | 1.22 | 0.00 | .80015E+07 |
| 5681.02 | -0.13 | 1.22 | ******* | 0.155E-03 | 1.22 | ******** | 1.22 | 0.00 | .81157E+07 |
| 5760.98 | -0.13 | 1.22 | ******* | 0.151E-03 | 1.22 | ******** | 1.22 | 0.00 | .82300E+07 |
| 5840.95 | -0.13 | 1.22 | ******* | 0.148E-03 | 1.22 | ******** | 1.22 | 0.00 | .83442E+07 |
| 5920.91 | -0.13 | 1.22 | ******* | 0.145E-03 | 1.22 | ******** | 1.22 | 0.00 | .84584E+07 |
| 6000.88 | -0.13 | 1.22 | ******* | 0.142E-03 | 1.22 | ******** | 1.22 | 0.00 | .85727E+07 |
| 6080.84 | -0.13 | 1.22 | ******* | 0.140E-03 | 1.22 | ******** | 1.22 | 0.00 | .86869E+07 |
| 6160.81 | -0.13 | 1.22 | ******* | 0.137E-03 | 1.22 | ******** | 1.22 | 0.00 | .88012E+07 |
| 6240.77 | -0.13 | 1.22 | ******* | 0.134E-03 | 1.22 | ******** | 1.22 | 0.00 | .89154E+07 |
| 6320.74 | -0.13 | 1.22 | ******* | 0.132E-03 | 1.22 | ******** | 1.22 | 0.00 | .90296E+07 |
| 6400.70 | -0.13 | 1.22 | ******* | 0.129E-03 | 1.22 | ******** | 1.22 | 0.00 | .91439E+07 |
| 6480.67 | -0.13 | 1.22 | ******* | 0.127E-03 | 1.22 | ******** | 1.22 | 0.00 | .92581E+07 |
| 6560.63 | -0.13 | 1.22 | ******* | 0.125E-03 | 1.22 | ******** | 1.22 | 0.00 | .93723E+07 |
| 6640.60 | -0.13 | 1.22 | ******* | 0.122E-03 | 1.22 | ******** | 1.22 | 0.00 | .94866E+07 |
| 6720.56 | -0.13 | 1.22 | ******* | 0.120E-03 | 1.22 | ******** | 1.22 | 0.00 | .96008E+07 |
| 6800.53 | -0.13 | 1.22 | ******* | 0.118E-03 | 1.22 | ******** | 1.22 | 0.00 | .97150E+07 |
| 6880.49 | -0.13 | 1.22 | ******* | 0.116E-03 | 1.22 | ******** | 1.22 | 0.00 | .98293E+07 |
| 6960.46 | -0.13 | 1.22 | ******* | 0.114E-03 | 1.22 | ******** | 1.22 | 0.00 | .99435E+07 |
| 7040.42 | -0.13 | 1.22 | ******* | 0.112E-03 | 1.22 | ******** | 1.22 | 0.00 | .10058E+08 |
| 7120.38 | -0.13 | 1.22 | ******* | 0.110E-03 | 1.22 | ******** | 1.22 | 0.00 | .10172E+08 |
| 7200.35 | -0.13 | 1.22 | ******* | 0.108E-03 | 1.22 | ******** | 1.22 | 0.00 | .10286E+08 |
| 7280.31 | -0.13 | 1.22 | ******* | 0.107E-03 | 1.22 | ******** | 1.22 | 0.00 | .10400E+08 |
| 7360.28 | -0.13 | 1.22 | ******* | 0.105E-03 | 1.22 | ******** | 1.22 | 0.00 | .10515E+08 |
| 7440.24 | -0.13 | 1.22 | ******* | 0.103E-03 | 1.22 | ******** | 1.22 | 0.00 | .10629E+08 |
| 7520.21 | -0.13 | 1.22 | ******* | 0.101E-03 | 1.22 | ******** | 1.22 | 0.00 | .10743E+08 |
| 7600.17 | -0.13 | 1.22 | ******* | 0.999E-04 | 1.22 | ******** | 1.22 | 0.00 | .10857E+08 |
| 7680.14 | -0.13 | 1.22 | ******* | 0.983E-04 | 1.22 | ******** | 1.22 | 0.00 | .10972E+08 |
| 7760.10 | -0.13 | 1.22 | ******* | 0.968E-04 | 1.22 | ******** | 1.22 | 0.00 | .11086E+08 |
| 7840.07 | -0.13 | 1.22 | ******* | 0.954E-04 | 1.22 | ******** | 1.22 | 0.00 | .11200E+08 |
| 7920.03 | -0.13 | 1.22 | ******* | 0.939E-04 | 1.22 | ******** | 1.22 | 0.00 | .11314E+08 |
| 8000.00 | -0.13 | 1.22 | ******* | 0.925E-04 | 1.22 | ******** | 1.22 | 0.00 | .11429E+08 |

Cumulative travel time = 11428571.0000 sec ( 3174.60 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance =   8000.00 m.
  This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges            End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

CORMIX2 PREDICTION FILE:
222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX2: Multiport Diffuser Discharges
CORMIX Version 12.0GTD
HYDRO2 Version 12.0.0.0 December 2020

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------

CASE DESCRIPTION
Site name/label:   Goldboro Southeast Area
Design case:       Year 11
FILE NAME:        C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y11-SE_Pond.prd
Time stamp:       04/06/2022--21:57:15

ENVIRONMENT PARAMETERS (metric units)
Bounded section
BS    =     24.60  AS    =      0.62  QA    =      0.13  ICHREG= 2
HA    =      0.03  HD    =      0.03
UA    =      0.215 F     =      0.428 USTAR =0.4965E-01
UW    =      2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND=  U        RHOAM =  998.1636

DIFFUSER DISCHARGE PARAMETERS (metric units)
Diffuser type:     DITYPE= unidirectional_parallel
BANK  =  LEFT      DISTB =      0.00  YB1   =      0.10  YB2   =      0.10
LD    =      1.00  NOPEN =  100       NRISER=  100       SPAC  =      0.01    NPPERR =    1
D0    =      0.016 A0    =      0.000 H0    =      0.03  SUB0  =      0.00
D0INP =      0.016 CR0   =      1.000 B0    =0.2117E-01
Nozzle/port arrangement:   unidirectional_without_fanning
GAMMA =      0.00  THETA =      0.00  SIGMA =    270.00  BETA  =     90.00
U0    =      0.178 Q0    =      0.004 Q0A   =0.3800E-02
RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
C0    =0.1000E+03  CUNITS=  %
IPOLL =  1        KS    =0.0000E+00  KD    =0.0000E+00

DIFFUSER PARAMETERS WITH IMAGE EFFECTS (metric units)
The bank/shore proximity effect is accounted for by the following flow
variables and definitions of length scales and parameters.
LD    =      1.00  Q0    =      0.008 Q0A    =0.3800E-02

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
q0    =0.1520E-01        SIGNJ0=      1.0
m0 =U0^2*B0 =0.6686E-03   j0 =U0*GP0*B0 =0.0000E+00   (based on slot width B0)
m0 =U0*q0   =0.2701E-02   j0 =q0*GP0    =0.0000E+00   (based on volume flux q0)
Associated 2-d length scales (meters)
lQ=B  =      0.086 lM    =  99999.00  lm    =      0.03
lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
Q0    =0.7600E-02  M0    =0.6686E-03  J0    =0.0000E+00
Associated 3-d length scales (meters)
LQ    =      0.01  LM    =  99999.00  Lm    =      0.17  Lb    =      0.00

```
                        Lmp  =  99999.00  Lbp  =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0  =  99999.00  FRD0  =  99999.00  R    =     0.83  PL   =  140.00
 (slot)            (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.178 D0    =      0.016 A0    =      0.000 THETA =      0.00
 FR0  =  99999.00  FRD0  =  99999.00  R    =     0.83
 (slot)            (riser group)

FLOW CLASSIFICATION
 222222222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    IMPU9       2
 2  Applicable layer depth HS =     0.03       2
 2  Limiting Dilution S=QA/Q0 + 1=    18.42     2
 222222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =    500.00  XMAX  =    500.00

X-Y-Z COORDINATE SYSTEM:
  because of bank/shore proximity, the ORIGIN is located directly
   at the LEFT  bank/shore.
  the bank/shore acts as a plane of symmetry for the predicted
  plume geometry.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y       Z        S       C       BV       BH       Uc        TT
     0.00     0.00    0.03     1.0 0.100E+03   0.02     0.50     0.178   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
```

The diffuser near-field dilution is REDUCED because of the PROXIMITY
of the shoreline.
Because of the strong ambient current the diffuser plume of this crossflowing
discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
layer depth. Full mixing is achieved at a downstream distance of about
2.5 times (for alternating designs) to 5 times(for unidirectional and staged designsd) the layer depth.

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, measured horizontally in Y-direction
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.03 | 1.0 | 0.100E+03 | 0.02 | 0.50 | .00000E+00 |
| 0.00 | -0.01 | 0.03 | 1.0 | 0.960E+02 | 0.02 | 0.51 | .58435E-02 |
| 0.00 | -0.01 | 0.03 | 1.1 | 0.945E+02 | 0.02 | 0.52 | .11687E-01 |
| 0.00 | -0.02 | 0.03 | 1.1 | 0.933E+02 | 0.02 | 0.53 | .17530E-01 |
| 0.01 | -0.02 | 0.03 | 1.1 | 0.923E+02 | 0.02 | 0.54 | .23374E-01 |
| 0.01 | -0.03 | 0.03 | 1.1 | 0.915E+02 | 0.02 | 0.55 | .29217E-01 |
| 0.01 | -0.04 | 0.03 | 1.1 | 0.908E+02 | 0.02 | 0.55 | .35061E-01 |
| 0.01 | -0.04 | 0.03 | 1.1 | 0.901E+02 | 0.02 | 0.56 | .40904E-01 |
| 0.01 | -0.05 | 0.03 | 1.1 | 0.895E+02 | 0.02 | 0.57 | .46748E-01 |
| 0.01 | -0.05 | 0.03 | 1.1 | 0.889E+02 | 0.02 | 0.58 | .52591E-01 |
| 0.01 | -0.06 | 0.03 | 1.1 | 0.884E+02 | 0.02 | 0.59 | .58435E-01 |
| 0.01 | -0.06 | 0.03 | 1.1 | 0.879E+02 | 0.02 | 0.60 | .64278E-01 |
| 0.02 | -0.07 | 0.03 | 1.1 | 0.875E+02 | 0.02 | 0.61 | .70122E-01 |
| 0.02 | -0.08 | 0.03 | 1.1 | 0.870E+02 | 0.02 | 0.62 | .75965E-01 |
| 0.02 | -0.08 | 0.03 | 1.2 | 0.866E+02 | 0.02 | 0.63 | .81809E-01 |
| 0.02 | -0.09 | 0.03 | 1.2 | 0.862E+02 | 0.02 | 0.64 | .87652E-01 |
| 0.02 | -0.09 | 0.03 | 1.2 | 0.858E+02 | 0.02 | 0.65 | .93496E-01 |
| 0.02 | -0.10 | 0.03 | 1.2 | 0.854E+02 | 0.02 | 0.66 | .99339E-01 |
| 0.02 | -0.11 | 0.03 | 1.2 | 0.851E+02 | 0.02 | 0.66 | .10518E+00 |
| 0.02 | -0.11 | 0.03 | 1.2 | 0.847E+02 | 0.02 | 0.67 | .11103E+00 |
| 0.03 | -0.12 | 0.03 | 1.2 | 0.844E+02 | 0.02 | 0.68 | .11687E+00 |
| 0.03 | -0.12 | 0.03 | 1.2 | 0.840E+02 | 0.02 | 0.69 | .12271E+00 |
| 0.03 | -0.13 | 0.03 | 1.2 | 0.837E+02 | 0.02 | 0.70 | .12856E+00 |
| 0.03 | -0.13 | 0.03 | 1.2 | 0.834E+02 | 0.02 | 0.71 | .13440E+00 |
| 0.03 | -0.14 | 0.03 | 1.2 | 0.831E+02 | 0.02 | 0.72 | .14024E+00 |
| 0.03 | -0.15 | 0.03 | 1.2 | 0.828E+02 | 0.02 | 0.73 | .14609E+00 |
| 0.03 | -0.15 | 0.03 | 1.2 | 0.826E+02 | 0.02 | 0.74 | .15193E+00 |
| 0.03 | -0.16 | 0.03 | 1.2 | 0.823E+02 | 0.02 | 0.75 | .15777E+00 |
| 0.04 | -0.16 | 0.03 | 1.2 | 0.820E+02 | 0.02 | 0.76 | .16362E+00 |
| 0.04 | -0.17 | 0.03 | 1.2 | 0.818E+02 | 0.02 | 0.76 | .16946E+00 |
| 0.04 | -0.18 | 0.03 | 1.2 | 0.815E+02 | 0.02 | 0.77 | .17530E+00 |
| 0.04 | -0.18 | 0.03 | 1.2 | 0.813E+02 | 0.02 | 0.78 | .18115E+00 |
| 0.04 | -0.19 | 0.03 | 1.2 | 0.810E+02 | 0.02 | 0.79 | .18699E+00 |
| 0.04 | -0.19 | 0.03 | 1.2 | 0.808E+02 | 0.02 | 0.80 | .19284E+00 |
| 0.04 | -0.20 | 0.03 | 1.2 | 0.805E+02 | 0.02 | 0.81 | .19868E+00 |
| 0.04 | -0.20 | 0.03 | 1.2 | 0.803E+02 | 0.02 | 0.82 | .20452E+00 |
| 0.05 | -0.21 | 0.03 | 1.2 | 0.801E+02 | 0.02 | 0.83 | .21037E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | -0.22 | 0.03 | 1.3 | 0.799E+02 | 0.02 | 0.84 | .21621E+00 |
| 0.05 | -0.22 | 0.03 | 1.3 | 0.797E+02 | 0.02 | 0.85 | .22205E+00 |
| 0.05 | -0.23 | 0.03 | 1.3 | 0.794E+02 | 0.02 | 0.86 | .22790E+00 |
| 0.05 | -0.23 | 0.03 | 1.3 | 0.792E+02 | 0.02 | 0.86 | .23374E+00 |
| 0.05 | -0.24 | 0.03 | 1.3 | 0.790E+02 | 0.02 | 0.87 | .23958E+00 |
| 0.05 | -0.25 | 0.03 | 1.3 | 0.788E+02 | 0.02 | 0.88 | .24543E+00 |
| 0.05 | -0.25 | 0.03 | 1.3 | 0.786E+02 | 0.02 | 0.89 | .25127E+00 |
| 0.06 | -0.26 | 0.03 | 1.3 | 0.784E+02 | 0.02 | 0.90 | .25711E+00 |
| 0.06 | -0.26 | 0.03 | 1.3 | 0.783E+02 | 0.02 | 0.91 | .26296E+00 |
| 0.06 | -0.27 | 0.03 | 1.3 | 0.781E+02 | 0.02 | 0.92 | .26880E+00 |
| 0.06 | -0.27 | 0.03 | 1.3 | 0.779E+02 | 0.02 | 0.93 | .27464E+00 |
| 0.06 | -0.28 | 0.03 | 1.3 | 0.777E+02 | 0.02 | 0.94 | .28049E+00 |
| 0.06 | -0.29 | 0.03 | 1.3 | 0.775E+02 | 0.02 | 0.95 | .28633E+00 |
| 0.06 | -0.29 | 0.03 | 1.3 | 0.773E+02 | 0.02 | 0.96 | .29217E+00 |
| 0.06 | -0.30 | 0.03 | 1.3 | 0.772E+02 | 0.02 | 0.97 | .29802E+00 |
| 0.07 | -0.30 | 0.03 | 1.3 | 0.770E+02 | 0.02 | 0.97 | .30386E+00 |
| 0.07 | -0.31 | 0.03 | 1.3 | 0.768E+02 | 0.02 | 0.98 | .30970E+00 |
| 0.07 | -0.32 | 0.03 | 1.3 | 0.767E+02 | 0.02 | 0.99 | .31555E+00 |
| 0.07 | -0.32 | 0.03 | 1.3 | 0.765E+02 | 0.02 | 1.00 | .32139E+00 |
| 0.07 | -0.33 | 0.03 | 1.3 | 0.763E+02 | 0.02 | 1.01 | .32724E+00 |
| 0.07 | -0.33 | 0.03 | 1.3 | 0.762E+02 | 0.02 | 1.02 | .33308E+00 |
| 0.07 | -0.34 | 0.03 | 1.3 | 0.760E+02 | 0.02 | 1.03 | .33892E+00 |
| 0.07 | -0.34 | 0.03 | 1.3 | 0.759E+02 | 0.02 | 1.04 | .34477E+00 |
| 0.08 | -0.35 | 0.03 | 1.3 | 0.757E+02 | 0.02 | 1.05 | .35061E+00 |
| 0.08 | -0.36 | 0.03 | 1.3 | 0.756E+02 | 0.02 | 1.06 | .35645E+00 |
| 0.08 | -0.36 | 0.03 | 1.3 | 0.754E+02 | 0.02 | 1.07 | .36230E+00 |
| 0.08 | -0.37 | 0.03 | 1.3 | 0.753E+02 | 0.02 | 1.07 | .36814E+00 |
| 0.08 | -0.37 | 0.03 | 1.3 | 0.751E+02 | 0.02 | 1.08 | .37398E+00 |
| 0.08 | -0.38 | 0.03 | 1.3 | 0.750E+02 | 0.02 | 1.09 | .37983E+00 |
| 0.08 | -0.39 | 0.03 | 1.3 | 0.748E+02 | 0.02 | 1.10 | .38567E+00 |
| 0.08 | -0.39 | 0.03 | 1.3 | 0.747E+02 | 0.02 | 1.11 | .39151E+00 |
| 0.09 | -0.40 | 0.03 | 1.3 | 0.745E+02 | 0.02 | 1.12 | .39736E+00 |
| 0.09 | -0.40 | 0.03 | 1.3 | 0.744E+02 | 0.02 | 1.13 | .40320E+00 |
| 0.09 | -0.41 | 0.03 | 1.3 | 0.743E+02 | 0.02 | 1.14 | .40904E+00 |
| 0.09 | -0.42 | 0.03 | 1.3 | 0.741E+02 | 0.02 | 1.15 | .41489E+00 |
| 0.09 | -0.42 | 0.03 | 1.4 | 0.740E+02 | 0.02 | 1.16 | .42073E+00 |
| 0.09 | -0.43 | 0.03 | 1.4 | 0.739E+02 | 0.02 | 1.17 | .42657E+00 |
| 0.09 | -0.43 | 0.03 | 1.4 | 0.737E+02 | 0.02 | 1.17 | .43242E+00 |
| 0.09 | -0.44 | 0.03 | 1.4 | 0.736E+02 | 0.02 | 1.18 | .43826E+00 |
| 0.10 | -0.44 | 0.03 | 1.4 | 0.735E+02 | 0.02 | 1.19 | .44411E+00 |
| 0.10 | -0.45 | 0.03 | 1.4 | 0.733E+02 | 0.02 | 1.20 | .44995E+00 |
| 0.10 | -0.46 | 0.03 | 1.4 | 0.732E+02 | 0.02 | 1.21 | .45579E+00 |
| 0.10 | -0.46 | 0.03 | 1.4 | 0.731E+02 | 0.02 | 1.22 | .46164E+00 |
| 0.10 | -0.47 | 0.03 | 1.4 | 0.730E+02 | 0.02 | 1.23 | .46748E+00 |
| 0.10 | -0.47 | 0.03 | 1.4 | 0.728E+02 | 0.02 | 1.24 | .47332E+00 |
| 0.10 | -0.48 | 0.03 | 1.4 | 0.727E+02 | 0.02 | 1.25 | .47917E+00 |
| 0.10 | -0.49 | 0.03 | 1.4 | 0.726E+02 | 0.02 | 1.26 | .48501E+00 |
| 0.11 | -0.49 | 0.03 | 1.4 | 0.725E+02 | 0.02 | 1.27 | .49085E+00 |
| 0.11 | -0.50 | 0.03 | 1.4 | 0.724E+02 | 0.02 | 1.28 | .49670E+00 |
| 0.11 | -0.50 | 0.03 | 1.4 | 0.722E+02 | 0.02 | 1.28 | .50254E+00 |
| 0.11 | -0.51 | 0.03 | 1.4 | 0.721E+02 | 0.02 | 1.29 | .50838E+00 |
| 0.11 | -0.51 | 0.03 | 1.4 | 0.720E+02 | 0.02 | 1.30 | .51423E+00 |
| 0.11 | -0.52 | 0.03 | 1.4 | 0.719E+02 | 0.02 | 1.31 | .52007E+00 |
| 0.11 | -0.53 | 0.03 | 1.4 | 0.718E+02 | 0.02 | 1.32 | .52591E+00 |

```
    0.11    -0.53    0.03     1.4 0.717E+02   0.02     1.33 .53176E+00
    0.12    -0.54    0.03     1.4 0.716E+02   0.02     1.34 .53760E+00
    0.12    -0.54    0.03     1.4 0.715E+02   0.02     1.35 .54344E+00
    0.12    -0.55    0.03     1.4 0.713E+02   0.02     1.36 .54929E+00
    0.12    -0.56    0.03     1.4 0.712E+02   0.02     1.37 .55513E+00
    0.12    -0.56    0.03     1.4 0.711E+02   0.02     1.38 .56097E+00
    0.12    -0.57    0.03     1.4 0.710E+02   0.02     1.38 .56682E+00
    0.12    -0.57    0.03     1.4 0.709E+02   0.02     1.39 .57266E+00
    0.12    -0.58    0.03     1.4 0.708E+02   0.02     1.40 .57851E+00
    0.13    -0.58    0.03     1.4 0.707E+02   0.03     1.41 .58435E+00
 Cumulative travel time =           0.5843 sec  (    0.00 hrs)
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
-----------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 WAKE FLOW CONDITIONS: The discharge velocity (U0) is less than or equal to the
 ambient velocity (Ua) and results in wake flow conditions. There is no discharge
 momentum induced mixing. The mixing characteristics are UNDESIRABLE.

 Recall that the plume is symmetric to the bank/shore on which the centerline
   (X-axis) is located.
-----------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Plume is ATTACHED to LEFT  bank/shore.
   Plume width is now determined from LEFT  bank/shore.

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.249E-03 m^2/s
  Horizontal diffusivity (initial value) = 0.623E-03 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 0.13 | 0.00 | 0.03 | 1.4 | 0.707E+02 | 0.02 | 2.00 | 0.03 | 0.01 | .58435E+00 |
| 5.12 | 0.00 | 0.03 | 1.4 | 0.703E+02 | 0.02 | 2.01 | 0.03 | 0.01 | .23228E+02 |
| 10.12 | 0.00 | 0.03 | 1.4 | 0.699E+02 | 0.02 | 2.02 | 0.03 | 0.01 | .45872E+02 |
| 15.12 | 0.00 | 0.03 | 1.4 | 0.696E+02 | 0.02 | 2.03 | 0.03 | 0.01 | .68515E+02 |
| 20.12 | 0.00 | 0.03 | 1.4 | 0.692E+02 | 0.02 | 2.04 | 0.03 | 0.01 | .91159E+02 |
| 25.12 | 0.00 | 0.03 | 1.5 | 0.688E+02 | 0.02 | 2.05 | 0.03 | 0.01 | .11380E+03 |
| 30.12 | 0.00 | 0.03 | 1.5 | 0.685E+02 | 0.02 | 2.06 | 0.03 | 0.01 | .13645E+03 |
| 35.12 | 0.00 | 0.03 | 1.5 | 0.681E+02 | 0.02 | 2.07 | 0.03 | 0.01 | .15909E+03 |
| 40.12 | 0.00 | 0.03 | 1.5 | 0.678E+02 | 0.02 | 2.08 | 0.03 | 0.01 | .18173E+03 |
| 45.11 | 0.00 | 0.03 | 1.5 | 0.674E+02 | 0.02 | 2.09 | 0.03 | 0.01 | .20438E+03 |
| 50.11 | 0.00 | 0.03 | 1.5 | 0.671E+02 | 0.02 | 2.10 | 0.03 | 0.01 | .22702E+03 |
| 55.11 | 0.00 | 0.03 | 1.5 | 0.667E+02 | 0.02 | 2.12 | 0.03 | 0.01 | .24966E+03 |
| 60.11 | 0.00 | 0.03 | 1.5 | 0.664E+02 | 0.02 | 2.13 | 0.03 | 0.01 | .27231E+03 |
| 65.11 | 0.00 | 0.03 | 1.5 | 0.661E+02 | 0.02 | 2.14 | 0.03 | 0.01 | .29495E+03 |
| 70.11 | 0.00 | 0.03 | 1.5 | 0.658E+02 | 0.02 | 2.15 | 0.03 | 0.01 | .31760E+03 |
| 75.11 | 0.00 | 0.03 | 1.5 | 0.655E+02 | 0.02 | 2.16 | 0.03 | 0.01 | .34024E+03 |
| 80.11 | 0.00 | 0.03 | 1.5 | 0.652E+02 | 0.02 | 2.17 | 0.03 | 0.01 | .36288E+03 |
| 85.10 | 0.00 | 0.03 | 1.5 | 0.648E+02 | 0.02 | 2.18 | 0.03 | 0.01 | .38553E+03 |
| 90.10 | 0.00 | 0.03 | 1.5 | 0.645E+02 | 0.02 | 2.19 | 0.03 | 0.01 | .40817E+03 |
| 95.10 | 0.00 | 0.03 | 1.6 | 0.643E+02 | 0.02 | 2.20 | 0.03 | 0.01 | .43081E+03 |
| 100.10 | 0.00 | 0.03 | 1.6 | 0.640E+02 | 0.02 | 2.21 | 0.03 | 0.01 | .45346E+03 |
| 105.10 | 0.00 | 0.03 | 1.6 | 0.637E+02 | 0.02 | 2.22 | 0.03 | 0.01 | .47610E+03 |
| 110.10 | 0.00 | 0.03 | 1.6 | 0.634E+02 | 0.02 | 2.23 | 0.03 | 0.01 | .49874E+03 |
| 115.10 | 0.00 | 0.03 | 1.6 | 0.631E+02 | 0.02 | 2.24 | 0.03 | 0.01 | .52139E+03 |
| 120.10 | 0.00 | 0.03 | 1.6 | 0.628E+02 | 0.02 | 2.25 | 0.03 | 0.01 | .54403E+03 |
| 125.09 | 0.00 | 0.03 | 1.6 | 0.626E+02 | 0.02 | 2.26 | 0.03 | 0.01 | .56668E+03 |
| 130.09 | 0.00 | 0.03 | 1.6 | 0.623E+02 | 0.02 | 2.27 | 0.03 | 0.01 | .58932E+03 |
| 135.09 | 0.00 | 0.03 | 1.6 | 0.620E+02 | 0.02 | 2.28 | 0.03 | 0.01 | .61196E+03 |
| 140.09 | 0.00 | 0.03 | 1.6 | 0.618E+02 | 0.02 | 2.29 | 0.03 | 0.01 | .63461E+03 |
| 145.09 | 0.00 | 0.03 | 1.6 | 0.615E+02 | 0.02 | 2.30 | 0.03 | 0.01 | .65725E+03 |
| 150.09 | 0.00 | 0.03 | 1.6 | 0.612E+02 | 0.02 | 2.31 | 0.03 | 0.01 | .67989E+03 |
| 155.09 | 0.00 | 0.03 | 1.6 | 0.610E+02 | 0.02 | 2.32 | 0.03 | 0.01 | .70254E+03 |
| 160.09 | 0.00 | 0.03 | 1.6 | 0.607E+02 | 0.02 | 2.32 | 0.03 | 0.01 | .72518E+03 |
| 165.08 | 0.00 | 0.03 | 1.7 | 0.605E+02 | 0.02 | 2.33 | 0.03 | 0.01 | .74783E+03 |
| 170.08 | 0.00 | 0.03 | 1.7 | 0.602E+02 | 0.02 | 2.34 | 0.03 | 0.01 | .77047E+03 |
| 175.08 | 0.00 | 0.03 | 1.7 | 0.600E+02 | 0.02 | 2.35 | 0.03 | 0.01 | .79311E+03 |
| 180.08 | 0.00 | 0.03 | 1.7 | 0.598E+02 | 0.02 | 2.36 | 0.03 | 0.01 | .81576E+03 |
| 185.08 | 0.00 | 0.03 | 1.7 | 0.595E+02 | 0.02 | 2.37 | 0.03 | 0.01 | .83840E+03 |
| 190.08 | 0.00 | 0.03 | 1.7 | 0.593E+02 | 0.02 | 2.38 | 0.03 | 0.01 | .86104E+03 |
| 195.08 | 0.00 | 0.03 | 1.7 | 0.591E+02 | 0.02 | 2.39 | 0.03 | 0.01 | .88369E+03 |
| 200.08 | 0.00 | 0.03 | 1.7 | 0.588E+02 | 0.02 | 2.40 | 0.03 | 0.01 | .90633E+03 |
| 205.07 | 0.00 | 0.03 | 1.7 | 0.586E+02 | 0.02 | 2.41 | 0.03 | 0.01 | .92897E+03 |
| 210.07 | 0.00 | 0.03 | 1.7 | 0.584E+02 | 0.02 | 2.42 | 0.03 | 0.01 | .95162E+03 |
| 215.07 | 0.00 | 0.03 | 1.7 | 0.582E+02 | 0.02 | 2.43 | 0.03 | 0.01 | .97426E+03 |
| 220.07 | 0.00 | 0.03 | 1.7 | 0.579E+02 | 0.02 | 2.44 | 0.03 | 0.01 | .99691E+03 |
| 225.07 | 0.00 | 0.03 | 1.7 | 0.577E+02 | 0.02 | 2.45 | 0.03 | 0.01 | .10195E+04 |
| 230.07 | 0.00 | 0.03 | 1.7 | 0.575E+02 | 0.02 | 2.45 | 0.03 | 0.01 | .10422E+04 |
| 235.07 | 0.00 | 0.03 | 1.7 | 0.573E+02 | 0.02 | 2.46 | 0.03 | 0.01 | .10648E+04 |
| 240.07 | 0.00 | 0.03 | 1.8 | 0.571E+02 | 0.02 | 2.47 | 0.03 | 0.01 | .10875E+04 |
| 245.06 | 0.00 | 0.03 | 1.8 | 0.569E+02 | 0.02 | 2.48 | 0.03 | 0.01 | .11101E+04 |
| 250.06 | 0.00 | 0.03 | 1.8 | 0.567E+02 | 0.02 | 2.49 | 0.03 | 0.01 | .11328E+04 |
| 255.06 | 0.00 | 0.03 | 1.8 | 0.565E+02 | 0.02 | 2.50 | 0.03 | 0.01 | .11554E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 260.06 | 0.00 | 0.03 | 1.8 | 0.563E+02 | 0.02 | 2.51 | 0.03 | 0.01 | .11781E+04 |
| 265.06 | 0.00 | 0.03 | 1.8 | 0.561E+02 | 0.02 | 2.52 | 0.03 | 0.01 | .12007E+04 |
| 270.06 | 0.00 | 0.03 | 1.8 | 0.559E+02 | 0.02 | 2.53 | 0.03 | 0.01 | .12233E+04 |
| 275.06 | 0.00 | 0.03 | 1.8 | 0.557E+02 | 0.02 | 2.53 | 0.03 | 0.01 | .12460E+04 |
| 280.06 | 0.00 | 0.03 | 1.8 | 0.555E+02 | 0.02 | 2.54 | 0.03 | 0.01 | .12686E+04 |
| 285.05 | 0.00 | 0.03 | 1.8 | 0.553E+02 | 0.02 | 2.55 | 0.03 | 0.01 | .12913E+04 |
| 290.05 | 0.00 | 0.03 | 1.8 | 0.551E+02 | 0.02 | 2.56 | 0.03 | 0.01 | .13139E+04 |
| 295.05 | 0.00 | 0.03 | 1.8 | 0.550E+02 | 0.02 | 2.57 | 0.03 | 0.01 | .13366E+04 |
| 300.05 | 0.00 | 0.03 | 1.8 | 0.548E+02 | 0.02 | 2.58 | 0.03 | 0.01 | .13592E+04 |
| 305.05 | 0.00 | 0.03 | 1.8 | 0.546E+02 | 0.02 | 2.59 | 0.03 | 0.01 | .13818E+04 |
| 310.05 | 0.00 | 0.03 | 1.8 | 0.544E+02 | 0.02 | 2.60 | 0.03 | 0.01 | .14045E+04 |
| 315.05 | 0.00 | 0.03 | 1.8 | 0.542E+02 | 0.02 | 2.60 | 0.03 | 0.01 | .14271E+04 |
| 320.05 | 0.00 | 0.03 | 1.8 | 0.541E+02 | 0.02 | 2.61 | 0.03 | 0.01 | .14498E+04 |
| 325.04 | 0.00 | 0.03 | 1.9 | 0.539E+02 | 0.02 | 2.62 | 0.03 | 0.01 | .14724E+04 |
| 330.04 | 0.00 | 0.03 | 1.9 | 0.537E+02 | 0.02 | 2.63 | 0.03 | 0.01 | .14951E+04 |
| 335.04 | 0.00 | 0.03 | 1.9 | 0.535E+02 | 0.02 | 2.64 | 0.03 | 0.01 | .15177E+04 |
| 340.04 | 0.00 | 0.03 | 1.9 | 0.534E+02 | 0.02 | 2.65 | 0.03 | 0.01 | .15404E+04 |
| 345.04 | 0.00 | 0.03 | 1.9 | 0.532E+02 | 0.02 | 2.65 | 0.03 | 0.01 | .15630E+04 |
| 350.04 | 0.00 | 0.03 | 1.9 | 0.530E+02 | 0.02 | 2.66 | 0.03 | 0.01 | .15856E+04 |
| 355.04 | 0.00 | 0.03 | 1.9 | 0.529E+02 | 0.02 | 2.67 | 0.03 | 0.01 | .16083E+04 |
| 360.04 | 0.00 | 0.03 | 1.9 | 0.527E+02 | 0.02 | 2.68 | 0.03 | 0.01 | .16309E+04 |
| 365.03 | 0.00 | 0.03 | 1.9 | 0.525E+02 | 0.02 | 2.69 | 0.03 | 0.01 | .16536E+04 |
| 370.03 | 0.00 | 0.03 | 1.9 | 0.524E+02 | 0.02 | 2.70 | 0.03 | 0.01 | .16762E+04 |
| 375.03 | 0.00 | 0.03 | 1.9 | 0.522E+02 | 0.02 | 2.70 | 0.03 | 0.01 | .16989E+04 |
| 380.03 | 0.00 | 0.03 | 1.9 | 0.521E+02 | 0.02 | 2.71 | 0.03 | 0.01 | .17215E+04 |
| 385.03 | 0.00 | 0.03 | 1.9 | 0.519E+02 | 0.02 | 2.72 | 0.03 | 0.01 | .17441E+04 |
| 390.03 | 0.00 | 0.03 | 1.9 | 0.518E+02 | 0.02 | 2.73 | 0.03 | 0.01 | .17668E+04 |
| 395.03 | 0.00 | 0.03 | 1.9 | 0.516E+02 | 0.02 | 2.74 | 0.03 | 0.01 | .17894E+04 |
| 400.03 | 0.00 | 0.03 | 1.9 | 0.514E+02 | 0.02 | 2.74 | 0.03 | 0.01 | .18121E+04 |
| 405.02 | 0.00 | 0.03 | 1.9 | 0.513E+02 | 0.02 | 2.75 | 0.03 | 0.01 | .18347E+04 |
| 410.02 | 0.00 | 0.03 | 2.0 | 0.511E+02 | 0.02 | 2.76 | 0.03 | 0.01 | .18574E+04 |
| 415.02 | 0.00 | 0.03 | 2.0 | 0.510E+02 | 0.02 | 2.77 | 0.03 | 0.01 | .18800E+04 |
| 420.02 | 0.00 | 0.03 | 2.0 | 0.509E+02 | 0.02 | 2.78 | 0.03 | 0.01 | .19027E+04 |
| 425.02 | 0.00 | 0.03 | 2.0 | 0.507E+02 | 0.02 | 2.78 | 0.03 | 0.01 | .19253E+04 |
| 430.02 | 0.00 | 0.03 | 2.0 | 0.506E+02 | 0.02 | 2.79 | 0.03 | 0.01 | .19479E+04 |
| 435.02 | 0.00 | 0.03 | 2.0 | 0.504E+02 | 0.02 | 2.80 | 0.03 | 0.01 | .19706E+04 |
| 440.02 | 0.00 | 0.03 | 2.0 | 0.503E+02 | 0.02 | 2.81 | 0.03 | 0.01 | .19932E+04 |
| 445.01 | 0.00 | 0.03 | 2.0 | 0.501E+02 | 0.02 | 2.82 | 0.03 | 0.01 | .20159E+04 |
| 450.01 | 0.00 | 0.03 | 2.0 | 0.500E+02 | 0.02 | 2.82 | 0.03 | 0.01 | .20385E+04 |
| 455.01 | 0.00 | 0.03 | 2.0 | 0.499E+02 | 0.02 | 2.83 | 0.03 | 0.01 | .20612E+04 |
| 460.01 | 0.00 | 0.03 | 2.0 | 0.497E+02 | 0.02 | 2.84 | 0.03 | 0.01 | .20838E+04 |
| 465.01 | 0.00 | 0.03 | 2.0 | 0.496E+02 | 0.02 | 2.85 | 0.03 | 0.01 | .21064E+04 |
| 470.01 | 0.00 | 0.03 | 2.0 | 0.495E+02 | 0.02 | 2.86 | 0.03 | 0.01 | .21291E+04 |
| 475.01 | 0.00 | 0.03 | 2.0 | 0.493E+02 | 0.02 | 2.86 | 0.03 | 0.01 | .21517E+04 |
| 480.01 | 0.00 | 0.03 | 2.0 | 0.492E+02 | 0.02 | 2.87 | 0.03 | 0.01 | .21744E+04 |
| 485.00 | 0.00 | 0.03 | 2.0 | 0.491E+02 | 0.02 | 2.88 | 0.03 | 0.01 | .21970E+04 |
| 490.00 | 0.00 | 0.03 | 2.0 | 0.489E+02 | 0.02 | 2.89 | 0.03 | 0.01 | .22197E+04 |
| 495.00 | 0.00 | 0.03 | 2.0 | 0.488E+02 | 0.02 | 2.89 | 0.03 | 0.01 | .22423E+04 |
| 500.00 | 0.00 | 0.03 | 2.1 | 0.487E+02 | 0.02 | 2.90 | 0.03 | 0.01 | .22650E+04 |

Cumulative travel time = 2264.9502 sec ( 0.63 hrs)

Simulation limit based on maximum specified distance = 500.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
----------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges      End of Prediction File
222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1: Single Port Discharges
CORMIX Version 12.0GTD
HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------

```
CASE DESCRIPTION
 Site name/label:   Goldboro TMF Area
 Design case:       Year 21
 FILE NAME:         C:\... - Goldboro\Mar 2022 EARD\rev7\Y21-TMF_Outlet.prd
 Time stamp:        04/06/2022--21:59:43

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.45  HD    =      1.45
 UA    =      0.001 F     =      0.111 USTAR =0.8242E-04
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  LEFT      DISTB =      0.14
 D0    =      0.166 A0    =      0.022 H0    =      1.45  SUB0  =      0.00
 THETA =      0.00  SIGMA =    271.00
 U0    =      1.424 Q0    =      0.031       =0.3100E-01
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.3100E-01  M0    =0.4415E-01  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.15  LM    =  99999.00  Lm    =    300.18  Lb    =      0.00
                    Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2034.73

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4        1
 1  Applicable layer depth HS =    1.45        1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
```

XINT = 7000.00 XMAX = 7000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.14 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -80.00 SIGMAE= 271.07
LE = 0.83 XE = 0.00 YE = -0.14 ZE = 0.63

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .00000E+00 |
| 0.00 | -0.14 | 0.63 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .12474E-02 |
| 0.00 | -0.14 | 0.63 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .24990E-02 |
| 0.00 | -0.15 | 0.62 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .50144E-02 |
| 0.00 | -0.15 | 0.62 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .75463E-02 |
| 0.00 | -0.15 | 0.61 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .10095E-01 |
| 0.00 | -0.15 | 0.61 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .12659E-01 |
| 0.00 | -0.15 | 0.60 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .15241E-01 |
| 0.00 | -0.15 | 0.60 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .17839E-01 |
| 0.00 | -0.15 | 0.59 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .20453E-01 |
| 0.00 | -0.15 | 0.59 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .23083E-01 |
| 0.00 | -0.15 | 0.58 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .25730E-01 |
| 0.00 | -0.15 | 0.58 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .28394E-01 |
| 0.00 | -0.15 | 0.57 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .31074E-01 |
| 0.00 | -0.16 | 0.57 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .33771E-01 |
| 0.00 | -0.16 | 0.57 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .36484E-01 |
| 0.00 | -0.16 | 0.56 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .39213E-01 |
| 0.00 | -0.16 | 0.56 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .41959E-01 |
| 0.00 | -0.16 | 0.55 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .44721E-01 |
| 0.00 | -0.16 | 0.55 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .47500E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.16 | 0.54 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .50295E-01 |
| 0.00 | -0.16 | 0.54 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .53107E-01 |
| 0.00 | -0.16 | 0.53 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .55935E-01 |
| 0.00 | -0.16 | 0.53 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .58780E-01 |
| 0.00 | -0.16 | 0.52 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .61641E-01 |
| 0.00 | -0.16 | 0.52 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .64518E-01 |
| 0.00 | -0.17 | 0.51 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .67413E-01 |
| 0.00 | -0.17 | 0.51 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .70323E-01 |
| 0.00 | -0.17 | 0.50 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .73250E-01 |
| 0.00 | -0.17 | 0.50 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .76193E-01 |
| 0.00 | -0.17 | 0.49 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .79153E-01 |
| 0.00 | -0.17 | 0.49 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .82130E-01 |
| 0.00 | -0.17 | 0.48 | 1.0 | 0.994E+02 | 0.10 | 1.424 | .85122E-01 |
| 0.00 | -0.17 | 0.48 | 1.0 | 0.989E+02 | 0.10 | 1.424 | .88132E-01 |
| 0.00 | -0.17 | 0.47 | 1.0 | 0.983E+02 | 0.10 | 1.424 | .91157E-01 |
| 0.00 | -0.17 | 0.47 | 1.0 | 0.978E+02 | 0.10 | 1.424 | .94199E-01 |
| 0.00 | -0.17 | 0.46 | 1.0 | 0.973E+02 | 0.10 | 1.424 | .97258E-01 |
| 0.00 | -0.18 | 0.46 | 1.0 | 0.968E+02 | 0.10 | 1.424 | .10033E+00 |
| 0.00 | -0.18 | 0.45 | 1.0 | 0.962E+02 | 0.10 | 1.424 | .10342E+00 |
| 0.00 | -0.18 | 0.45 | 1.0 | 0.957E+02 | 0.10 | 1.424 | .10653E+00 |
| 0.00 | -0.18 | 0.44 | 1.1 | 0.952E+02 | 0.10 | 1.424 | .10966E+00 |
| 0.00 | -0.18 | 0.44 | 1.1 | 0.947E+02 | 0.11 | 1.424 | .11280E+00 |
| 0.00 | -0.18 | 0.43 | 1.1 | 0.942E+02 | 0.11 | 1.424 | .11596E+00 |
| 0.00 | -0.18 | 0.43 | 1.1 | 0.938E+02 | 0.11 | 1.424 | .11913E+00 |
| 0.00 | -0.18 | 0.42 | 1.1 | 0.933E+02 | 0.11 | 1.424 | .12232E+00 |
| 0.00 | -0.18 | 0.42 | 1.1 | 0.928E+02 | 0.11 | 1.424 | .12553E+00 |
| 0.00 | -0.18 | 0.41 | 1.1 | 0.923E+02 | 0.11 | 1.424 | .12875E+00 |
| 0.00 | -0.18 | 0.41 | 1.1 | 0.918E+02 | 0.11 | 1.424 | .13199E+00 |
| 0.00 | -0.18 | 0.40 | 1.1 | 0.914E+02 | 0.11 | 1.424 | .13525E+00 |
| 0.00 | -0.19 | 0.40 | 1.1 | 0.909E+02 | 0.11 | 1.424 | .13852E+00 |
| 0.00 | -0.19 | 0.39 | 1.1 | 0.902E+02 | 0.11 | 1.424 | .14346E+00 |
| 0.00 | -0.19 | 0.38 | 1.1 | 0.898E+02 | 0.11 | 1.424 | .14677E+00 |
| 0.00 | -0.19 | 0.38 | 1.1 | 0.894E+02 | 0.11 | 1.424 | .15010E+00 |
| 0.00 | -0.19 | 0.38 | 1.1 | 0.889E+02 | 0.11 | 1.424 | .15345E+00 |
| 0.00 | -0.19 | 0.37 | 1.1 | 0.885E+02 | 0.11 | 1.424 | .15681E+00 |
| 0.00 | -0.19 | 0.37 | 1.1 | 0.881E+02 | 0.11 | 1.424 | .16019E+00 |
| 0.00 | -0.19 | 0.36 | 1.1 | 0.876E+02 | 0.11 | 1.424 | .16359E+00 |
| 0.00 | -0.19 | 0.36 | 1.1 | 0.872E+02 | 0.11 | 1.424 | .16700E+00 |
| 0.00 | -0.19 | 0.35 | 1.2 | 0.868E+02 | 0.11 | 1.424 | .17043E+00 |
| 0.00 | -0.19 | 0.35 | 1.2 | 0.864E+02 | 0.12 | 1.424 | .17387E+00 |
| 0.00 | -0.20 | 0.34 | 1.2 | 0.860E+02 | 0.12 | 1.424 | .17734E+00 |
| 0.00 | -0.20 | 0.34 | 1.2 | 0.856E+02 | 0.12 | 1.424 | .18081E+00 |
| 0.00 | -0.20 | 0.33 | 1.2 | 0.852E+02 | 0.12 | 1.424 | .18431E+00 |
| 0.00 | -0.20 | 0.33 | 1.2 | 0.848E+02 | 0.12 | 1.424 | .18782E+00 |
| 0.00 | -0.20 | 0.32 | 1.2 | 0.844E+02 | 0.12 | 1.418 | .19135E+00 |
| 0.00 | -0.20 | 0.32 | 1.2 | 0.840E+02 | 0.12 | 1.412 | .19489E+00 |
| 0.00 | -0.20 | 0.31 | 1.2 | 0.836E+02 | 0.12 | 1.405 | .19845E+00 |
| 0.00 | -0.20 | 0.31 | 1.2 | 0.832E+02 | 0.12 | 1.399 | .20203E+00 |
| 0.00 | -0.20 | 0.30 | 1.2 | 0.828E+02 | 0.12 | 1.392 | .20562E+00 |
| 0.00 | -0.20 | 0.30 | 1.2 | 0.824E+02 | 0.12 | 1.386 | .20923E+00 |
| 0.00 | -0.20 | 0.29 | 1.2 | 0.821E+02 | 0.12 | 1.380 | .21286E+00 |
| 0.00 | -0.21 | 0.29 | 1.2 | 0.817E+02 | 0.12 | 1.373 | .21650E+00 |
| 0.00 | -0.21 | 0.28 | 1.2 | 0.813E+02 | 0.12 | 1.367 | .22016E+00 |
| 0.00 | -0.21 | 0.28 | 1.2 | 0.810E+02 | 0.12 | 1.361 | .22384E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.21 | 0.27 | 1.2 | 0.806E+02 | 0.12 | 1.355 | .22753E+00 |
| 0.00 | -0.21 | 0.27 | 1.2 | 0.802E+02 | 0.12 | 1.349 | .23124E+00 |
| 0.00 | -0.21 | 0.26 | 1.3 | 0.799E+02 | 0.12 | 1.343 | .23496E+00 |
| 0.00 | -0.21 | 0.26 | 1.3 | 0.795E+02 | 0.13 | 1.337 | .23871E+00 |
| 0.00 | -0.21 | 0.25 | 1.3 | 0.792E+02 | 0.13 | 1.331 | .24246E+00 |
| 0.00 | -0.21 | 0.25 | 1.3 | 0.788E+02 | 0.13 | 1.326 | .24624E+00 |
| 0.00 | -0.21 | 0.24 | 1.3 | 0.785E+02 | 0.13 | 1.320 | .25003E+00 |
| 0.00 | -0.21 | 0.24 | 1.3 | 0.782E+02 | 0.13 | 1.314 | .25384E+00 |
| 0.00 | -0.21 | 0.23 | 1.3 | 0.778E+02 | 0.13 | 1.308 | .25766E+00 |
| 0.00 | -0.22 | 0.23 | 1.3 | 0.775E+02 | 0.13 | 1.303 | .26150E+00 |
| 0.00 | -0.22 | 0.22 | 1.3 | 0.772E+02 | 0.13 | 1.297 | .26536E+00 |
| 0.00 | -0.22 | 0.22 | 1.3 | 0.768E+02 | 0.13 | 1.292 | .26923E+00 |
| 0.00 | -0.22 | 0.21 | 1.3 | 0.765E+02 | 0.13 | 1.286 | .27312E+00 |
| 0.00 | -0.22 | 0.21 | 1.3 | 0.762E+02 | 0.13 | 1.281 | .27703E+00 |
| 0.00 | -0.22 | 0.20 | 1.3 | 0.759E+02 | 0.13 | 1.276 | .28095E+00 |
| 0.00 | -0.22 | 0.20 | 1.3 | 0.756E+02 | 0.13 | 1.270 | .28489E+00 |
| 0.00 | -0.22 | 0.19 | 1.3 | 0.752E+02 | 0.13 | 1.265 | .28885E+00 |
| 0.00 | -0.22 | 0.19 | 1.3 | 0.749E+02 | 0.13 | 1.260 | .29282E+00 |
| 0.00 | -0.22 | 0.18 | 1.3 | 0.746E+02 | 0.13 | 1.254 | .29681E+00 |
| 0.00 | -0.22 | 0.18 | 1.3 | 0.743E+02 | 0.13 | 1.249 | .30081E+00 |
| 0.00 | -0.23 | 0.17 | 1.4 | 0.740E+02 | 0.13 | 1.244 | .30483E+00 |
| 0.00 | -0.23 | 0.17 | 1.4 | 0.737E+02 | 0.14 | 1.239 | .30887E+00 |
| 0.00 | -0.23 | 0.16 | 1.4 | 0.734E+02 | 0.14 | 1.234 | .31293E+00 |
| 0.00 | -0.23 | 0.16 | 1.4 | 0.731E+02 | 0.14 | 1.229 | .31700E+00 |
| 0.00 | -0.23 | 0.15 | 1.4 | 0.728E+02 | 0.14 | 1.224 | .32109E+00 |
| 0.00 | -0.23 | 0.15 | 1.4 | 0.725E+02 | 0.14 | 1.219 | .32519E+00 |
| 0.00 | -0.23 | 0.14 | 1.4 | 0.722E+02 | 0.14 | 1.214 | .32931E+00 |
| 0.00 | -0.23 | 0.14 | 1.4 | 0.721E+02 | 0.14 | 1.212 | .33138E+00 |

Cumulative travel time = 0.3314 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | -0.23 | 0.14 | 1.4 | 0.721E+02 | 0.14 | .33138E+00 |

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.13 | -34.31 | 1.45 | 1.4 | 0.721E+02 | 0.00 | 0.00 | 1.45 | 1.45 | .33138E+00 |
| 0.02 | -34.31 | 1.45 | 1.4 | 0.721E+02 | 1.45 | 9.38 | 1.45 | 0.00 | .29619E+02 |
| 0.18 | -34.31 | 1.45 | 1.4 | 0.704E+02 | 1.45 | 13.26 | 1.45 | 0.00 | .25652E+03 |
| 0.34 | -34.31 | 1.45 | 1.5 | 0.669E+02 | 1.45 | 16.24 | 1.45 | 0.00 | .48343E+03 |
| 0.50 | -34.31 | 1.45 | 1.6 | 0.627E+02 | 1.45 | 18.76 | 1.45 | 0.00 | .71033E+03 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.66 | -34.31 | 1.45 | 1.7 | 0.589E+02 | 1.45 | 20.97 | 1.45 | 0.00 | .93724E+03 |
| 0.82 | -34.31 | 1.45 | 1.8 | 0.560E+02 | 1.45 | 22.97 | 1.45 | 0.00 | .11641E+04 |
| 0.98 | -34.31 | 1.45 | 1.9 | 0.540E+02 | 1.45 | 24.81 | 1.45 | 0.00 | .13910E+04 |
| 1.14 | -34.31 | 1.45 | 1.9 | 0.528E+02 | 1.45 | 26.52 | 1.45 | 0.00 | .16180E+04 |
| 1.30 | -34.31 | 1.45 | 1.9 | 0.521E+02 | 1.45 | 28.13 | 1.45 | 0.00 | .18449E+04 |
| 1.45 | -34.31 | 1.45 | 1.9 | 0.515E+02 | 1.45 | 29.66 | 1.45 | 0.00 | .20718E+04 |

Cumulative travel time = 2071.7600 sec ( 0.58 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.638E-03 m^2/s
Horizontal diffusivity (initial value) = 0.138E+00 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.45 | -34.31 | 1.45 | 1.9 | 0.515E+02 | 1.45 | 29.66 | 1.45 | 0.00 | .20718E+04 |
| 1.46 | -34.31 | 1.45 | 1.9 | 0.514E+02 | 1.45 | 29.70 | 1.45 | 0.00 | .20782E+04 |
| 1.46 | -34.31 | 1.45 | 1.9 | 0.513E+02 | 1.45 | 29.75 | 1.45 | 0.00 | .20846E+04 |
| 1.47 | -34.31 | 1.45 | 2.0 | 0.513E+02 | 1.45 | 29.80 | 1.45 | 0.00 | .20910E+04 |
| 1.47 | -34.31 | 1.45 | 2.0 | 0.512E+02 | 1.45 | 29.84 | 1.45 | 0.00 | .20974E+04 |
| 1.48 | -34.31 | 1.45 | 2.0 | 0.511E+02 | 1.45 | 29.89 | 1.45 | 0.00 | .21038E+04 |
| 1.48 | -34.31 | 1.45 | 2.0 | 0.510E+02 | 1.45 | 29.94 | 1.45 | 0.00 | .21102E+04 |
| 1.49 | -34.31 | 1.45 | 2.0 | 0.509E+02 | 1.45 | 29.98 | 1.45 | 0.00 | .21166E+04 |
| 1.49 | -34.31 | 1.45 | 2.0 | 0.509E+02 | 1.45 | 30.03 | 1.45 | 0.00 | .21230E+04 |
| 1.49 | -34.31 | 1.45 | 2.0 | 0.508E+02 | 1.45 | 30.08 | 1.45 | 0.00 | .21294E+04 |
| 1.50 | -34.31 | 1.45 | 2.0 | 0.507E+02 | 1.45 | 30.12 | 1.45 | 0.00 | .21358E+04 |
| 1.50 | -34.31 | 1.45 | 2.0 | 0.506E+02 | 1.45 | 30.17 | 1.45 | 0.00 | .21422E+04 |
| 1.51 | -34.31 | 1.45 | 2.0 | 0.505E+02 | 1.45 | 30.22 | 1.45 | 0.00 | .21486E+04 |
| 1.51 | -34.31 | 1.45 | 2.0 | 0.505E+02 | 1.45 | 30.26 | 1.45 | 0.00 | .21550E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.52 | -34.31 | 1.45 | 2.0 | 0.504E+02 | 1.45 | 30.31 | 1.45 | 0.00 | .21614E+04 |
| 1.52 | -34.31 | 1.45 | 2.0 | 0.503E+02 | 1.45 | 30.36 | 1.45 | 0.00 | .21678E+04 |
| 1.53 | -34.31 | 1.45 | 2.0 | 0.502E+02 | 1.45 | 30.41 | 1.45 | 0.00 | .21742E+04 |
| 1.53 | -34.31 | 1.45 | 2.0 | 0.501E+02 | 1.45 | 30.45 | 1.45 | 0.00 | .21806E+04 |
| 1.53 | -34.31 | 1.45 | 2.0 | 0.501E+02 | 1.45 | 30.50 | 1.45 | 0.00 | .21870E+04 |
| 1.54 | -34.31 | 1.45 | 2.0 | 0.500E+02 | 1.45 | 30.55 | 1.45 | 0.00 | .21934E+04 |
| 1.54 | -34.31 | 1.45 | 2.0 | 0.499E+02 | 1.45 | 30.59 | 1.45 | 0.00 | .21998E+04 |
| 1.55 | -34.31 | 1.45 | 2.0 | 0.498E+02 | 1.45 | 30.64 | 1.45 | 0.00 | .22062E+04 |
| 1.55 | -34.31 | 1.45 | 2.0 | 0.498E+02 | 1.45 | 30.69 | 1.45 | 0.00 | .22126E+04 |
| 1.56 | -34.31 | 1.45 | 2.0 | 0.497E+02 | 1.45 | 30.74 | 1.45 | 0.00 | .22190E+04 |
| 1.56 | -34.31 | 1.45 | 2.0 | 0.496E+02 | 1.45 | 30.78 | 1.45 | 0.00 | .22254E+04 |
| 1.57 | -34.31 | 1.45 | 2.0 | 0.495E+02 | 1.45 | 30.83 | 1.45 | 0.00 | .22318E+04 |
| 1.57 | -34.31 | 1.45 | 2.0 | 0.495E+02 | 1.45 | 30.88 | 1.45 | 0.00 | .22382E+04 |
| 1.58 | -34.31 | 1.45 | 2.0 | 0.494E+02 | 1.45 | 30.92 | 1.45 | 0.00 | .22446E+04 |
| 1.58 | -34.31 | 1.45 | 2.0 | 0.493E+02 | 1.45 | 30.97 | 1.45 | 0.00 | .22510E+04 |
| 1.58 | -34.31 | 1.45 | 2.0 | 0.492E+02 | 1.45 | 31.02 | 1.45 | 0.00 | .22574E+04 |
| 1.59 | -34.31 | 1.45 | 2.0 | 0.492E+02 | 1.45 | 31.07 | 1.45 | 0.00 | .22638E+04 |
| 1.59 | -34.31 | 1.45 | 2.0 | 0.491E+02 | 1.45 | 31.11 | 1.45 | 0.00 | .22702E+04 |
| 1.60 | -34.31 | 1.45 | 2.0 | 0.490E+02 | 1.45 | 31.16 | 1.45 | 0.00 | .22766E+04 |
| 1.60 | -34.31 | 1.45 | 2.0 | 0.489E+02 | 1.45 | 31.21 | 1.45 | 0.00 | .22830E+04 |
| 1.61 | -34.31 | 1.45 | 2.0 | 0.489E+02 | 1.45 | 31.26 | 1.45 | 0.00 | .22894E+04 |
| 1.61 | -34.31 | 1.45 | 2.0 | 0.488E+02 | 1.45 | 31.30 | 1.45 | 0.00 | .22958E+04 |
| 1.62 | -34.31 | 1.45 | 2.1 | 0.487E+02 | 1.45 | 31.35 | 1.45 | 0.00 | .23022E+04 |
| 1.62 | -34.31 | 1.45 | 2.1 | 0.486E+02 | 1.45 | 31.40 | 1.45 | 0.00 | .23086E+04 |
| 1.62 | -34.31 | 1.45 | 2.1 | 0.486E+02 | 1.45 | 31.45 | 1.45 | 0.00 | .23150E+04 |
| 1.63 | -34.31 | 1.45 | 2.1 | 0.485E+02 | 1.45 | 31.49 | 1.45 | 0.00 | .23214E+04 |
| 1.63 | -34.31 | 1.45 | 2.1 | 0.484E+02 | 1.45 | 31.54 | 1.45 | 0.00 | .23278E+04 |
| 1.64 | -34.31 | 1.45 | 2.1 | 0.483E+02 | 1.45 | 31.59 | 1.45 | 0.00 | .23342E+04 |
| 1.64 | -34.31 | 1.45 | 2.1 | 0.483E+02 | 1.45 | 31.64 | 1.45 | 0.00 | .23406E+04 |
| 1.65 | -34.31 | 1.45 | 2.1 | 0.482E+02 | 1.45 | 31.69 | 1.45 | 0.00 | .23470E+04 |
| 1.65 | -34.31 | 1.45 | 2.1 | 0.481E+02 | 1.45 | 31.73 | 1.45 | 0.00 | .23534E+04 |
| 1.66 | -34.31 | 1.45 | 2.1 | 0.481E+02 | 1.45 | 31.78 | 1.45 | 0.00 | .23598E+04 |
| 1.66 | -34.31 | 1.45 | 2.1 | 0.480E+02 | 1.45 | 31.83 | 1.45 | 0.00 | .23662E+04 |
| 1.66 | -34.31 | 1.45 | 2.1 | 0.479E+02 | 1.45 | 31.88 | 1.45 | 0.00 | .23726E+04 |
| 1.67 | -34.31 | 1.45 | 2.1 | 0.478E+02 | 1.45 | 31.92 | 1.45 | 0.00 | .23790E+04 |
| 1.67 | -34.31 | 1.45 | 2.1 | 0.478E+02 | 1.45 | 31.97 | 1.45 | 0.00 | .23854E+04 |
| 1.68 | -34.31 | 1.45 | 2.1 | 0.477E+02 | 1.45 | 32.02 | 1.45 | 0.00 | .23918E+04 |
| 1.68 | -34.31 | 1.45 | 2.1 | 0.476E+02 | 1.45 | 32.07 | 1.45 | 0.00 | .23982E+04 |
| 1.69 | -34.31 | 1.45 | 2.1 | 0.476E+02 | 1.45 | 32.12 | 1.45 | 0.00 | .24046E+04 |
| 1.69 | -34.31 | 1.45 | 2.1 | 0.475E+02 | 1.45 | 32.16 | 1.45 | 0.00 | .24110E+04 |
| 1.70 | -34.31 | 1.45 | 2.1 | 0.474E+02 | 1.45 | 32.21 | 1.45 | 0.00 | .24174E+04 |
| 1.70 | -34.31 | 1.45 | 2.1 | 0.473E+02 | 1.45 | 32.26 | 1.45 | 0.00 | .24238E+04 |
| 1.71 | -34.31 | 1.45 | 2.1 | 0.473E+02 | 1.45 | 32.31 | 1.45 | 0.00 | .24302E+04 |
| 1.71 | -34.31 | 1.45 | 2.1 | 0.472E+02 | 1.45 | 32.36 | 1.45 | 0.00 | .24366E+04 |
| 1.71 | -34.31 | 1.45 | 2.1 | 0.471E+02 | 1.45 | 32.40 | 1.45 | 0.00 | .24430E+04 |
| 1.72 | -34.31 | 1.45 | 2.1 | 0.471E+02 | 1.45 | 32.45 | 1.45 | 0.00 | .24494E+04 |
| 1.72 | -34.31 | 1.45 | 2.1 | 0.470E+02 | 1.45 | 32.50 | 1.45 | 0.00 | .24558E+04 |
| 1.73 | -34.31 | 1.45 | 2.1 | 0.469E+02 | 1.45 | 32.55 | 1.45 | 0.00 | .24622E+04 |
| 1.73 | -34.31 | 1.45 | 2.1 | 0.468E+02 | 1.45 | 32.60 | 1.45 | 0.00 | .24686E+04 |
| 1.74 | -34.31 | 1.45 | 2.1 | 0.468E+02 | 1.45 | 32.64 | 1.45 | 0.00 | .24750E+04 |
| 1.74 | -34.31 | 1.45 | 2.1 | 0.467E+02 | 1.45 | 32.69 | 1.45 | 0.00 | .24814E+04 |
| 1.75 | -34.31 | 1.45 | 2.1 | 0.466E+02 | 1.45 | 32.74 | 1.45 | 0.00 | .24878E+04 |
| 1.75 | -34.31 | 1.45 | 2.1 | 0.466E+02 | 1.45 | 32.79 | 1.45 | 0.00 | .24942E+04 |
| 1.75 | -34.31 | 1.45 | 2.2 | 0.465E+02 | 1.45 | 32.84 | 1.45 | 0.00 | .25006E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.76 | -34.31 | 1.45 | 2.2 | 0.464E+02 | 1.45 | 32.89 | 1.45 | 0.00 | .25070E+04 |
| 1.76 | -34.31 | 1.45 | 2.2 | 0.464E+02 | 1.45 | 32.93 | 1.45 | 0.00 | .25134E+04 |
| 1.77 | -34.31 | 1.45 | 2.2 | 0.463E+02 | 1.45 | 32.98 | 1.45 | 0.00 | .25198E+04 |
| 1.77 | -34.31 | 1.45 | 2.2 | 0.462E+02 | 1.45 | 33.03 | 1.45 | 0.00 | .25262E+04 |
| 1.78 | -34.31 | 1.45 | 2.2 | 0.462E+02 | 1.45 | 33.08 | 1.45 | 0.00 | .25326E+04 |
| 1.78 | -34.31 | 1.45 | 2.2 | 0.461E+02 | 1.45 | 33.13 | 1.45 | 0.00 | .25390E+04 |
| 1.79 | -34.31 | 1.45 | 2.2 | 0.460E+02 | 1.45 | 33.18 | 1.45 | 0.00 | .25454E+04 |
| 1.79 | -34.31 | 1.45 | 2.2 | 0.460E+02 | 1.45 | 33.22 | 1.45 | 0.00 | .25518E+04 |
| 1.79 | -34.31 | 1.45 | 2.2 | 0.459E+02 | 1.45 | 33.27 | 1.45 | 0.00 | .25582E+04 |
| 1.80 | -34.31 | 1.45 | 2.2 | 0.458E+02 | 1.45 | 33.32 | 1.45 | 0.00 | .25646E+04 |
| 1.80 | -34.31 | 1.45 | 2.2 | 0.458E+02 | 1.45 | 33.37 | 1.45 | 0.00 | .25710E+04 |
| 1.81 | -34.31 | 1.45 | 2.2 | 0.457E+02 | 1.45 | 33.42 | 1.45 | 0.00 | .25774E+04 |
| 1.81 | -34.31 | 1.45 | 2.2 | 0.456E+02 | 1.45 | 33.47 | 1.45 | 0.00 | .25838E+04 |
| 1.82 | -34.31 | 1.45 | 2.2 | 0.456E+02 | 1.45 | 33.52 | 1.45 | 0.00 | .25902E+04 |
| 1.82 | -34.31 | 1.45 | 2.2 | 0.455E+02 | 1.45 | 33.56 | 1.45 | 0.00 | .25966E+04 |
| 1.83 | -34.31 | 1.45 | 2.2 | 0.454E+02 | 1.45 | 33.61 | 1.45 | 0.00 | .26030E+04 |
| 1.83 | -34.31 | 1.45 | 2.2 | 0.454E+02 | 1.45 | 33.66 | 1.45 | 0.00 | .26094E+04 |
| 1.84 | -34.31 | 1.45 | 2.2 | 0.453E+02 | 1.45 | 33.71 | 1.45 | 0.00 | .26158E+04 |
| 1.84 | -34.31 | 1.45 | 2.2 | 0.452E+02 | 1.45 | 33.76 | 1.45 | 0.00 | .26222E+04 |
| 1.84 | -34.31 | 1.45 | 2.2 | 0.452E+02 | 1.45 | 33.81 | 1.45 | 0.00 | .26286E+04 |
| 1.85 | -34.31 | 1.45 | 2.2 | 0.451E+02 | 1.45 | 33.86 | 1.45 | 0.00 | .26351E+04 |
| 1.85 | -34.31 | 1.45 | 2.2 | 0.450E+02 | 1.45 | 33.91 | 1.45 | 0.00 | .26415E+04 |
| 1.86 | -34.31 | 1.45 | 2.2 | 0.450E+02 | 1.45 | 33.95 | 1.45 | 0.00 | .26479E+04 |
| 1.86 | -34.31 | 1.45 | 2.2 | 0.449E+02 | 1.45 | 34.00 | 1.45 | 0.00 | .26543E+04 |
| 1.87 | -34.31 | 1.45 | 2.2 | 0.448E+02 | 1.45 | 34.05 | 1.45 | 0.00 | .26607E+04 |
| 1.87 | -34.31 | 1.45 | 2.2 | 0.448E+02 | 1.45 | 34.10 | 1.45 | 0.00 | .26671E+04 |
| 1.88 | -34.31 | 1.45 | 2.2 | 0.447E+02 | 1.45 | 34.15 | 1.45 | 0.00 | .26735E+04 |
| 1.88 | -34.31 | 1.45 | 2.2 | 0.447E+02 | 1.45 | 34.20 | 1.45 | 0.00 | .26799E+04 |
| 1.88 | -34.31 | 1.45 | 2.2 | 0.446E+02 | 1.45 | 34.25 | 1.45 | 0.00 | .26863E+04 |
| 1.89 | -34.31 | 1.45 | 2.2 | 0.445E+02 | 1.45 | 34.30 | 1.45 | 0.00 | .26927E+04 |
| 1.89 | -34.31 | 1.45 | 2.2 | 0.445E+02 | 1.45 | 34.35 | 1.45 | 0.00 | .26991E+04 |
| 1.90 | -34.31 | 1.45 | 2.3 | 0.444E+02 | 1.45 | 34.39 | 1.45 | 0.00 | .27055E+04 |
| 1.90 | -34.31 | 1.45 | 2.3 | 0.443E+02 | 1.45 | 34.44 | 1.45 | 0.00 | .27119E+04 |

Cumulative travel time = 2711.8655 sec ( 0.75 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.90 | 0.14 | 1.45 | 2.3 | 0.443E+02 | 1.45 | 68.89 | 1.45 | 0.00 | .27119E+04 |
| 71.88 | 0.14 | 1.45 | 75.0 | 0.133E+01 | 1.45 | 2292.08 | 1.45 | 0.00 | .10268E+06 |
| 141.86 | 0.14 | 1.45 | 197.1 | 0.507E+00 | 1.45 | 6018.70 | 1.45 | 0.00 | .20266E+06 |
| 211.85 | 0.14 | 1.45 | 352.9 | 0.283E+00 | 1.45 | 10777.48 | 1.45 | 0.00 | .30263E+06 |
| 281.83 | 0.14 | 1.45 | 536.3 | 0.186E+00 | 1.45 | 16379.16 | 1.45 | 0.00 | .40260E+06 |
| 351.81 | 0.14 | 1.45 | 743.6 | 0.134E+00 | 1.45 | 22711.88 | 1.45 | 0.00 | .50258E+06 |
| 421.79 | 0.14 | 1.45 | 972.4 | 0.103E+00 | 1.45 | 29699.29 | 1.45 | 0.00 | .60255E+06 |
| 491.77 | 0.14 | 1.45 | 1220.8 | 0.819E-01 | 1.45 | 37284.94 | 1.45 | 0.00 | .70252E+06 |
| 561.75 | 0.14 | 1.45 | 1487.3 | 0.672E-01 | 1.45 | 45424.91 | 1.45 | 0.00 | .80249E+06 |
| 631.73 | 0.14 | 1.45 | 1770.8 | 0.565E-01 | 1.45 | 54083.74 | 1.45 | 0.00 | .90247E+06 |
| 701.71 | 0.14 | 1.45 | 2070.3 | 0.483E-01 | 1.45 | 63232.00 | 1.45 | 0.00 | .10024E+07 |
| 771.69 | 0.14 | 1.45 | 2385.1 | 0.419E-01 | 1.45 | 72844.82 | 1.45 | 0.00 | .11024E+07 |
| 841.67 | 0.14 | 1.45 | 2714.3 | 0.368E-01 | 1.45 | 82900.71 | 1.45 | 0.00 | .12024E+07 |
| 911.66 | 0.14 | 1.45 | 3057.5 | 0.327E-01 | 1.45 | 93380.96 | 1.45 | 0.00 | .13024E+07 |
| 981.64 | 0.14 | 1.45 | 3414.0 | 0.293E-01 | 1.45 | ******** | 1.45 | 0.00 | .14023E+07 |
| 1051.62 | 0.14 | 1.45 | 3783.3 | 0.264E-01 | 1.45 | ******** | 1.45 | 0.00 | .15023E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1121.60 | 0.14 | 1.45 | 4165.1 | 0.240E-01 | 1.45 | ******** | 1.45 | 0.00 | .16023E+07 |
| 1191.58 | 0.14 | 1.45 | 4559.0 | 0.219E-01 | 1.45 | ******** | 1.45 | 0.00 | .17022E+07 |
| 1261.56 | 0.14 | 1.45 | 4964.5 | 0.201E-01 | 1.45 | ******** | 1.45 | 0.00 | .18022E+07 |
| 1331.54 | 0.14 | 1.45 | 5381.4 | 0.186E-01 | 1.45 | ******** | 1.45 | 0.00 | .19022E+07 |
| 1401.52 | 0.14 | 1.45 | 5809.4 | 0.172E-01 | 1.45 | ******** | 1.45 | 0.00 | .20022E+07 |
| 1471.50 | 0.14 | 1.45 | 6248.1 | 0.160E-01 | 1.45 | ******** | 1.45 | 0.00 | .21021E+07 |
| 1541.48 | 0.14 | 1.45 | 6697.3 | 0.149E-01 | 1.45 | ******** | 1.45 | 0.00 | .22021E+07 |
| 1611.46 | 0.14 | 1.45 | 7156.9 | 0.140E-01 | 1.45 | ******** | 1.45 | 0.00 | .23021E+07 |
| 1681.45 | 0.14 | 1.45 | 7626.4 | 0.131E-01 | 1.45 | ******** | 1.45 | 0.00 | .24021E+07 |
| 1751.43 | 0.14 | 1.45 | 8105.9 | 0.123E-01 | 1.45 | ******** | 1.45 | 0.00 | .25020E+07 |
| 1821.41 | 0.14 | 1.45 | 8594.9 | 0.116E-01 | 1.45 | ******** | 1.45 | 0.00 | .26020E+07 |
| 1891.39 | 0.14 | 1.45 | 9093.5 | 0.110E-01 | 1.45 | ******** | 1.45 | 0.00 | .27020E+07 |
| 1961.37 | 0.14 | 1.45 | 9601.3 | 0.104E-01 | 1.45 | ******** | 1.45 | 0.00 | .28020E+07 |
| 2031.35 | 0.14 | 1.45 | 10118.2 | 0.988E-02 | 1.45 | ******** | 1.45 | 0.00 | .29019E+07 |
| 2101.33 | 0.14 | 1.45 | 10644.1 | 0.939E-02 | 1.45 | ******** | 1.45 | 0.00 | .30019E+07 |
| 2171.31 | 0.14 | 1.45 | 11178.8 | 0.895E-02 | 1.45 | ******** | 1.45 | 0.00 | .31019E+07 |
| 2241.29 | 0.14 | 1.45 | 11722.1 | 0.853E-02 | 1.45 | ******** | 1.45 | 0.00 | .32018E+07 |
| 2311.27 | 0.14 | 1.45 | 12274.0 | 0.815E-02 | 1.45 | ******** | 1.45 | 0.00 | .33018E+07 |
| 2381.26 | 0.14 | 1.45 | 12834.3 | 0.779E-02 | 1.45 | ******** | 1.45 | 0.00 | .34018E+07 |
| 2451.24 | 0.14 | 1.45 | 13402.9 | 0.746E-02 | 1.45 | ******** | 1.45 | 0.00 | .35018E+07 |
| 2521.22 | 0.14 | 1.45 | 13979.6 | 0.715E-02 | 1.45 | ******** | 1.45 | 0.00 | .36017E+07 |
| 2591.20 | 0.14 | 1.45 | 14564.4 | 0.687E-02 | 1.45 | ******** | 1.45 | 0.00 | .37017E+07 |
| 2661.18 | 0.14 | 1.45 | 15157.0 | 0.660E-02 | 1.45 | ******** | 1.45 | 0.00 | .38017E+07 |
| 2731.16 | 0.14 | 1.45 | 15757.6 | 0.635E-02 | 1.45 | ******** | 1.45 | 0.00 | .39017E+07 |
| 2801.14 | 0.14 | 1.45 | 16365.8 | 0.611E-02 | 1.45 | ******** | 1.45 | 0.00 | .40016E+07 |
| 2871.12 | 0.14 | 1.45 | 16981.7 | 0.589E-02 | 1.45 | ******** | 1.45 | 0.00 | .41016E+07 |
| 2941.10 | 0.14 | 1.45 | 17605.1 | 0.568E-02 | 1.45 | ******** | 1.45 | 0.00 | .42016E+07 |
| 3011.08 | 0.14 | 1.45 | 18236.0 | 0.548E-02 | 1.45 | ******** | 1.45 | 0.00 | .43015E+07 |
| 3081.06 | 0.14 | 1.45 | 18874.2 | 0.530E-02 | 1.45 | ******** | 1.45 | 0.00 | .44015E+07 |
| 3151.05 | 0.14 | 1.45 | 19519.7 | 0.512E-02 | 1.45 | ******** | 1.45 | 0.00 | .45015E+07 |
| 3221.03 | 0.14 | 1.45 | 20172.4 | 0.496E-02 | 1.45 | ******** | 1.45 | 0.00 | .46015E+07 |
| 3291.01 | 0.14 | 1.45 | 20832.2 | 0.480E-02 | 1.45 | ******** | 1.45 | 0.00 | .47014E+07 |
| 3360.99 | 0.14 | 1.45 | 21499.1 | 0.465E-02 | 1.45 | ******** | 1.45 | 0.00 | .48014E+07 |
| 3430.97 | 0.14 | 1.45 | 22172.9 | 0.451E-02 | 1.45 | ******** | 1.45 | 0.00 | .49014E+07 |
| 3500.95 | 0.14 | 1.45 | 22853.6 | 0.438E-02 | 1.45 | ******** | 1.45 | 0.00 | .50014E+07 |
| 3570.93 | 0.14 | 1.45 | 23541.2 | 0.425E-02 | 1.45 | ******** | 1.45 | 0.00 | .51013E+07 |
| 3640.91 | 0.14 | 1.45 | 24235.5 | 0.413E-02 | 1.45 | ******** | 1.45 | 0.00 | .52013E+07 |
| 3710.89 | 0.14 | 1.45 | 24936.5 | 0.401E-02 | 1.45 | ******** | 1.45 | 0.00 | .53013E+07 |
| 3780.87 | 0.14 | 1.45 | 25644.1 | 0.390E-02 | 1.45 | ******** | 1.45 | 0.00 | .54012E+07 |
| 3850.86 | 0.14 | 1.45 | 26358.3 | 0.379E-02 | 1.45 | ******** | 1.45 | 0.00 | .55012E+07 |
| 3920.84 | 0.14 | 1.45 | 27079.0 | 0.369E-02 | 1.45 | ******** | 1.45 | 0.00 | .56012E+07 |
| 3990.82 | 0.14 | 1.45 | 27806.2 | 0.360E-02 | 1.45 | ******** | 1.45 | 0.00 | .57012E+07 |
| 4060.80 | 0.14 | 1.45 | 28539.7 | 0.350E-02 | 1.45 | ******** | 1.45 | 0.00 | .58011E+07 |
| 4130.78 | 0.14 | 1.45 | 29279.6 | 0.342E-02 | 1.45 | ******** | 1.45 | 0.00 | .59011E+07 |
| 4200.76 | 0.14 | 1.45 | 30025.8 | 0.333E-02 | 1.45 | ******** | 1.45 | 0.00 | .60011E+07 |
| 4270.74 | 0.14 | 1.45 | 30778.2 | 0.325E-02 | 1.45 | ******** | 1.45 | 0.00 | .61011E+07 |
| 4340.72 | 0.14 | 1.45 | 31536.8 | 0.317E-02 | 1.45 | ******** | 1.45 | 0.00 | .62010E+07 |
| 4410.70 | 0.14 | 1.45 | 32301.6 | 0.310E-02 | 1.45 | ******** | 1.45 | 0.00 | .63010E+07 |
| 4480.68 | 0.14 | 1.45 | 33072.4 | 0.302E-02 | 1.45 | ******** | 1.45 | 0.00 | .64010E+07 |
| 4550.67 | 0.14 | 1.45 | 33849.2 | 0.295E-02 | 1.45 | ******** | 1.45 | 0.00 | .65009E+07 |
| 4620.65 | 0.14 | 1.45 | 34632.1 | 0.289E-02 | 1.45 | ******** | 1.45 | 0.00 | .66009E+07 |
| 4690.63 | 0.14 | 1.45 | 35420.9 | 0.282E-02 | 1.45 | ******** | 1.45 | 0.00 | .67009E+07 |
| 4760.61 | 0.14 | 1.45 | 36215.5 | 0.276E-02 | 1.45 | ******** | 1.45 | 0.00 | .68009E+07 |
| 4830.59 | 0.14 | 1.45 | 37016.1 | 0.270E-02 | 1.45 | ******** | 1.45 | 0.00 | .69008E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4900.57 | 0.14 | 1.45 | 37822.4 | 0.264E-02 | 1.45 | ******** | 1.45 | 0.00 | .70008E+07 |
| 4970.55 | 0.14 | 1.45 | 38634.5 | 0.259E-02 | 1.45 | ******** | 1.45 | 0.00 | .71008E+07 |
| 5040.53 | 0.14 | 1.45 | 39452.4 | 0.253E-02 | 1.45 | ******** | 1.45 | 0.00 | .72008E+07 |
| 5110.51 | 0.14 | 1.45 | 40275.9 | 0.248E-02 | 1.45 | ******** | 1.45 | 0.00 | .73007E+07 |
| 5180.49 | 0.14 | 1.45 | 41105.1 | 0.243E-02 | 1.45 | ******** | 1.45 | 0.00 | .74007E+07 |
| 5250.47 | 0.14 | 1.45 | 41939.9 | 0.238E-02 | 1.45 | ******** | 1.45 | 0.00 | .75007E+07 |
| 5320.46 | 0.14 | 1.45 | 42780.3 | 0.234E-02 | 1.45 | ******** | 1.45 | 0.00 | .76006E+07 |
| 5390.44 | 0.14 | 1.45 | 43626.3 | 0.229E-02 | 1.45 | ******** | 1.45 | 0.00 | .77006E+07 |
| 5460.42 | 0.14 | 1.45 | 44477.7 | 0.225E-02 | 1.45 | ******** | 1.45 | 0.00 | .78006E+07 |
| 5530.40 | 0.14 | 1.45 | 45334.6 | 0.221E-02 | 1.45 | ******** | 1.45 | 0.00 | .79006E+07 |
| 5600.38 | 0.14 | 1.45 | 46196.9 | 0.216E-02 | 1.45 | ******** | 1.45 | 0.00 | .80005E+07 |
| 5670.36 | 0.14 | 1.45 | 47064.6 | 0.212E-02 | 1.45 | ******** | 1.45 | 0.00 | .81005E+07 |
| 5740.34 | 0.14 | 1.45 | 47937.7 | 0.209E-02 | 1.45 | ******** | 1.45 | 0.00 | .82005E+07 |
| 5810.32 | 0.14 | 1.45 | 48816.2 | 0.205E-02 | 1.45 | ******** | 1.45 | 0.00 | .83005E+07 |
| 5880.30 | 0.14 | 1.45 | 49699.9 | 0.201E-02 | 1.45 | ******** | 1.45 | 0.00 | .84004E+07 |
| 5950.28 | 0.14 | 1.45 | 50588.9 | 0.198E-02 | 1.45 | ******** | 1.45 | 0.00 | .85004E+07 |
| 6020.27 | 0.14 | 1.45 | 51483.1 | 0.194E-02 | 1.45 | ******** | 1.45 | 0.00 | .86004E+07 |
| 6090.25 | 0.14 | 1.45 | 52382.6 | 0.191E-02 | 1.45 | ******** | 1.45 | 0.00 | .87003E+07 |
| 6160.23 | 0.14 | 1.45 | 53287.2 | 0.188E-02 | 1.45 | ******** | 1.45 | 0.00 | .88003E+07 |
| 6230.21 | 0.14 | 1.45 | 54197.0 | 0.185E-02 | 1.45 | ******** | 1.45 | 0.00 | .89003E+07 |
| 6300.19 | 0.14 | 1.45 | 55111.9 | 0.181E-02 | 1.45 | ******** | 1.45 | 0.00 | .90003E+07 |
| 6370.17 | 0.14 | 1.45 | 56031.8 | 0.178E-02 | 1.45 | ******** | 1.45 | 0.00 | .91002E+07 |
| 6440.15 | 0.14 | 1.45 | 56956.9 | 0.176E-02 | 1.45 | ******** | 1.45 | 0.00 | .92002E+07 |
| 6510.13 | 0.14 | 1.45 | 57887.0 | 0.173E-02 | 1.45 | ******** | 1.45 | 0.00 | .93002E+07 |
| 6580.11 | 0.14 | 1.45 | 58822.0 | 0.170E-02 | 1.45 | ******** | 1.45 | 0.00 | .94002E+07 |
| 6650.09 | 0.14 | 1.45 | 59762.1 | 0.167E-02 | 1.45 | ******** | 1.45 | 0.00 | .95001E+07 |
| 6720.07 | 0.14 | 1.45 | 60707.1 | 0.165E-02 | 1.45 | ******** | 1.45 | 0.00 | .96001E+07 |
| 6790.06 | 0.14 | 1.45 | 61657.1 | 0.162E-02 | 1.45 | ******** | 1.45 | 0.00 | .97001E+07 |
| 6860.04 | 0.14 | 1.45 | 62611.9 | 0.160E-02 | 1.45 | ******** | 1.45 | 0.00 | .98000E+07 |
| 6930.02 | 0.14 | 1.45 | 63571.7 | 0.157E-02 | 1.45 | ******** | 1.45 | 0.00 | .99000E+07 |
| 7000.00 | 0.14 | 1.45 | 64536.3 | 0.155E-02 | 1.45 | ******** | 1.45 | 0.00 | .10000E+08 |

Cumulative travel time = 9999995.0000 sec ( 2777.78 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

CORMIX1: Single Port Discharges End of Prediction File

1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1: Single Port Discharges
CORMIX Version 12.0GTD
HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CASE DESCRIPTION
Site name/label: Goldboro Northwest Area
Design case: Year 21
FILE NAME: C:\... - Goldboro\Mar 2022 EARD\rev7\Y21-North_Pond.prd
Time stamp: 04/04/2022--21:48:02

ENVIRONMENT PARAMETERS (metric units)
Unbounded section
HA = 1.22 HD = 1.22
UA = 0.001 F = 0.066 USTAR =0.6363E-04
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 998.1636

DISCHARGE PARAMETERS (metric units)
Above Surface Discharge:
Re-computed discharge conditions at entry point at water surface.
BANK = RIGHT DISTB = 0.13
D0 = 0.041 A0 = 0.001 H0 = 1.22 SUB0 = 0.00
THETA = 0.00 SIGMA = 90.00
U0 = 1.416 Q0 = 0.002 =0.1900E-02
RHO0 = 998.1636 DRHO0 =0.0000E+00 GP0 =0.0000E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES (metric units)
Q0 =0.1900E-02 M0 =0.2691E-02 J0 =0.0000E+00 SIGNJ0= 1.0
Associated length scales (meters)
LQ = 0.04 LM = 99999.00 Lm = 74.11 Lb = 0.00
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS
FR0 = 99999.00 R = 2023.32

FLOW CLASSIFICATION
111111111111111111111111111111111111111111111
1 Flow class (CORMIX1) = IPV4 1
1 Applicable layer depth HS = 1.22 1
111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 =0.1000E+03 CUNITS= %
NTOX = 0
NSTD = 0
REGMZ = 1

REGSPC= 1 XREG = 100.00 WREG = 0.00 AREG = 0.00
XINT = 8000.00 XMAX = 8000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.13 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.

COORDINATE SYSTEM SPECIFIED (WGS84 Decimal):
PHI = 178.00 ALPHA = 88.00
LAT = 45.2066994
LON = -61.6408005

NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -81.00 SIGMAE= 89.93
LE = 0.21 XE = 0.00 YE = 0.03 ZE = 1.02

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .00000E+00 |
| 0.00 | 0.03 | 1.02 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .23168E-02 |
| 0.00 | 0.03 | 1.01 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .46881E-02 |
| 0.00 | 0.04 | 1.00 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .12130E-01 |
| 0.00 | 0.04 | 0.99 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .17363E-01 |
| 0.00 | 0.04 | 0.98 | 1.0 | 0.984E+02 | 0.03 | 1.416 | .22815E-01 |
| 0.00 | 0.04 | 0.98 | 1.0 | 0.965E+02 | 0.03 | 1.416 | .25623E-01 |
| 0.00 | 0.04 | 0.97 | 1.1 | 0.929E+02 | 0.03 | 1.416 | .31403E-01 |
| 0.00 | 0.04 | 0.95 | 1.1 | 0.880E+02 | 0.03 | 1.416 | .40481E-01 |
| 0.00 | 0.04 | 0.94 | 1.2 | 0.850E+02 | 0.03 | 1.416 | .46806E-01 |
| 0.00 | 0.05 | 0.93 | 1.2 | 0.822E+02 | 0.03 | 1.374 | .53349E-01 |
| 0.00 | 0.05 | 0.93 | 1.3 | 0.795E+02 | 0.03 | 1.330 | .60111E-01 |
| 0.00 | 0.05 | 0.92 | 1.3 | 0.771E+02 | 0.03 | 1.288 | .67091E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.05 | 0.91 | 1.3 | 0.747E+02 | 0.03 | 1.250 | .74289E-01 |
| 0.00 | 0.05 | 0.90 | 1.4 | 0.726E+02 | 0.03 | 1.213 | .81705E-01 |
| 0.00 | 0.05 | 0.89 | 1.4 | 0.705E+02 | 0.04 | 1.179 | .89340E-01 |
| 0.00 | 0.05 | 0.88 | 1.5 | 0.686E+02 | 0.04 | 1.146 | .97193E-01 |
| 0.00 | 0.05 | 0.87 | 1.5 | 0.667E+02 | 0.04 | 1.115 | .10526E+00 |
| 0.00 | 0.06 | 0.86 | 1.5 | 0.650E+02 | 0.04 | 1.086 | .11355E+00 |
| 0.00 | 0.06 | 0.85 | 1.6 | 0.633E+02 | 0.04 | 1.058 | .12206E+00 |
| 0.00 | 0.06 | 0.85 | 1.6 | 0.617E+02 | 0.04 | 1.032 | .13079E+00 |
| 0.00 | 0.06 | 0.84 | 1.7 | 0.602E+02 | 0.04 | 1.007 | .13973E+00 |
| 0.00 | 0.06 | 0.83 | 1.7 | 0.588E+02 | 0.04 | 0.983 | .14889E+00 |
| 0.00 | 0.06 | 0.82 | 1.7 | 0.575E+02 | 0.04 | 0.960 | .15827E+00 |
| 0.00 | 0.06 | 0.81 | 1.8 | 0.562E+02 | 0.04 | 0.939 | .16787E+00 |
| 0.00 | 0.07 | 0.80 | 1.8 | 0.549E+02 | 0.05 | 0.918 | .17769E+00 |
| 0.00 | 0.07 | 0.79 | 1.9 | 0.537E+02 | 0.05 | 0.898 | .18773E+00 |
| 0.00 | 0.07 | 0.78 | 1.9 | 0.526E+02 | 0.05 | 0.879 | .19798E+00 |
| 0.00 | 0.07 | 0.77 | 1.9 | 0.515E+02 | 0.05 | 0.861 | .20845E+00 |
| 0.00 | 0.07 | 0.76 | 2.0 | 0.505E+02 | 0.05 | 0.843 | .21914E+00 |
| 0.00 | 0.07 | 0.76 | 2.0 | 0.494E+02 | 0.05 | 0.827 | .23005E+00 |
| 0.00 | 0.07 | 0.75 | 2.1 | 0.485E+02 | 0.05 | 0.810 | .24118E+00 |
| 0.00 | 0.08 | 0.74 | 2.1 | 0.476E+02 | 0.05 | 0.795 | .25252E+00 |
| 0.00 | 0.08 | 0.73 | 2.1 | 0.467E+02 | 0.05 | 0.780 | .26409E+00 |
| 0.00 | 0.08 | 0.72 | 2.2 | 0.458E+02 | 0.05 | 0.766 | .27587E+00 |
| 0.00 | 0.08 | 0.72 | 2.2 | 0.454E+02 | 0.05 | 0.759 | .28184E+00 |
| 0.00 | 0.08 | 0.71 | 2.2 | 0.446E+02 | 0.06 | 0.745 | .29395E+00 |
| 0.00 | 0.08 | 0.70 | 2.3 | 0.438E+02 | 0.06 | 0.732 | .30628E+00 |
| 0.00 | 0.08 | 0.69 | 2.3 | 0.430E+02 | 0.06 | 0.719 | .31882E+00 |
| 0.00 | 0.09 | 0.68 | 2.4 | 0.423E+02 | 0.06 | 0.707 | .33158E+00 |
| 0.00 | 0.09 | 0.67 | 2.4 | 0.416E+02 | 0.06 | 0.695 | .34457E+00 |
| 0.00 | 0.09 | 0.66 | 2.4 | 0.409E+02 | 0.06 | 0.684 | .35777E+00 |
| 0.00 | 0.09 | 0.65 | 2.5 | 0.402E+02 | 0.06 | 0.673 | .37119E+00 |
| 0.00 | 0.09 | 0.64 | 2.5 | 0.396E+02 | 0.06 | 0.662 | .38482E+00 |
| 0.00 | 0.09 | 0.64 | 2.6 | 0.390E+02 | 0.06 | 0.652 | .39868E+00 |
| 0.00 | 0.09 | 0.63 | 2.6 | 0.384E+02 | 0.06 | 0.641 | .41275E+00 |
| 0.00 | 0.10 | 0.62 | 2.6 | 0.378E+02 | 0.07 | 0.632 | .42704E+00 |
| 0.00 | 0.10 | 0.61 | 2.7 | 0.372E+02 | 0.07 | 0.622 | .44155E+00 |
| 0.00 | 0.10 | 0.60 | 2.7 | 0.367E+02 | 0.07 | 0.613 | .45628E+00 |
| 0.00 | 0.10 | 0.59 | 2.8 | 0.361E+02 | 0.07 | 0.604 | .47123E+00 |
| 0.00 | 0.10 | 0.58 | 2.8 | 0.356E+02 | 0.07 | 0.595 | .48639E+00 |
| 0.00 | 0.10 | 0.57 | 2.8 | 0.351E+02 | 0.07 | 0.587 | .50177E+00 |
| 0.00 | 0.10 | 0.56 | 2.9 | 0.346E+02 | 0.07 | 0.579 | .51738E+00 |
| 0.00 | 0.11 | 0.55 | 2.9 | 0.341E+02 | 0.07 | 0.571 | .53319E+00 |
| 0.00 | 0.11 | 0.55 | 3.0 | 0.337E+02 | 0.07 | 0.563 | .54923E+00 |
| 0.00 | 0.11 | 0.54 | 3.0 | 0.332E+02 | 0.07 | 0.556 | .56549E+00 |
| 0.00 | 0.11 | 0.53 | 3.0 | 0.328E+02 | 0.08 | 0.548 | .58196E+00 |
| 0.00 | 0.11 | 0.52 | 3.1 | 0.324E+02 | 0.08 | 0.541 | .59866E+00 |
| 0.00 | 0.11 | 0.51 | 3.1 | 0.320E+02 | 0.08 | 0.534 | .61557E+00 |
| 0.00 | 0.11 | 0.50 | 3.2 | 0.315E+02 | 0.08 | 0.527 | .63269E+00 |
| 0.00 | 0.12 | 0.49 | 3.2 | 0.312E+02 | 0.08 | 0.521 | .65004E+00 |
| 0.00 | 0.12 | 0.48 | 3.3 | 0.308E+02 | 0.08 | 0.514 | .66761E+00 |
| 0.00 | 0.12 | 0.47 | 3.3 | 0.304E+02 | 0.08 | 0.508 | .68539E+00 |
| 0.00 | 0.12 | 0.46 | 3.3 | 0.300E+02 | 0.08 | 0.502 | .70339E+00 |
| 0.00 | 0.12 | 0.46 | 3.4 | 0.297E+02 | 0.08 | 0.496 | .72161E+00 |
| 0.00 | 0.12 | 0.45 | 3.4 | 0.293E+02 | 0.08 | 0.490 | .74005E+00 |
| 0.00 | 0.12 | 0.44 | 3.5 | 0.290E+02 | 0.09 | 0.484 | .75871E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.13 | 0.43 | 3.5 | 0.286E+02 | 0.09 | 0.479 | .77758E+00 |
| 0.00 | 0.13 | 0.42 | 3.5 | 0.283E+02 | 0.09 | 0.473 | .79668E+00 |
| 0.00 | 0.13 | 0.41 | 3.6 | 0.280E+02 | 0.09 | 0.468 | .81599E+00 |
| 0.00 | 0.13 | 0.40 | 3.6 | 0.277E+02 | 0.09 | 0.463 | .83552E+00 |
| 0.00 | 0.13 | 0.39 | 3.7 | 0.274E+02 | 0.09 | 0.458 | .85527E+00 |
| 0.00 | 0.13 | 0.38 | 3.7 | 0.271E+02 | 0.09 | 0.453 | .87523E+00 |
| 0.00 | 0.13 | 0.38 | 3.7 | 0.268E+02 | 0.09 | 0.448 | .89542E+00 |
| 0.00 | 0.14 | 0.37 | 3.8 | 0.265E+02 | 0.09 | 0.443 | .91582E+00 |
| 0.00 | 0.14 | 0.36 | 3.8 | 0.262E+02 | 0.09 | 0.438 | .93644E+00 |
| 0.00 | 0.14 | 0.35 | 3.9 | 0.259E+02 | 0.10 | 0.434 | .95728E+00 |
| 0.00 | 0.14 | 0.34 | 3.9 | 0.257E+02 | 0.10 | 0.429 | .97834E+00 |
| 0.00 | 0.14 | 0.33 | 3.9 | 0.254E+02 | 0.10 | 0.425 | .99962E+00 |
| 0.00 | 0.14 | 0.32 | 4.0 | 0.252E+02 | 0.10 | 0.421 | .10211E+01 |
| 0.00 | 0.14 | 0.31 | 4.0 | 0.249E+02 | 0.10 | 0.416 | .10428E+01 |
| 0.00 | 0.14 | 0.30 | 4.1 | 0.247E+02 | 0.10 | 0.412 | .10648E+01 |
| 0.00 | 0.15 | 0.29 | 4.1 | 0.244E+02 | 0.10 | 0.408 | .10869E+01 |
| 0.00 | 0.15 | 0.29 | 4.1 | 0.242E+02 | 0.10 | 0.404 | .11093E+01 |
| 0.00 | 0.15 | 0.28 | 4.2 | 0.239E+02 | 0.10 | 0.400 | .11319E+01 |
| 0.00 | 0.15 | 0.27 | 4.2 | 0.237E+02 | 0.10 | 0.396 | .11547E+01 |
| 0.00 | 0.15 | 0.26 | 4.3 | 0.235E+02 | 0.11 | 0.393 | .11777E+01 |
| 0.00 | 0.15 | 0.25 | 4.3 | 0.233E+02 | 0.11 | 0.389 | .12009E+01 |
| 0.00 | 0.15 | 0.24 | 4.3 | 0.231E+02 | 0.11 | 0.385 | .12244E+01 |
| 0.00 | 0.16 | 0.23 | 4.4 | 0.228E+02 | 0.11 | 0.382 | .12481E+01 |
| 0.00 | 0.16 | 0.22 | 4.4 | 0.226E+02 | 0.11 | 0.378 | .12720E+01 |
| 0.00 | 0.16 | 0.21 | 4.5 | 0.224E+02 | 0.11 | 0.375 | .12961E+01 |
| 0.00 | 0.16 | 0.21 | 4.5 | 0.222E+02 | 0.11 | 0.372 | .13204E+01 |
| 0.00 | 0.16 | 0.20 | 4.5 | 0.220E+02 | 0.11 | 0.368 | .13449E+01 |
| 0.00 | 0.16 | 0.19 | 4.6 | 0.218E+02 | 0.11 | 0.365 | .13697E+01 |
| 0.00 | 0.16 | 0.18 | 4.6 | 0.216E+02 | 0.11 | 0.362 | .13947E+01 |
| 0.00 | 0.17 | 0.17 | 4.7 | 0.215E+02 | 0.12 | 0.359 | .14199E+01 |
| 0.00 | 0.17 | 0.16 | 4.7 | 0.213E+02 | 0.12 | 0.356 | .14453E+01 |
| 0.00 | 0.17 | 0.15 | 4.7 | 0.211E+02 | 0.12 | 0.353 | .14710E+01 |
| 0.00 | 0.17 | 0.14 | 4.8 | 0.209E+02 | 0.12 | 0.350 | .14968E+01 |
| 0.00 | 0.17 | 0.13 | 4.8 | 0.207E+02 | 0.12 | 0.347 | .15229E+01 |
| 0.00 | 0.17 | 0.12 | 4.9 | 0.206E+02 | 0.12 | 0.344 | .15492E+01 |

Cumulative travel time = 1.5492 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | 0.17 | 0.12 | 4.9 | 0.206E+02 | 0.12 | .15492E+01 |

Profile definitions:
- BV = layer depth (vertically mixed)
- BH = top-hat half-width, in horizontal plane normal to trajectory
- ZU = upper plume boundary (Z-coordinate)
- ZL = lower plume boundary (Z-coordinate)
- S = hydrodynamic average (bulk) dilution
- C = average (bulk) concentration (includes reaction effects, if any)
- TT = Cumulative travel time

```
     X        Y       Z        S        C        BV       BH       ZU       ZL       TT
   -0.12    26.87    1.22     4.9 0.206E+02   0.00     0.00     1.22    1.22 .15492E+01
    0.02    26.87    1.22     4.9 0.206E+02   1.22     2.40     1.22    0.00 .20984E+02
    0.15    26.87    1.22     5.0 0.201E+02   1.22     3.39     1.22    0.00 .21235E+03
    0.28    26.87    1.22     5.2 0.191E+02   1.22     4.15     1.22    0.00 .40371E+03
    0.42    26.87    1.22     5.6 0.179E+02   1.22     4.79     1.22    0.00 .59508E+03
    0.55    26.87    1.22     5.9 0.168E+02   1.22     5.36     1.22    0.00 .78644E+03
    0.69    26.87    1.22     6.3 0.160E+02   1.22     5.87     1.22    0.00 .97781E+03
    0.82    26.87    1.22     6.5 0.154E+02   1.22     6.34     1.22    0.00 .11692E+04
    0.95    26.87    1.22     6.6 0.151E+02   1.22     6.78     1.22    0.00 .13605E+04
    1.09    26.87    1.22     6.7 0.149E+02   1.22     7.19     1.22    0.00 .15519E+04
    1.22    26.87    1.22     6.8 0.147E+02   1.22     7.58     1.22    0.00 .17433E+04
 Cumulative travel time =        1743.2635 sec  (    0.48 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING
-----------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
-----------------------------------------------------------------------------------------
BEGIN MOD141: BUOYANT AMBIENT SPREADING

 Discharge is non-buoyant or weakly buoyant.
 Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.536E-03 m^2/s
  Horizontal diffusivity (initial value) = 0.223E-01 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time

 Plume Stage 1 (not bank attached):
     X        Y       Z        S        C        BV       BH       ZU       ZL       TT
    1.22    26.87    1.22     6.8 0.147E+02   1.22     7.58     1.22    0.00 .17433E+04
    1.24    26.87    1.22     6.9 0.144E+02   1.22     7.73     1.22    0.00 .17760E+04
    1.27    26.87    1.22     7.1 0.141E+02   1.22     7.88     1.22    0.00 .18087E+04
    1.29    26.87    1.22     7.2 0.139E+02   1.22     8.03     1.22    0.00 .18415E+04
    1.31    26.87    1.22     7.4 0.136E+02   1.22     8.19     1.22    0.00 .18742E+04
    1.34    26.87    1.22     7.5 0.133E+02   1.22     8.35     1.22    0.00 .19070E+04
    1.36    26.87    1.22     7.6 0.131E+02   1.22     8.50     1.22    0.00 .19397E+04
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.38 | 26.87 | 1.22 | 7.8 | 0.129E+02 | 1.22 | 8.66 | 1.22 | 0.00 | .19724E+04 |
| 1.40 | 26.87 | 1.22 | 7.9 | 0.126E+02 | 1.22 | 8.82 | 1.22 | 0.00 | .20052E+04 |
| 1.43 | 26.87 | 1.22 | 8.1 | 0.124E+02 | 1.22 | 8.98 | 1.22 | 0.00 | .20379E+04 |
| 1.45 | 26.87 | 1.22 | 8.2 | 0.122E+02 | 1.22 | 9.14 | 1.22 | 0.00 | .20707E+04 |
| 1.47 | 26.87 | 1.22 | 8.4 | 0.120E+02 | 1.22 | 9.30 | 1.22 | 0.00 | .21034E+04 |
| 1.50 | 26.87 | 1.22 | 8.5 | 0.118E+02 | 1.22 | 9.46 | 1.22 | 0.00 | .21362E+04 |
| 1.52 | 26.87 | 1.22 | 8.6 | 0.116E+02 | 1.22 | 9.63 | 1.22 | 0.00 | .21689E+04 |
| 1.54 | 26.87 | 1.22 | 8.8 | 0.114E+02 | 1.22 | 9.79 | 1.22 | 0.00 | .22016E+04 |
| 1.56 | 26.87 | 1.22 | 8.9 | 0.112E+02 | 1.22 | 9.96 | 1.22 | 0.00 | .22344E+04 |
| 1.59 | 26.87 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 10.12 | 1.22 | 0.00 | .22671E+04 |
| 1.61 | 26.87 | 1.22 | 9.2 | 0.108E+02 | 1.22 | 10.29 | 1.22 | 0.00 | .22999E+04 |
| 1.63 | 26.87 | 1.22 | 9.4 | 0.106E+02 | 1.22 | 10.46 | 1.22 | 0.00 | .23326E+04 |
| 1.66 | 26.87 | 1.22 | 9.5 | 0.105E+02 | 1.22 | 10.63 | 1.22 | 0.00 | .23653E+04 |
| 1.68 | 26.87 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 10.80 | 1.22 | 0.00 | .23981E+04 |
| 1.70 | 26.87 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 10.97 | 1.22 | 0.00 | .24308E+04 |
| 1.73 | 26.87 | 1.22 | 10.0 | 0.999E+01 | 1.22 | 11.14 | 1.22 | 0.00 | .24636E+04 |
| 1.75 | 26.87 | 1.22 | 10.2 | 0.984E+01 | 1.22 | 11.31 | 1.22 | 0.00 | .24963E+04 |
| 1.77 | 26.87 | 1.22 | 10.3 | 0.969E+01 | 1.22 | 11.49 | 1.22 | 0.00 | .25290E+04 |
| 1.79 | 26.87 | 1.22 | 10.5 | 0.954E+01 | 1.22 | 11.66 | 1.22 | 0.00 | .25618E+04 |
| 1.82 | 26.87 | 1.22 | 10.6 | 0.940E+01 | 1.22 | 11.84 | 1.22 | 0.00 | .25945E+04 |
| 1.84 | 26.87 | 1.22 | 10.8 | 0.926E+01 | 1.22 | 12.01 | 1.22 | 0.00 | .26273E+04 |
| 1.86 | 26.87 | 1.22 | 11.0 | 0.913E+01 | 1.22 | 12.19 | 1.22 | 0.00 | .26600E+04 |
| 1.89 | 26.87 | 1.22 | 11.1 | 0.900E+01 | 1.22 | 12.37 | 1.22 | 0.00 | .26927E+04 |
| 1.91 | 26.87 | 1.22 | 11.3 | 0.887E+01 | 1.22 | 12.55 | 1.22 | 0.00 | .27255E+04 |
| 1.93 | 26.87 | 1.22 | 11.4 | 0.875E+01 | 1.22 | 12.73 | 1.22 | 0.00 | .27582E+04 |
| 1.95 | 26.87 | 1.22 | 11.6 | 0.862E+01 | 1.22 | 12.91 | 1.22 | 0.00 | .27910E+04 |
| 1.98 | 26.87 | 1.22 | 11.8 | 0.850E+01 | 1.22 | 13.09 | 1.22 | 0.00 | .28237E+04 |
| 2.00 | 26.87 | 1.22 | 11.9 | 0.839E+01 | 1.22 | 13.27 | 1.22 | 0.00 | .28565E+04 |
| 2.02 | 26.87 | 1.22 | 12.1 | 0.827E+01 | 1.22 | 13.46 | 1.22 | 0.00 | .28892E+04 |
| 2.05 | 26.87 | 1.22 | 12.3 | 0.816E+01 | 1.22 | 13.64 | 1.22 | 0.00 | .29219E+04 |
| 2.07 | 26.87 | 1.22 | 12.4 | 0.805E+01 | 1.22 | 13.82 | 1.22 | 0.00 | .29547E+04 |
| 2.09 | 26.87 | 1.22 | 12.6 | 0.795E+01 | 1.22 | 14.01 | 1.22 | 0.00 | .29874E+04 |
| 2.11 | 26.87 | 1.22 | 12.8 | 0.784E+01 | 1.22 | 14.20 | 1.22 | 0.00 | .30202E+04 |
| 2.14 | 26.87 | 1.22 | 12.9 | 0.774E+01 | 1.22 | 14.38 | 1.22 | 0.00 | .30529E+04 |
| 2.16 | 26.87 | 1.22 | 13.1 | 0.764E+01 | 1.22 | 14.57 | 1.22 | 0.00 | .30856E+04 |
| 2.18 | 26.87 | 1.22 | 13.3 | 0.754E+01 | 1.22 | 14.76 | 1.22 | 0.00 | .31184E+04 |
| 2.21 | 26.87 | 1.22 | 13.4 | 0.745E+01 | 1.22 | 14.95 | 1.22 | 0.00 | .31511E+04 |
| 2.23 | 26.87 | 1.22 | 13.6 | 0.735E+01 | 1.22 | 15.14 | 1.22 | 0.00 | .31839E+04 |
| 2.25 | 26.87 | 1.22 | 13.8 | 0.726E+01 | 1.22 | 15.33 | 1.22 | 0.00 | .32166E+04 |
| 2.28 | 26.87 | 1.22 | 13.9 | 0.717E+01 | 1.22 | 15.52 | 1.22 | 0.00 | .32493E+04 |
| 2.30 | 26.87 | 1.22 | 14.1 | 0.708E+01 | 1.22 | 15.72 | 1.22 | 0.00 | .32821E+04 |
| 2.32 | 26.87 | 1.22 | 14.3 | 0.700E+01 | 1.22 | 15.91 | 1.22 | 0.00 | .33148E+04 |
| 2.34 | 26.87 | 1.22 | 14.5 | 0.691E+01 | 1.22 | 16.10 | 1.22 | 0.00 | .33476E+04 |
| 2.37 | 26.87 | 1.22 | 14.6 | 0.683E+01 | 1.22 | 16.30 | 1.22 | 0.00 | .33803E+04 |
| 2.39 | 26.87 | 1.22 | 14.8 | 0.675E+01 | 1.22 | 16.50 | 1.22 | 0.00 | .34130E+04 |
| 2.41 | 26.87 | 1.22 | 15.0 | 0.667E+01 | 1.22 | 16.69 | 1.22 | 0.00 | .34458E+04 |
| 2.44 | 26.87 | 1.22 | 15.2 | 0.659E+01 | 1.22 | 16.89 | 1.22 | 0.00 | .34785E+04 |
| 2.46 | 26.87 | 1.22 | 15.4 | 0.651E+01 | 1.22 | 17.09 | 1.22 | 0.00 | .35113E+04 |
| 2.48 | 26.87 | 1.22 | 15.5 | 0.644E+01 | 1.22 | 17.29 | 1.22 | 0.00 | .35440E+04 |
| 2.50 | 26.87 | 1.22 | 15.7 | 0.637E+01 | 1.22 | 17.49 | 1.22 | 0.00 | .35767E+04 |
| 2.53 | 26.87 | 1.22 | 15.9 | 0.629E+01 | 1.22 | 17.69 | 1.22 | 0.00 | .36095E+04 |
| 2.55 | 26.87 | 1.22 | 16.1 | 0.622E+01 | 1.22 | 17.89 | 1.22 | 0.00 | .36422E+04 |
| 2.57 | 26.87 | 1.22 | 16.3 | 0.615E+01 | 1.22 | 18.09 | 1.22 | 0.00 | .36750E+04 |
| 2.60 | 26.87 | 1.22 | 16.4 | 0.608E+01 | 1.22 | 18.29 | 1.22 | 0.00 | .37077E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2.62 | 26.87 | 1.22 | 16.6 | 0.602E+01 | 1.22 | 18.50 | 1.22 | 0.00 | .37404E+04 |
| 2.64 | 26.87 | 1.22 | 16.8 | 0.595E+01 | 1.22 | 18.70 | 1.22 | 0.00 | .37732E+04 |
| 2.66 | 26.87 | 1.22 | 17.0 | 0.589E+01 | 1.22 | 18.91 | 1.22 | 0.00 | .38059E+04 |
| 2.69 | 26.87 | 1.22 | 17.2 | 0.582E+01 | 1.22 | 19.11 | 1.22 | 0.00 | .38387E+04 |
| 2.71 | 26.87 | 1.22 | 17.4 | 0.576E+01 | 1.22 | 19.32 | 1.22 | 0.00 | .38714E+04 |
| 2.73 | 26.87 | 1.22 | 17.5 | 0.570E+01 | 1.22 | 19.53 | 1.22 | 0.00 | .39042E+04 |
| 2.76 | 26.87 | 1.22 | 17.7 | 0.564E+01 | 1.22 | 19.74 | 1.22 | 0.00 | .39369E+04 |
| 2.78 | 26.87 | 1.22 | 17.9 | 0.558E+01 | 1.22 | 19.94 | 1.22 | 0.00 | .39696E+04 |
| 2.80 | 26.87 | 1.22 | 18.1 | 0.552E+01 | 1.22 | 20.15 | 1.22 | 0.00 | .40024E+04 |
| 2.83 | 26.87 | 1.22 | 18.3 | 0.547E+01 | 1.22 | 20.36 | 1.22 | 0.00 | .40351E+04 |
| 2.85 | 26.87 | 1.22 | 18.5 | 0.541E+01 | 1.22 | 20.57 | 1.22 | 0.00 | .40679E+04 |
| 2.87 | 26.87 | 1.22 | 18.7 | 0.536E+01 | 1.22 | 20.79 | 1.22 | 0.00 | .41006E+04 |
| 2.89 | 26.87 | 1.22 | 18.9 | 0.530E+01 | 1.22 | 21.00 | 1.22 | 0.00 | .41333E+04 |
| 2.92 | 26.87 | 1.22 | 19.1 | 0.525E+01 | 1.22 | 21.21 | 1.22 | 0.00 | .41661E+04 |
| 2.94 | 26.87 | 1.22 | 19.2 | 0.520E+01 | 1.22 | 21.43 | 1.22 | 0.00 | .41988E+04 |
| 2.96 | 26.87 | 1.22 | 19.4 | 0.514E+01 | 1.22 | 21.64 | 1.22 | 0.00 | .42316E+04 |
| 2.99 | 26.87 | 1.22 | 19.6 | 0.509E+01 | 1.22 | 21.86 | 1.22 | 0.00 | .42643E+04 |
| 3.01 | 26.87 | 1.22 | 19.8 | 0.504E+01 | 1.22 | 22.07 | 1.22 | 0.00 | .42970E+04 |
| 3.03 | 26.87 | 1.22 | 20.0 | 0.499E+01 | 1.22 | 22.29 | 1.22 | 0.00 | .43298E+04 |
| 3.05 | 26.87 | 1.22 | 20.2 | 0.495E+01 | 1.22 | 22.51 | 1.22 | 0.00 | .43625E+04 |
| 3.08 | 26.87 | 1.22 | 20.4 | 0.490E+01 | 1.22 | 22.72 | 1.22 | 0.00 | .43953E+04 |
| 3.10 | 26.87 | 1.22 | 20.6 | 0.485E+01 | 1.22 | 22.94 | 1.22 | 0.00 | .44280E+04 |
| 3.12 | 26.87 | 1.22 | 20.8 | 0.481E+01 | 1.22 | 23.16 | 1.22 | 0.00 | .44607E+04 |
| 3.15 | 26.87 | 1.22 | 21.0 | 0.476E+01 | 1.22 | 23.38 | 1.22 | 0.00 | .44935E+04 |
| 3.17 | 26.87 | 1.22 | 21.2 | 0.472E+01 | 1.22 | 23.60 | 1.22 | 0.00 | .45262E+04 |
| 3.19 | 26.87 | 1.22 | 21.4 | 0.467E+01 | 1.22 | 23.83 | 1.22 | 0.00 | .45590E+04 |
| 3.21 | 26.87 | 1.22 | 21.6 | 0.463E+01 | 1.22 | 24.05 | 1.22 | 0.00 | .45917E+04 |
| 3.24 | 26.87 | 1.22 | 21.8 | 0.459E+01 | 1.22 | 24.27 | 1.22 | 0.00 | .46244E+04 |
| 3.26 | 26.87 | 1.22 | 22.0 | 0.454E+01 | 1.22 | 24.49 | 1.22 | 0.00 | .46572E+04 |
| 3.28 | 26.87 | 1.22 | 22.2 | 0.450E+01 | 1.22 | 24.72 | 1.22 | 0.00 | .46899E+04 |
| 3.31 | 26.87 | 1.22 | 22.4 | 0.446E+01 | 1.22 | 24.94 | 1.22 | 0.00 | .47227E+04 |
| 3.33 | 26.87 | 1.22 | 22.6 | 0.442E+01 | 1.22 | 25.17 | 1.22 | 0.00 | .47554E+04 |
| 3.35 | 26.87 | 1.22 | 22.8 | 0.438E+01 | 1.22 | 25.40 | 1.22 | 0.00 | .47882E+04 |
| 3.38 | 26.87 | 1.22 | 23.0 | 0.434E+01 | 1.22 | 25.62 | 1.22 | 0.00 | .48209E+04 |
| 3.40 | 26.87 | 1.22 | 23.2 | 0.431E+01 | 1.22 | 25.85 | 1.22 | 0.00 | .48536E+04 |
| 3.42 | 26.87 | 1.22 | 23.4 | 0.427E+01 | 1.22 | 26.08 | 1.22 | 0.00 | .48864E+04 |
| 3.44 | 26.87 | 1.22 | 23.6 | 0.423E+01 | 1.22 | 26.31 | 1.22 | 0.00 | .49191E+04 |
| 3.47 | 26.87 | 1.22 | 23.8 | 0.419E+01 | 1.22 | 26.54 | 1.22 | 0.00 | .49519E+04 |
| 3.49 | 26.87 | 1.22 | 24.0 | 0.416E+01 | 1.22 | 26.77 | 1.22 | 0.00 | .49846E+04 |
| 3.51 | 26.87 | 1.22 | 24.3 | 0.412E+01 | 1.22 | 27.00 | 1.22 | 0.00 | .50173E+04 |

Cumulative travel time = 5017.3452 sec ( 1.39 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 3.51 | -0.13 | 1.22 | 24.3 | 0.412E+01 | 1.22 | 54.00 | 1.22 | 0.00 | .50173E+04 |
| 83.48 | -0.13 | 1.22 | 1211.2 | 0.826E-01 | 1.22 | 2696.42 | 1.22 | 0.00 | .11925E+06 |

** REGULATORY MIXING ZONE BOUNDARY **

In this prediction interval the plume DOWNSTREAM distance meets or exceeds
the regulatory value = 100.00 m.
This is the extent of the REGULATORY MIXING ZONE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 163.44 | -0.13 | 1.22 | 3238.0 | 0.309E-01 | 1.22 | 7208.70 | 1.22 | 0.00 | .23349E+06 |
| 243.41 | -0.13 | 1.22 | 5835.1 | 0.171E-01 | 1.22 | 12990.54 | 1.22 | 0.00 | .34772E+06 |
| 323.37 | -0.13 | 1.22 | 8896.7 | 0.112E-01 | 1.22 | 19806.65 | 1.22 | 0.00 | .46196E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 403.34 | -0.13 | 1.22 | 12360.8 | 0.809E-02 | 1.22 | 27518.72 | 1.22 | 0.00 | .57620E+06 |
| 483.30 | -0.13 | 1.22 | 16185.1 | 0.618E-02 | 1.22 | 36032.65 | 1.22 | 0.00 | .69043E+06 |
| 563.27 | -0.13 | 1.22 | 20338.4 | 0.492E-02 | 1.22 | 45278.97 | 1.22 | 0.00 | .80467E+06 |
| 643.23 | -0.13 | 1.22 | 24796.3 | 0.403E-02 | 1.22 | 55203.68 | 1.22 | 0.00 | .91890E+06 |
| 723.20 | -0.13 | 1.22 | 29539.5 | 0.339E-02 | 1.22 | 65763.24 | 1.22 | 0.00 | .10331E+07 |
| 803.16 | -0.13 | 1.22 | 34551.5 | 0.289E-02 | 1.22 | 76921.52 | 1.22 | 0.00 | .11474E+07 |
| 883.13 | -0.13 | 1.22 | 39818.8 | 0.251E-02 | 1.22 | 88647.98 | 1.22 | 0.00 | .12616E+07 |
| 963.09 | -0.13 | 1.22 | 45329.5 | 0.221E-02 | 1.22 | ******** | 1.22 | 0.00 | .13758E+07 |
| 1043.06 | -0.13 | 1.22 | 51073.3 | 0.196E-02 | 1.22 | ******** | 1.22 | 0.00 | .14901E+07 |
| 1123.02 | -0.13 | 1.22 | 57041.0 | 0.175E-02 | 1.22 | ******** | 1.22 | 0.00 | .16043E+07 |
| 1202.99 | -0.13 | 1.22 | 63224.7 | 0.158E-02 | 1.22 | ******** | 1.22 | 0.00 | .17186E+07 |
| 1282.95 | -0.13 | 1.22 | 69616.9 | 0.144E-02 | 1.22 | ******** | 1.22 | 0.00 | .18328E+07 |
| 1362.92 | -0.13 | 1.22 | 76211.1 | 0.131E-02 | 1.22 | ******** | 1.22 | 0.00 | .19470E+07 |
| 1442.88 | -0.13 | 1.22 | 83001.3 | 0.120E-02 | 1.22 | ******** | 1.22 | 0.00 | .20613E+07 |
| 1522.85 | -0.13 | 1.22 | 89982.0 | 0.111E-02 | 1.22 | ******** | 1.22 | 0.00 | .21755E+07 |
| 1602.81 | -0.13 | 1.22 | 97148.1 | 0.103E-02 | 1.22 | ******** | 1.22 | 0.00 | .22897E+07 |
| 1682.77 | -0.13 | 1.22 | ******* | 0.957E-03 | 1.22 | ******** | 1.22 | 0.00 | .24040E+07 |
| 1762.74 | -0.13 | 1.22 | ******* | 0.893E-03 | 1.22 | ******** | 1.22 | 0.00 | .25182E+07 |
| 1842.70 | -0.13 | 1.22 | ******* | 0.835E-03 | 1.22 | ******** | 1.22 | 0.00 | .26324E+07 |
| 1922.67 | -0.13 | 1.22 | ******* | 0.784E-03 | 1.22 | ******** | 1.22 | 0.00 | .27467E+07 |
| 2002.63 | -0.13 | 1.22 | ******* | 0.737E-03 | 1.22 | ******** | 1.22 | 0.00 | .28609E+07 |
| 2082.60 | -0.13 | 1.22 | ******* | 0.695E-03 | 1.22 | ******** | 1.22 | 0.00 | .29751E+07 |
| 2162.56 | -0.13 | 1.22 | ******* | 0.657E-03 | 1.22 | ******** | 1.22 | 0.00 | .30894E+07 |
| 2242.53 | -0.13 | 1.22 | ******* | 0.622E-03 | 1.22 | ******** | 1.22 | 0.00 | .32036E+07 |
| 2322.49 | -0.13 | 1.22 | ******* | 0.591E-03 | 1.22 | ******** | 1.22 | 0.00 | .33178E+07 |
| 2402.46 | -0.13 | 1.22 | ******* | 0.561E-03 | 1.22 | ******** | 1.22 | 0.00 | .34321E+07 |
| 2482.42 | -0.13 | 1.22 | ******* | 0.535E-03 | 1.22 | ******** | 1.22 | 0.00 | .35463E+07 |
| 2562.39 | -0.13 | 1.22 | ******* | 0.510E-03 | 1.22 | ******** | 1.22 | 0.00 | .36606E+07 |
| 2642.35 | -0.13 | 1.22 | ******* | 0.487E-03 | 1.22 | ******** | 1.22 | 0.00 | .37748E+07 |
| 2722.32 | -0.13 | 1.22 | ******* | 0.466E-03 | 1.22 | ******** | 1.22 | 0.00 | .38890E+07 |
| 2802.28 | -0.13 | 1.22 | ******* | 0.446E-03 | 1.22 | ******** | 1.22 | 0.00 | .40033E+07 |
| 2882.25 | -0.13 | 1.22 | ******* | 0.427E-03 | 1.22 | ******** | 1.22 | 0.00 | .41175E+07 |
| 2962.21 | -0.13 | 1.22 | ******* | 0.410E-03 | 1.22 | ******** | 1.22 | 0.00 | .42317E+07 |
| 3042.18 | -0.13 | 1.22 | ******* | 0.394E-03 | 1.22 | ******** | 1.22 | 0.00 | .43460E+07 |
| 3122.14 | -0.13 | 1.22 | ******* | 0.379E-03 | 1.22 | ******** | 1.22 | 0.00 | .44602E+07 |
| 3202.11 | -0.13 | 1.22 | ******* | 0.365E-03 | 1.22 | ******** | 1.22 | 0.00 | .45744E+07 |
| 3282.07 | -0.13 | 1.22 | ******* | 0.352E-03 | 1.22 | ******** | 1.22 | 0.00 | .46887E+07 |
| 3362.04 | -0.13 | 1.22 | ******* | 0.339E-03 | 1.22 | ******** | 1.22 | 0.00 | .48029E+07 |
| 3442.00 | -0.13 | 1.22 | ******* | 0.328E-03 | 1.22 | ******** | 1.22 | 0.00 | .49171E+07 |
| 3521.97 | -0.13 | 1.22 | ******* | 0.316E-03 | 1.22 | ******** | 1.22 | 0.00 | .50314E+07 |
| 3601.93 | -0.13 | 1.22 | ******* | 0.306E-03 | 1.22 | ******** | 1.22 | 0.00 | .51456E+07 |
| 3681.90 | -0.13 | 1.22 | ******* | 0.296E-03 | 1.22 | ******** | 1.22 | 0.00 | .52599E+07 |
| 3761.86 | -0.13 | 1.22 | ******* | 0.287E-03 | 1.22 | ******** | 1.22 | 0.00 | .53741E+07 |
| 3841.83 | -0.13 | 1.22 | ******* | 0.278E-03 | 1.22 | ******** | 1.22 | 0.00 | .54883E+07 |
| 3921.79 | -0.13 | 1.22 | ******* | 0.269E-03 | 1.22 | ******** | 1.22 | 0.00 | .56026E+07 |
| 4001.76 | -0.13 | 1.22 | ******* | 0.261E-03 | 1.22 | ******** | 1.22 | 0.00 | .57168E+07 |
| 4081.72 | -0.13 | 1.22 | ******* | 0.254E-03 | 1.22 | ******** | 1.22 | 0.00 | .58310E+07 |
| 4161.69 | -0.13 | 1.22 | ******* | 0.246E-03 | 1.22 | ******** | 1.22 | 0.00 | .59453E+07 |
| 4241.65 | -0.13 | 1.22 | ******* | 0.240E-03 | 1.22 | ******** | 1.22 | 0.00 | .60595E+07 |
| 4321.61 | -0.13 | 1.22 | ******* | 0.233E-03 | 1.22 | ******** | 1.22 | 0.00 | .61737E+07 |
| 4401.58 | -0.13 | 1.22 | ******* | 0.227E-03 | 1.22 | ******** | 1.22 | 0.00 | .62880E+07 |
| 4481.54 | -0.13 | 1.22 | ******* | 0.221E-03 | 1.22 | ******** | 1.22 | 0.00 | .64022E+07 |
| 4561.51 | -0.13 | 1.22 | ******* | 0.215E-03 | 1.22 | ******** | 1.22 | 0.00 | .65164E+07 |
| 4641.47 | -0.13 | 1.22 | ******* | 0.209E-03 | 1.22 | ******** | 1.22 | 0.00 | .66307E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4721.44 | -0.13 | 1.22 | ******* | 0.204E-03 | 1.22 | ******** | 1.22 | 0.00 | .67449E+07 |
| 4801.40 | -0.13 | 1.22 | ******* | 0.199E-03 | 1.22 | ******** | 1.22 | 0.00 | .68591E+07 |
| 4881.37 | -0.13 | 1.22 | ******* | 0.194E-03 | 1.22 | ******** | 1.22 | 0.00 | .69734E+07 |
| 4961.33 | -0.13 | 1.22 | ******* | 0.189E-03 | 1.22 | ******** | 1.22 | 0.00 | .70876E+07 |
| 5041.30 | -0.13 | 1.22 | ******* | 0.185E-03 | 1.22 | ******** | 1.22 | 0.00 | .72019E+07 |
| 5121.26 | -0.13 | 1.22 | ******* | 0.181E-03 | 1.22 | ******** | 1.22 | 0.00 | .73161E+07 |
| 5201.23 | -0.13 | 1.22 | ******* | 0.176E-03 | 1.22 | ******** | 1.22 | 0.00 | .74303E+07 |
| 5281.19 | -0.13 | 1.22 | ******* | 0.172E-03 | 1.22 | ******** | 1.22 | 0.00 | .75446E+07 |
| 5361.16 | -0.13 | 1.22 | ******* | 0.169E-03 | 1.22 | ******** | 1.22 | 0.00 | .76588E+07 |
| 5441.12 | -0.13 | 1.22 | ******* | 0.165E-03 | 1.22 | ******** | 1.22 | 0.00 | .77730E+07 |
| 5521.09 | -0.13 | 1.22 | ******* | 0.161E-03 | 1.22 | ******** | 1.22 | 0.00 | .78873E+07 |
| 5601.05 | -0.13 | 1.22 | ******* | 0.158E-03 | 1.22 | ******** | 1.22 | 0.00 | .80015E+07 |
| 5681.02 | -0.13 | 1.22 | ******* | 0.155E-03 | 1.22 | ******** | 1.22 | 0.00 | .81157E+07 |
| 5760.98 | -0.13 | 1.22 | ******* | 0.151E-03 | 1.22 | ******** | 1.22 | 0.00 | .82300E+07 |
| 5840.95 | -0.13 | 1.22 | ******* | 0.148E-03 | 1.22 | ******** | 1.22 | 0.00 | .83442E+07 |
| 5920.91 | -0.13 | 1.22 | ******* | 0.145E-03 | 1.22 | ******** | 1.22 | 0.00 | .84584E+07 |
| 6000.88 | -0.13 | 1.22 | ******* | 0.142E-03 | 1.22 | ******** | 1.22 | 0.00 | .85727E+07 |
| 6080.84 | -0.13 | 1.22 | ******* | 0.140E-03 | 1.22 | ******** | 1.22 | 0.00 | .86869E+07 |
| 6160.81 | -0.13 | 1.22 | ******* | 0.137E-03 | 1.22 | ******** | 1.22 | 0.00 | .88012E+07 |
| 6240.77 | -0.13 | 1.22 | ******* | 0.134E-03 | 1.22 | ******** | 1.22 | 0.00 | .89154E+07 |
| 6320.74 | -0.13 | 1.22 | ******* | 0.132E-03 | 1.22 | ******** | 1.22 | 0.00 | .90296E+07 |
| 6400.70 | -0.13 | 1.22 | ******* | 0.129E-03 | 1.22 | ******** | 1.22 | 0.00 | .91439E+07 |
| 6480.67 | -0.13 | 1.22 | ******* | 0.127E-03 | 1.22 | ******** | 1.22 | 0.00 | .92581E+07 |
| 6560.63 | -0.13 | 1.22 | ******* | 0.125E-03 | 1.22 | ******** | 1.22 | 0.00 | .93723E+07 |
| 6640.60 | -0.13 | 1.22 | ******* | 0.122E-03 | 1.22 | ******** | 1.22 | 0.00 | .94866E+07 |
| 6720.56 | -0.13 | 1.22 | ******* | 0.120E-03 | 1.22 | ******** | 1.22 | 0.00 | .96008E+07 |
| 6800.52 | -0.13 | 1.22 | ******* | 0.118E-03 | 1.22 | ******** | 1.22 | 0.00 | .97150E+07 |
| 6880.49 | -0.13 | 1.22 | ******* | 0.116E-03 | 1.22 | ******** | 1.22 | 0.00 | .98293E+07 |
| 6960.45 | -0.13 | 1.22 | ******* | 0.114E-03 | 1.22 | ******** | 1.22 | 0.00 | .99435E+07 |
| 7040.42 | -0.13 | 1.22 | ******* | 0.112E-03 | 1.22 | ******** | 1.22 | 0.00 | .10058E+08 |
| 7120.38 | -0.13 | 1.22 | ******* | 0.110E-03 | 1.22 | ******** | 1.22 | 0.00 | .10172E+08 |
| 7200.35 | -0.13 | 1.22 | ******* | 0.108E-03 | 1.22 | ******** | 1.22 | 0.00 | .10286E+08 |
| 7280.31 | -0.13 | 1.22 | ******* | 0.107E-03 | 1.22 | ******** | 1.22 | 0.00 | .10400E+08 |
| 7360.28 | -0.13 | 1.22 | ******* | 0.105E-03 | 1.22 | ******** | 1.22 | 0.00 | .10515E+08 |
| 7440.24 | -0.13 | 1.22 | ******* | 0.103E-03 | 1.22 | ******** | 1.22 | 0.00 | .10629E+08 |
| 7520.21 | -0.13 | 1.22 | ******* | 0.101E-03 | 1.22 | ******** | 1.22 | 0.00 | .10743E+08 |
| 7600.17 | -0.13 | 1.22 | ******* | 0.999E-04 | 1.22 | ******** | 1.22 | 0.00 | .10857E+08 |
| 7680.14 | -0.13 | 1.22 | ******* | 0.983E-04 | 1.22 | ******** | 1.22 | 0.00 | .10972E+08 |
| 7760.10 | -0.13 | 1.22 | ******* | 0.968E-04 | 1.22 | ******** | 1.22 | 0.00 | .11086E+08 |
| 7840.07 | -0.13 | 1.22 | ******* | 0.954E-04 | 1.22 | ******** | 1.22 | 0.00 | .11200E+08 |
| 7920.03 | -0.13 | 1.22 | ******* | 0.939E-04 | 1.22 | ******** | 1.22 | 0.00 | .11314E+08 |
| 8000.00 | -0.13 | 1.22 | ******* | 0.925E-04 | 1.22 | ******** | 1.22 | 0.00 | .11429E+08 |

Cumulative travel time = 11428571.0000 sec ( 3174.60 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 8000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges End of Prediction File
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX1: Single Port Discharges
CORMIX Version 12.0GTD
HYDRO1 Version 12.0.0.0 December 2020

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

CASE DESCRIPTION
Site name/label: Goldboro East Pit
Design case: Year 21
FILE NAME: C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y21-EastPit.prd
Time stamp: 04/06/2022--22:04:39

ENVIRONMENT PARAMETERS (metric units)
Bounded section
BS = 64.60 AS = 78.76 QA = 0.10 ICHREG= 2
HA = 1.22 HD = 1.22
UA = 0.001 F = 0.118 USTAR =0.1610E-03
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 998.1636

DISCHARGE PARAMETERS (metric units)
Above Surface Discharge:
Re-computed discharge conditions at entry point at water surface.
BANK = LEFT DISTB = 0.12
D0 = 0.089 A0 = 0.006 H0 = 1.22 SUB0 = 0.00
THETA = 0.00 SIGMA = 270.00
U0 = 1.411 Q0 = 0.009 =0.8700E-02
RHO0 = 998.1636 DRHO0 =0.0000E+00 GP0 =0.0000E+00
C0 =0.1000E+03 CUNITS= %
IPOLL = 1 KS =0.0000E+00 KD =0.0000E+00

FLUX VARIABLES (metric units)
Q0 =0.8700E-02 M0 =0.1227E-01 J0 =0.0000E+00 SIGNJ0= 1.0
Associated length scales (meters)
LQ = 0.08 LM = 99999.00 Lm = 83.42 Lb = 0.00
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS
FR0 = 99999.00 R = 1062.28

FLOW CLASSIFICATION
111111111111111111111111111111111111111111111
1 Flow class (CORMIX1) = IPV4 1
1 Applicable layer depth HS = 1.22 1
1 Limiting Dilution S=QA/Q0 + 1= 13.02 1
111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
C0 =0.1000E+03 CUNITS= %
NTOX = 0

NSTD = 0
REGMZ = 0
XINT = 7000.00 XMAX = 7000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.12 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.04 | 1.411 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -83.00 SIGMAE= 270.18
LE = 0.44 XE = 0.00 YE = -0.05 ZE = 0.78

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.04 | 1.411 | .00000E+00 |
| 0.00 | -0.05 | 0.78 | 1.0 | 0.100E+03 | 0.04 | 1.411 | .16879E-02 |
| 0.00 | -0.05 | 0.78 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .33896E-02 |
| 0.00 | -0.06 | 0.77 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .68348E-02 |
| 0.00 | -0.06 | 0.76 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .10336E-01 |
| 0.00 | -0.06 | 0.76 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .13892E-01 |
| 0.00 | -0.06 | 0.75 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .17503E-01 |
| 0.00 | -0.06 | 0.74 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .21171E-01 |
| 0.00 | -0.06 | 0.74 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .24894E-01 |
| 0.00 | -0.06 | 0.73 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .28672E-01 |
| 0.00 | -0.06 | 0.72 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .32506E-01 |
| 0.00 | -0.06 | 0.71 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .38361E-01 |
| 0.00 | -0.06 | 0.71 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .42333E-01 |
| 0.00 | -0.06 | 0.70 | 1.0 | 0.992E+02 | 0.05 | 1.411 | .46361E-01 |
| 0.00 | -0.06 | 0.69 | 1.0 | 0.979E+02 | 0.05 | 1.411 | .50445E-01 |
| 0.00 | -0.07 | 0.69 | 1.0 | 0.966E+02 | 0.05 | 1.411 | .54584E-01 |
| 0.00 | -0.07 | 0.68 | 1.0 | 0.953E+02 | 0.06 | 1.411 | .58779E-01 |
| 0.00 | -0.07 | 0.67 | 1.1 | 0.941E+02 | 0.06 | 1.411 | .63029E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.07 | 0.67 | 1.1 | 0.929E+02 | 0.06 | 1.411 | .67335E-01 |
| 0.00 | -0.07 | 0.66 | 1.1 | 0.917E+02 | 0.06 | 1.411 | .71697E-01 |
| 0.00 | -0.07 | 0.65 | 1.1 | 0.905E+02 | 0.06 | 1.411 | .76113E-01 |
| 0.00 | -0.07 | 0.65 | 1.1 | 0.894E+02 | 0.06 | 1.411 | .80586E-01 |
| 0.00 | -0.07 | 0.64 | 1.1 | 0.883E+02 | 0.06 | 1.411 | .85114E-01 |
| 0.00 | -0.07 | 0.63 | 1.1 | 0.873E+02 | 0.06 | 1.411 | .89697E-01 |
| 0.00 | -0.07 | 0.63 | 1.2 | 0.862E+02 | 0.06 | 1.411 | .94336E-01 |
| 0.00 | -0.07 | 0.62 | 1.2 | 0.852E+02 | 0.06 | 1.411 | .99031E-01 |
| 0.00 | -0.07 | 0.62 | 1.2 | 0.842E+02 | 0.06 | 1.402 | .10378E+00 |
| 0.00 | -0.07 | 0.61 | 1.2 | 0.832E+02 | 0.06 | 1.386 | .10859E+00 |
| 0.00 | -0.08 | 0.60 | 1.2 | 0.823E+02 | 0.06 | 1.370 | .11345E+00 |
| 0.00 | -0.08 | 0.60 | 1.2 | 0.814E+02 | 0.07 | 1.355 | .11836E+00 |
| 0.00 | -0.08 | 0.59 | 1.2 | 0.805E+02 | 0.07 | 1.340 | .12334E+00 |
| 0.00 | -0.08 | 0.58 | 1.3 | 0.796E+02 | 0.07 | 1.325 | .12836E+00 |
| 0.00 | -0.08 | 0.58 | 1.3 | 0.787E+02 | 0.07 | 1.311 | .13345E+00 |
| 0.00 | -0.08 | 0.57 | 1.3 | 0.779E+02 | 0.07 | 1.296 | .13859E+00 |
| 0.00 | -0.08 | 0.56 | 1.3 | 0.770E+02 | 0.07 | 1.283 | .14378E+00 |
| 0.00 | -0.08 | 0.56 | 1.3 | 0.762E+02 | 0.07 | 1.269 | .14903E+00 |
| 0.00 | -0.08 | 0.55 | 1.3 | 0.754E+02 | 0.07 | 1.256 | .15433E+00 |
| 0.00 | -0.08 | 0.54 | 1.3 | 0.746E+02 | 0.07 | 1.243 | .15970E+00 |
| 0.00 | -0.08 | 0.54 | 1.4 | 0.739E+02 | 0.07 | 1.230 | .16511E+00 |
| 0.00 | -0.08 | 0.53 | 1.4 | 0.731E+02 | 0.07 | 1.218 | .17058E+00 |
| 0.00 | -0.09 | 0.52 | 1.4 | 0.724E+02 | 0.07 | 1.205 | .17611E+00 |
| 0.00 | -0.09 | 0.52 | 1.4 | 0.717E+02 | 0.07 | 1.194 | .18169E+00 |
| 0.00 | -0.09 | 0.51 | 1.4 | 0.710E+02 | 0.07 | 1.182 | .18733E+00 |
| 0.00 | -0.09 | 0.50 | 1.4 | 0.703E+02 | 0.08 | 1.170 | .19303E+00 |
| 0.00 | -0.09 | 0.50 | 1.4 | 0.696E+02 | 0.08 | 1.159 | .19878E+00 |
| 0.00 | -0.09 | 0.49 | 1.5 | 0.689E+02 | 0.08 | 1.148 | .20458E+00 |
| 0.00 | -0.09 | 0.48 | 1.5 | 0.683E+02 | 0.08 | 1.137 | .21044E+00 |
| 0.00 | -0.09 | 0.48 | 1.5 | 0.676E+02 | 0.08 | 1.126 | .21636E+00 |
| 0.00 | -0.09 | 0.47 | 1.5 | 0.670E+02 | 0.08 | 1.116 | .22233E+00 |
| 0.00 | -0.09 | 0.46 | 1.5 | 0.664E+02 | 0.08 | 1.106 | .22836E+00 |
| 0.00 | -0.09 | 0.46 | 1.5 | 0.658E+02 | 0.08 | 1.096 | .23444E+00 |
| 0.00 | -0.09 | 0.45 | 1.5 | 0.652E+02 | 0.08 | 1.086 | .24058E+00 |
| 0.00 | -0.10 | 0.44 | 1.5 | 0.646E+02 | 0.08 | 1.076 | .24677E+00 |
| 0.00 | -0.10 | 0.44 | 1.6 | 0.640E+02 | 0.08 | 1.067 | .25302E+00 |
| 0.00 | -0.10 | 0.43 | 1.6 | 0.635E+02 | 0.08 | 1.057 | .25932E+00 |
| 0.00 | -0.10 | 0.42 | 1.6 | 0.629E+02 | 0.08 | 1.048 | .26568E+00 |
| 0.00 | -0.10 | 0.42 | 1.6 | 0.624E+02 | 0.09 | 1.039 | .27210E+00 |
| 0.00 | -0.10 | 0.41 | 1.6 | 0.619E+02 | 0.09 | 1.030 | .27857E+00 |
| 0.00 | -0.10 | 0.40 | 1.6 | 0.613E+02 | 0.09 | 1.021 | .28510E+00 |
| 0.00 | -0.10 | 0.40 | 1.6 | 0.608E+02 | 0.09 | 1.013 | .29168E+00 |
| 0.00 | -0.10 | 0.39 | 1.7 | 0.603E+02 | 0.09 | 1.004 | .29832E+00 |
| 0.00 | -0.10 | 0.38 | 1.7 | 0.598E+02 | 0.09 | 0.996 | .30501E+00 |
| 0.00 | -0.10 | 0.38 | 1.7 | 0.593E+02 | 0.09 | 0.988 | .31176E+00 |
| 0.00 | -0.10 | 0.37 | 1.7 | 0.588E+02 | 0.09 | 0.980 | .31857E+00 |
| 0.00 | -0.11 | 0.36 | 1.7 | 0.584E+02 | 0.09 | 0.972 | .32543E+00 |
| 0.00 | -0.11 | 0.36 | 1.7 | 0.579E+02 | 0.09 | 0.964 | .33234E+00 |
| 0.00 | -0.11 | 0.35 | 1.7 | 0.574E+02 | 0.09 | 0.956 | .33931E+00 |
| 0.00 | -0.11 | 0.34 | 1.8 | 0.570E+02 | 0.09 | 0.949 | .34634E+00 |
| 0.00 | -0.11 | 0.34 | 1.8 | 0.565E+02 | 0.09 | 0.941 | .35342E+00 |
| 0.00 | -0.11 | 0.33 | 1.8 | 0.561E+02 | 0.09 | 0.934 | .36056E+00 |
| 0.00 | -0.11 | 0.32 | 1.8 | 0.557E+02 | 0.10 | 0.927 | .36775E+00 |
| 0.00 | -0.11 | 0.32 | 1.8 | 0.552E+02 | 0.10 | 0.920 | .37500E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.11 | 0.31 | 1.8 | 0.548E+02 | 0.10 | 0.913 | .38230E+00 |
| 0.00 | -0.11 | 0.30 | 1.8 | 0.544E+02 | 0.10 | 0.906 | .38966E+00 |
| 0.00 | -0.11 | 0.30 | 1.9 | 0.540E+02 | 0.10 | 0.899 | .39708E+00 |
| 0.00 | -0.11 | 0.29 | 1.9 | 0.536E+02 | 0.10 | 0.892 | .40455E+00 |
| 0.00 | -0.11 | 0.28 | 1.9 | 0.532E+02 | 0.10 | 0.886 | .41208E+00 |
| 0.00 | -0.12 | 0.28 | 1.9 | 0.528E+02 | 0.10 | 0.879 | .41966E+00 |
| 0.00 | -0.12 | 0.27 | 1.9 | 0.524E+02 | 0.10 | 0.873 | .42730E+00 |
| 0.00 | -0.12 | 0.26 | 1.9 | 0.521E+02 | 0.10 | 0.867 | .43499E+00 |
| 0.00 | -0.12 | 0.26 | 1.9 | 0.517E+02 | 0.10 | 0.861 | .44274E+00 |
| 0.00 | -0.12 | 0.25 | 1.9 | 0.513E+02 | 0.10 | 0.854 | .45054E+00 |
| 0.00 | -0.12 | 0.24 | 2.0 | 0.509E+02 | 0.10 | 0.848 | .45840E+00 |
| 0.00 | -0.12 | 0.24 | 2.0 | 0.506E+02 | 0.10 | 0.842 | .46632E+00 |
| 0.00 | -0.12 | 0.23 | 2.0 | 0.502E+02 | 0.11 | 0.837 | .47429E+00 |
| 0.00 | -0.12 | 0.22 | 2.0 | 0.499E+02 | 0.11 | 0.831 | .48231E+00 |
| 0.00 | -0.12 | 0.22 | 2.0 | 0.496E+02 | 0.11 | 0.825 | .49039E+00 |
| 0.00 | -0.12 | 0.21 | 2.0 | 0.492E+02 | 0.11 | 0.820 | .49853E+00 |
| 0.00 | -0.12 | 0.20 | 2.0 | 0.489E+02 | 0.11 | 0.814 | .50672E+00 |
| 0.00 | -0.13 | 0.20 | 2.1 | 0.486E+02 | 0.11 | 0.808 | .51497E+00 |
| 0.00 | -0.13 | 0.19 | 2.1 | 0.482E+02 | 0.11 | 0.803 | .52327E+00 |
| 0.00 | -0.13 | 0.18 | 2.1 | 0.479E+02 | 0.11 | 0.798 | .53163E+00 |
| 0.00 | -0.13 | 0.18 | 2.1 | 0.476E+02 | 0.11 | 0.793 | .54005E+00 |
| 0.00 | -0.13 | 0.17 | 2.1 | 0.473E+02 | 0.11 | 0.787 | .54852E+00 |
| 0.00 | -0.13 | 0.16 | 2.1 | 0.470E+02 | 0.11 | 0.782 | .55704E+00 |
| 0.00 | -0.13 | 0.16 | 2.1 | 0.467E+02 | 0.11 | 0.777 | .56563E+00 |
| 0.00 | -0.13 | 0.15 | 2.2 | 0.464E+02 | 0.11 | 0.772 | .57426E+00 |
| 0.00 | -0.13 | 0.14 | 2.2 | 0.461E+02 | 0.12 | 0.767 | .58296E+00 |
| 0.00 | -0.13 | 0.14 | 2.2 | 0.458E+02 | 0.12 | 0.762 | .59170E+00 |
| 0.00 | -0.13 | 0.13 | 2.2 | 0.455E+02 | 0.12 | 0.758 | .60051E+00 |
| 0.00 | -0.13 | 0.12 | 2.2 | 0.452E+02 | 0.12 | 0.753 | .60937E+00 |
| 0.00 | -0.14 | 0.12 | 2.2 | 0.451E+02 | 0.12 | 0.750 | .61382E+00 |

Cumulative travel time = 0.6138 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | -0.14 | 0.12 | 2.2 | 0.451E+02 | 0.12 | .61382E+00 |

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.12 | -28.64 | 1.22 | 2.2 | 0.451E+02 | 0.00 | 0.00 | 1.22 | 1.22 | .61382E+00 |
| 0.02 | -28.64 | 1.22 | 2.2 | 0.451E+02 | 1.22 | 2.64 | 1.22 | 0.00 | .12597E+02 |
| 0.15 | -28.64 | 1.22 | 2.3 | 0.440E+02 | 1.22 | 3.73 | 1.22 | 0.00 | .11327E+03 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.28 | -28.64 | 1.22 | 2.4 | 0.418E+02 | 1.22 | 4.57 | 1.22 | 0.00 | .21394E+03 |
| 0.42 | -28.64 | 1.22 | 2.6 | 0.392E+02 | 1.22 | 5.28 | 1.22 | 0.00 | .31461E+03 |
| 0.55 | -28.64 | 1.22 | 2.7 | 0.368E+02 | 1.22 | 5.90 | 1.22 | 0.00 | .41528E+03 |
| 0.69 | -28.64 | 1.22 | 2.9 | 0.350E+02 | 1.22 | 6.46 | 1.22 | 0.00 | .51595E+03 |
| 0.82 | -28.64 | 1.22 | 3.0 | 0.338E+02 | 1.22 | 6.98 | 1.22 | 0.00 | .61662E+03 |
| 0.95 | -28.64 | 1.22 | 3.0 | 0.330E+02 | 1.22 | 7.46 | 1.22 | 0.00 | .71729E+03 |
| 1.09 | -28.64 | 1.22 | 3.1 | 0.326E+02 | 1.22 | 7.92 | 1.22 | 0.00 | .81796E+03 |
| 1.22 | -28.64 | 1.22 | 3.1 | 0.322E+02 | 1.22 | 8.35 | 1.22 | 0.00 | .91863E+03 |

Cumulative travel time = 918.6309 sec ( 0.26 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.536E-03 m^2/s
Horizontal diffusivity (initial value) = 0.134E-02 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.22 | -28.64 | 1.22 | 3.1 | 0.322E+02 | 1.22 | 8.35 | 1.22 | 0.00 | .91863E+03 |
| 3.81 | -28.64 | 1.22 | 3.3 | 0.306E+02 | 1.22 | 8.79 | 1.22 | 0.00 | .27172E+04 |
| 6.39 | -28.64 | 1.22 | 3.4 | 0.292E+02 | 1.22 | 9.21 | 1.22 | 0.00 | .45157E+04 |
| 8.98 | -28.64 | 1.22 | 3.6 | 0.280E+02 | 1.22 | 9.61 | 1.22 | 0.00 | .63142E+04 |
| 11.57 | -28.64 | 1.22 | 3.7 | 0.269E+02 | 1.22 | 10.00 | 1.22 | 0.00 | .81128E+04 |
| 14.16 | -28.64 | 1.22 | 3.9 | 0.259E+02 | 1.22 | 10.37 | 1.22 | 0.00 | .99113E+04 |
| 16.74 | -28.64 | 1.22 | 4.0 | 0.250E+02 | 1.22 | 10.73 | 1.22 | 0.00 | .11710E+05 |
| 19.33 | -28.64 | 1.22 | 4.1 | 0.243E+02 | 1.22 | 11.08 | 1.22 | 0.00 | .13508E+05 |
| 21.92 | -28.64 | 1.22 | 4.2 | 0.235E+02 | 1.22 | 11.41 | 1.22 | 0.00 | .15307E+05 |
| 24.51 | -28.64 | 1.22 | 4.4 | 0.229E+02 | 1.22 | 11.74 | 1.22 | 0.00 | .17105E+05 |
| 27.09 | -28.64 | 1.22 | 4.5 | 0.223E+02 | 1.22 | 12.06 | 1.22 | 0.00 | .18904E+05 |
| 29.68 | -28.64 | 1.22 | 4.6 | 0.217E+02 | 1.22 | 12.37 | 1.22 | 0.00 | .20702E+05 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 32.27 | -28.64 | 1.22 | 4.7 | 0.212E+02 | 1.22 | 12.67 | 1.22 | 0.00 | .22501E+05 |
| 34.85 | -28.64 | 1.22 | 4.8 | 0.207E+02 | 1.22 | 12.97 | 1.22 | 0.00 | .24300E+05 |
| 37.44 | -28.64 | 1.22 | 4.9 | 0.203E+02 | 1.22 | 13.26 | 1.22 | 0.00 | .26098E+05 |
| 40.03 | -28.64 | 1.22 | 5.0 | 0.198E+02 | 1.22 | 13.54 | 1.22 | 0.00 | .27897E+05 |
| 42.62 | -28.64 | 1.22 | 5.1 | 0.194E+02 | 1.22 | 13.81 | 1.22 | 0.00 | .29695E+05 |
| 45.20 | -28.64 | 1.22 | 5.2 | 0.191E+02 | 1.22 | 14.09 | 1.22 | 0.00 | .31494E+05 |
| 47.79 | -28.64 | 1.22 | 5.3 | 0.187E+02 | 1.22 | 14.35 | 1.22 | 0.00 | .33292E+05 |
| 50.38 | -28.64 | 1.22 | 5.4 | 0.184E+02 | 1.22 | 14.61 | 1.22 | 0.00 | .35091E+05 |
| 52.97 | -28.64 | 1.22 | 5.5 | 0.181E+02 | 1.22 | 14.87 | 1.22 | 0.00 | .36889E+05 |
| 55.55 | -28.64 | 1.22 | 5.6 | 0.178E+02 | 1.22 | 15.12 | 1.22 | 0.00 | .38688E+05 |
| 58.14 | -28.64 | 1.22 | 5.7 | 0.175E+02 | 1.22 | 15.37 | 1.22 | 0.00 | .40486E+05 |
| 60.73 | -28.64 | 1.22 | 5.8 | 0.172E+02 | 1.22 | 15.62 | 1.22 | 0.00 | .42285E+05 |
| 63.31 | -28.64 | 1.22 | 5.9 | 0.169E+02 | 1.22 | 15.86 | 1.22 | 0.00 | .44083E+05 |
| 65.90 | -28.64 | 1.22 | 6.0 | 0.167E+02 | 1.22 | 16.09 | 1.22 | 0.00 | .45882E+05 |
| 68.49 | -28.64 | 1.22 | 6.1 | 0.165E+02 | 1.22 | 16.33 | 1.22 | 0.00 | .47680E+05 |
| 71.08 | -28.64 | 1.22 | 6.2 | 0.162E+02 | 1.22 | 16.56 | 1.22 | 0.00 | .49479E+05 |
| 73.66 | -28.64 | 1.22 | 6.2 | 0.160E+02 | 1.22 | 16.79 | 1.22 | 0.00 | .51278E+05 |
| 76.25 | -28.64 | 1.22 | 6.3 | 0.158E+02 | 1.22 | 17.01 | 1.22 | 0.00 | .53076E+05 |
| 78.84 | -28.64 | 1.22 | 6.4 | 0.156E+02 | 1.22 | 17.23 | 1.22 | 0.00 | .54875E+05 |
| 81.43 | -28.64 | 1.22 | 6.5 | 0.154E+02 | 1.22 | 17.45 | 1.22 | 0.00 | .56673E+05 |
| 84.01 | -28.64 | 1.22 | 6.6 | 0.152E+02 | 1.22 | 17.67 | 1.22 | 0.00 | .58472E+05 |
| 86.60 | -28.64 | 1.22 | 6.7 | 0.150E+02 | 1.22 | 17.88 | 1.22 | 0.00 | .60270E+05 |
| 89.19 | -28.64 | 1.22 | 6.7 | 0.149E+02 | 1.22 | 18.09 | 1.22 | 0.00 | .62069E+05 |
| 91.77 | -28.64 | 1.22 | 6.8 | 0.147E+02 | 1.22 | 18.30 | 1.22 | 0.00 | .63867E+05 |
| 94.36 | -28.64 | 1.22 | 6.9 | 0.145E+02 | 1.22 | 18.50 | 1.22 | 0.00 | .65666E+05 |
| 96.95 | -28.64 | 1.22 | 7.0 | 0.144E+02 | 1.22 | 18.71 | 1.22 | 0.00 | .67464E+05 |
| 99.54 | -28.64 | 1.22 | 7.0 | 0.142E+02 | 1.22 | 18.91 | 1.22 | 0.00 | .69263E+05 |
| 102.12 | -28.64 | 1.22 | 7.1 | 0.141E+02 | 1.22 | 19.11 | 1.22 | 0.00 | .71061E+05 |
| 104.71 | -28.64 | 1.22 | 7.2 | 0.139E+02 | 1.22 | 19.30 | 1.22 | 0.00 | .72860E+05 |
| 107.30 | -28.64 | 1.22 | 7.3 | 0.138E+02 | 1.22 | 19.50 | 1.22 | 0.00 | .74658E+05 |
| 109.89 | -28.64 | 1.22 | 7.3 | 0.136E+02 | 1.22 | 19.69 | 1.22 | 0.00 | .76457E+05 |
| 112.47 | -28.64 | 1.22 | 7.4 | 0.135E+02 | 1.22 | 19.88 | 1.22 | 0.00 | .78256E+05 |
| 115.06 | -28.64 | 1.22 | 7.5 | 0.134E+02 | 1.22 | 20.07 | 1.22 | 0.00 | .80054E+05 |
| 117.65 | -28.64 | 1.22 | 7.5 | 0.133E+02 | 1.22 | 20.26 | 1.22 | 0.00 | .81853E+05 |
| 120.23 | -28.64 | 1.22 | 7.6 | 0.131E+02 | 1.22 | 20.45 | 1.22 | 0.00 | .83651E+05 |
| 122.82 | -28.64 | 1.22 | 7.7 | 0.130E+02 | 1.22 | 20.63 | 1.22 | 0.00 | .85450E+05 |
| 125.41 | -28.64 | 1.22 | 7.7 | 0.129E+02 | 1.22 | 20.82 | 1.22 | 0.00 | .87248E+05 |
| 128.00 | -28.64 | 1.22 | 7.8 | 0.128E+02 | 1.22 | 21.00 | 1.22 | 0.00 | .89047E+05 |
| 130.58 | -28.64 | 1.22 | 7.9 | 0.127E+02 | 1.22 | 21.18 | 1.22 | 0.00 | .90845E+05 |
| 133.17 | -28.64 | 1.22 | 7.9 | 0.126E+02 | 1.22 | 21.35 | 1.22 | 0.00 | .92644E+05 |
| 135.76 | -28.64 | 1.22 | 8.0 | 0.125E+02 | 1.22 | 21.53 | 1.22 | 0.00 | .94442E+05 |
| 138.35 | -28.64 | 1.22 | 8.1 | 0.124E+02 | 1.22 | 21.71 | 1.22 | 0.00 | .96241E+05 |
| 140.93 | -28.64 | 1.22 | 8.1 | 0.123E+02 | 1.22 | 21.88 | 1.22 | 0.00 | .98039E+05 |
| 143.52 | -28.64 | 1.22 | 8.2 | 0.122E+02 | 1.22 | 22.05 | 1.22 | 0.00 | .99838E+05 |
| 146.11 | -28.64 | 1.22 | 8.3 | 0.121E+02 | 1.22 | 22.22 | 1.22 | 0.00 | .10164E+06 |
| 148.69 | -28.64 | 1.22 | 8.3 | 0.120E+02 | 1.22 | 22.39 | 1.22 | 0.00 | .10343E+06 |
| 151.28 | -28.64 | 1.22 | 8.4 | 0.119E+02 | 1.22 | 22.56 | 1.22 | 0.00 | .10523E+06 |
| 153.87 | -28.64 | 1.22 | 8.5 | 0.118E+02 | 1.22 | 22.73 | 1.22 | 0.00 | .10703E+06 |
| 156.46 | -28.64 | 1.22 | 8.5 | 0.117E+02 | 1.22 | 22.89 | 1.22 | 0.00 | .10883E+06 |
| 159.04 | -28.64 | 1.22 | 8.6 | 0.117E+02 | 1.22 | 23.06 | 1.22 | 0.00 | .11063E+06 |
| 161.63 | -28.64 | 1.22 | 8.6 | 0.116E+02 | 1.22 | 23.22 | 1.22 | 0.00 | .11243E+06 |
| 164.22 | -28.64 | 1.22 | 8.7 | 0.115E+02 | 1.22 | 23.39 | 1.22 | 0.00 | .11423E+06 |
| 166.81 | -28.64 | 1.22 | 8.8 | 0.114E+02 | 1.22 | 23.55 | 1.22 | 0.00 | .11602E+06 |
| 169.39 | -28.64 | 1.22 | 8.8 | 0.113E+02 | 1.22 | 23.71 | 1.22 | 0.00 | .11782E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 171.98 | -28.64 | 1.22 | 8.9 | 0.113E+02 | 1.22 | 23.87 | 1.22 | 0.00 | .11962E+06 |
| 174.57 | -28.64 | 1.22 | 8.9 | 0.112E+02 | 1.22 | 24.02 | 1.22 | 0.00 | .12142E+06 |
| 177.15 | -28.64 | 1.22 | 9.0 | 0.111E+02 | 1.22 | 24.18 | 1.22 | 0.00 | .12322E+06 |
| 179.74 | -28.64 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 24.34 | 1.22 | 0.00 | .12502E+06 |
| 182.33 | -28.64 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 24.49 | 1.22 | 0.00 | .12682E+06 |
| 184.92 | -28.64 | 1.22 | 9.2 | 0.109E+02 | 1.22 | 24.65 | 1.22 | 0.00 | .12861E+06 |
| 187.50 | -28.64 | 1.22 | 9.2 | 0.108E+02 | 1.22 | 24.80 | 1.22 | 0.00 | .13041E+06 |
| 190.09 | -28.64 | 1.22 | 9.3 | 0.108E+02 | 1.22 | 24.95 | 1.22 | 0.00 | .13221E+06 |
| 192.68 | -28.64 | 1.22 | 9.3 | 0.107E+02 | 1.22 | 25.10 | 1.22 | 0.00 | .13401E+06 |
| 195.27 | -28.64 | 1.22 | 9.4 | 0.106E+02 | 1.22 | 25.25 | 1.22 | 0.00 | .13581E+06 |
| 197.85 | -28.64 | 1.22 | 9.5 | 0.106E+02 | 1.22 | 25.40 | 1.22 | 0.00 | .13761E+06 |
| 200.44 | -28.64 | 1.22 | 9.5 | 0.105E+02 | 1.22 | 25.55 | 1.22 | 0.00 | .13941E+06 |
| 203.03 | -28.64 | 1.22 | 9.6 | 0.105E+02 | 1.22 | 25.70 | 1.22 | 0.00 | .14120E+06 |
| 205.61 | -28.64 | 1.22 | 9.6 | 0.104E+02 | 1.22 | 25.85 | 1.22 | 0.00 | .14300E+06 |
| 208.20 | -28.64 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 25.99 | 1.22 | 0.00 | .14480E+06 |
| 210.79 | -28.64 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 26.14 | 1.22 | 0.00 | .14660E+06 |
| 213.38 | -28.64 | 1.22 | 9.8 | 0.102E+02 | 1.22 | 26.28 | 1.22 | 0.00 | .14840E+06 |
| 215.96 | -28.64 | 1.22 | 9.8 | 0.102E+02 | 1.22 | 26.43 | 1.22 | 0.00 | .15020E+06 |
| 218.55 | -28.64 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 26.57 | 1.22 | 0.00 | .15200E+06 |
| 221.14 | -28.64 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 26.71 | 1.22 | 0.00 | .15379E+06 |
| 223.72 | -28.64 | 1.22 | 10.0 | 0.100E+02 | 1.22 | 26.85 | 1.22 | 0.00 | .15559E+06 |
| 226.31 | -28.64 | 1.22 | 10.0 | 0.995E+01 | 1.22 | 26.99 | 1.22 | 0.00 | .15739E+06 |
| 228.90 | -28.64 | 1.22 | 10.1 | 0.990E+01 | 1.22 | 27.13 | 1.22 | 0.00 | .15919E+06 |
| 231.49 | -28.64 | 1.22 | 10.2 | 0.985E+01 | 1.22 | 27.27 | 1.22 | 0.00 | .16099E+06 |
| 234.07 | -28.64 | 1.22 | 10.2 | 0.980E+01 | 1.22 | 27.41 | 1.22 | 0.00 | .16279E+06 |
| 236.66 | -28.64 | 1.22 | 10.3 | 0.975E+01 | 1.22 | 27.55 | 1.22 | 0.00 | .16459E+06 |
| 239.25 | -28.64 | 1.22 | 10.3 | 0.970E+01 | 1.22 | 27.69 | 1.22 | 0.00 | .16638E+06 |
| 241.84 | -28.64 | 1.22 | 10.4 | 0.966E+01 | 1.22 | 27.82 | 1.22 | 0.00 | .16818E+06 |
| 244.42 | -28.64 | 1.22 | 10.4 | 0.961E+01 | 1.22 | 27.96 | 1.22 | 0.00 | .16998E+06 |
| 247.01 | -28.64 | 1.22 | 10.5 | 0.956E+01 | 1.22 | 28.09 | 1.22 | 0.00 | .17178E+06 |
| 249.60 | -28.64 | 1.22 | 10.5 | 0.952E+01 | 1.22 | 28.23 | 1.22 | 0.00 | .17358E+06 |
| 252.18 | -28.64 | 1.22 | 10.6 | 0.947E+01 | 1.22 | 28.36 | 1.22 | 0.00 | .17538E+06 |
| 254.77 | -28.64 | 1.22 | 10.6 | 0.943E+01 | 1.22 | 28.50 | 1.22 | 0.00 | .17717E+06 |
| 257.36 | -28.64 | 1.22 | 10.7 | 0.938E+01 | 1.22 | 28.63 | 1.22 | 0.00 | .17897E+06 |
| 259.95 | -28.64 | 1.22 | 10.7 | 0.934E+01 | 1.22 | 28.76 | 1.22 | 0.00 | .18077E+06 |

Cumulative travel time = 180771.7500 sec ( 50.21 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 259.95 | 0.12 | 1.22 | 10.7 | 0.934E+01 | 1.22 | 57.52 | 1.22 | 0.00 | .18077E+06 |
| 327.35 | 0.12 | 1.22 | 11.0 | 0.907E+01 | 1.22 | 59.21 | 1.22 | 0.00 | .22763E+06 |
| 394.75 | 0.12 | 1.22 | 11.3 | 0.883E+01 | 1.22 | 60.86 | 1.22 | 0.00 | .27448E+06 |
| 462.15 | 0.12 | 1.22 | 11.6 | 0.860E+01 | 1.22 | 62.46 | 1.22 | 0.00 | .32133E+06 |

529.55 0.12 1.22 11.9 0.839E+01 1.22 64.02 1.22 0.00 .36819E+06
The passive diffusion plume becomes LATERALLY FULLY MIXED over the channel
width during the current prediction interval.
The x-coordinate of bank attachment is 555.17 m.
596.95 0.12 1.22 12.2 0.820E+01 1.22 64.60 1.22 0.00 .41504E+06
Effluent is FULLY MIXED over the entire channel cross-section.
Except for possible far-field decay or reaction processes, there are
NO FURTHER CHANGES with downstream direction.
664.35 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .46189E+06
731.75 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .50875E+06
799.15 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .55560E+06
866.55 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .60245E+06
933.95 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .64931E+06
1001.35 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .69616E+06
1068.75 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .74301E+06
1136.15 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .78987E+06
1203.55 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .83672E+06
1270.95 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .88357E+06
1338.35 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .93043E+06
1405.76 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .97728E+06
1473.16 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .10241E+07
1540.56 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .10710E+07
1607.96 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .11178E+07
1675.36 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .11647E+07
1742.76 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .12115E+07
1810.16 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .12584E+07
1877.56 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .13053E+07
1944.96 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .13521E+07
2012.36 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .13990E+07
2079.76 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .14458E+07
2147.16 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .14927E+07
2214.56 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .15395E+07
2281.96 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .15864E+07
2349.36 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .16332E+07
2416.76 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .16801E+07
2484.16 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .17269E+07
2551.57 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .17738E+07
2618.97 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .18206E+07
2686.37 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .18675E+07
2753.77 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .19143E+07
2821.17 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .19612E+07
2888.57 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .20081E+07
2955.97 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .20549E+07
3023.37 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .21018E+07
3090.77 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .21486E+07
3158.17 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .21955E+07
3225.57 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .22423E+07
3292.97 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .22892E+07
3360.37 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .23360E+07
3427.77 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .23829E+07
3495.17 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .24297E+07
3562.57 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .24766E+07
3629.98 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .25234E+07
3697.38 0.12 1.22 12.0 0.832E+01 1.22 64.60 1.22 0.00 .25703E+07

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3764.78 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .26171E+07 |
| 3832.18 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .26640E+07 |
| 3899.58 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .27109E+07 |
| 3966.98 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .27577E+07 |
| 4034.38 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .28046E+07 |
| 4101.78 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .28514E+07 |
| 4169.18 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .28983E+07 |
| 4236.58 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .29451E+07 |
| 4303.98 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .29920E+07 |
| 4371.38 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .30388E+07 |
| 4438.78 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .30857E+07 |
| 4506.18 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .31325E+07 |
| 4573.58 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .31794E+07 |
| 4640.98 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .32262E+07 |
| 4708.38 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .32731E+07 |
| 4775.78 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .33199E+07 |
| 4843.18 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .33668E+07 |
| 4910.58 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .34137E+07 |
| 4977.98 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .34605E+07 |
| 5045.39 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .35074E+07 |
| 5112.79 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .35542E+07 |
| 5180.19 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .36011E+07 |
| 5247.59 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .36479E+07 |
| 5314.99 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .36948E+07 |
| 5382.39 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .37416E+07 |
| 5449.79 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .37885E+07 |
| 5517.19 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .38353E+07 |
| 5584.59 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .38822E+07 |
| 5651.99 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .39290E+07 |
| 5719.39 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .39759E+07 |
| 5786.79 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .40227E+07 |
| 5854.19 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .40696E+07 |
| 5921.59 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .41165E+07 |
| 5988.99 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .41633E+07 |
| 6056.39 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .42102E+07 |
| 6123.79 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .42570E+07 |
| 6191.19 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .43039E+07 |
| 6258.59 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .43507E+07 |
| 6325.99 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .43976E+07 |
| 6393.39 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .44444E+07 |
| 6460.79 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .44913E+07 |
| 6528.19 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .45381E+07 |
| 6595.59 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .45850E+07 |
| 6662.99 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .46318E+07 |
| 6730.40 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .46787E+07 |
| 6797.80 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .47255E+07 |
| 6865.20 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .47724E+07 |
| 6932.60 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .48193E+07 |
| 7000.00 | 0.12 | 1.22 | 12.0 | 0.832E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .48661E+07 |

Cumulative travel time = 4866110.0000 sec ( 1351.70 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory

distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges End of Prediction File
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX2 PREDICTION FILE:
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                      CORMIX MIXING ZONE EXPERT SYSTEM
              Subsystem CORMIX2: Multiport Diffuser Discharges
                            CORMIX Version 12.0GTD
                    HYDRO2 Version 12.0.0.0 December 2020
---------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro Southeast Area
 Design case:       Year 21
 FILE NAME:         C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y21-SE_Pond.prd
 Time stamp:        04/06/2022--22:02:33

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =     24.60  AS    =      0.61  QA    =      0.13  ICHREG= 2
 HA    =      0.02  HD    =      0.02
 UA    =      0.212 F     =      0.431 USTAR =0.4924E-01
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  LEFT      DISTB =      0.00  YB1   =      0.10  YB2   =      0.10
 LD    =      1.00  NOPEN =  100       NRISER=  100       SPAC  =      0.01    NPPERR =    1
 D0    =      0.016 A0    =      0.000 H0    =      0.02  SUB0  =      0.00
 D0INP =      0.016 CR0   =      1.000 B0    =0.2117E-01
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =      0.00  THETA =      0.00  SIGMA =    270.00  BETA  =     90.00
 U0    =      0.178 Q0    =      0.004 Q0A   =0.3800E-02
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

DIFFUSER PARAMETERS WITH IMAGE EFFECTS (metric units)
 The bank/shore proximity effect is accounted for by the following flow
 variables and definitions of length scales and parameters.
 LD    =      1.00  Q0    =      0.008 Q0A    =0.3800E-02

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1520E-01         SIGNJ0=      1.0
 m0 =U0^2*B0 =0.6686E-03   j0 =U0*GP0*B0 =0.0000E+00   (based on slot width B0)
 m0 =U0*q0   =0.2701E-02   j0 =q0*GP0    =0.0000E+00   (based on volume flux q0)
 Associated 2-d length scales (meters)
 lQ=B  =      0.086 lM    =  99999.00  lm    =      0.03
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.7600E-02  M0    =0.6686E-03  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =      0.01  LM    =  99999.00  Lm    =      0.17  Lb    =      0.00
```

```
                                Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      0.84  PL    =  140.00
 (slot)            (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.178 D0    =      0.016 A0    =      0.000 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      0.84
 (slot)            (riser group)

FLOW CLASSIFICATION
 222222222222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    IMPU9        2
 2  Applicable layer depth HS =     0.02        2
 2  Limiting Dilution S=QA/Q0 + 1=    17.92     2
 222222222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =    500.00  XMAX  =    500.00

X-Y-Z COORDINATE SYSTEM:
  because of bank/shore proximity, the ORIGIN is located directly
   at the LEFT  bank/shore.
  the bank/shore acts as a plane of symmetry for the predicted
  plume geometry.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y       Z        S       C       BV       BH       Uc        TT
     0.00     0.00    0.02     1.0 0.100E+03   0.02     0.50     0.178   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
```

The diffuser near-field dilution is REDUCED because of the PROXIMITY
of the shoreline.
Because of the strong ambient current the diffuser plume of this crossflowing
discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
layer depth. Full mixing is achieved at a downstream distance of about
2.5 times (for alternating designs) to 5 times(for unidirectional and staged designsd) the layer depth.

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, measured horizontally in Y-direction
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.02 | 1.0 | 0.100E+03 | 0.02 | 0.50 | .00000E+00 |
| 0.00 | -0.01 | 0.02 | 1.0 | 0.960E+02 | 0.02 | 0.51 | .58069E-02 |
| 0.00 | -0.01 | 0.02 | 1.1 | 0.945E+02 | 0.02 | 0.52 | .11614E-01 |
| 0.00 | -0.02 | 0.02 | 1.1 | 0.933E+02 | 0.02 | 0.53 | .17421E-01 |
| 0.00 | -0.02 | 0.02 | 1.1 | 0.923E+02 | 0.02 | 0.54 | .23228E-01 |
| 0.01 | -0.03 | 0.02 | 1.1 | 0.915E+02 | 0.02 | 0.55 | .29035E-01 |
| 0.01 | -0.04 | 0.02 | 1.1 | 0.908E+02 | 0.02 | 0.56 | .34841E-01 |
| 0.01 | -0.04 | 0.02 | 1.1 | 0.901E+02 | 0.02 | 0.57 | .40648E-01 |
| 0.01 | -0.05 | 0.02 | 1.1 | 0.895E+02 | 0.02 | 0.58 | .46455E-01 |
| 0.01 | -0.05 | 0.02 | 1.1 | 0.889E+02 | 0.02 | 0.59 | .52262E-01 |
| 0.01 | -0.06 | 0.02 | 1.1 | 0.884E+02 | 0.02 | 0.60 | .58069E-01 |
| 0.01 | -0.07 | 0.02 | 1.1 | 0.879E+02 | 0.02 | 0.60 | .63876E-01 |
| 0.01 | -0.07 | 0.02 | 1.1 | 0.875E+02 | 0.02 | 0.61 | .69683E-01 |
| 0.02 | -0.08 | 0.02 | 1.1 | 0.870E+02 | 0.02 | 0.62 | .75490E-01 |
| 0.02 | -0.09 | 0.02 | 1.2 | 0.866E+02 | 0.02 | 0.63 | .81297E-01 |
| 0.02 | -0.09 | 0.02 | 1.2 | 0.862E+02 | 0.02 | 0.64 | .87104E-01 |
| 0.02 | -0.10 | 0.02 | 1.2 | 0.858E+02 | 0.02 | 0.65 | .92911E-01 |
| 0.02 | -0.10 | 0.02 | 1.2 | 0.854E+02 | 0.02 | 0.66 | .98718E-01 |
| 0.02 | -0.11 | 0.02 | 1.2 | 0.851E+02 | 0.02 | 0.67 | .10452E+00 |
| 0.02 | -0.12 | 0.02 | 1.2 | 0.847E+02 | 0.02 | 0.68 | .11033E+00 |
| 0.02 | -0.12 | 0.02 | 1.2 | 0.844E+02 | 0.02 | 0.69 | .11614E+00 |
| 0.03 | -0.13 | 0.02 | 1.2 | 0.840E+02 | 0.02 | 0.70 | .12195E+00 |
| 0.03 | -0.13 | 0.02 | 1.2 | 0.837E+02 | 0.02 | 0.71 | .12775E+00 |
| 0.03 | -0.14 | 0.02 | 1.2 | 0.834E+02 | 0.02 | 0.72 | .13356E+00 |
| 0.03 | -0.15 | 0.02 | 1.2 | 0.831E+02 | 0.02 | 0.73 | .13937E+00 |
| 0.03 | -0.15 | 0.02 | 1.2 | 0.828E+02 | 0.02 | 0.74 | .14517E+00 |
| 0.03 | -0.16 | 0.02 | 1.2 | 0.826E+02 | 0.02 | 0.75 | .15098E+00 |
| 0.03 | -0.16 | 0.02 | 1.2 | 0.823E+02 | 0.02 | 0.76 | .15679E+00 |
| 0.03 | -0.17 | 0.02 | 1.2 | 0.820E+02 | 0.02 | 0.77 | .16259E+00 |
| 0.04 | -0.18 | 0.02 | 1.2 | 0.818E+02 | 0.02 | 0.78 | .16840E+00 |
| 0.04 | -0.18 | 0.02 | 1.2 | 0.815E+02 | 0.02 | 0.79 | .17421E+00 |
| 0.04 | -0.19 | 0.02 | 1.2 | 0.813E+02 | 0.02 | 0.80 | .18001E+00 |
| 0.04 | -0.19 | 0.02 | 1.2 | 0.810E+02 | 0.02 | 0.81 | .18582E+00 |
| 0.04 | -0.20 | 0.02 | 1.2 | 0.808E+02 | 0.02 | 0.81 | .19163E+00 |
| 0.04 | -0.21 | 0.02 | 1.2 | 0.805E+02 | 0.02 | 0.82 | .19744E+00 |
| 0.04 | -0.21 | 0.02 | 1.2 | 0.803E+02 | 0.02 | 0.83 | .20324E+00 |
| 0.04 | -0.22 | 0.02 | 1.2 | 0.801E+02 | 0.02 | 0.84 | .20905E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | -0.23 | 0.02 | 1.3 | 0.799E+02 | 0.02 | 0.85 | .21486E+00 |
| 0.05 | -0.23 | 0.02 | 1.3 | 0.797E+02 | 0.02 | 0.86 | .22066E+00 |
| 0.05 | -0.24 | 0.02 | 1.3 | 0.794E+02 | 0.02 | 0.87 | .22647E+00 |
| 0.05 | -0.24 | 0.02 | 1.3 | 0.792E+02 | 0.02 | 0.88 | .23228E+00 |
| 0.05 | -0.25 | 0.02 | 1.3 | 0.790E+02 | 0.02 | 0.89 | .23808E+00 |
| 0.05 | -0.26 | 0.02 | 1.3 | 0.788E+02 | 0.02 | 0.90 | .24389E+00 |
| 0.05 | -0.26 | 0.02 | 1.3 | 0.786E+02 | 0.02 | 0.91 | .24970E+00 |
| 0.05 | -0.27 | 0.02 | 1.3 | 0.784E+02 | 0.02 | 0.92 | .25550E+00 |
| 0.06 | -0.27 | 0.02 | 1.3 | 0.783E+02 | 0.02 | 0.93 | .26131E+00 |
| 0.06 | -0.28 | 0.02 | 1.3 | 0.781E+02 | 0.02 | 0.94 | .26712E+00 |
| 0.06 | -0.29 | 0.02 | 1.3 | 0.779E+02 | 0.02 | 0.95 | .27292E+00 |
| 0.06 | -0.29 | 0.02 | 1.3 | 0.777E+02 | 0.02 | 0.96 | .27873E+00 |
| 0.06 | -0.30 | 0.02 | 1.3 | 0.775E+02 | 0.02 | 0.97 | .28454E+00 |
| 0.06 | -0.30 | 0.02 | 1.3 | 0.773E+02 | 0.02 | 0.98 | .29035E+00 |
| 0.06 | -0.31 | 0.02 | 1.3 | 0.772E+02 | 0.02 | 0.99 | .29615E+00 |
| 0.06 | -0.32 | 0.02 | 1.3 | 0.770E+02 | 0.02 | 1.00 | .30196E+00 |
| 0.07 | -0.32 | 0.02 | 1.3 | 0.768E+02 | 0.02 | 1.01 | .30777E+00 |
| 0.07 | -0.33 | 0.02 | 1.3 | 0.767E+02 | 0.02 | 1.02 | .31357E+00 |
| 0.07 | -0.33 | 0.02 | 1.3 | 0.765E+02 | 0.02 | 1.02 | .31938E+00 |
| 0.07 | -0.34 | 0.02 | 1.3 | 0.763E+02 | 0.02 | 1.03 | .32519E+00 |
| 0.07 | -0.35 | 0.02 | 1.3 | 0.762E+02 | 0.02 | 1.04 | .33099E+00 |
| 0.07 | -0.35 | 0.02 | 1.3 | 0.760E+02 | 0.02 | 1.05 | .33680E+00 |
| 0.07 | -0.36 | 0.02 | 1.3 | 0.759E+02 | 0.02 | 1.06 | .34261E+00 |
| 0.07 | -0.37 | 0.02 | 1.3 | 0.757E+02 | 0.02 | 1.07 | .34841E+00 |
| 0.08 | -0.37 | 0.02 | 1.3 | 0.756E+02 | 0.02 | 1.08 | .35422E+00 |
| 0.08 | -0.38 | 0.02 | 1.3 | 0.754E+02 | 0.02 | 1.09 | .36003E+00 |
| 0.08 | -0.38 | 0.02 | 1.3 | 0.753E+02 | 0.02 | 1.10 | .36584E+00 |
| 0.08 | -0.39 | 0.02 | 1.3 | 0.751E+02 | 0.02 | 1.11 | .37164E+00 |
| 0.08 | -0.40 | 0.02 | 1.3 | 0.750E+02 | 0.02 | 1.12 | .37745E+00 |
| 0.08 | -0.40 | 0.02 | 1.3 | 0.748E+02 | 0.02 | 1.13 | .38326E+00 |
| 0.08 | -0.41 | 0.02 | 1.3 | 0.747E+02 | 0.02 | 1.14 | .38906E+00 |
| 0.08 | -0.41 | 0.02 | 1.3 | 0.745E+02 | 0.02 | 1.15 | .39487E+00 |
| 0.09 | -0.42 | 0.02 | 1.3 | 0.744E+02 | 0.02 | 1.16 | .40068E+00 |
| 0.09 | -0.43 | 0.02 | 1.3 | 0.743E+02 | 0.02 | 1.17 | .40648E+00 |
| 0.09 | -0.43 | 0.02 | 1.3 | 0.741E+02 | 0.02 | 1.18 | .41229E+00 |
| 0.09 | -0.44 | 0.02 | 1.4 | 0.740E+02 | 0.02 | 1.19 | .41810E+00 |
| 0.09 | -0.44 | 0.02 | 1.4 | 0.739E+02 | 0.02 | 1.20 | .42390E+00 |
| 0.09 | -0.45 | 0.02 | 1.4 | 0.737E+02 | 0.02 | 1.21 | .42971E+00 |
| 0.09 | -0.46 | 0.02 | 1.4 | 0.736E+02 | 0.02 | 1.22 | .43552E+00 |
| 0.09 | -0.46 | 0.02 | 1.4 | 0.735E+02 | 0.02 | 1.22 | .44133E+00 |
| 0.09 | -0.47 | 0.02 | 1.4 | 0.733E+02 | 0.02 | 1.23 | .44713E+00 |
| 0.10 | -0.47 | 0.02 | 1.4 | 0.732E+02 | 0.02 | 1.24 | .45294E+00 |
| 0.10 | -0.48 | 0.02 | 1.4 | 0.731E+02 | 0.02 | 1.25 | .45875E+00 |
| 0.10 | -0.49 | 0.02 | 1.4 | 0.730E+02 | 0.02 | 1.26 | .46455E+00 |
| 0.10 | -0.49 | 0.02 | 1.4 | 0.728E+02 | 0.02 | 1.27 | .47036E+00 |
| 0.10 | -0.50 | 0.02 | 1.4 | 0.727E+02 | 0.02 | 1.28 | .47617E+00 |
| 0.10 | -0.51 | 0.02 | 1.4 | 0.726E+02 | 0.02 | 1.29 | .48197E+00 |
| 0.10 | -0.51 | 0.02 | 1.4 | 0.725E+02 | 0.02 | 1.30 | .48778E+00 |
| 0.10 | -0.52 | 0.02 | 1.4 | 0.724E+02 | 0.02 | 1.31 | .49359E+00 |
| 0.11 | -0.52 | 0.02 | 1.4 | 0.722E+02 | 0.02 | 1.32 | .49939E+00 |
| 0.11 | -0.53 | 0.02 | 1.4 | 0.721E+02 | 0.02 | 1.33 | .50520E+00 |
| 0.11 | -0.54 | 0.02 | 1.4 | 0.720E+02 | 0.02 | 1.34 | .51101E+00 |
| 0.11 | -0.54 | 0.02 | 1.4 | 0.719E+02 | 0.02 | 1.35 | .51682E+00 |
| 0.11 | -0.55 | 0.02 | 1.4 | 0.718E+02 | 0.02 | 1.36 | .52262E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.11 | -0.55 | 0.02 | 1.4 | 0.717E+02 | 0.02 | 1.37 | .52843E+00 |
| 0.11 | -0.56 | 0.02 | 1.4 | 0.716E+02 | 0.02 | 1.38 | .53424E+00 |
| 0.11 | -0.57 | 0.02 | 1.4 | 0.715E+02 | 0.02 | 1.39 | .54004E+00 |
| 0.12 | -0.57 | 0.02 | 1.4 | 0.713E+02 | 0.02 | 1.40 | .54585E+00 |
| 0.12 | -0.58 | 0.02 | 1.4 | 0.712E+02 | 0.02 | 1.41 | .55166E+00 |
| 0.12 | -0.58 | 0.02 | 1.4 | 0.711E+02 | 0.02 | 1.42 | .55746E+00 |
| 0.12 | -0.59 | 0.02 | 1.4 | 0.710E+02 | 0.02 | 1.43 | .56327E+00 |
| 0.12 | -0.60 | 0.02 | 1.4 | 0.709E+02 | 0.02 | 1.43 | .56908E+00 |
| 0.12 | -0.60 | 0.02 | 1.4 | 0.708E+02 | 0.02 | 1.44 | .57488E+00 |
| 0.12 | -0.61 | 0.02 | 1.4 | 0.707E+02 | 0.02 | 1.45 | .58069E+00 |

Cumulative travel time = 0.5807 sec ( 0.00 hrs)
Plume centerline may exhibit slight discontinuities in transition
to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

WAKE FLOW CONDITIONS: The discharge velocity (U0) is less than or equal to the
ambient velocity (Ua) and results in wake flow conditions. There is no discharge
momentum induced mixing. The mixing characteristics are UNDESIRABLE.

Recall that the plume is symmetric to the bank/shore on which the centerline
(X-axis) is located.
-----------------------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

Plume is ATTACHED to LEFT bank/shore.
Plume width is now determined from LEFT bank/shore.

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.243E-03 m^2/s
Horizontal diffusivity (initial value) = 0.607E-03 m^2/s

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 2 (bank attached):
X Y Z S C BV BH ZU ZL TT

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.12 | 0.00 | 0.02 | 1.4 | 0.707E+02 | 0.02 | 2.06 | 0.02 | 0.01 | .58069E+00 |

Plume interacts with BOTTOM.
The passive diffusion plume becomes VERTICALLY FULLY MIXED within this
prediction interval.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 5.12 | 0.00 | 0.02 | 2.0 | 0.496E+02 | 0.02 | 2.07 | 0.02 | 0.00 | .23466E+02 |
| 10.12 | 0.00 | 0.02 | 2.0 | 0.493E+02 | 0.02 | 2.08 | 0.02 | 0.00 | .46351E+02 |
| 15.12 | 0.00 | 0.02 | 2.0 | 0.491E+02 | 0.02 | 2.09 | 0.02 | 0.00 | .69236E+02 |
| 20.12 | 0.00 | 0.02 | 2.0 | 0.488E+02 | 0.02 | 2.10 | 0.02 | 0.00 | .92121E+02 |
| 25.12 | 0.00 | 0.02 | 2.1 | 0.486E+02 | 0.02 | 2.11 | 0.02 | 0.00 | .11501E+03 |
| 30.12 | 0.00 | 0.02 | 2.1 | 0.484E+02 | 0.02 | 2.13 | 0.02 | 0.00 | .13789E+03 |
| 35.11 | 0.00 | 0.02 | 2.1 | 0.481E+02 | 0.02 | 2.14 | 0.02 | 0.00 | .16078E+03 |
| 40.11 | 0.00 | 0.02 | 2.1 | 0.479E+02 | 0.02 | 2.15 | 0.02 | 0.00 | .18366E+03 |
| 45.11 | 0.00 | 0.02 | 2.1 | 0.477E+02 | 0.02 | 2.16 | 0.02 | 0.00 | .20655E+03 |
| 50.11 | 0.00 | 0.02 | 2.1 | 0.475E+02 | 0.02 | 2.17 | 0.02 | 0.00 | .22943E+03 |
| 55.11 | 0.00 | 0.02 | 2.1 | 0.472E+02 | 0.02 | 2.18 | 0.02 | 0.00 | .25232E+03 |
| 60.11 | 0.00 | 0.02 | 2.1 | 0.470E+02 | 0.02 | 2.19 | 0.02 | 0.00 | .27520E+03 |
| 65.11 | 0.00 | 0.02 | 2.1 | 0.468E+02 | 0.02 | 2.20 | 0.02 | 0.00 | .29809E+03 |
| 70.11 | 0.00 | 0.02 | 2.1 | 0.466E+02 | 0.02 | 2.21 | 0.02 | 0.00 | .32097E+03 |
| 75.10 | 0.00 | 0.02 | 2.2 | 0.464E+02 | 0.02 | 2.22 | 0.02 | 0.00 | .34386E+03 |
| 80.10 | 0.00 | 0.02 | 2.2 | 0.462E+02 | 0.02 | 2.23 | 0.02 | 0.00 | .36674E+03 |
| 85.10 | 0.00 | 0.02 | 2.2 | 0.460E+02 | 0.02 | 2.24 | 0.02 | 0.00 | .38963E+03 |
| 90.10 | 0.00 | 0.02 | 2.2 | 0.458E+02 | 0.02 | 2.24 | 0.02 | 0.00 | .41251E+03 |
| 95.10 | 0.00 | 0.02 | 2.2 | 0.456E+02 | 0.02 | 2.25 | 0.02 | 0.00 | .43540E+03 |
| 100.10 | 0.00 | 0.02 | 2.2 | 0.454E+02 | 0.02 | 2.26 | 0.02 | 0.00 | .45828E+03 |
| 105.10 | 0.00 | 0.02 | 2.2 | 0.452E+02 | 0.02 | 2.27 | 0.02 | 0.00 | .48117E+03 |
| 110.10 | 0.00 | 0.02 | 2.2 | 0.450E+02 | 0.02 | 2.28 | 0.02 | 0.00 | .50405E+03 |
| 115.09 | 0.00 | 0.02 | 2.2 | 0.448E+02 | 0.02 | 2.29 | 0.02 | 0.00 | .52694E+03 |
| 120.09 | 0.00 | 0.02 | 2.2 | 0.446E+02 | 0.02 | 2.30 | 0.02 | 0.00 | .54982E+03 |
| 125.09 | 0.00 | 0.02 | 2.2 | 0.445E+02 | 0.02 | 2.31 | 0.02 | 0.00 | .57271E+03 |
| 130.09 | 0.00 | 0.02 | 2.3 | 0.443E+02 | 0.02 | 2.32 | 0.02 | 0.00 | .59559E+03 |
| 135.09 | 0.00 | 0.02 | 2.3 | 0.441E+02 | 0.02 | 2.33 | 0.02 | 0.00 | .61848E+03 |
| 140.09 | 0.00 | 0.02 | 2.3 | 0.439E+02 | 0.02 | 2.34 | 0.02 | 0.00 | .64136E+03 |
| 145.09 | 0.00 | 0.02 | 2.3 | 0.438E+02 | 0.02 | 2.35 | 0.02 | 0.00 | .66425E+03 |
| 150.09 | 0.00 | 0.02 | 2.3 | 0.436E+02 | 0.02 | 2.36 | 0.02 | 0.00 | .68713E+03 |
| 155.08 | 0.00 | 0.02 | 2.3 | 0.434E+02 | 0.02 | 2.37 | 0.02 | 0.00 | .71002E+03 |
| 160.08 | 0.00 | 0.02 | 2.3 | 0.432E+02 | 0.02 | 2.38 | 0.02 | 0.00 | .73290E+03 |
| 165.08 | 0.00 | 0.02 | 2.3 | 0.431E+02 | 0.02 | 2.39 | 0.02 | 0.00 | .75579E+03 |
| 170.08 | 0.00 | 0.02 | 2.3 | 0.429E+02 | 0.02 | 2.40 | 0.02 | 0.00 | .77867E+03 |
| 175.08 | 0.00 | 0.02 | 2.3 | 0.428E+02 | 0.02 | 2.40 | 0.02 | 0.00 | .80156E+03 |
| 180.08 | 0.00 | 0.02 | 2.3 | 0.426E+02 | 0.02 | 2.41 | 0.02 | 0.00 | .82444E+03 |
| 185.08 | 0.00 | 0.02 | 2.4 | 0.424E+02 | 0.02 | 2.42 | 0.02 | 0.00 | .84732E+03 |
| 190.08 | 0.00 | 0.02 | 2.4 | 0.423E+02 | 0.02 | 2.43 | 0.02 | 0.00 | .87021E+03 |
| 195.08 | 0.00 | 0.02 | 2.4 | 0.421E+02 | 0.02 | 2.44 | 0.02 | 0.00 | .89309E+03 |
| 200.07 | 0.00 | 0.02 | 2.4 | 0.420E+02 | 0.02 | 2.45 | 0.02 | 0.00 | .91598E+03 |
| 205.07 | 0.00 | 0.02 | 2.4 | 0.418E+02 | 0.02 | 2.46 | 0.02 | 0.00 | .93886E+03 |
| 210.07 | 0.00 | 0.02 | 2.4 | 0.417E+02 | 0.02 | 2.47 | 0.02 | 0.00 | .96175E+03 |
| 215.07 | 0.00 | 0.02 | 2.4 | 0.415E+02 | 0.02 | 2.48 | 0.02 | 0.00 | .98463E+03 |
| 220.07 | 0.00 | 0.02 | 2.4 | 0.414E+02 | 0.02 | 2.48 | 0.02 | 0.00 | .10075E+04 |
| 225.07 | 0.00 | 0.02 | 2.4 | 0.412E+02 | 0.02 | 2.49 | 0.02 | 0.00 | .10304E+04 |
| 230.07 | 0.00 | 0.02 | 2.4 | 0.411E+02 | 0.02 | 2.50 | 0.02 | 0.00 | .10533E+04 |
| 235.07 | 0.00 | 0.02 | 2.4 | 0.409E+02 | 0.02 | 2.51 | 0.02 | 0.00 | .10762E+04 |
| 240.06 | 0.00 | 0.02 | 2.5 | 0.408E+02 | 0.02 | 2.52 | 0.02 | 0.00 | .10991E+04 |
| 245.06 | 0.00 | 0.02 | 2.5 | 0.407E+02 | 0.02 | 2.53 | 0.02 | 0.00 | .11219E+04 |
| 250.06 | 0.00 | 0.02 | 2.5 | 0.405E+02 | 0.02 | 2.54 | 0.02 | 0.00 | .11448E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 255.06 | 0.00 | 0.02 | 2.5 | 0.404E+02 | 0.02 | 2.55 | 0.02 | 0.00 | .11677E+04 |
| 260.06 | 0.00 | 0.02 | 2.5 | 0.402E+02 | 0.02 | 2.55 | 0.02 | 0.00 | .11906E+04 |
| 265.06 | 0.00 | 0.02 | 2.5 | 0.401E+02 | 0.02 | 2.56 | 0.02 | 0.00 | .12135E+04 |
| 270.06 | 0.00 | 0.02 | 2.5 | 0.400E+02 | 0.02 | 2.57 | 0.02 | 0.00 | .12364E+04 |
| 275.06 | 0.00 | 0.02 | 2.5 | 0.399E+02 | 0.02 | 2.58 | 0.02 | 0.00 | .12593E+04 |
| 280.05 | 0.00 | 0.02 | 2.5 | 0.397E+02 | 0.02 | 2.59 | 0.02 | 0.00 | .12821E+04 |
| 285.05 | 0.00 | 0.02 | 2.5 | 0.396E+02 | 0.02 | 2.60 | 0.02 | 0.00 | .13050E+04 |
| 290.05 | 0.00 | 0.02 | 2.5 | 0.395E+02 | 0.02 | 2.60 | 0.02 | 0.00 | .13279E+04 |
| 295.05 | 0.00 | 0.02 | 2.5 | 0.393E+02 | 0.02 | 2.61 | 0.02 | 0.00 | .13508E+04 |
| 300.05 | 0.00 | 0.02 | 2.6 | 0.392E+02 | 0.02 | 2.62 | 0.02 | 0.00 | .13737E+04 |
| 305.05 | 0.00 | 0.02 | 2.6 | 0.391E+02 | 0.02 | 2.63 | 0.02 | 0.00 | .13966E+04 |
| 310.05 | 0.00 | 0.02 | 2.6 | 0.390E+02 | 0.02 | 2.64 | 0.02 | 0.00 | .14195E+04 |
| 315.05 | 0.00 | 0.02 | 2.6 | 0.388E+02 | 0.02 | 2.65 | 0.02 | 0.00 | .14423E+04 |
| 320.04 | 0.00 | 0.02 | 2.6 | 0.387E+02 | 0.02 | 2.65 | 0.02 | 0.00 | .14652E+04 |
| 325.04 | 0.00 | 0.02 | 2.6 | 0.386E+02 | 0.02 | 2.66 | 0.02 | 0.00 | .14881E+04 |
| 330.04 | 0.00 | 0.02 | 2.6 | 0.385E+02 | 0.02 | 2.67 | 0.02 | 0.00 | .15110E+04 |
| 335.04 | 0.00 | 0.02 | 2.6 | 0.384E+02 | 0.02 | 2.68 | 0.02 | 0.00 | .15339E+04 |
| 340.04 | 0.00 | 0.02 | 2.6 | 0.383E+02 | 0.02 | 2.69 | 0.02 | 0.00 | .15568E+04 |
| 345.04 | 0.00 | 0.02 | 2.6 | 0.381E+02 | 0.02 | 2.70 | 0.02 | 0.00 | .15796E+04 |
| 350.04 | 0.00 | 0.02 | 2.6 | 0.380E+02 | 0.02 | 2.70 | 0.02 | 0.00 | .16025E+04 |
| 355.04 | 0.00 | 0.02 | 2.6 | 0.379E+02 | 0.02 | 2.71 | 0.02 | 0.00 | .16254E+04 |
| 360.03 | 0.00 | 0.02 | 2.6 | 0.378E+02 | 0.02 | 2.72 | 0.02 | 0.00 | .16483E+04 |
| 365.03 | 0.00 | 0.02 | 2.7 | 0.377E+02 | 0.02 | 2.73 | 0.02 | 0.00 | .16712E+04 |
| 370.03 | 0.00 | 0.02 | 2.7 | 0.376E+02 | 0.02 | 2.74 | 0.02 | 0.00 | .16941E+04 |
| 375.03 | 0.00 | 0.02 | 2.7 | 0.375E+02 | 0.02 | 2.74 | 0.02 | 0.00 | .17170E+04 |
| 380.03 | 0.00 | 0.02 | 2.7 | 0.374E+02 | 0.02 | 2.75 | 0.02 | 0.00 | .17398E+04 |
| 385.03 | 0.00 | 0.02 | 2.7 | 0.373E+02 | 0.02 | 2.76 | 0.02 | 0.00 | .17627E+04 |
| 390.03 | 0.00 | 0.02 | 2.7 | 0.371E+02 | 0.02 | 2.77 | 0.02 | 0.00 | .17856E+04 |
| 395.03 | 0.00 | 0.02 | 2.7 | 0.370E+02 | 0.02 | 2.78 | 0.02 | 0.00 | .18085E+04 |
| 400.02 | 0.00 | 0.02 | 2.7 | 0.369E+02 | 0.02 | 2.78 | 0.02 | 0.00 | .18314E+04 |
| 405.02 | 0.00 | 0.02 | 2.7 | 0.368E+02 | 0.02 | 2.79 | 0.02 | 0.00 | .18543E+04 |
| 410.02 | 0.00 | 0.02 | 2.7 | 0.367E+02 | 0.02 | 2.80 | 0.02 | 0.00 | .18772E+04 |
| 415.02 | 0.00 | 0.02 | 2.7 | 0.366E+02 | 0.02 | 2.81 | 0.02 | 0.00 | .19000E+04 |
| 420.02 | 0.00 | 0.02 | 2.7 | 0.365E+02 | 0.02 | 2.81 | 0.02 | 0.00 | .19229E+04 |
| 425.02 | 0.00 | 0.02 | 2.7 | 0.364E+02 | 0.02 | 2.82 | 0.02 | 0.00 | .19458E+04 |
| 430.02 | 0.00 | 0.02 | 2.8 | 0.363E+02 | 0.02 | 2.83 | 0.02 | 0.00 | .19687E+04 |
| 435.02 | 0.00 | 0.02 | 2.8 | 0.362E+02 | 0.02 | 2.84 | 0.02 | 0.00 | .19916E+04 |
| 440.02 | 0.00 | 0.02 | 2.8 | 0.361E+02 | 0.02 | 2.84 | 0.02 | 0.00 | .20145E+04 |
| 445.01 | 0.00 | 0.02 | 2.8 | 0.360E+02 | 0.02 | 2.85 | 0.02 | 0.00 | .20373E+04 |
| 450.01 | 0.00 | 0.02 | 2.8 | 0.359E+02 | 0.02 | 2.86 | 0.02 | 0.00 | .20602E+04 |
| 455.01 | 0.00 | 0.02 | 2.8 | 0.358E+02 | 0.02 | 2.87 | 0.02 | 0.00 | .20831E+04 |
| 460.01 | 0.00 | 0.02 | 2.8 | 0.358E+02 | 0.02 | 2.88 | 0.02 | 0.00 | .21060E+04 |
| 465.01 | 0.00 | 0.02 | 2.8 | 0.357E+02 | 0.02 | 2.88 | 0.02 | 0.00 | .21289E+04 |
| 470.01 | 0.00 | 0.02 | 2.8 | 0.356E+02 | 0.02 | 2.89 | 0.02 | 0.00 | .21518E+04 |
| 475.01 | 0.00 | 0.02 | 2.8 | 0.355E+02 | 0.02 | 2.90 | 0.02 | 0.00 | .21747E+04 |
| 480.01 | 0.00 | 0.02 | 2.8 | 0.354E+02 | 0.02 | 2.91 | 0.02 | 0.00 | .21975E+04 |
| 485.00 | 0.00 | 0.02 | 2.8 | 0.353E+02 | 0.02 | 2.91 | 0.02 | 0.00 | .22204E+04 |
| 490.00 | 0.00 | 0.02 | 2.8 | 0.352E+02 | 0.02 | 2.92 | 0.02 | 0.00 | .22433E+04 |
| 495.00 | 0.00 | 0.02 | 2.8 | 0.351E+02 | 0.02 | 2.93 | 0.02 | 0.00 | .22662E+04 |
| 500.00 | 0.00 | 0.02 | 2.9 | 0.350E+02 | 0.02 | 2.94 | 0.02 | 0.00 | .22891E+04 |

Cumulative travel time = 2289.0801 sec ( 0.64 hrs)

Simulation limit based on maximum specified distance = 500.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

```
CORMIX1 PREDICTION FILE:
1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                    CORMIX MIXING ZONE EXPERT SYSTEM
                 Subsystem CORMIX1: Single Port Discharges
                          CORMIX Version 12.0GTD
                   HYDRO1 Version 12.0.0.0 December 2020
-----------------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro TMF Area
 Design case:       Year 37
 FILE NAME:         C:\... - Goldboro\Mar 2022 EARD\rev7\Y37-TMF_Outlet.prd
 Time stamp:        04/06/2022--22:06:38

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.45  HD    =      1.45
 UA    =      0.001 F     =      0.111 USTAR =0.8242E-04
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  LEFT      DISTB =      0.14
 D0    =      0.166 A0    =      0.022 H0    =      1.45  SUB0  =      0.00
 THETA =      0.00  SIGMA =    271.00
 U0    =      1.424 Q0    =      0.031       =0.3100E-01
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.3100E-01  M0    =0.4415E-01  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.15  LM    =  99999.00  Lm    =    300.18  Lb    =      0.00
                                Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2034.73

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4         1
 1  Applicable layer depth HS =    1.45         1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
```

XINT = 7000.00 XMAX = 7000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.14 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -80.00 SIGMAE= 271.07
LE = 0.83 XE = 0.00 YE = -0.14 ZE = 0.63

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.45 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .00000E+00 |
| 0.00 | -0.14 | 0.63 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .12474E-02 |
| 0.00 | -0.14 | 0.63 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .24990E-02 |
| 0.00 | -0.15 | 0.62 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .50144E-02 |
| 0.00 | -0.15 | 0.62 | 1.0 | 0.100E+03 | 0.08 | 1.424 | .75463E-02 |
| 0.00 | -0.15 | 0.61 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .10095E-01 |
| 0.00 | -0.15 | 0.61 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .12659E-01 |
| 0.00 | -0.15 | 0.60 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .15241E-01 |
| 0.00 | -0.15 | 0.60 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .17839E-01 |
| 0.00 | -0.15 | 0.59 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .20453E-01 |
| 0.00 | -0.15 | 0.59 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .23083E-01 |
| 0.00 | -0.15 | 0.58 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .25730E-01 |
| 0.00 | -0.15 | 0.58 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .28394E-01 |
| 0.00 | -0.15 | 0.57 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .31074E-01 |
| 0.00 | -0.16 | 0.57 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .33771E-01 |
| 0.00 | -0.16 | 0.57 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .36484E-01 |
| 0.00 | -0.16 | 0.56 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .39213E-01 |
| 0.00 | -0.16 | 0.56 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .41959E-01 |
| 0.00 | -0.16 | 0.55 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .44721E-01 |
| 0.00 | -0.16 | 0.55 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .47500E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.16 | 0.54 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .50295E-01 |
| 0.00 | -0.16 | 0.54 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .53107E-01 |
| 0.00 | -0.16 | 0.53 | 1.0 | 0.100E+03 | 0.09 | 1.424 | .55935E-01 |
| 0.00 | -0.16 | 0.53 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .58780E-01 |
| 0.00 | -0.16 | 0.52 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .61641E-01 |
| 0.00 | -0.16 | 0.52 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .64518E-01 |
| 0.00 | -0.17 | 0.51 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .67413E-01 |
| 0.00 | -0.17 | 0.51 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .70323E-01 |
| 0.00 | -0.17 | 0.50 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .73250E-01 |
| 0.00 | -0.17 | 0.50 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .76193E-01 |
| 0.00 | -0.17 | 0.49 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .79153E-01 |
| 0.00 | -0.17 | 0.49 | 1.0 | 0.100E+03 | 0.10 | 1.424 | .82130E-01 |
| 0.00 | -0.17 | 0.48 | 1.0 | 0.994E+02 | 0.10 | 1.424 | .85122E-01 |
| 0.00 | -0.17 | 0.48 | 1.0 | 0.989E+02 | 0.10 | 1.424 | .88132E-01 |
| 0.00 | -0.17 | 0.47 | 1.0 | 0.983E+02 | 0.10 | 1.424 | .91157E-01 |
| 0.00 | -0.17 | 0.47 | 1.0 | 0.978E+02 | 0.10 | 1.424 | .94199E-01 |
| 0.00 | -0.17 | 0.46 | 1.0 | 0.973E+02 | 0.10 | 1.424 | .97258E-01 |
| 0.00 | -0.18 | 0.46 | 1.0 | 0.968E+02 | 0.10 | 1.424 | .10033E+00 |
| 0.00 | -0.18 | 0.45 | 1.0 | 0.962E+02 | 0.10 | 1.424 | .10342E+00 |
| 0.00 | -0.18 | 0.45 | 1.0 | 0.957E+02 | 0.10 | 1.424 | .10653E+00 |
| 0.00 | -0.18 | 0.44 | 1.1 | 0.952E+02 | 0.10 | 1.424 | .10966E+00 |
| 0.00 | -0.18 | 0.44 | 1.1 | 0.947E+02 | 0.11 | 1.424 | .11280E+00 |
| 0.00 | -0.18 | 0.43 | 1.1 | 0.942E+02 | 0.11 | 1.424 | .11596E+00 |
| 0.00 | -0.18 | 0.43 | 1.1 | 0.938E+02 | 0.11 | 1.424 | .11913E+00 |
| 0.00 | -0.18 | 0.42 | 1.1 | 0.933E+02 | 0.11 | 1.424 | .12232E+00 |
| 0.00 | -0.18 | 0.42 | 1.1 | 0.928E+02 | 0.11 | 1.424 | .12553E+00 |
| 0.00 | -0.18 | 0.41 | 1.1 | 0.923E+02 | 0.11 | 1.424 | .12875E+00 |
| 0.00 | -0.18 | 0.41 | 1.1 | 0.918E+02 | 0.11 | 1.424 | .13199E+00 |
| 0.00 | -0.18 | 0.40 | 1.1 | 0.914E+02 | 0.11 | 1.424 | .13525E+00 |
| 0.00 | -0.19 | 0.40 | 1.1 | 0.909E+02 | 0.11 | 1.424 | .13852E+00 |
| 0.00 | -0.19 | 0.39 | 1.1 | 0.902E+02 | 0.11 | 1.424 | .14346E+00 |
| 0.00 | -0.19 | 0.38 | 1.1 | 0.898E+02 | 0.11 | 1.424 | .14677E+00 |
| 0.00 | -0.19 | 0.38 | 1.1 | 0.894E+02 | 0.11 | 1.424 | .15010E+00 |
| 0.00 | -0.19 | 0.38 | 1.1 | 0.889E+02 | 0.11 | 1.424 | .15345E+00 |
| 0.00 | -0.19 | 0.37 | 1.1 | 0.885E+02 | 0.11 | 1.424 | .15681E+00 |
| 0.00 | -0.19 | 0.37 | 1.1 | 0.881E+02 | 0.11 | 1.424 | .16019E+00 |
| 0.00 | -0.19 | 0.36 | 1.1 | 0.876E+02 | 0.11 | 1.424 | .16359E+00 |
| 0.00 | -0.19 | 0.36 | 1.1 | 0.872E+02 | 0.11 | 1.424 | .16700E+00 |
| 0.00 | -0.19 | 0.35 | 1.2 | 0.868E+02 | 0.11 | 1.424 | .17043E+00 |
| 0.00 | -0.19 | 0.35 | 1.2 | 0.864E+02 | 0.12 | 1.424 | .17387E+00 |
| 0.00 | -0.20 | 0.34 | 1.2 | 0.860E+02 | 0.12 | 1.424 | .17734E+00 |
| 0.00 | -0.20 | 0.34 | 1.2 | 0.856E+02 | 0.12 | 1.424 | .18081E+00 |
| 0.00 | -0.20 | 0.33 | 1.2 | 0.852E+02 | 0.12 | 1.424 | .18431E+00 |
| 0.00 | -0.20 | 0.33 | 1.2 | 0.848E+02 | 0.12 | 1.424 | .18782E+00 |
| 0.00 | -0.20 | 0.32 | 1.2 | 0.844E+02 | 0.12 | 1.418 | .19135E+00 |
| 0.00 | -0.20 | 0.32 | 1.2 | 0.840E+02 | 0.12 | 1.412 | .19489E+00 |
| 0.00 | -0.20 | 0.31 | 1.2 | 0.836E+02 | 0.12 | 1.405 | .19845E+00 |
| 0.00 | -0.20 | 0.31 | 1.2 | 0.832E+02 | 0.12 | 1.399 | .20203E+00 |
| 0.00 | -0.20 | 0.30 | 1.2 | 0.828E+02 | 0.12 | 1.392 | .20562E+00 |
| 0.00 | -0.20 | 0.30 | 1.2 | 0.824E+02 | 0.12 | 1.386 | .20923E+00 |
| 0.00 | -0.20 | 0.29 | 1.2 | 0.821E+02 | 0.12 | 1.380 | .21286E+00 |
| 0.00 | -0.21 | 0.29 | 1.2 | 0.817E+02 | 0.12 | 1.373 | .21650E+00 |
| 0.00 | -0.21 | 0.28 | 1.2 | 0.813E+02 | 0.12 | 1.367 | .22016E+00 |
| 0.00 | -0.21 | 0.28 | 1.2 | 0.810E+02 | 0.12 | 1.361 | .22384E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.21 | 0.27 | 1.2 | 0.806E+02 | 0.12 | 1.355 | .22753E+00 |
| 0.00 | -0.21 | 0.27 | 1.2 | 0.802E+02 | 0.12 | 1.349 | .23124E+00 |
| 0.00 | -0.21 | 0.26 | 1.3 | 0.799E+02 | 0.12 | 1.343 | .23496E+00 |
| 0.00 | -0.21 | 0.26 | 1.3 | 0.795E+02 | 0.13 | 1.337 | .23871E+00 |
| 0.00 | -0.21 | 0.25 | 1.3 | 0.792E+02 | 0.13 | 1.331 | .24246E+00 |
| 0.00 | -0.21 | 0.25 | 1.3 | 0.788E+02 | 0.13 | 1.326 | .24624E+00 |
| 0.00 | -0.21 | 0.24 | 1.3 | 0.785E+02 | 0.13 | 1.320 | .25003E+00 |
| 0.00 | -0.21 | 0.24 | 1.3 | 0.782E+02 | 0.13 | 1.314 | .25384E+00 |
| 0.00 | -0.21 | 0.23 | 1.3 | 0.778E+02 | 0.13 | 1.308 | .25766E+00 |
| 0.00 | -0.22 | 0.23 | 1.3 | 0.775E+02 | 0.13 | 1.303 | .26150E+00 |
| 0.00 | -0.22 | 0.22 | 1.3 | 0.772E+02 | 0.13 | 1.297 | .26536E+00 |
| 0.00 | -0.22 | 0.22 | 1.3 | 0.768E+02 | 0.13 | 1.292 | .26923E+00 |
| 0.00 | -0.22 | 0.21 | 1.3 | 0.765E+02 | 0.13 | 1.286 | .27312E+00 |
| 0.00 | -0.22 | 0.21 | 1.3 | 0.762E+02 | 0.13 | 1.281 | .27703E+00 |
| 0.00 | -0.22 | 0.20 | 1.3 | 0.759E+02 | 0.13 | 1.276 | .28095E+00 |
| 0.00 | -0.22 | 0.20 | 1.3 | 0.756E+02 | 0.13 | 1.270 | .28489E+00 |
| 0.00 | -0.22 | 0.19 | 1.3 | 0.752E+02 | 0.13 | 1.265 | .28885E+00 |
| 0.00 | -0.22 | 0.19 | 1.3 | 0.749E+02 | 0.13 | 1.260 | .29282E+00 |
| 0.00 | -0.22 | 0.18 | 1.3 | 0.746E+02 | 0.13 | 1.254 | .29681E+00 |
| 0.00 | -0.22 | 0.18 | 1.3 | 0.743E+02 | 0.13 | 1.249 | .30081E+00 |
| 0.00 | -0.23 | 0.17 | 1.4 | 0.740E+02 | 0.13 | 1.244 | .30483E+00 |
| 0.00 | -0.23 | 0.17 | 1.4 | 0.737E+02 | 0.14 | 1.239 | .30887E+00 |
| 0.00 | -0.23 | 0.16 | 1.4 | 0.734E+02 | 0.14 | 1.234 | .31293E+00 |
| 0.00 | -0.23 | 0.16 | 1.4 | 0.731E+02 | 0.14 | 1.229 | .31700E+00 |
| 0.00 | -0.23 | 0.15 | 1.4 | 0.728E+02 | 0.14 | 1.224 | .32109E+00 |
| 0.00 | -0.23 | 0.15 | 1.4 | 0.725E+02 | 0.14 | 1.219 | .32519E+00 |
| 0.00 | -0.23 | 0.14 | 1.4 | 0.722E+02 | 0.14 | 1.214 | .32931E+00 |
| 0.00 | -0.23 | 0.14 | 1.4 | 0.721E+02 | 0.14 | 1.212 | .33138E+00 |

Cumulative travel time = 0.3314 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | -0.23 | 0.14 | 1.4 | 0.721E+02 | 0.14 | .33138E+00 |

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.13 | -34.31 | 1.45 | 1.4 | 0.721E+02 | 0.00 | 0.00 | 1.45 | 1.45 | .33138E+00 |
| 0.02 | -34.31 | 1.45 | 1.4 | 0.721E+02 | 1.45 | 9.38 | 1.45 | 0.00 | .29619E+02 |
| 0.18 | -34.31 | 1.45 | 1.4 | 0.704E+02 | 1.45 | 13.26 | 1.45 | 0.00 | .25652E+03 |
| 0.34 | -34.31 | 1.45 | 1.5 | 0.669E+02 | 1.45 | 16.24 | 1.45 | 0.00 | .48343E+03 |
| 0.50 | -34.31 | 1.45 | 1.6 | 0.627E+02 | 1.45 | 18.76 | 1.45 | 0.00 | .71033E+03 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.66 | -34.31 | 1.45 | 1.7 | 0.589E+02 | 1.45 | 20.97 | 1.45 | 0.00 | .93724E+03 |
| 0.82 | -34.31 | 1.45 | 1.8 | 0.560E+02 | 1.45 | 22.97 | 1.45 | 0.00 | .11641E+04 |
| 0.98 | -34.31 | 1.45 | 1.9 | 0.540E+02 | 1.45 | 24.81 | 1.45 | 0.00 | .13910E+04 |
| 1.14 | -34.31 | 1.45 | 1.9 | 0.528E+02 | 1.45 | 26.52 | 1.45 | 0.00 | .16180E+04 |
| 1.30 | -34.31 | 1.45 | 1.9 | 0.521E+02 | 1.45 | 28.13 | 1.45 | 0.00 | .18449E+04 |
| 1.45 | -34.31 | 1.45 | 1.9 | 0.515E+02 | 1.45 | 29.66 | 1.45 | 0.00 | .20718E+04 |

Cumulative travel time = 2071.7600 sec ( 0.58 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING
-----------------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
-----------------------------------------------------------------------------------------------
BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.638E-03 m^2/s
Horizontal diffusivity (initial value) = 0.138E+00 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.45 | -34.31 | 1.45 | 1.9 | 0.515E+02 | 1.45 | 29.66 | 1.45 | 0.00 | .20718E+04 |
| 1.46 | -34.31 | 1.45 | 1.9 | 0.514E+02 | 1.45 | 29.70 | 1.45 | 0.00 | .20782E+04 |
| 1.46 | -34.31 | 1.45 | 1.9 | 0.513E+02 | 1.45 | 29.75 | 1.45 | 0.00 | .20846E+04 |
| 1.47 | -34.31 | 1.45 | 2.0 | 0.513E+02 | 1.45 | 29.80 | 1.45 | 0.00 | .20910E+04 |
| 1.47 | -34.31 | 1.45 | 2.0 | 0.512E+02 | 1.45 | 29.84 | 1.45 | 0.00 | .20974E+04 |
| 1.48 | -34.31 | 1.45 | 2.0 | 0.511E+02 | 1.45 | 29.89 | 1.45 | 0.00 | .21038E+04 |
| 1.48 | -34.31 | 1.45 | 2.0 | 0.510E+02 | 1.45 | 29.94 | 1.45 | 0.00 | .21102E+04 |
| 1.49 | -34.31 | 1.45 | 2.0 | 0.509E+02 | 1.45 | 29.98 | 1.45 | 0.00 | .21166E+04 |
| 1.49 | -34.31 | 1.45 | 2.0 | 0.509E+02 | 1.45 | 30.03 | 1.45 | 0.00 | .21230E+04 |
| 1.49 | -34.31 | 1.45 | 2.0 | 0.508E+02 | 1.45 | 30.08 | 1.45 | 0.00 | .21294E+04 |
| 1.50 | -34.31 | 1.45 | 2.0 | 0.507E+02 | 1.45 | 30.12 | 1.45 | 0.00 | .21358E+04 |
| 1.50 | -34.31 | 1.45 | 2.0 | 0.506E+02 | 1.45 | 30.17 | 1.45 | 0.00 | .21422E+04 |
| 1.51 | -34.31 | 1.45 | 2.0 | 0.505E+02 | 1.45 | 30.22 | 1.45 | 0.00 | .21486E+04 |
| 1.51 | -34.31 | 1.45 | 2.0 | 0.505E+02 | 1.45 | 30.26 | 1.45 | 0.00 | .21550E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.52 | -34.31 | 1.45 | 2.0 | 0.504E+02 | 1.45 | 30.31 | 1.45 | 0.00 | .21614E+04 |
| 1.52 | -34.31 | 1.45 | 2.0 | 0.503E+02 | 1.45 | 30.36 | 1.45 | 0.00 | .21678E+04 |
| 1.53 | -34.31 | 1.45 | 2.0 | 0.502E+02 | 1.45 | 30.41 | 1.45 | 0.00 | .21742E+04 |
| 1.53 | -34.31 | 1.45 | 2.0 | 0.501E+02 | 1.45 | 30.45 | 1.45 | 0.00 | .21806E+04 |
| 1.53 | -34.31 | 1.45 | 2.0 | 0.501E+02 | 1.45 | 30.50 | 1.45 | 0.00 | .21870E+04 |
| 1.54 | -34.31 | 1.45 | 2.0 | 0.500E+02 | 1.45 | 30.55 | 1.45 | 0.00 | .21934E+04 |
| 1.54 | -34.31 | 1.45 | 2.0 | 0.499E+02 | 1.45 | 30.59 | 1.45 | 0.00 | .21998E+04 |
| 1.55 | -34.31 | 1.45 | 2.0 | 0.498E+02 | 1.45 | 30.64 | 1.45 | 0.00 | .22062E+04 |
| 1.55 | -34.31 | 1.45 | 2.0 | 0.498E+02 | 1.45 | 30.69 | 1.45 | 0.00 | .22126E+04 |
| 1.56 | -34.31 | 1.45 | 2.0 | 0.497E+02 | 1.45 | 30.74 | 1.45 | 0.00 | .22190E+04 |
| 1.56 | -34.31 | 1.45 | 2.0 | 0.496E+02 | 1.45 | 30.78 | 1.45 | 0.00 | .22254E+04 |
| 1.57 | -34.31 | 1.45 | 2.0 | 0.495E+02 | 1.45 | 30.83 | 1.45 | 0.00 | .22318E+04 |
| 1.57 | -34.31 | 1.45 | 2.0 | 0.495E+02 | 1.45 | 30.88 | 1.45 | 0.00 | .22382E+04 |
| 1.58 | -34.31 | 1.45 | 2.0 | 0.494E+02 | 1.45 | 30.92 | 1.45 | 0.00 | .22446E+04 |
| 1.58 | -34.31 | 1.45 | 2.0 | 0.493E+02 | 1.45 | 30.97 | 1.45 | 0.00 | .22510E+04 |
| 1.58 | -34.31 | 1.45 | 2.0 | 0.492E+02 | 1.45 | 31.02 | 1.45 | 0.00 | .22574E+04 |
| 1.59 | -34.31 | 1.45 | 2.0 | 0.492E+02 | 1.45 | 31.07 | 1.45 | 0.00 | .22638E+04 |
| 1.59 | -34.31 | 1.45 | 2.0 | 0.491E+02 | 1.45 | 31.11 | 1.45 | 0.00 | .22702E+04 |
| 1.60 | -34.31 | 1.45 | 2.0 | 0.490E+02 | 1.45 | 31.16 | 1.45 | 0.00 | .22766E+04 |
| 1.60 | -34.31 | 1.45 | 2.0 | 0.489E+02 | 1.45 | 31.21 | 1.45 | 0.00 | .22830E+04 |
| 1.61 | -34.31 | 1.45 | 2.0 | 0.489E+02 | 1.45 | 31.26 | 1.45 | 0.00 | .22894E+04 |
| 1.61 | -34.31 | 1.45 | 2.0 | 0.488E+02 | 1.45 | 31.30 | 1.45 | 0.00 | .22958E+04 |
| 1.62 | -34.31 | 1.45 | 2.1 | 0.487E+02 | 1.45 | 31.35 | 1.45 | 0.00 | .23022E+04 |
| 1.62 | -34.31 | 1.45 | 2.1 | 0.486E+02 | 1.45 | 31.40 | 1.45 | 0.00 | .23086E+04 |
| 1.62 | -34.31 | 1.45 | 2.1 | 0.486E+02 | 1.45 | 31.45 | 1.45 | 0.00 | .23150E+04 |
| 1.63 | -34.31 | 1.45 | 2.1 | 0.485E+02 | 1.45 | 31.49 | 1.45 | 0.00 | .23214E+04 |
| 1.63 | -34.31 | 1.45 | 2.1 | 0.484E+02 | 1.45 | 31.54 | 1.45 | 0.00 | .23278E+04 |
| 1.64 | -34.31 | 1.45 | 2.1 | 0.483E+02 | 1.45 | 31.59 | 1.45 | 0.00 | .23342E+04 |
| 1.64 | -34.31 | 1.45 | 2.1 | 0.483E+02 | 1.45 | 31.64 | 1.45 | 0.00 | .23406E+04 |
| 1.65 | -34.31 | 1.45 | 2.1 | 0.482E+02 | 1.45 | 31.69 | 1.45 | 0.00 | .23470E+04 |
| 1.65 | -34.31 | 1.45 | 2.1 | 0.481E+02 | 1.45 | 31.73 | 1.45 | 0.00 | .23534E+04 |
| 1.66 | -34.31 | 1.45 | 2.1 | 0.481E+02 | 1.45 | 31.78 | 1.45 | 0.00 | .23598E+04 |
| 1.66 | -34.31 | 1.45 | 2.1 | 0.480E+02 | 1.45 | 31.83 | 1.45 | 0.00 | .23662E+04 |
| 1.66 | -34.31 | 1.45 | 2.1 | 0.479E+02 | 1.45 | 31.88 | 1.45 | 0.00 | .23726E+04 |
| 1.67 | -34.31 | 1.45 | 2.1 | 0.478E+02 | 1.45 | 31.92 | 1.45 | 0.00 | .23790E+04 |
| 1.67 | -34.31 | 1.45 | 2.1 | 0.478E+02 | 1.45 | 31.97 | 1.45 | 0.00 | .23854E+04 |
| 1.68 | -34.31 | 1.45 | 2.1 | 0.477E+02 | 1.45 | 32.02 | 1.45 | 0.00 | .23918E+04 |
| 1.68 | -34.31 | 1.45 | 2.1 | 0.476E+02 | 1.45 | 32.07 | 1.45 | 0.00 | .23982E+04 |
| 1.69 | -34.31 | 1.45 | 2.1 | 0.476E+02 | 1.45 | 32.12 | 1.45 | 0.00 | .24046E+04 |
| 1.69 | -34.31 | 1.45 | 2.1 | 0.475E+02 | 1.45 | 32.16 | 1.45 | 0.00 | .24110E+04 |
| 1.70 | -34.31 | 1.45 | 2.1 | 0.474E+02 | 1.45 | 32.21 | 1.45 | 0.00 | .24174E+04 |
| 1.70 | -34.31 | 1.45 | 2.1 | 0.473E+02 | 1.45 | 32.26 | 1.45 | 0.00 | .24238E+04 |
| 1.71 | -34.31 | 1.45 | 2.1 | 0.473E+02 | 1.45 | 32.31 | 1.45 | 0.00 | .24302E+04 |
| 1.71 | -34.31 | 1.45 | 2.1 | 0.472E+02 | 1.45 | 32.36 | 1.45 | 0.00 | .24366E+04 |
| 1.71 | -34.31 | 1.45 | 2.1 | 0.471E+02 | 1.45 | 32.40 | 1.45 | 0.00 | .24430E+04 |
| 1.72 | -34.31 | 1.45 | 2.1 | 0.471E+02 | 1.45 | 32.45 | 1.45 | 0.00 | .24494E+04 |
| 1.72 | -34.31 | 1.45 | 2.1 | 0.470E+02 | 1.45 | 32.50 | 1.45 | 0.00 | .24558E+04 |
| 1.73 | -34.31 | 1.45 | 2.1 | 0.469E+02 | 1.45 | 32.55 | 1.45 | 0.00 | .24622E+04 |
| 1.73 | -34.31 | 1.45 | 2.1 | 0.468E+02 | 1.45 | 32.60 | 1.45 | 0.00 | .24686E+04 |
| 1.74 | -34.31 | 1.45 | 2.1 | 0.468E+02 | 1.45 | 32.64 | 1.45 | 0.00 | .24750E+04 |
| 1.74 | -34.31 | 1.45 | 2.1 | 0.467E+02 | 1.45 | 32.69 | 1.45 | 0.00 | .24814E+04 |
| 1.75 | -34.31 | 1.45 | 2.1 | 0.466E+02 | 1.45 | 32.74 | 1.45 | 0.00 | .24878E+04 |
| 1.75 | -34.31 | 1.45 | 2.1 | 0.466E+02 | 1.45 | 32.79 | 1.45 | 0.00 | .24942E+04 |
| 1.75 | -34.31 | 1.45 | 2.2 | 0.465E+02 | 1.45 | 32.84 | 1.45 | 0.00 | .25006E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.76 | -34.31 | 1.45 | 2.2 | 0.464E+02 | 1.45 | 32.89 | 1.45 | 0.00 | .25070E+04 |
| 1.76 | -34.31 | 1.45 | 2.2 | 0.464E+02 | 1.45 | 32.93 | 1.45 | 0.00 | .25134E+04 |
| 1.77 | -34.31 | 1.45 | 2.2 | 0.463E+02 | 1.45 | 32.98 | 1.45 | 0.00 | .25198E+04 |
| 1.77 | -34.31 | 1.45 | 2.2 | 0.462E+02 | 1.45 | 33.03 | 1.45 | 0.00 | .25262E+04 |
| 1.78 | -34.31 | 1.45 | 2.2 | 0.462E+02 | 1.45 | 33.08 | 1.45 | 0.00 | .25326E+04 |
| 1.78 | -34.31 | 1.45 | 2.2 | 0.461E+02 | 1.45 | 33.13 | 1.45 | 0.00 | .25390E+04 |
| 1.79 | -34.31 | 1.45 | 2.2 | 0.460E+02 | 1.45 | 33.18 | 1.45 | 0.00 | .25454E+04 |
| 1.79 | -34.31 | 1.45 | 2.2 | 0.460E+02 | 1.45 | 33.22 | 1.45 | 0.00 | .25518E+04 |
| 1.79 | -34.31 | 1.45 | 2.2 | 0.459E+02 | 1.45 | 33.27 | 1.45 | 0.00 | .25582E+04 |
| 1.80 | -34.31 | 1.45 | 2.2 | 0.458E+02 | 1.45 | 33.32 | 1.45 | 0.00 | .25646E+04 |
| 1.80 | -34.31 | 1.45 | 2.2 | 0.458E+02 | 1.45 | 33.37 | 1.45 | 0.00 | .25710E+04 |
| 1.81 | -34.31 | 1.45 | 2.2 | 0.457E+02 | 1.45 | 33.42 | 1.45 | 0.00 | .25774E+04 |
| 1.81 | -34.31 | 1.45 | 2.2 | 0.456E+02 | 1.45 | 33.47 | 1.45 | 0.00 | .25838E+04 |
| 1.82 | -34.31 | 1.45 | 2.2 | 0.456E+02 | 1.45 | 33.52 | 1.45 | 0.00 | .25902E+04 |
| 1.82 | -34.31 | 1.45 | 2.2 | 0.455E+02 | 1.45 | 33.56 | 1.45 | 0.00 | .25966E+04 |
| 1.83 | -34.31 | 1.45 | 2.2 | 0.454E+02 | 1.45 | 33.61 | 1.45 | 0.00 | .26030E+04 |
| 1.83 | -34.31 | 1.45 | 2.2 | 0.454E+02 | 1.45 | 33.66 | 1.45 | 0.00 | .26094E+04 |
| 1.84 | -34.31 | 1.45 | 2.2 | 0.453E+02 | 1.45 | 33.71 | 1.45 | 0.00 | .26158E+04 |
| 1.84 | -34.31 | 1.45 | 2.2 | 0.452E+02 | 1.45 | 33.76 | 1.45 | 0.00 | .26222E+04 |
| 1.84 | -34.31 | 1.45 | 2.2 | 0.452E+02 | 1.45 | 33.81 | 1.45 | 0.00 | .26286E+04 |
| 1.85 | -34.31 | 1.45 | 2.2 | 0.451E+02 | 1.45 | 33.86 | 1.45 | 0.00 | .26351E+04 |
| 1.85 | -34.31 | 1.45 | 2.2 | 0.450E+02 | 1.45 | 33.91 | 1.45 | 0.00 | .26415E+04 |
| 1.86 | -34.31 | 1.45 | 2.2 | 0.450E+02 | 1.45 | 33.95 | 1.45 | 0.00 | .26479E+04 |
| 1.86 | -34.31 | 1.45 | 2.2 | 0.449E+02 | 1.45 | 34.00 | 1.45 | 0.00 | .26543E+04 |
| 1.87 | -34.31 | 1.45 | 2.2 | 0.448E+02 | 1.45 | 34.05 | 1.45 | 0.00 | .26607E+04 |
| 1.87 | -34.31 | 1.45 | 2.2 | 0.448E+02 | 1.45 | 34.10 | 1.45 | 0.00 | .26671E+04 |
| 1.88 | -34.31 | 1.45 | 2.2 | 0.447E+02 | 1.45 | 34.15 | 1.45 | 0.00 | .26735E+04 |
| 1.88 | -34.31 | 1.45 | 2.2 | 0.447E+02 | 1.45 | 34.20 | 1.45 | 0.00 | .26799E+04 |
| 1.88 | -34.31 | 1.45 | 2.2 | 0.446E+02 | 1.45 | 34.25 | 1.45 | 0.00 | .26863E+04 |
| 1.89 | -34.31 | 1.45 | 2.2 | 0.445E+02 | 1.45 | 34.30 | 1.45 | 0.00 | .26927E+04 |
| 1.89 | -34.31 | 1.45 | 2.2 | 0.445E+02 | 1.45 | 34.35 | 1.45 | 0.00 | .26991E+04 |
| 1.90 | -34.31 | 1.45 | 2.3 | 0.444E+02 | 1.45 | 34.39 | 1.45 | 0.00 | .27055E+04 |
| 1.90 | -34.31 | 1.45 | 2.3 | 0.443E+02 | 1.45 | 34.44 | 1.45 | 0.00 | .27119E+04 |

Cumulative travel time = 2711.8655 sec ( 0.75 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.90 | 0.14 | 1.45 | 2.3 | 0.443E+02 | 1.45 | 68.89 | 1.45 | 0.00 | .27119E+04 |
| 71.88 | 0.14 | 1.45 | 75.0 | 0.133E+01 | 1.45 | 2292.08 | 1.45 | 0.00 | .10268E+06 |
| 141.86 | 0.14 | 1.45 | 197.1 | 0.507E+00 | 1.45 | 6018.70 | 1.45 | 0.00 | .20266E+06 |
| 211.85 | 0.14 | 1.45 | 352.9 | 0.283E+00 | 1.45 | 10777.48 | 1.45 | 0.00 | .30263E+06 |
| 281.83 | 0.14 | 1.45 | 536.3 | 0.186E+00 | 1.45 | 16379.16 | 1.45 | 0.00 | .40260E+06 |
| 351.81 | 0.14 | 1.45 | 743.6 | 0.134E+00 | 1.45 | 22711.88 | 1.45 | 0.00 | .50258E+06 |
| 421.79 | 0.14 | 1.45 | 972.4 | 0.103E+00 | 1.45 | 29699.29 | 1.45 | 0.00 | .60255E+06 |
| 491.77 | 0.14 | 1.45 | 1220.8 | 0.819E-01 | 1.45 | 37284.94 | 1.45 | 0.00 | .70252E+06 |
| 561.75 | 0.14 | 1.45 | 1487.3 | 0.672E-01 | 1.45 | 45424.91 | 1.45 | 0.00 | .80249E+06 |
| 631.73 | 0.14 | 1.45 | 1770.8 | 0.565E-01 | 1.45 | 54083.74 | 1.45 | 0.00 | .90247E+06 |
| 701.71 | 0.14 | 1.45 | 2070.3 | 0.483E-01 | 1.45 | 63232.00 | 1.45 | 0.00 | .10024E+07 |
| 771.69 | 0.14 | 1.45 | 2385.1 | 0.419E-01 | 1.45 | 72844.82 | 1.45 | 0.00 | .11024E+07 |
| 841.67 | 0.14 | 1.45 | 2714.3 | 0.368E-01 | 1.45 | 82900.71 | 1.45 | 0.00 | .12024E+07 |
| 911.66 | 0.14 | 1.45 | 3057.5 | 0.327E-01 | 1.45 | 93380.96 | 1.45 | 0.00 | .13024E+07 |
| 981.64 | 0.14 | 1.45 | 3414.0 | 0.293E-01 | 1.45 | ******** | 1.45 | 0.00 | .14023E+07 |
| 1051.62 | 0.14 | 1.45 | 3783.3 | 0.264E-01 | 1.45 | ******** | 1.45 | 0.00 | .15023E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1121.60 | 0.14 | 1.45 | 4165.1 | 0.240E-01 | 1.45 | ******** | 1.45 | 0.00 | .16023E+07 |
| 1191.58 | 0.14 | 1.45 | 4559.0 | 0.219E-01 | 1.45 | ******** | 1.45 | 0.00 | .17022E+07 |
| 1261.56 | 0.14 | 1.45 | 4964.5 | 0.201E-01 | 1.45 | ******** | 1.45 | 0.00 | .18022E+07 |
| 1331.54 | 0.14 | 1.45 | 5381.4 | 0.186E-01 | 1.45 | ******** | 1.45 | 0.00 | .19022E+07 |
| 1401.52 | 0.14 | 1.45 | 5809.4 | 0.172E-01 | 1.45 | ******** | 1.45 | 0.00 | .20022E+07 |
| 1471.50 | 0.14 | 1.45 | 6248.1 | 0.160E-01 | 1.45 | ******** | 1.45 | 0.00 | .21021E+07 |
| 1541.48 | 0.14 | 1.45 | 6697.3 | 0.149E-01 | 1.45 | ******** | 1.45 | 0.00 | .22021E+07 |
| 1611.46 | 0.14 | 1.45 | 7156.9 | 0.140E-01 | 1.45 | ******** | 1.45 | 0.00 | .23021E+07 |
| 1681.45 | 0.14 | 1.45 | 7626.4 | 0.131E-01 | 1.45 | ******** | 1.45 | 0.00 | .24021E+07 |
| 1751.43 | 0.14 | 1.45 | 8105.9 | 0.123E-01 | 1.45 | ******** | 1.45 | 0.00 | .25020E+07 |
| 1821.41 | 0.14 | 1.45 | 8594.9 | 0.116E-01 | 1.45 | ******** | 1.45 | 0.00 | .26020E+07 |
| 1891.39 | 0.14 | 1.45 | 9093.5 | 0.110E-01 | 1.45 | ******** | 1.45 | 0.00 | .27020E+07 |
| 1961.37 | 0.14 | 1.45 | 9601.3 | 0.104E-01 | 1.45 | ******** | 1.45 | 0.00 | .28020E+07 |
| 2031.35 | 0.14 | 1.45 | 10118.2 | 0.988E-02 | 1.45 | ******** | 1.45 | 0.00 | .29019E+07 |
| 2101.33 | 0.14 | 1.45 | 10644.1 | 0.939E-02 | 1.45 | ******** | 1.45 | 0.00 | .30019E+07 |
| 2171.31 | 0.14 | 1.45 | 11178.8 | 0.895E-02 | 1.45 | ******** | 1.45 | 0.00 | .31019E+07 |
| 2241.29 | 0.14 | 1.45 | 11722.1 | 0.853E-02 | 1.45 | ******** | 1.45 | 0.00 | .32018E+07 |
| 2311.27 | 0.14 | 1.45 | 12274.0 | 0.815E-02 | 1.45 | ******** | 1.45 | 0.00 | .33018E+07 |
| 2381.26 | 0.14 | 1.45 | 12834.3 | 0.779E-02 | 1.45 | ******** | 1.45 | 0.00 | .34018E+07 |
| 2451.24 | 0.14 | 1.45 | 13402.9 | 0.746E-02 | 1.45 | ******** | 1.45 | 0.00 | .35018E+07 |
| 2521.22 | 0.14 | 1.45 | 13979.6 | 0.715E-02 | 1.45 | ******** | 1.45 | 0.00 | .36017E+07 |
| 2591.20 | 0.14 | 1.45 | 14564.4 | 0.687E-02 | 1.45 | ******** | 1.45 | 0.00 | .37017E+07 |
| 2661.18 | 0.14 | 1.45 | 15157.0 | 0.660E-02 | 1.45 | ******** | 1.45 | 0.00 | .38017E+07 |
| 2731.16 | 0.14 | 1.45 | 15757.6 | 0.635E-02 | 1.45 | ******** | 1.45 | 0.00 | .39017E+07 |
| 2801.14 | 0.14 | 1.45 | 16365.8 | 0.611E-02 | 1.45 | ******** | 1.45 | 0.00 | .40016E+07 |
| 2871.12 | 0.14 | 1.45 | 16981.7 | 0.589E-02 | 1.45 | ******** | 1.45 | 0.00 | .41016E+07 |
| 2941.10 | 0.14 | 1.45 | 17605.1 | 0.568E-02 | 1.45 | ******** | 1.45 | 0.00 | .42016E+07 |
| 3011.08 | 0.14 | 1.45 | 18236.0 | 0.548E-02 | 1.45 | ******** | 1.45 | 0.00 | .43015E+07 |
| 3081.06 | 0.14 | 1.45 | 18874.2 | 0.530E-02 | 1.45 | ******** | 1.45 | 0.00 | .44015E+07 |
| 3151.05 | 0.14 | 1.45 | 19519.7 | 0.512E-02 | 1.45 | ******** | 1.45 | 0.00 | .45015E+07 |
| 3221.03 | 0.14 | 1.45 | 20172.4 | 0.496E-02 | 1.45 | ******** | 1.45 | 0.00 | .46015E+07 |
| 3291.01 | 0.14 | 1.45 | 20832.2 | 0.480E-02 | 1.45 | ******** | 1.45 | 0.00 | .47014E+07 |
| 3360.99 | 0.14 | 1.45 | 21499.1 | 0.465E-02 | 1.45 | ******** | 1.45 | 0.00 | .48014E+07 |
| 3430.97 | 0.14 | 1.45 | 22172.9 | 0.451E-02 | 1.45 | ******** | 1.45 | 0.00 | .49014E+07 |
| 3500.95 | 0.14 | 1.45 | 22853.6 | 0.438E-02 | 1.45 | ******** | 1.45 | 0.00 | .50014E+07 |
| 3570.93 | 0.14 | 1.45 | 23541.2 | 0.425E-02 | 1.45 | ******** | 1.45 | 0.00 | .51013E+07 |
| 3640.91 | 0.14 | 1.45 | 24235.5 | 0.413E-02 | 1.45 | ******** | 1.45 | 0.00 | .52013E+07 |
| 3710.89 | 0.14 | 1.45 | 24936.5 | 0.401E-02 | 1.45 | ******** | 1.45 | 0.00 | .53013E+07 |
| 3780.87 | 0.14 | 1.45 | 25644.1 | 0.390E-02 | 1.45 | ******** | 1.45 | 0.00 | .54012E+07 |
| 3850.86 | 0.14 | 1.45 | 26358.3 | 0.379E-02 | 1.45 | ******** | 1.45 | 0.00 | .55012E+07 |
| 3920.84 | 0.14 | 1.45 | 27079.0 | 0.369E-02 | 1.45 | ******** | 1.45 | 0.00 | .56012E+07 |
| 3990.82 | 0.14 | 1.45 | 27806.2 | 0.360E-02 | 1.45 | ******** | 1.45 | 0.00 | .57012E+07 |
| 4060.80 | 0.14 | 1.45 | 28539.7 | 0.350E-02 | 1.45 | ******** | 1.45 | 0.00 | .58011E+07 |
| 4130.78 | 0.14 | 1.45 | 29279.6 | 0.342E-02 | 1.45 | ******** | 1.45 | 0.00 | .59011E+07 |
| 4200.76 | 0.14 | 1.45 | 30025.8 | 0.333E-02 | 1.45 | ******** | 1.45 | 0.00 | .60011E+07 |
| 4270.74 | 0.14 | 1.45 | 30778.2 | 0.325E-02 | 1.45 | ******** | 1.45 | 0.00 | .61011E+07 |
| 4340.72 | 0.14 | 1.45 | 31536.8 | 0.317E-02 | 1.45 | ******** | 1.45 | 0.00 | .62010E+07 |
| 4410.70 | 0.14 | 1.45 | 32301.6 | 0.310E-02 | 1.45 | ******** | 1.45 | 0.00 | .63010E+07 |
| 4480.68 | 0.14 | 1.45 | 33072.4 | 0.302E-02 | 1.45 | ******** | 1.45 | 0.00 | .64010E+07 |
| 4550.67 | 0.14 | 1.45 | 33849.2 | 0.295E-02 | 1.45 | ******** | 1.45 | 0.00 | .65009E+07 |
| 4620.65 | 0.14 | 1.45 | 34632.1 | 0.289E-02 | 1.45 | ******** | 1.45 | 0.00 | .66009E+07 |
| 4690.63 | 0.14 | 1.45 | 35420.9 | 0.282E-02 | 1.45 | ******** | 1.45 | 0.00 | .67009E+07 |
| 4760.61 | 0.14 | 1.45 | 36215.5 | 0.276E-02 | 1.45 | ******** | 1.45 | 0.00 | .68009E+07 |
| 4830.59 | 0.14 | 1.45 | 37016.1 | 0.270E-02 | 1.45 | ******** | 1.45 | 0.00 | .69008E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4900.57 | 0.14 | 1.45 | 37822.4 | 0.264E-02 | 1.45 | ******** | 1.45 | 0.00 | .70008E+07 |
| 4970.55 | 0.14 | 1.45 | 38634.5 | 0.259E-02 | 1.45 | ******** | 1.45 | 0.00 | .71008E+07 |
| 5040.53 | 0.14 | 1.45 | 39452.4 | 0.253E-02 | 1.45 | ******** | 1.45 | 0.00 | .72008E+07 |
| 5110.51 | 0.14 | 1.45 | 40275.9 | 0.248E-02 | 1.45 | ******** | 1.45 | 0.00 | .73007E+07 |
| 5180.49 | 0.14 | 1.45 | 41105.1 | 0.243E-02 | 1.45 | ******** | 1.45 | 0.00 | .74007E+07 |
| 5250.47 | 0.14 | 1.45 | 41939.9 | 0.238E-02 | 1.45 | ******** | 1.45 | 0.00 | .75007E+07 |
| 5320.46 | 0.14 | 1.45 | 42780.3 | 0.234E-02 | 1.45 | ******** | 1.45 | 0.00 | .76006E+07 |
| 5390.44 | 0.14 | 1.45 | 43626.3 | 0.229E-02 | 1.45 | ******** | 1.45 | 0.00 | .77006E+07 |
| 5460.42 | 0.14 | 1.45 | 44477.7 | 0.225E-02 | 1.45 | ******** | 1.45 | 0.00 | .78006E+07 |
| 5530.40 | 0.14 | 1.45 | 45334.6 | 0.221E-02 | 1.45 | ******** | 1.45 | 0.00 | .79006E+07 |
| 5600.38 | 0.14 | 1.45 | 46196.9 | 0.216E-02 | 1.45 | ******** | 1.45 | 0.00 | .80005E+07 |
| 5670.36 | 0.14 | 1.45 | 47064.6 | 0.212E-02 | 1.45 | ******** | 1.45 | 0.00 | .81005E+07 |
| 5740.34 | 0.14 | 1.45 | 47937.7 | 0.209E-02 | 1.45 | ******** | 1.45 | 0.00 | .82005E+07 |
| 5810.32 | 0.14 | 1.45 | 48816.2 | 0.205E-02 | 1.45 | ******** | 1.45 | 0.00 | .83005E+07 |
| 5880.30 | 0.14 | 1.45 | 49699.9 | 0.201E-02 | 1.45 | ******** | 1.45 | 0.00 | .84004E+07 |
| 5950.28 | 0.14 | 1.45 | 50588.9 | 0.198E-02 | 1.45 | ******** | 1.45 | 0.00 | .85004E+07 |
| 6020.27 | 0.14 | 1.45 | 51483.1 | 0.194E-02 | 1.45 | ******** | 1.45 | 0.00 | .86004E+07 |
| 6090.25 | 0.14 | 1.45 | 52382.6 | 0.191E-02 | 1.45 | ******** | 1.45 | 0.00 | .87003E+07 |
| 6160.23 | 0.14 | 1.45 | 53287.2 | 0.188E-02 | 1.45 | ******** | 1.45 | 0.00 | .88003E+07 |
| 6230.21 | 0.14 | 1.45 | 54197.0 | 0.185E-02 | 1.45 | ******** | 1.45 | 0.00 | .89003E+07 |
| 6300.19 | 0.14 | 1.45 | 55111.9 | 0.181E-02 | 1.45 | ******** | 1.45 | 0.00 | .90003E+07 |
| 6370.17 | 0.14 | 1.45 | 56031.8 | 0.178E-02 | 1.45 | ******** | 1.45 | 0.00 | .91002E+07 |
| 6440.15 | 0.14 | 1.45 | 56956.9 | 0.176E-02 | 1.45 | ******** | 1.45 | 0.00 | .92002E+07 |
| 6510.13 | 0.14 | 1.45 | 57887.0 | 0.173E-02 | 1.45 | ******** | 1.45 | 0.00 | .93002E+07 |
| 6580.11 | 0.14 | 1.45 | 58822.0 | 0.170E-02 | 1.45 | ******** | 1.45 | 0.00 | .94002E+07 |
| 6650.09 | 0.14 | 1.45 | 59762.1 | 0.167E-02 | 1.45 | ******** | 1.45 | 0.00 | .95001E+07 |
| 6720.07 | 0.14 | 1.45 | 60707.1 | 0.165E-02 | 1.45 | ******** | 1.45 | 0.00 | .96001E+07 |
| 6790.06 | 0.14 | 1.45 | 61657.1 | 0.162E-02 | 1.45 | ******** | 1.45 | 0.00 | .97001E+07 |
| 6860.04 | 0.14 | 1.45 | 62611.9 | 0.160E-02 | 1.45 | ******** | 1.45 | 0.00 | .98000E+07 |
| 6930.02 | 0.14 | 1.45 | 63571.7 | 0.157E-02 | 1.45 | ******** | 1.45 | 0.00 | .99000E+07 |
| 7000.00 | 0.14 | 1.45 | 64536.3 | 0.155E-02 | 1.45 | ******** | 1.45 | 0.00 | .10000E+08 |

Cumulative travel time = 9999995.0000 sec ( 2777.78 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

CORMIX1: Single Port Discharges End of Prediction File

1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                   CORMIX MIXING ZONE EXPERT SYSTEM
                Subsystem CORMIX1: Single Port Discharges
                        CORMIX Version 12.0GTD
                 HYDRO1 Version 12.0.0.0 December 2020
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro Northwest Area
 Design case:       Year 37
 FILE NAME:         C:\... - Goldboro\Mar 2022 EARD\rev7\Y37-North_Pond.prd
 Time stamp:        04/06/2022--22:07:55

ENVIRONMENT PARAMETERS (metric units)
 Unbounded section
 HA    =      1.22  HD    =      1.22
 UA    =     0.001 F     =     0.066 USTAR =0.6363E-04
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U        RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  RIGHT     DISTB =      0.13
 D0    =     0.041 A0    =     0.001 H0    =      1.22  SUB0  =      0.00
 THETA =      0.00  SIGMA =     90.00
 U0    =     1.416 Q0    =     0.002       =0.1900E-02
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1        KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.1900E-02  M0    =0.2691E-02  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.04  LM    =  99999.00  Lm    =     74.11  Lb    =      0.00
                              Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2023.32

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4        1
 1  Applicable layer depth HS =    1.22        1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  1
```

REGSPC= 1 XREG = 100.00 WREG = 0.00 AREG = 0.00
XINT = 8000.00 XMAX = 8000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.13 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.

COORDINATE SYSTEM SPECIFIED (WGS84 Decimal):
PHI = 178.00 ALPHA = 88.00
LAT = 45.2066994
LON = -61.6408005

NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -81.00 SIGMAE= 89.93
LE = 0.21 XE = 0.00 YE = 0.03 ZE = 1.02

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .00000E+00 |
| 0.00 | 0.03 | 1.02 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .23168E-02 |
| 0.00 | 0.03 | 1.01 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .46881E-02 |
| 0.00 | 0.04 | 1.00 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .12130E-01 |
| 0.00 | 0.04 | 0.99 | 1.0 | 0.100E+03 | 0.02 | 1.416 | .17363E-01 |
| 0.00 | 0.04 | 0.98 | 1.0 | 0.984E+02 | 0.03 | 1.416 | .22815E-01 |
| 0.00 | 0.04 | 0.98 | 1.0 | 0.965E+02 | 0.03 | 1.416 | .25623E-01 |
| 0.00 | 0.04 | 0.97 | 1.1 | 0.929E+02 | 0.03 | 1.416 | .31403E-01 |
| 0.00 | 0.04 | 0.95 | 1.1 | 0.880E+02 | 0.03 | 1.416 | .40481E-01 |
| 0.00 | 0.04 | 0.94 | 1.2 | 0.850E+02 | 0.03 | 1.416 | .46806E-01 |
| 0.00 | 0.05 | 0.93 | 1.2 | 0.822E+02 | 0.03 | 1.374 | .53349E-01 |
| 0.00 | 0.05 | 0.93 | 1.3 | 0.795E+02 | 0.03 | 1.330 | .60111E-01 |
| 0.00 | 0.05 | 0.92 | 1.3 | 0.771E+02 | 0.03 | 1.288 | .67091E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.05 | 0.91 | 1.3 | 0.747E+02 | 0.03 | 1.250 | .74289E-01 |
| 0.00 | 0.05 | 0.90 | 1.4 | 0.726E+02 | 0.03 | 1.213 | .81705E-01 |
| 0.00 | 0.05 | 0.89 | 1.4 | 0.705E+02 | 0.04 | 1.179 | .89340E-01 |
| 0.00 | 0.05 | 0.88 | 1.5 | 0.686E+02 | 0.04 | 1.146 | .97193E-01 |
| 0.00 | 0.05 | 0.87 | 1.5 | 0.667E+02 | 0.04 | 1.115 | .10526E+00 |
| 0.00 | 0.06 | 0.86 | 1.5 | 0.650E+02 | 0.04 | 1.086 | .11355E+00 |
| 0.00 | 0.06 | 0.85 | 1.6 | 0.633E+02 | 0.04 | 1.058 | .12206E+00 |
| 0.00 | 0.06 | 0.85 | 1.6 | 0.617E+02 | 0.04 | 1.032 | .13079E+00 |
| 0.00 | 0.06 | 0.84 | 1.7 | 0.602E+02 | 0.04 | 1.007 | .13973E+00 |
| 0.00 | 0.06 | 0.83 | 1.7 | 0.588E+02 | 0.04 | 0.983 | .14889E+00 |
| 0.00 | 0.06 | 0.82 | 1.7 | 0.575E+02 | 0.04 | 0.960 | .15827E+00 |
| 0.00 | 0.06 | 0.81 | 1.8 | 0.562E+02 | 0.04 | 0.939 | .16787E+00 |
| 0.00 | 0.07 | 0.80 | 1.8 | 0.549E+02 | 0.05 | 0.918 | .17769E+00 |
| 0.00 | 0.07 | 0.79 | 1.9 | 0.537E+02 | 0.05 | 0.898 | .18773E+00 |
| 0.00 | 0.07 | 0.78 | 1.9 | 0.526E+02 | 0.05 | 0.879 | .19798E+00 |
| 0.00 | 0.07 | 0.77 | 1.9 | 0.515E+02 | 0.05 | 0.861 | .20845E+00 |
| 0.00 | 0.07 | 0.76 | 2.0 | 0.505E+02 | 0.05 | 0.843 | .21914E+00 |
| 0.00 | 0.07 | 0.76 | 2.0 | 0.494E+02 | 0.05 | 0.827 | .23005E+00 |
| 0.00 | 0.07 | 0.75 | 2.1 | 0.485E+02 | 0.05 | 0.810 | .24118E+00 |
| 0.00 | 0.08 | 0.74 | 2.1 | 0.476E+02 | 0.05 | 0.795 | .25252E+00 |
| 0.00 | 0.08 | 0.73 | 2.1 | 0.467E+02 | 0.05 | 0.780 | .26409E+00 |
| 0.00 | 0.08 | 0.72 | 2.2 | 0.458E+02 | 0.05 | 0.766 | .27587E+00 |
| 0.00 | 0.08 | 0.72 | 2.2 | 0.454E+02 | 0.05 | 0.759 | .28184E+00 |
| 0.00 | 0.08 | 0.71 | 2.2 | 0.446E+02 | 0.06 | 0.745 | .29395E+00 |
| 0.00 | 0.08 | 0.70 | 2.3 | 0.438E+02 | 0.06 | 0.732 | .30628E+00 |
| 0.00 | 0.08 | 0.69 | 2.3 | 0.430E+02 | 0.06 | 0.719 | .31882E+00 |
| 0.00 | 0.09 | 0.68 | 2.4 | 0.423E+02 | 0.06 | 0.707 | .33158E+00 |
| 0.00 | 0.09 | 0.67 | 2.4 | 0.416E+02 | 0.06 | 0.695 | .34457E+00 |
| 0.00 | 0.09 | 0.66 | 2.4 | 0.409E+02 | 0.06 | 0.684 | .35777E+00 |
| 0.00 | 0.09 | 0.65 | 2.5 | 0.402E+02 | 0.06 | 0.673 | .37119E+00 |
| 0.00 | 0.09 | 0.64 | 2.5 | 0.396E+02 | 0.06 | 0.662 | .38482E+00 |
| 0.00 | 0.09 | 0.64 | 2.6 | 0.390E+02 | 0.06 | 0.652 | .39868E+00 |
| 0.00 | 0.09 | 0.63 | 2.6 | 0.384E+02 | 0.06 | 0.641 | .41275E+00 |
| 0.00 | 0.10 | 0.62 | 2.6 | 0.378E+02 | 0.07 | 0.632 | .42704E+00 |
| 0.00 | 0.10 | 0.61 | 2.7 | 0.372E+02 | 0.07 | 0.622 | .44155E+00 |
| 0.00 | 0.10 | 0.60 | 2.7 | 0.367E+02 | 0.07 | 0.613 | .45628E+00 |
| 0.00 | 0.10 | 0.59 | 2.8 | 0.361E+02 | 0.07 | 0.604 | .47123E+00 |
| 0.00 | 0.10 | 0.58 | 2.8 | 0.356E+02 | 0.07 | 0.595 | .48639E+00 |
| 0.00 | 0.10 | 0.57 | 2.8 | 0.351E+02 | 0.07 | 0.587 | .50177E+00 |
| 0.00 | 0.10 | 0.56 | 2.9 | 0.346E+02 | 0.07 | 0.579 | .51738E+00 |
| 0.00 | 0.11 | 0.55 | 2.9 | 0.341E+02 | 0.07 | 0.571 | .53319E+00 |
| 0.00 | 0.11 | 0.55 | 3.0 | 0.337E+02 | 0.07 | 0.563 | .54923E+00 |
| 0.00 | 0.11 | 0.54 | 3.0 | 0.332E+02 | 0.07 | 0.556 | .56549E+00 |
| 0.00 | 0.11 | 0.53 | 3.0 | 0.328E+02 | 0.08 | 0.548 | .58196E+00 |
| 0.00 | 0.11 | 0.52 | 3.1 | 0.324E+02 | 0.08 | 0.541 | .59866E+00 |
| 0.00 | 0.11 | 0.51 | 3.1 | 0.320E+02 | 0.08 | 0.534 | .61557E+00 |
| 0.00 | 0.11 | 0.50 | 3.2 | 0.315E+02 | 0.08 | 0.527 | .63269E+00 |
| 0.00 | 0.12 | 0.49 | 3.2 | 0.312E+02 | 0.08 | 0.521 | .65004E+00 |
| 0.00 | 0.12 | 0.48 | 3.3 | 0.308E+02 | 0.08 | 0.514 | .66761E+00 |
| 0.00 | 0.12 | 0.47 | 3.3 | 0.304E+02 | 0.08 | 0.508 | .68539E+00 |
| 0.00 | 0.12 | 0.46 | 3.3 | 0.300E+02 | 0.08 | 0.502 | .70339E+00 |
| 0.00 | 0.12 | 0.46 | 3.4 | 0.297E+02 | 0.08 | 0.496 | .72161E+00 |
| 0.00 | 0.12 | 0.45 | 3.4 | 0.293E+02 | 0.08 | 0.490 | .74005E+00 |
| 0.00 | 0.12 | 0.44 | 3.5 | 0.290E+02 | 0.09 | 0.484 | .75871E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.13 | 0.43 | 3.5 | 0.286E+02 | 0.09 | 0.479 | .77758E+00 |
| 0.00 | 0.13 | 0.42 | 3.5 | 0.283E+02 | 0.09 | 0.473 | .79668E+00 |
| 0.00 | 0.13 | 0.41 | 3.6 | 0.280E+02 | 0.09 | 0.468 | .81599E+00 |
| 0.00 | 0.13 | 0.40 | 3.6 | 0.277E+02 | 0.09 | 0.463 | .83552E+00 |
| 0.00 | 0.13 | 0.39 | 3.7 | 0.274E+02 | 0.09 | 0.458 | .85527E+00 |
| 0.00 | 0.13 | 0.38 | 3.7 | 0.271E+02 | 0.09 | 0.453 | .87523E+00 |
| 0.00 | 0.13 | 0.38 | 3.7 | 0.268E+02 | 0.09 | 0.448 | .89542E+00 |
| 0.00 | 0.14 | 0.37 | 3.8 | 0.265E+02 | 0.09 | 0.443 | .91582E+00 |
| 0.00 | 0.14 | 0.36 | 3.8 | 0.262E+02 | 0.09 | 0.438 | .93644E+00 |
| 0.00 | 0.14 | 0.35 | 3.9 | 0.259E+02 | 0.10 | 0.434 | .95728E+00 |
| 0.00 | 0.14 | 0.34 | 3.9 | 0.257E+02 | 0.10 | 0.429 | .97834E+00 |
| 0.00 | 0.14 | 0.33 | 3.9 | 0.254E+02 | 0.10 | 0.425 | .99962E+00 |
| 0.00 | 0.14 | 0.32 | 4.0 | 0.252E+02 | 0.10 | 0.421 | .10211E+01 |
| 0.00 | 0.14 | 0.31 | 4.0 | 0.249E+02 | 0.10 | 0.416 | .10428E+01 |
| 0.00 | 0.14 | 0.30 | 4.1 | 0.247E+02 | 0.10 | 0.412 | .10648E+01 |
| 0.00 | 0.15 | 0.29 | 4.1 | 0.244E+02 | 0.10 | 0.408 | .10869E+01 |
| 0.00 | 0.15 | 0.29 | 4.1 | 0.242E+02 | 0.10 | 0.404 | .11093E+01 |
| 0.00 | 0.15 | 0.28 | 4.2 | 0.239E+02 | 0.10 | 0.400 | .11319E+01 |
| 0.00 | 0.15 | 0.27 | 4.2 | 0.237E+02 | 0.10 | 0.396 | .11547E+01 |
| 0.00 | 0.15 | 0.26 | 4.3 | 0.235E+02 | 0.11 | 0.393 | .11777E+01 |
| 0.00 | 0.15 | 0.25 | 4.3 | 0.233E+02 | 0.11 | 0.389 | .12009E+01 |
| 0.00 | 0.15 | 0.24 | 4.3 | 0.231E+02 | 0.11 | 0.385 | .12244E+01 |
| 0.00 | 0.16 | 0.23 | 4.4 | 0.228E+02 | 0.11 | 0.382 | .12481E+01 |
| 0.00 | 0.16 | 0.22 | 4.4 | 0.226E+02 | 0.11 | 0.378 | .12720E+01 |
| 0.00 | 0.16 | 0.21 | 4.5 | 0.224E+02 | 0.11 | 0.375 | .12961E+01 |
| 0.00 | 0.16 | 0.21 | 4.5 | 0.222E+02 | 0.11 | 0.372 | .13204E+01 |
| 0.00 | 0.16 | 0.20 | 4.5 | 0.220E+02 | 0.11 | 0.368 | .13449E+01 |
| 0.00 | 0.16 | 0.19 | 4.6 | 0.218E+02 | 0.11 | 0.365 | .13697E+01 |
| 0.00 | 0.16 | 0.18 | 4.6 | 0.216E+02 | 0.11 | 0.362 | .13947E+01 |
| 0.00 | 0.17 | 0.17 | 4.7 | 0.215E+02 | 0.12 | 0.359 | .14199E+01 |
| 0.00 | 0.17 | 0.16 | 4.7 | 0.213E+02 | 0.12 | 0.356 | .14453E+01 |
| 0.00 | 0.17 | 0.15 | 4.7 | 0.211E+02 | 0.12 | 0.353 | .14710E+01 |
| 0.00 | 0.17 | 0.14 | 4.8 | 0.209E+02 | 0.12 | 0.350 | .14968E+01 |
| 0.00 | 0.17 | 0.13 | 4.8 | 0.207E+02 | 0.12 | 0.347 | .15229E+01 |
| 0.00 | 0.17 | 0.12 | 4.9 | 0.206E+02 | 0.12 | 0.344 | .15492E+01 |

Cumulative travel time = 1.5492 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | 0.17 | 0.12 | 4.9 | 0.206E+02 | 0.12 | .15492E+01 |

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.12 | 26.87 | 1.22 | 4.9 | 0.206E+02 | 0.00 | 0.00 | 1.22 | 1.22 | .15492E+01 |
| 0.02 | 26.87 | 1.22 | 4.9 | 0.206E+02 | 1.22 | 2.40 | 1.22 | 0.00 | .20984E+02 |
| 0.15 | 26.87 | 1.22 | 5.0 | 0.201E+02 | 1.22 | 3.39 | 1.22 | 0.00 | .21235E+03 |
| 0.28 | 26.87 | 1.22 | 5.2 | 0.191E+02 | 1.22 | 4.15 | 1.22 | 0.00 | .40371E+03 |
| 0.42 | 26.87 | 1.22 | 5.6 | 0.179E+02 | 1.22 | 4.79 | 1.22 | 0.00 | .59508E+03 |
| 0.55 | 26.87 | 1.22 | 5.9 | 0.168E+02 | 1.22 | 5.36 | 1.22 | 0.00 | .78644E+03 |
| 0.69 | 26.87 | 1.22 | 6.3 | 0.160E+02 | 1.22 | 5.87 | 1.22 | 0.00 | .97781E+03 |
| 0.82 | 26.87 | 1.22 | 6.5 | 0.154E+02 | 1.22 | 6.34 | 1.22 | 0.00 | .11692E+04 |
| 0.95 | 26.87 | 1.22 | 6.6 | 0.151E+02 | 1.22 | 6.78 | 1.22 | 0.00 | .13605E+04 |
| 1.09 | 26.87 | 1.22 | 6.7 | 0.149E+02 | 1.22 | 7.19 | 1.22 | 0.00 | .15519E+04 |
| 1.22 | 26.87 | 1.22 | 6.8 | 0.147E+02 | 1.22 | 7.58 | 1.22 | 0.00 | .17433E+04 |

Cumulative travel time = 1743.2635 sec ( 0.48 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.536E-03 m^2/s
Horizontal diffusivity (initial value) = 0.223E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.22 | 26.87 | 1.22 | 6.8 | 0.147E+02 | 1.22 | 7.58 | 1.22 | 0.00 | .17433E+04 |
| 1.24 | 26.87 | 1.22 | 6.9 | 0.144E+02 | 1.22 | 7.73 | 1.22 | 0.00 | .17760E+04 |
| 1.27 | 26.87 | 1.22 | 7.1 | 0.141E+02 | 1.22 | 7.88 | 1.22 | 0.00 | .18087E+04 |
| 1.29 | 26.87 | 1.22 | 7.2 | 0.139E+02 | 1.22 | 8.03 | 1.22 | 0.00 | .18415E+04 |
| 1.31 | 26.87 | 1.22 | 7.4 | 0.136E+02 | 1.22 | 8.19 | 1.22 | 0.00 | .18742E+04 |
| 1.34 | 26.87 | 1.22 | 7.5 | 0.133E+02 | 1.22 | 8.35 | 1.22 | 0.00 | .19070E+04 |
| 1.36 | 26.87 | 1.22 | 7.6 | 0.131E+02 | 1.22 | 8.50 | 1.22 | 0.00 | .19397E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1.38 | 26.87 | 1.22 | 7.8 | 0.129E+02 | 1.22 | 8.66 | 1.22 | 0.00 | .19724E+04 |
| 1.40 | 26.87 | 1.22 | 7.9 | 0.126E+02 | 1.22 | 8.82 | 1.22 | 0.00 | .20052E+04 |
| 1.43 | 26.87 | 1.22 | 8.1 | 0.124E+02 | 1.22 | 8.98 | 1.22 | 0.00 | .20379E+04 |
| 1.45 | 26.87 | 1.22 | 8.2 | 0.122E+02 | 1.22 | 9.14 | 1.22 | 0.00 | .20707E+04 |
| 1.47 | 26.87 | 1.22 | 8.4 | 0.120E+02 | 1.22 | 9.30 | 1.22 | 0.00 | .21034E+04 |
| 1.50 | 26.87 | 1.22 | 8.5 | 0.118E+02 | 1.22 | 9.46 | 1.22 | 0.00 | .21362E+04 |
| 1.52 | 26.87 | 1.22 | 8.6 | 0.116E+02 | 1.22 | 9.63 | 1.22 | 0.00 | .21689E+04 |
| 1.54 | 26.87 | 1.22 | 8.8 | 0.114E+02 | 1.22 | 9.79 | 1.22 | 0.00 | .22016E+04 |
| 1.56 | 26.87 | 1.22 | 8.9 | 0.112E+02 | 1.22 | 9.96 | 1.22 | 0.00 | .22344E+04 |
| 1.59 | 26.87 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 10.12 | 1.22 | 0.00 | .22671E+04 |
| 1.61 | 26.87 | 1.22 | 9.2 | 0.108E+02 | 1.22 | 10.29 | 1.22 | 0.00 | .22999E+04 |
| 1.63 | 26.87 | 1.22 | 9.4 | 0.106E+02 | 1.22 | 10.46 | 1.22 | 0.00 | .23326E+04 |
| 1.66 | 26.87 | 1.22 | 9.5 | 0.105E+02 | 1.22 | 10.63 | 1.22 | 0.00 | .23653E+04 |
| 1.68 | 26.87 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 10.80 | 1.22 | 0.00 | .23981E+04 |
| 1.70 | 26.87 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 10.97 | 1.22 | 0.00 | .24308E+04 |
| 1.73 | 26.87 | 1.22 | 10.0 | 0.999E+01 | 1.22 | 11.14 | 1.22 | 0.00 | .24636E+04 |
| 1.75 | 26.87 | 1.22 | 10.2 | 0.984E+01 | 1.22 | 11.31 | 1.22 | 0.00 | .24963E+04 |
| 1.77 | 26.87 | 1.22 | 10.3 | 0.969E+01 | 1.22 | 11.49 | 1.22 | 0.00 | .25290E+04 |
| 1.79 | 26.87 | 1.22 | 10.5 | 0.954E+01 | 1.22 | 11.66 | 1.22 | 0.00 | .25618E+04 |
| 1.82 | 26.87 | 1.22 | 10.6 | 0.940E+01 | 1.22 | 11.84 | 1.22 | 0.00 | .25945E+04 |
| 1.84 | 26.87 | 1.22 | 10.8 | 0.926E+01 | 1.22 | 12.01 | 1.22 | 0.00 | .26273E+04 |
| 1.86 | 26.87 | 1.22 | 11.0 | 0.913E+01 | 1.22 | 12.19 | 1.22 | 0.00 | .26600E+04 |
| 1.89 | 26.87 | 1.22 | 11.1 | 0.900E+01 | 1.22 | 12.37 | 1.22 | 0.00 | .26927E+04 |
| 1.91 | 26.87 | 1.22 | 11.3 | 0.887E+01 | 1.22 | 12.55 | 1.22 | 0.00 | .27255E+04 |
| 1.93 | 26.87 | 1.22 | 11.4 | 0.875E+01 | 1.22 | 12.73 | 1.22 | 0.00 | .27582E+04 |
| 1.95 | 26.87 | 1.22 | 11.6 | 0.862E+01 | 1.22 | 12.91 | 1.22 | 0.00 | .27910E+04 |
| 1.98 | 26.87 | 1.22 | 11.8 | 0.850E+01 | 1.22 | 13.09 | 1.22 | 0.00 | .28237E+04 |
| 2.00 | 26.87 | 1.22 | 11.9 | 0.839E+01 | 1.22 | 13.27 | 1.22 | 0.00 | .28565E+04 |
| 2.02 | 26.87 | 1.22 | 12.1 | 0.827E+01 | 1.22 | 13.46 | 1.22 | 0.00 | .28892E+04 |
| 2.05 | 26.87 | 1.22 | 12.3 | 0.816E+01 | 1.22 | 13.64 | 1.22 | 0.00 | .29219E+04 |
| 2.07 | 26.87 | 1.22 | 12.4 | 0.805E+01 | 1.22 | 13.82 | 1.22 | 0.00 | .29547E+04 |
| 2.09 | 26.87 | 1.22 | 12.6 | 0.795E+01 | 1.22 | 14.01 | 1.22 | 0.00 | .29874E+04 |
| 2.11 | 26.87 | 1.22 | 12.8 | 0.784E+01 | 1.22 | 14.20 | 1.22 | 0.00 | .30202E+04 |
| 2.14 | 26.87 | 1.22 | 12.9 | 0.774E+01 | 1.22 | 14.38 | 1.22 | 0.00 | .30529E+04 |
| 2.16 | 26.87 | 1.22 | 13.1 | 0.764E+01 | 1.22 | 14.57 | 1.22 | 0.00 | .30856E+04 |
| 2.18 | 26.87 | 1.22 | 13.3 | 0.754E+01 | 1.22 | 14.76 | 1.22 | 0.00 | .31184E+04 |
| 2.21 | 26.87 | 1.22 | 13.4 | 0.745E+01 | 1.22 | 14.95 | 1.22 | 0.00 | .31511E+04 |
| 2.23 | 26.87 | 1.22 | 13.6 | 0.735E+01 | 1.22 | 15.14 | 1.22 | 0.00 | .31839E+04 |
| 2.25 | 26.87 | 1.22 | 13.8 | 0.726E+01 | 1.22 | 15.33 | 1.22 | 0.00 | .32166E+04 |
| 2.28 | 26.87 | 1.22 | 13.9 | 0.717E+01 | 1.22 | 15.52 | 1.22 | 0.00 | .32493E+04 |
| 2.30 | 26.87 | 1.22 | 14.1 | 0.708E+01 | 1.22 | 15.72 | 1.22 | 0.00 | .32821E+04 |
| 2.32 | 26.87 | 1.22 | 14.3 | 0.700E+01 | 1.22 | 15.91 | 1.22 | 0.00 | .33148E+04 |
| 2.34 | 26.87 | 1.22 | 14.5 | 0.691E+01 | 1.22 | 16.10 | 1.22 | 0.00 | .33476E+04 |
| 2.37 | 26.87 | 1.22 | 14.6 | 0.683E+01 | 1.22 | 16.30 | 1.22 | 0.00 | .33803E+04 |
| 2.39 | 26.87 | 1.22 | 14.8 | 0.675E+01 | 1.22 | 16.50 | 1.22 | 0.00 | .34130E+04 |
| 2.41 | 26.87 | 1.22 | 15.0 | 0.667E+01 | 1.22 | 16.69 | 1.22 | 0.00 | .34458E+04 |
| 2.44 | 26.87 | 1.22 | 15.2 | 0.659E+01 | 1.22 | 16.89 | 1.22 | 0.00 | .34785E+04 |
| 2.46 | 26.87 | 1.22 | 15.4 | 0.651E+01 | 1.22 | 17.09 | 1.22 | 0.00 | .35113E+04 |
| 2.48 | 26.87 | 1.22 | 15.5 | 0.644E+01 | 1.22 | 17.29 | 1.22 | 0.00 | .35440E+04 |
| 2.50 | 26.87 | 1.22 | 15.7 | 0.637E+01 | 1.22 | 17.49 | 1.22 | 0.00 | .35767E+04 |
| 2.53 | 26.87 | 1.22 | 15.9 | 0.629E+01 | 1.22 | 17.69 | 1.22 | 0.00 | .36095E+04 |
| 2.55 | 26.87 | 1.22 | 16.1 | 0.622E+01 | 1.22 | 17.89 | 1.22 | 0.00 | .36422E+04 |
| 2.57 | 26.87 | 1.22 | 16.3 | 0.615E+01 | 1.22 | 18.09 | 1.22 | 0.00 | .36750E+04 |
| 2.60 | 26.87 | 1.22 | 16.4 | 0.608E+01 | 1.22 | 18.29 | 1.22 | 0.00 | .37077E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2.62 | 26.87 | 1.22 | 16.6 | 0.602E+01 | 1.22 | 18.50 | 1.22 | 0.00 | .37404E+04 |
| 2.64 | 26.87 | 1.22 | 16.8 | 0.595E+01 | 1.22 | 18.70 | 1.22 | 0.00 | .37732E+04 |
| 2.66 | 26.87 | 1.22 | 17.0 | 0.589E+01 | 1.22 | 18.91 | 1.22 | 0.00 | .38059E+04 |
| 2.69 | 26.87 | 1.22 | 17.2 | 0.582E+01 | 1.22 | 19.11 | 1.22 | 0.00 | .38387E+04 |
| 2.71 | 26.87 | 1.22 | 17.4 | 0.576E+01 | 1.22 | 19.32 | 1.22 | 0.00 | .38714E+04 |
| 2.73 | 26.87 | 1.22 | 17.5 | 0.570E+01 | 1.22 | 19.53 | 1.22 | 0.00 | .39042E+04 |
| 2.76 | 26.87 | 1.22 | 17.7 | 0.564E+01 | 1.22 | 19.74 | 1.22 | 0.00 | .39369E+04 |
| 2.78 | 26.87 | 1.22 | 17.9 | 0.558E+01 | 1.22 | 19.94 | 1.22 | 0.00 | .39696E+04 |
| 2.80 | 26.87 | 1.22 | 18.1 | 0.552E+01 | 1.22 | 20.15 | 1.22 | 0.00 | .40024E+04 |
| 2.83 | 26.87 | 1.22 | 18.3 | 0.547E+01 | 1.22 | 20.36 | 1.22 | 0.00 | .40351E+04 |
| 2.85 | 26.87 | 1.22 | 18.5 | 0.541E+01 | 1.22 | 20.57 | 1.22 | 0.00 | .40679E+04 |
| 2.87 | 26.87 | 1.22 | 18.7 | 0.536E+01 | 1.22 | 20.79 | 1.22 | 0.00 | .41006E+04 |
| 2.89 | 26.87 | 1.22 | 18.9 | 0.530E+01 | 1.22 | 21.00 | 1.22 | 0.00 | .41333E+04 |
| 2.92 | 26.87 | 1.22 | 19.1 | 0.525E+01 | 1.22 | 21.21 | 1.22 | 0.00 | .41661E+04 |
| 2.94 | 26.87 | 1.22 | 19.2 | 0.520E+01 | 1.22 | 21.43 | 1.22 | 0.00 | .41988E+04 |
| 2.96 | 26.87 | 1.22 | 19.4 | 0.514E+01 | 1.22 | 21.64 | 1.22 | 0.00 | .42316E+04 |
| 2.99 | 26.87 | 1.22 | 19.6 | 0.509E+01 | 1.22 | 21.86 | 1.22 | 0.00 | .42643E+04 |
| 3.01 | 26.87 | 1.22 | 19.8 | 0.504E+01 | 1.22 | 22.07 | 1.22 | 0.00 | .42970E+04 |
| 3.03 | 26.87 | 1.22 | 20.0 | 0.499E+01 | 1.22 | 22.29 | 1.22 | 0.00 | .43298E+04 |
| 3.05 | 26.87 | 1.22 | 20.2 | 0.495E+01 | 1.22 | 22.51 | 1.22 | 0.00 | .43625E+04 |
| 3.08 | 26.87 | 1.22 | 20.4 | 0.490E+01 | 1.22 | 22.72 | 1.22 | 0.00 | .43953E+04 |
| 3.10 | 26.87 | 1.22 | 20.6 | 0.485E+01 | 1.22 | 22.94 | 1.22 | 0.00 | .44280E+04 |
| 3.12 | 26.87 | 1.22 | 20.8 | 0.481E+01 | 1.22 | 23.16 | 1.22 | 0.00 | .44607E+04 |
| 3.15 | 26.87 | 1.22 | 21.0 | 0.476E+01 | 1.22 | 23.38 | 1.22 | 0.00 | .44935E+04 |
| 3.17 | 26.87 | 1.22 | 21.2 | 0.472E+01 | 1.22 | 23.60 | 1.22 | 0.00 | .45262E+04 |
| 3.19 | 26.87 | 1.22 | 21.4 | 0.467E+01 | 1.22 | 23.83 | 1.22 | 0.00 | .45590E+04 |
| 3.21 | 26.87 | 1.22 | 21.6 | 0.463E+01 | 1.22 | 24.05 | 1.22 | 0.00 | .45917E+04 |
| 3.24 | 26.87 | 1.22 | 21.8 | 0.459E+01 | 1.22 | 24.27 | 1.22 | 0.00 | .46244E+04 |
| 3.26 | 26.87 | 1.22 | 22.0 | 0.454E+01 | 1.22 | 24.49 | 1.22 | 0.00 | .46572E+04 |
| 3.28 | 26.87 | 1.22 | 22.2 | 0.450E+01 | 1.22 | 24.72 | 1.22 | 0.00 | .46899E+04 |
| 3.31 | 26.87 | 1.22 | 22.4 | 0.446E+01 | 1.22 | 24.94 | 1.22 | 0.00 | .47227E+04 |
| 3.33 | 26.87 | 1.22 | 22.6 | 0.442E+01 | 1.22 | 25.17 | 1.22 | 0.00 | .47554E+04 |
| 3.35 | 26.87 | 1.22 | 22.8 | 0.438E+01 | 1.22 | 25.40 | 1.22 | 0.00 | .47882E+04 |
| 3.38 | 26.87 | 1.22 | 23.0 | 0.434E+01 | 1.22 | 25.62 | 1.22 | 0.00 | .48209E+04 |
| 3.40 | 26.87 | 1.22 | 23.2 | 0.431E+01 | 1.22 | 25.85 | 1.22 | 0.00 | .48536E+04 |
| 3.42 | 26.87 | 1.22 | 23.4 | 0.427E+01 | 1.22 | 26.08 | 1.22 | 0.00 | .48864E+04 |
| 3.44 | 26.87 | 1.22 | 23.6 | 0.423E+01 | 1.22 | 26.31 | 1.22 | 0.00 | .49191E+04 |
| 3.47 | 26.87 | 1.22 | 23.8 | 0.419E+01 | 1.22 | 26.54 | 1.22 | 0.00 | .49519E+04 |
| 3.49 | 26.87 | 1.22 | 24.0 | 0.416E+01 | 1.22 | 26.77 | 1.22 | 0.00 | .49846E+04 |
| 3.51 | 26.87 | 1.22 | 24.3 | 0.412E+01 | 1.22 | 27.00 | 1.22 | 0.00 | .50173E+04 |

Cumulative travel time = 5017.3452 sec ( 1.39 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 3.51 | -0.13 | 1.22 | 24.3 | 0.412E+01 | 1.22 | 54.00 | 1.22 | 0.00 | .50173E+04 |
| 83.48 | -0.13 | 1.22 | 1211.2 | 0.826E-01 | 1.22 | 2696.42 | 1.22 | 0.00 | .11925E+06 |

** REGULATORY MIXING ZONE BOUNDARY **
In this prediction interval the plume DOWNSTREAM distance meets or exceeds
the regulatory value = 100.00 m.
This is the extent of the REGULATORY MIXING ZONE.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 163.44 | -0.13 | 1.22 | 3238.0 | 0.309E-01 | 1.22 | 7208.70 | 1.22 | 0.00 | .23349E+06 |
| 243.41 | -0.13 | 1.22 | 5835.1 | 0.171E-01 | 1.22 | 12990.54 | 1.22 | 0.00 | .34772E+06 |
| 323.37 | -0.13 | 1.22 | 8896.7 | 0.112E-01 | 1.22 | 19806.65 | 1.22 | 0.00 | .46196E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 403.34 | -0.13 | 1.22 | 12360.8 | 0.809E-02 | 1.22 | 27518.72 | 1.22 | 0.00 | .57620E+06 |
| 483.30 | -0.13 | 1.22 | 16185.1 | 0.618E-02 | 1.22 | 36032.65 | 1.22 | 0.00 | .69043E+06 |
| 563.27 | -0.13 | 1.22 | 20338.4 | 0.492E-02 | 1.22 | 45278.97 | 1.22 | 0.00 | .80467E+06 |
| 643.23 | -0.13 | 1.22 | 24796.3 | 0.403E-02 | 1.22 | 55203.68 | 1.22 | 0.00 | .91890E+06 |
| 723.20 | -0.13 | 1.22 | 29539.5 | 0.339E-02 | 1.22 | 65763.24 | 1.22 | 0.00 | .10331E+07 |
| 803.16 | -0.13 | 1.22 | 34551.5 | 0.289E-02 | 1.22 | 76921.52 | 1.22 | 0.00 | .11474E+07 |
| 883.13 | -0.13 | 1.22 | 39818.8 | 0.251E-02 | 1.22 | 88647.98 | 1.22 | 0.00 | .12616E+07 |
| 963.09 | -0.13 | 1.22 | 45329.5 | 0.221E-02 | 1.22 | ******** | 1.22 | 0.00 | .13758E+07 |
| 1043.06 | -0.13 | 1.22 | 51073.3 | 0.196E-02 | 1.22 | ******** | 1.22 | 0.00 | .14901E+07 |
| 1123.02 | -0.13 | 1.22 | 57041.0 | 0.175E-02 | 1.22 | ******** | 1.22 | 0.00 | .16043E+07 |
| 1202.99 | -0.13 | 1.22 | 63224.7 | 0.158E-02 | 1.22 | ******** | 1.22 | 0.00 | .17186E+07 |
| 1282.95 | -0.13 | 1.22 | 69616.9 | 0.144E-02 | 1.22 | ******** | 1.22 | 0.00 | .18328E+07 |
| 1362.92 | -0.13 | 1.22 | 76211.1 | 0.131E-02 | 1.22 | ******** | 1.22 | 0.00 | .19470E+07 |
| 1442.88 | -0.13 | 1.22 | 83001.3 | 0.120E-02 | 1.22 | ******** | 1.22 | 0.00 | .20613E+07 |
| 1522.85 | -0.13 | 1.22 | 89982.0 | 0.111E-02 | 1.22 | ******** | 1.22 | 0.00 | .21755E+07 |
| 1602.81 | -0.13 | 1.22 | 97148.1 | 0.103E-02 | 1.22 | ******** | 1.22 | 0.00 | .22897E+07 |
| 1682.77 | -0.13 | 1.22 | ******* | 0.957E-03 | 1.22 | ******** | 1.22 | 0.00 | .24040E+07 |
| 1762.74 | -0.13 | 1.22 | ******* | 0.893E-03 | 1.22 | ******** | 1.22 | 0.00 | .25182E+07 |
| 1842.70 | -0.13 | 1.22 | ******* | 0.835E-03 | 1.22 | ******** | 1.22 | 0.00 | .26324E+07 |
| 1922.67 | -0.13 | 1.22 | ******* | 0.784E-03 | 1.22 | ******** | 1.22 | 0.00 | .27467E+07 |
| 2002.63 | -0.13 | 1.22 | ******* | 0.737E-03 | 1.22 | ******** | 1.22 | 0.00 | .28609E+07 |
| 2082.60 | -0.13 | 1.22 | ******* | 0.695E-03 | 1.22 | ******** | 1.22 | 0.00 | .29751E+07 |
| 2162.56 | -0.13 | 1.22 | ******* | 0.657E-03 | 1.22 | ******** | 1.22 | 0.00 | .30894E+07 |
| 2242.53 | -0.13 | 1.22 | ******* | 0.622E-03 | 1.22 | ******** | 1.22 | 0.00 | .32036E+07 |
| 2322.49 | -0.13 | 1.22 | ******* | 0.591E-03 | 1.22 | ******** | 1.22 | 0.00 | .33178E+07 |
| 2402.46 | -0.13 | 1.22 | ******* | 0.561E-03 | 1.22 | ******** | 1.22 | 0.00 | .34321E+07 |
| 2482.42 | -0.13 | 1.22 | ******* | 0.535E-03 | 1.22 | ******** | 1.22 | 0.00 | .35463E+07 |
| 2562.39 | -0.13 | 1.22 | ******* | 0.510E-03 | 1.22 | ******** | 1.22 | 0.00 | .36606E+07 |
| 2642.35 | -0.13 | 1.22 | ******* | 0.487E-03 | 1.22 | ******** | 1.22 | 0.00 | .37748E+07 |
| 2722.32 | -0.13 | 1.22 | ******* | 0.466E-03 | 1.22 | ******** | 1.22 | 0.00 | .38890E+07 |
| 2802.28 | -0.13 | 1.22 | ******* | 0.446E-03 | 1.22 | ******** | 1.22 | 0.00 | .40033E+07 |
| 2882.25 | -0.13 | 1.22 | ******* | 0.427E-03 | 1.22 | ******** | 1.22 | 0.00 | .41175E+07 |
| 2962.21 | -0.13 | 1.22 | ******* | 0.410E-03 | 1.22 | ******** | 1.22 | 0.00 | .42317E+07 |
| 3042.18 | -0.13 | 1.22 | ******* | 0.394E-03 | 1.22 | ******** | 1.22 | 0.00 | .43460E+07 |
| 3122.14 | -0.13 | 1.22 | ******* | 0.379E-03 | 1.22 | ******** | 1.22 | 0.00 | .44602E+07 |
| 3202.11 | -0.13 | 1.22 | ******* | 0.365E-03 | 1.22 | ******** | 1.22 | 0.00 | .45744E+07 |
| 3282.07 | -0.13 | 1.22 | ******* | 0.352E-03 | 1.22 | ******** | 1.22 | 0.00 | .46887E+07 |
| 3362.04 | -0.13 | 1.22 | ******* | 0.339E-03 | 1.22 | ******** | 1.22 | 0.00 | .48029E+07 |
| 3442.00 | -0.13 | 1.22 | ******* | 0.328E-03 | 1.22 | ******** | 1.22 | 0.00 | .49171E+07 |
| 3521.97 | -0.13 | 1.22 | ******* | 0.316E-03 | 1.22 | ******** | 1.22 | 0.00 | .50314E+07 |
| 3601.93 | -0.13 | 1.22 | ******* | 0.306E-03 | 1.22 | ******** | 1.22 | 0.00 | .51456E+07 |
| 3681.90 | -0.13 | 1.22 | ******* | 0.296E-03 | 1.22 | ******** | 1.22 | 0.00 | .52599E+07 |
| 3761.86 | -0.13 | 1.22 | ******* | 0.287E-03 | 1.22 | ******** | 1.22 | 0.00 | .53741E+07 |
| 3841.83 | -0.13 | 1.22 | ******* | 0.278E-03 | 1.22 | ******** | 1.22 | 0.00 | .54883E+07 |
| 3921.79 | -0.13 | 1.22 | ******* | 0.269E-03 | 1.22 | ******** | 1.22 | 0.00 | .56026E+07 |
| 4001.76 | -0.13 | 1.22 | ******* | 0.261E-03 | 1.22 | ******** | 1.22 | 0.00 | .57168E+07 |
| 4081.72 | -0.13 | 1.22 | ******* | 0.254E-03 | 1.22 | ******** | 1.22 | 0.00 | .58310E+07 |
| 4161.69 | -0.13 | 1.22 | ******* | 0.246E-03 | 1.22 | ******** | 1.22 | 0.00 | .59453E+07 |
| 4241.65 | -0.13 | 1.22 | ******* | 0.240E-03 | 1.22 | ******** | 1.22 | 0.00 | .60595E+07 |
| 4321.61 | -0.13 | 1.22 | ******* | 0.233E-03 | 1.22 | ******** | 1.22 | 0.00 | .61737E+07 |
| 4401.58 | -0.13 | 1.22 | ******* | 0.227E-03 | 1.22 | ******** | 1.22 | 0.00 | .62880E+07 |
| 4481.54 | -0.13 | 1.22 | ******* | 0.221E-03 | 1.22 | ******** | 1.22 | 0.00 | .64022E+07 |
| 4561.51 | -0.13 | 1.22 | ******* | 0.215E-03 | 1.22 | ******** | 1.22 | 0.00 | .65164E+07 |
| 4641.47 | -0.13 | 1.22 | ******* | 0.209E-03 | 1.22 | ******** | 1.22 | 0.00 | .66307E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4721.44 | -0.13 | 1.22 | ******* | 0.204E-03 | 1.22 | ******** | 1.22 | 0.00 | .67449E+07 |
| 4801.40 | -0.13 | 1.22 | ******* | 0.199E-03 | 1.22 | ******** | 1.22 | 0.00 | .68591E+07 |
| 4881.37 | -0.13 | 1.22 | ******* | 0.194E-03 | 1.22 | ******** | 1.22 | 0.00 | .69734E+07 |
| 4961.33 | -0.13 | 1.22 | ******* | 0.189E-03 | 1.22 | ******** | 1.22 | 0.00 | .70876E+07 |
| 5041.30 | -0.13 | 1.22 | ******* | 0.185E-03 | 1.22 | ******** | 1.22 | 0.00 | .72019E+07 |
| 5121.26 | -0.13 | 1.22 | ******* | 0.181E-03 | 1.22 | ******** | 1.22 | 0.00 | .73161E+07 |
| 5201.23 | -0.13 | 1.22 | ******* | 0.176E-03 | 1.22 | ******** | 1.22 | 0.00 | .74303E+07 |
| 5281.19 | -0.13 | 1.22 | ******* | 0.172E-03 | 1.22 | ******** | 1.22 | 0.00 | .75446E+07 |
| 5361.16 | -0.13 | 1.22 | ******* | 0.169E-03 | 1.22 | ******** | 1.22 | 0.00 | .76588E+07 |
| 5441.12 | -0.13 | 1.22 | ******* | 0.165E-03 | 1.22 | ******** | 1.22 | 0.00 | .77730E+07 |
| 5521.09 | -0.13 | 1.22 | ******* | 0.161E-03 | 1.22 | ******** | 1.22 | 0.00 | .78873E+07 |
| 5601.05 | -0.13 | 1.22 | ******* | 0.158E-03 | 1.22 | ******** | 1.22 | 0.00 | .80015E+07 |
| 5681.02 | -0.13 | 1.22 | ******* | 0.155E-03 | 1.22 | ******** | 1.22 | 0.00 | .81157E+07 |
| 5760.98 | -0.13 | 1.22 | ******* | 0.151E-03 | 1.22 | ******** | 1.22 | 0.00 | .82300E+07 |
| 5840.95 | -0.13 | 1.22 | ******* | 0.148E-03 | 1.22 | ******** | 1.22 | 0.00 | .83442E+07 |
| 5920.91 | -0.13 | 1.22 | ******* | 0.145E-03 | 1.22 | ******** | 1.22 | 0.00 | .84584E+07 |
| 6000.88 | -0.13 | 1.22 | ******* | 0.142E-03 | 1.22 | ******** | 1.22 | 0.00 | .85727E+07 |
| 6080.84 | -0.13 | 1.22 | ******* | 0.140E-03 | 1.22 | ******** | 1.22 | 0.00 | .86869E+07 |
| 6160.81 | -0.13 | 1.22 | ******* | 0.137E-03 | 1.22 | ******** | 1.22 | 0.00 | .88012E+07 |
| 6240.77 | -0.13 | 1.22 | ******* | 0.134E-03 | 1.22 | ******** | 1.22 | 0.00 | .89154E+07 |
| 6320.74 | -0.13 | 1.22 | ******* | 0.132E-03 | 1.22 | ******** | 1.22 | 0.00 | .90296E+07 |
| 6400.70 | -0.13 | 1.22 | ******* | 0.129E-03 | 1.22 | ******** | 1.22 | 0.00 | .91439E+07 |
| 6480.67 | -0.13 | 1.22 | ******* | 0.127E-03 | 1.22 | ******** | 1.22 | 0.00 | .92581E+07 |
| 6560.63 | -0.13 | 1.22 | ******* | 0.125E-03 | 1.22 | ******** | 1.22 | 0.00 | .93723E+07 |
| 6640.60 | -0.13 | 1.22 | ******* | 0.122E-03 | 1.22 | ******** | 1.22 | 0.00 | .94866E+07 |
| 6720.56 | -0.13 | 1.22 | ******* | 0.120E-03 | 1.22 | ******** | 1.22 | 0.00 | .96008E+07 |
| 6800.52 | -0.13 | 1.22 | ******* | 0.118E-03 | 1.22 | ******** | 1.22 | 0.00 | .97150E+07 |
| 6880.49 | -0.13 | 1.22 | ******* | 0.116E-03 | 1.22 | ******** | 1.22 | 0.00 | .98293E+07 |
| 6960.45 | -0.13 | 1.22 | ******* | 0.114E-03 | 1.22 | ******** | 1.22 | 0.00 | .99435E+07 |
| 7040.42 | -0.13 | 1.22 | ******* | 0.112E-03 | 1.22 | ******** | 1.22 | 0.00 | .10058E+08 |
| 7120.38 | -0.13 | 1.22 | ******* | 0.110E-03 | 1.22 | ******** | 1.22 | 0.00 | .10172E+08 |
| 7200.35 | -0.13 | 1.22 | ******* | 0.108E-03 | 1.22 | ******** | 1.22 | 0.00 | .10286E+08 |
| 7280.31 | -0.13 | 1.22 | ******* | 0.107E-03 | 1.22 | ******** | 1.22 | 0.00 | .10400E+08 |
| 7360.28 | -0.13 | 1.22 | ******* | 0.105E-03 | 1.22 | ******** | 1.22 | 0.00 | .10515E+08 |
| 7440.24 | -0.13 | 1.22 | ******* | 0.103E-03 | 1.22 | ******** | 1.22 | 0.00 | .10629E+08 |
| 7520.21 | -0.13 | 1.22 | ******* | 0.101E-03 | 1.22 | ******** | 1.22 | 0.00 | .10743E+08 |
| 7600.17 | -0.13 | 1.22 | ******* | 0.999E-04 | 1.22 | ******** | 1.22 | 0.00 | .10857E+08 |
| 7680.14 | -0.13 | 1.22 | ******* | 0.983E-04 | 1.22 | ******** | 1.22 | 0.00 | .10972E+08 |
| 7760.10 | -0.13 | 1.22 | ******* | 0.968E-04 | 1.22 | ******** | 1.22 | 0.00 | .11086E+08 |
| 7840.07 | -0.13 | 1.22 | ******* | 0.954E-04 | 1.22 | ******** | 1.22 | 0.00 | .11200E+08 |
| 7920.03 | -0.13 | 1.22 | ******* | 0.939E-04 | 1.22 | ******** | 1.22 | 0.00 | .11314E+08 |
| 8000.00 | -0.13 | 1.22 | ******* | 0.925E-04 | 1.22 | ******** | 1.22 | 0.00 | .11429E+08 |

Cumulative travel time = 11428571.0000 sec ( 3174.60 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 8000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges End of Prediction File
111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX1 PREDICTION FILE:
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                    CORMIX MIXING ZONE EXPERT SYSTEM
                 Subsystem CORMIX1: Single Port Discharges
                         CORMIX Version 12.0GTD
                   HYDRO1 Version 12.0.0.0 December 2020
---------------------------------------------------------------------------------------------
---------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro West Pit
 Design case:       Year 37
 FILE NAME:         C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y37-WestPit.prd
 Time stamp:        04/06/2022--22:13:27

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    104.80  AS    =    159.40  QA    =      0.11  ICHREG= 1
 HA    =      1.52  HD    =      1.52
 UA    =      0.001 F     =      0.109 USTAR =0.7849E-04
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  RIGHT     DISTB =      0.13
 D0    =      0.112 A0    =      0.010 H0    =      1.52  SUB0  =      0.00
 THETA =      0.00  SIGMA =     90.00
 U0    =      1.414 Q0    =      0.014       =0.1400E-01
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.1400E-01  M0    =0.1979E-01  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.10  LM    =  99999.00  Lm    =    209.40  Lb    =      0.00
                              Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =   2104.31

FLOW CLASSIFICATION
 11111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4         1
 1  Applicable layer depth HS =    1.52         1
 1  Limiting Dilution S=QA/Q0 + 1=     8.65     1
 11111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
```

NSTD = 0
REGMZ = 0
XINT = 7000.00 XMAX = 7000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.13 m from the RIGHT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.52 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -82.00 SIGMAE= 89.92
LE = 0.56 XE = 0.00 YE = 0.08 ZE = 0.97

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.52 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .00000E+00 |
| 0.00 | 0.08 | 0.97 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .20844E-02 |
| 0.00 | 0.08 | 0.96 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .63034E-02 |
| 0.00 | 0.08 | 0.95 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .10589E-01 |
| 0.00 | 0.08 | 0.94 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .14942E-01 |
| 0.00 | 0.08 | 0.93 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .19362E-01 |
| 0.00 | 0.08 | 0.92 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .23849E-01 |
| 0.00 | 0.08 | 0.92 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .28403E-01 |
| 0.00 | 0.09 | 0.91 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .33024E-01 |
| 0.00 | 0.09 | 0.90 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .37712E-01 |
| 0.00 | 0.09 | 0.89 | 1.0 | 0.100E+03 | 0.06 | 1.414 | .42467E-01 |
| 0.00 | 0.09 | 0.88 | 1.0 | 0.100E+03 | 0.07 | 1.414 | .47289E-01 |
| 0.00 | 0.09 | 0.88 | 1.0 | 0.100E+03 | 0.07 | 1.414 | .52178E-01 |
| 0.00 | 0.09 | 0.87 | 1.0 | 0.996E+02 | 0.07 | 1.414 | .57134E-01 |
| 0.00 | 0.09 | 0.86 | 1.0 | 0.983E+02 | 0.07 | 1.414 | .62157E-01 |
| 0.00 | 0.09 | 0.85 | 1.0 | 0.970E+02 | 0.07 | 1.414 | .67247E-01 |
| 0.00 | 0.10 | 0.84 | 1.0 | 0.958E+02 | 0.07 | 1.414 | .72404E-01 |
| 0.00 | 0.10 | 0.83 | 1.1 | 0.945E+02 | 0.07 | 1.414 | .77628E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.10 | 0.83 | 1.1 | 0.933E+02 | 0.07 | 1.414 | .82919E-01 |
| 0.00 | 0.10 | 0.82 | 1.1 | 0.922E+02 | 0.07 | 1.414 | .88277E-01 |
| 0.00 | 0.10 | 0.81 | 1.1 | 0.911E+02 | 0.07 | 1.414 | .93701E-01 |
| 0.00 | 0.10 | 0.80 | 1.1 | 0.899E+02 | 0.07 | 1.414 | .99193E-01 |
| 0.00 | 0.10 | 0.79 | 1.1 | 0.889E+02 | 0.08 | 1.414 | .10475E+00 |
| 0.00 | 0.10 | 0.79 | 1.1 | 0.878E+02 | 0.08 | 1.414 | .11038E+00 |
| 0.00 | 0.10 | 0.78 | 1.2 | 0.868E+02 | 0.08 | 1.414 | .11607E+00 |
| 0.00 | 0.11 | 0.77 | 1.2 | 0.858E+02 | 0.08 | 1.414 | .12183E+00 |
| 0.00 | 0.11 | 0.76 | 1.2 | 0.848E+02 | 0.08 | 1.414 | .12766E+00 |
| 0.00 | 0.11 | 0.75 | 1.2 | 0.838E+02 | 0.08 | 1.399 | .13355E+00 |
| 0.00 | 0.11 | 0.74 | 1.2 | 0.829E+02 | 0.08 | 1.383 | .13951E+00 |
| 0.00 | 0.11 | 0.74 | 1.2 | 0.820E+02 | 0.08 | 1.368 | .14554E+00 |
| 0.00 | 0.11 | 0.73 | 1.2 | 0.811E+02 | 0.08 | 1.353 | .15164E+00 |
| 0.00 | 0.11 | 0.72 | 1.2 | 0.802E+02 | 0.08 | 1.338 | .15780E+00 |
| 0.00 | 0.11 | 0.71 | 1.3 | 0.793E+02 | 0.08 | 1.324 | .16403E+00 |
| 0.00 | 0.11 | 0.70 | 1.3 | 0.785E+02 | 0.09 | 1.310 | .17032E+00 |
| 0.00 | 0.12 | 0.70 | 1.3 | 0.777E+02 | 0.09 | 1.296 | .17668E+00 |
| 0.00 | 0.12 | 0.69 | 1.3 | 0.769E+02 | 0.09 | 1.283 | .18311E+00 |
| 0.00 | 0.12 | 0.68 | 1.3 | 0.761E+02 | 0.09 | 1.269 | .18961E+00 |
| 0.00 | 0.12 | 0.67 | 1.3 | 0.753E+02 | 0.09 | 1.257 | .19617E+00 |
| 0.00 | 0.12 | 0.66 | 1.3 | 0.745E+02 | 0.09 | 1.244 | .20281E+00 |
| 0.00 | 0.12 | 0.65 | 1.4 | 0.738E+02 | 0.09 | 1.231 | .20950E+00 |
| 0.00 | 0.12 | 0.65 | 1.4 | 0.731E+02 | 0.09 | 1.219 | .21627E+00 |
| 0.00 | 0.12 | 0.64 | 1.4 | 0.723E+02 | 0.09 | 1.207 | .22310E+00 |
| 0.00 | 0.13 | 0.63 | 1.4 | 0.716E+02 | 0.09 | 1.196 | .23000E+00 |
| 0.00 | 0.13 | 0.62 | 1.4 | 0.710E+02 | 0.09 | 1.184 | .23696E+00 |
| 0.00 | 0.13 | 0.61 | 1.4 | 0.703E+02 | 0.10 | 1.173 | .24400E+00 |
| 0.00 | 0.13 | 0.61 | 1.4 | 0.696E+02 | 0.10 | 1.162 | .25110E+00 |
| 0.00 | 0.13 | 0.60 | 1.4 | 0.690E+02 | 0.10 | 1.151 | .25826E+00 |
| 0.00 | 0.13 | 0.59 | 1.5 | 0.683E+02 | 0.10 | 1.140 | .26550E+00 |
| 0.00 | 0.13 | 0.58 | 1.5 | 0.677E+02 | 0.10 | 1.130 | .27280E+00 |
| 0.00 | 0.13 | 0.57 | 1.5 | 0.671E+02 | 0.10 | 1.120 | .28017E+00 |
| 0.00 | 0.13 | 0.56 | 1.5 | 0.665E+02 | 0.10 | 1.110 | .28760E+00 |
| 0.00 | 0.14 | 0.56 | 1.5 | 0.659E+02 | 0.10 | 1.100 | .29510E+00 |
| 0.00 | 0.14 | 0.55 | 1.5 | 0.653E+02 | 0.10 | 1.090 | .30267E+00 |
| 0.00 | 0.14 | 0.54 | 1.5 | 0.647E+02 | 0.10 | 1.081 | .31031E+00 |
| 0.00 | 0.14 | 0.53 | 1.6 | 0.642E+02 | 0.10 | 1.071 | .31801E+00 |
| 0.00 | 0.14 | 0.52 | 1.6 | 0.636E+02 | 0.11 | 1.062 | .32578E+00 |
| 0.00 | 0.14 | 0.52 | 1.6 | 0.631E+02 | 0.11 | 1.053 | .33362E+00 |
| 0.00 | 0.14 | 0.51 | 1.6 | 0.626E+02 | 0.11 | 1.044 | .34152E+00 |
| 0.00 | 0.14 | 0.50 | 1.6 | 0.620E+02 | 0.11 | 1.035 | .34949E+00 |
| 0.00 | 0.14 | 0.49 | 1.6 | 0.615E+02 | 0.11 | 1.027 | .35753E+00 |
| 0.00 | 0.15 | 0.48 | 1.6 | 0.610E+02 | 0.11 | 1.018 | .36563E+00 |
| 0.00 | 0.15 | 0.47 | 1.7 | 0.605E+02 | 0.11 | 1.010 | .37380E+00 |
| 0.00 | 0.15 | 0.47 | 1.7 | 0.600E+02 | 0.11 | 1.002 | .38204E+00 |
| 0.00 | 0.15 | 0.46 | 1.7 | 0.595E+02 | 0.11 | 0.994 | .39035E+00 |
| 0.00 | 0.15 | 0.45 | 1.7 | 0.591E+02 | 0.11 | 0.986 | .39872E+00 |
| 0.00 | 0.15 | 0.44 | 1.7 | 0.586E+02 | 0.11 | 0.978 | .40716E+00 |
| 0.00 | 0.15 | 0.43 | 1.7 | 0.581E+02 | 0.12 | 0.970 | .41567E+00 |
| 0.00 | 0.15 | 0.43 | 1.7 | 0.577E+02 | 0.12 | 0.963 | .42424E+00 |
| 0.00 | 0.16 | 0.42 | 1.7 | 0.572E+02 | 0.12 | 0.955 | .43288E+00 |
| 0.00 | 0.16 | 0.41 | 1.8 | 0.568E+02 | 0.12 | 0.948 | .44159E+00 |
| 0.00 | 0.16 | 0.40 | 1.8 | 0.564E+02 | 0.12 | 0.941 | .45036E+00 |
| 0.00 | 0.16 | 0.39 | 1.8 | 0.559E+02 | 0.12 | 0.933 | .45921E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.16 | 0.38 | 1.8 | 0.555E+02 | 0.12 | 0.926 | .46811E+00 |
| 0.00 | 0.16 | 0.38 | 1.8 | 0.551E+02 | 0.12 | 0.920 | .47709E+00 |
| 0.00 | 0.16 | 0.37 | 1.8 | 0.547E+02 | 0.12 | 0.913 | .48613E+00 |
| 0.00 | 0.16 | 0.36 | 1.8 | 0.543E+02 | 0.12 | 0.906 | .49524E+00 |
| 0.00 | 0.16 | 0.35 | 1.9 | 0.539E+02 | 0.12 | 0.899 | .50442E+00 |
| 0.00 | 0.17 | 0.34 | 1.9 | 0.535E+02 | 0.13 | 0.893 | .51366E+00 |
| 0.00 | 0.17 | 0.34 | 1.9 | 0.531E+02 | 0.13 | 0.886 | .52297E+00 |
| 0.00 | 0.17 | 0.33 | 1.9 | 0.527E+02 | 0.13 | 0.880 | .53235E+00 |
| 0.00 | 0.17 | 0.32 | 1.9 | 0.524E+02 | 0.13 | 0.874 | .54179E+00 |
| 0.00 | 0.17 | 0.31 | 1.9 | 0.520E+02 | 0.13 | 0.868 | .55131E+00 |
| 0.00 | 0.17 | 0.31 | 1.9 | 0.518E+02 | 0.13 | 0.865 | .55609E+00 |
| 0.00 | 0.17 | 0.30 | 1.9 | 0.515E+02 | 0.13 | 0.859 | .56570E+00 |
| 0.00 | 0.17 | 0.29 | 2.0 | 0.511E+02 | 0.13 | 0.853 | .57538E+00 |
| 0.00 | 0.17 | 0.28 | 2.0 | 0.508E+02 | 0.13 | 0.847 | .58512E+00 |
| 0.00 | 0.18 | 0.27 | 2.0 | 0.504E+02 | 0.13 | 0.841 | .59494E+00 |
| 0.00 | 0.18 | 0.27 | 2.0 | 0.501E+02 | 0.13 | 0.835 | .60482E+00 |
| 0.00 | 0.18 | 0.26 | 2.0 | 0.497E+02 | 0.14 | 0.830 | .61476E+00 |
| 0.00 | 0.18 | 0.25 | 2.0 | 0.494E+02 | 0.14 | 0.824 | .62478E+00 |
| 0.00 | 0.18 | 0.24 | 2.0 | 0.491E+02 | 0.14 | 0.819 | .63486E+00 |
| 0.00 | 0.18 | 0.23 | 2.1 | 0.487E+02 | 0.14 | 0.813 | .64501E+00 |
| 0.00 | 0.18 | 0.22 | 2.1 | 0.484E+02 | 0.14 | 0.808 | .65522E+00 |
| 0.00 | 0.18 | 0.22 | 2.1 | 0.481E+02 | 0.14 | 0.803 | .66550E+00 |
| 0.00 | 0.18 | 0.21 | 2.1 | 0.478E+02 | 0.14 | 0.798 | .67585E+00 |
| 0.00 | 0.19 | 0.20 | 2.1 | 0.475E+02 | 0.14 | 0.793 | .68627E+00 |
| 0.00 | 0.19 | 0.19 | 2.1 | 0.472E+02 | 0.14 | 0.787 | .69675E+00 |
| 0.00 | 0.19 | 0.18 | 2.1 | 0.469E+02 | 0.14 | 0.783 | .70730E+00 |
| 0.00 | 0.19 | 0.18 | 2.1 | 0.466E+02 | 0.14 | 0.778 | .71792E+00 |
| 0.00 | 0.19 | 0.17 | 2.2 | 0.463E+02 | 0.15 | 0.773 | .72860E+00 |
| 0.00 | 0.19 | 0.16 | 2.2 | 0.460E+02 | 0.15 | 0.768 | .73935E+00 |
| 0.00 | 0.19 | 0.15 | 2.2 | 0.457E+02 | 0.15 | 0.763 | .75017E+00 |

Cumulative travel time = 0.7502 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | 0.19 | 0.15 | 2.2 | 0.457E+02 | 0.15 | .75017E+00 |

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.15 | 82.82 | 1.52 | 2.2 | 0.457E+02 | 0.00 | 0.00 | 1.52 | 1.52 | .75017E+00 |
| 0.02 | 82.82 | 1.52 | 2.2 | 0.457E+02 | 1.52 | 6.63 | 1.52 | 0.00 | .30093E+02 |
| 0.19 | 82.82 | 1.52 | 2.2 | 0.447E+02 | 1.52 | 9.38 | 1.52 | 0.00 | .27836E+03 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.35 | 82.82 | 1.52 | 2.4 | 0.424E+02 | 1.52 | 11.49 | 1.52 | 0.00 | .52663E+03 |
| 0.52 | 82.82 | 1.52 | 2.5 | 0.398E+02 | 1.52 | 13.26 | 1.52 | 0.00 | .77490E+03 |
| 0.69 | 82.82 | 1.52 | 2.7 | 0.374E+02 | 1.52 | 14.83 | 1.52 | 0.00 | .10232E+04 |
| 0.85 | 82.82 | 1.52 | 2.8 | 0.355E+02 | 1.52 | 16.24 | 1.52 | 0.00 | .12714E+04 |
| 1.02 | 82.82 | 1.52 | 2.9 | 0.343E+02 | 1.52 | 17.54 | 1.52 | 0.00 | .15197E+04 |
| 1.19 | 82.82 | 1.52 | 3.0 | 0.335E+02 | 1.52 | 18.76 | 1.52 | 0.00 | .17680E+04 |
| 1.35 | 82.82 | 1.52 | 3.0 | 0.331E+02 | 1.52 | 19.89 | 1.52 | 0.00 | .20162E+04 |
| 1.52 | 82.82 | 1.52 | 3.1 | 0.327E+02 | 1.52 | 20.97 | 1.52 | 0.00 | .22645E+04 |

Cumulative travel time = 2264.5095 sec ( 0.63 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING
-----------------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

Bank nearest to plume centerline has changed.
Nearest bank is now on LEFT.
-----------------------------------------------------------------------------------------
BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------
BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.669E-03 m^2/s
Horizontal diffusivity (initial value) = 0.836E-03 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.52 | 82.82 | 1.52 | 3.1 | 0.327E+02 | 1.52 | 20.97 | 1.52 | 0.00 | .22645E+04 |
| 1.63 | 82.82 | 1.52 | 3.1 | 0.327E+02 | 1.52 | 20.98 | 1.52 | 0.00 | .24079E+04 |
| 1.74 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 20.99 | 1.52 | 0.00 | .25512E+04 |
| 1.85 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 21.00 | 1.52 | 0.00 | .26946E+04 |
| 1.96 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 21.01 | 1.52 | 0.00 | .28380E+04 |
| 2.07 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 21.01 | 1.52 | 0.00 | .29813E+04 |
| 2.18 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 21.02 | 1.52 | 0.00 | .31247E+04 |
| 2.28 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 21.03 | 1.52 | 0.00 | .32680E+04 |
| 2.39 | 82.82 | 1.52 | 3.1 | 0.326E+02 | 1.52 | 21.04 | 1.52 | 0.00 | .34114E+04 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2.50 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.05 | 1.52 | 0.00 | .35548E+04 |
| 2.61 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.06 | 1.52 | 0.00 | .36981E+04 |
| 2.72 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.07 | 1.52 | 0.00 | .38415E+04 |
| 2.83 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.08 | 1.52 | 0.00 | .39849E+04 |
| 2.94 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.09 | 1.52 | 0.00 | .41282E+04 |
| 3.05 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.10 | 1.52 | 0.00 | .42716E+04 |
| 3.16 | 82.82 | 1.52 | 3.1 | 0.325E+02 | 1.52 | 21.10 | 1.52 | 0.00 | .44149E+04 |
| 3.26 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.11 | 1.52 | 0.00 | .45583E+04 |
| 3.37 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.12 | 1.52 | 0.00 | .47017E+04 |
| 3.48 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.13 | 1.52 | 0.00 | .48450E+04 |
| 3.59 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.14 | 1.52 | 0.00 | .49884E+04 |
| 3.70 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.15 | 1.52 | 0.00 | .51317E+04 |
| 3.81 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.16 | 1.52 | 0.00 | .52751E+04 |
| 3.92 | 82.82 | 1.52 | 3.1 | 0.324E+02 | 1.52 | 21.17 | 1.52 | 0.00 | .54185E+04 |
| 4.03 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.18 | 1.52 | 0.00 | .55618E+04 |
| 4.14 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.18 | 1.52 | 0.00 | .57052E+04 |
| 4.24 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.19 | 1.52 | 0.00 | .58486E+04 |
| 4.35 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.20 | 1.52 | 0.00 | .59919E+04 |
| 4.46 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.21 | 1.52 | 0.00 | .61353E+04 |
| 4.57 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.22 | 1.52 | 0.00 | .62786E+04 |
| 4.68 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.23 | 1.52 | 0.00 | .64220E+04 |
| 4.79 | 82.82 | 1.52 | 3.1 | 0.323E+02 | 1.52 | 21.24 | 1.52 | 0.00 | .65654E+04 |
| 4.90 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.25 | 1.52 | 0.00 | .67087E+04 |
| 5.01 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.26 | 1.52 | 0.00 | .68521E+04 |
| 5.12 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.26 | 1.52 | 0.00 | .69954E+04 |
| 5.22 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.27 | 1.52 | 0.00 | .71388E+04 |
| 5.33 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.28 | 1.52 | 0.00 | .72822E+04 |
| 5.44 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.29 | 1.52 | 0.00 | .74255E+04 |
| 5.55 | 82.82 | 1.52 | 3.1 | 0.322E+02 | 1.52 | 21.30 | 1.52 | 0.00 | .75689E+04 |
| 5.66 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.31 | 1.52 | 0.00 | .77123E+04 |
| 5.77 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.32 | 1.52 | 0.00 | .78556E+04 |
| 5.88 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.33 | 1.52 | 0.00 | .79990E+04 |
| 5.99 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.33 | 1.52 | 0.00 | .81423E+04 |
| 6.10 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.34 | 1.52 | 0.00 | .82857E+04 |
| 6.21 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.35 | 1.52 | 0.00 | .84291E+04 |
| 6.31 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.36 | 1.52 | 0.00 | .85724E+04 |
| 6.42 | 82.82 | 1.52 | 3.1 | 0.321E+02 | 1.52 | 21.37 | 1.52 | 0.00 | .87158E+04 |
| 6.53 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.38 | 1.52 | 0.00 | .88592E+04 |
| 6.64 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.39 | 1.52 | 0.00 | .90025E+04 |
| 6.75 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.40 | 1.52 | 0.00 | .91459E+04 |
| 6.86 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.41 | 1.52 | 0.00 | .92892E+04 |
| 6.97 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.41 | 1.52 | 0.00 | .94326E+04 |
| 7.08 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.42 | 1.52 | 0.00 | .95760E+04 |
| 7.19 | 82.82 | 1.52 | 3.1 | 0.320E+02 | 1.52 | 21.43 | 1.52 | 0.00 | .97193E+04 |
| 7.29 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.44 | 1.52 | 0.00 | .98627E+04 |
| 7.40 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.45 | 1.52 | 0.00 | .10006E+05 |
| 7.51 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.46 | 1.52 | 0.00 | .10149E+05 |
| 7.62 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.47 | 1.52 | 0.00 | .10293E+05 |
| 7.73 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.48 | 1.52 | 0.00 | .10436E+05 |
| 7.84 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.48 | 1.52 | 0.00 | .10579E+05 |
| 7.95 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.49 | 1.52 | 0.00 | .10723E+05 |
| 8.06 | 82.82 | 1.52 | 3.1 | 0.319E+02 | 1.52 | 21.50 | 1.52 | 0.00 | .10866E+05 |
| 8.17 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.51 | 1.52 | 0.00 | .11010E+05 |
| 8.27 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.52 | 1.52 | 0.00 | .11153E+05 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8.38 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.53 | 1.52 | 0.00 | .11296E+05 |
| 8.49 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.54 | 1.52 | 0.00 | .11440E+05 |
| 8.60 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.55 | 1.52 | 0.00 | .11583E+05 |
| 8.71 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.55 | 1.52 | 0.00 | .11726E+05 |
| 8.82 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.56 | 1.52 | 0.00 | .11870E+05 |
| 8.93 | 82.82 | 1.52 | 3.1 | 0.318E+02 | 1.52 | 21.57 | 1.52 | 0.00 | .12013E+05 |
| 9.04 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.58 | 1.52 | 0.00 | .12156E+05 |
| 9.15 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.59 | 1.52 | 0.00 | .12300E+05 |
| 9.25 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.60 | 1.52 | 0.00 | .12443E+05 |
| 9.36 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.61 | 1.52 | 0.00 | .12587E+05 |
| 9.47 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.62 | 1.52 | 0.00 | .12730E+05 |
| 9.58 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.62 | 1.52 | 0.00 | .12873E+05 |
| 9.69 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.63 | 1.52 | 0.00 | .13017E+05 |
| 9.80 | 82.82 | 1.52 | 3.2 | 0.317E+02 | 1.52 | 21.64 | 1.52 | 0.00 | .13160E+05 |
| 9.91 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.65 | 1.52 | 0.00 | .13303E+05 |
| 10.02 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.66 | 1.52 | 0.00 | .13447E+05 |
| 10.13 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.67 | 1.52 | 0.00 | .13590E+05 |
| 10.23 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.68 | 1.52 | 0.00 | .13733E+05 |
| 10.34 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.69 | 1.52 | 0.00 | .13877E+05 |
| 10.45 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.69 | 1.52 | 0.00 | .14020E+05 |
| 10.56 | 82.82 | 1.52 | 3.2 | 0.316E+02 | 1.52 | 21.70 | 1.52 | 0.00 | .14164E+05 |
| 10.67 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.71 | 1.52 | 0.00 | .14307E+05 |
| 10.78 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.72 | 1.52 | 0.00 | .14450E+05 |
| 10.89 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.73 | 1.52 | 0.00 | .14594E+05 |
| 11.00 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.74 | 1.52 | 0.00 | .14737E+05 |
| 11.11 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.75 | 1.52 | 0.00 | .14880E+05 |
| 11.22 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.75 | 1.52 | 0.00 | .15024E+05 |
| 11.32 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.76 | 1.52 | 0.00 | .15167E+05 |
| 11.43 | 82.82 | 1.52 | 3.2 | 0.315E+02 | 1.52 | 21.77 | 1.52 | 0.00 | .15310E+05 |
| 11.54 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.78 | 1.52 | 0.00 | .15454E+05 |
| 11.65 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.79 | 1.52 | 0.00 | .15597E+05 |
| 11.76 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.80 | 1.52 | 0.00 | .15741E+05 |
| 11.87 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.81 | 1.52 | 0.00 | .15884E+05 |
| 11.98 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.82 | 1.52 | 0.00 | .16027E+05 |
| 12.09 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.82 | 1.52 | 0.00 | .16171E+05 |
| 12.20 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.83 | 1.52 | 0.00 | .16314E+05 |
| 12.30 | 82.82 | 1.52 | 3.2 | 0.314E+02 | 1.52 | 21.84 | 1.52 | 0.00 | .16457E+05 |
| 12.41 | 82.82 | 1.52 | 3.2 | 0.313E+02 | 1.52 | 21.85 | 1.52 | 0.00 | .16601E+05 |

Cumulative travel time = 16600.6914 sec ( 4.61 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 12.41 | 104.67 | 1.52 | 3.2 | 0.313E+02 | 1.52 | 43.70 | 1.52 | 0.00 | .16601E+05 |
| 82.29 | 104.67 | 1.52 | 3.4 | 0.295E+02 | 1.52 | 46.38 | 1.52 | 0.00 | .10858E+06 |
| 152.16 | 104.67 | 1.52 | 3.6 | 0.280E+02 | 1.52 | 48.92 | 1.52 | 0.00 | .20055E+06 |
| 222.04 | 104.67 | 1.52 | 3.7 | 0.267E+02 | 1.52 | 51.33 | 1.52 | 0.00 | .29253E+06 |
| 291.92 | 104.67 | 1.52 | 3.9 | 0.255E+02 | 1.52 | 53.63 | 1.52 | 0.00 | .38450E+06 |
| 361.79 | 104.67 | 1.52 | 4.1 | 0.245E+02 | 1.52 | 55.84 | 1.52 | 0.00 | .47648E+06 |
| 431.67 | 104.67 | 1.52 | 4.2 | 0.236E+02 | 1.52 | 57.96 | 1.52 | 0.00 | .56846E+06 |
| 501.54 | 104.67 | 1.52 | 4.4 | 0.228E+02 | 1.52 | 60.01 | 1.52 | 0.00 | .66043E+06 |
| 571.42 | 104.67 | 1.52 | 4.5 | 0.221E+02 | 1.52 | 61.99 | 1.52 | 0.00 | .75241E+06 |
| 641.30 | 104.67 | 1.52 | 4.7 | 0.214E+02 | 1.52 | 63.91 | 1.52 | 0.00 | .84438E+06 |
| 711.17 | 104.67 | 1.52 | 4.8 | 0.208E+02 | 1.52 | 65.77 | 1.52 | 0.00 | .93636E+06 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 781.05 | 104.67 | 1.52 | 4.9 | 0.203E+02 | 1.52 | 67.58 | 1.52 | 0.00 | .10283E+07 |
| 850.92 | 104.67 | 1.52 | 5.1 | 0.198E+02 | 1.52 | 69.35 | 1.52 | 0.00 | .11203E+07 |
| 920.80 | 104.67 | 1.52 | 5.2 | 0.193E+02 | 1.52 | 71.07 | 1.52 | 0.00 | .12123E+07 |
| 990.68 | 104.67 | 1.52 | 5.3 | 0.188E+02 | 1.52 | 72.75 | 1.52 | 0.00 | .13043E+07 |
| 1060.55 | 104.67 | 1.52 | 5.4 | 0.184E+02 | 1.52 | 74.39 | 1.52 | 0.00 | .13962E+07 |
| 1130.43 | 104.67 | 1.52 | 5.5 | 0.180E+02 | 1.52 | 76.00 | 1.52 | 0.00 | .14882E+07 |
| 1200.30 | 104.67 | 1.52 | 5.7 | 0.177E+02 | 1.52 | 77.57 | 1.52 | 0.00 | .15802E+07 |
| 1270.18 | 104.67 | 1.52 | 5.8 | 0.173E+02 | 1.52 | 79.11 | 1.52 | 0.00 | .16722E+07 |
| 1340.05 | 104.67 | 1.52 | 5.9 | 0.170E+02 | 1.52 | 80.63 | 1.52 | 0.00 | .17641E+07 |
| 1409.93 | 104.67 | 1.52 | 6.0 | 0.167E+02 | 1.52 | 82.11 | 1.52 | 0.00 | .18561E+07 |
| 1479.81 | 104.67 | 1.52 | 6.1 | 0.164E+02 | 1.52 | 83.57 | 1.52 | 0.00 | .19481E+07 |
| 1549.68 | 104.67 | 1.52 | 6.2 | 0.161E+02 | 1.52 | 85.00 | 1.52 | 0.00 | .20401E+07 |
| 1619.56 | 104.67 | 1.52 | 6.3 | 0.159E+02 | 1.52 | 86.41 | 1.52 | 0.00 | .21320E+07 |
| 1689.43 | 104.67 | 1.52 | 6.4 | 0.156E+02 | 1.52 | 87.80 | 1.52 | 0.00 | .22240E+07 |
| 1759.31 | 104.67 | 1.52 | 6.5 | 0.154E+02 | 1.52 | 89.16 | 1.52 | 0.00 | .23160E+07 |
| 1829.19 | 104.67 | 1.52 | 6.6 | 0.151E+02 | 1.52 | 90.51 | 1.52 | 0.00 | .24080E+07 |
| 1899.06 | 104.67 | 1.52 | 6.7 | 0.149E+02 | 1.52 | 91.83 | 1.52 | 0.00 | .24999E+07 |
| 1968.94 | 104.67 | 1.52 | 6.8 | 0.147E+02 | 1.52 | 93.14 | 1.52 | 0.00 | .25919E+07 |
| 2038.81 | 104.67 | 1.52 | 6.9 | 0.145E+02 | 1.52 | 94.43 | 1.52 | 0.00 | .26839E+07 |
| 2108.69 | 104.67 | 1.52 | 7.0 | 0.143E+02 | 1.52 | 95.70 | 1.52 | 0.00 | .27759E+07 |
| 2178.56 | 104.67 | 1.52 | 7.1 | 0.141E+02 | 1.52 | 96.95 | 1.52 | 0.00 | .28679E+07 |
| 2248.44 | 104.67 | 1.52 | 7.2 | 0.140E+02 | 1.52 | 98.19 | 1.52 | 0.00 | .29598E+07 |
| 2318.32 | 104.67 | 1.52 | 7.3 | 0.138E+02 | 1.52 | 99.41 | 1.52 | 0.00 | .30518E+07 |
| 2388.19 | 104.67 | 1.52 | 7.3 | 0.136E+02 | 1.52 | 100.62 | 1.52 | 0.00 | .31438E+07 |
| 2458.07 | 104.67 | 1.52 | 7.4 | 0.135E+02 | 1.52 | 101.82 | 1.52 | 0.00 | .32358E+07 |
| 2527.94 | 104.67 | 1.52 | 7.5 | 0.133E+02 | 1.52 | 103.00 | 1.52 | 0.00 | .33277E+07 |
| 2597.82 | 104.67 | 1.52 | 7.6 | 0.132E+02 | 1.52 | 104.16 | 1.52 | 0.00 | .34197E+07 |

The passive diffusion plume becomes LATERALLY FULLY MIXED over the channel
width during the current prediction interval.

The x-coordinate of bank attachment is 2636.39 m.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2667.70 | 104.67 | 1.52 | 7.7 | 0.130E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .35117E+07 |

Effluent is FULLY MIXED over the entire channel cross-section.

Except for possible far-field decay or reaction processes, there are
NO FURTHER CHANGES with downstream direction.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2737.57 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .36037E+07 |
| 2807.45 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .36956E+07 |
| 2877.32 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .37876E+07 |
| 2947.20 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .38796E+07 |
| 3017.08 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .39716E+07 |
| 3086.95 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .40635E+07 |
| 3156.83 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .41555E+07 |
| 3226.70 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .42475E+07 |
| 3296.58 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .43395E+07 |
| 3366.46 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .44314E+07 |
| 3436.33 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .45234E+07 |
| 3506.21 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .46154E+07 |
| 3576.08 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .47074E+07 |
| 3645.96 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .47993E+07 |
| 3715.84 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .48913E+07 |
| 3785.71 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .49833E+07 |
| 3855.59 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .50753E+07 |
| 3925.46 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .51672E+07 |
| 3995.34 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .52592E+07 |
| 4065.22 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .53512E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4135.09 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .54432E+07 |
| 4204.97 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .55352E+07 |
| 4274.84 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .56271E+07 |
| 4344.72 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .57191E+07 |
| 4414.60 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .58111E+07 |
| 4484.47 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .59031E+07 |
| 4554.35 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .59950E+07 |
| 4624.22 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .60870E+07 |
| 4694.10 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .61790E+07 |
| 4763.98 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .62710E+07 |
| 4833.85 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .63629E+07 |
| 4903.73 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .64549E+07 |
| 4973.60 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .65469E+07 |
| 5043.48 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .66389E+07 |
| 5113.36 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .67308E+07 |
| 5183.23 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .68228E+07 |
| 5253.11 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .69148E+07 |
| 5322.98 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .70068E+07 |
| 5392.86 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .70987E+07 |
| 5462.74 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .71907E+07 |
| 5532.61 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .72827E+07 |
| 5602.49 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .73747E+07 |
| 5672.36 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .74666E+07 |
| 5742.24 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .75586E+07 |
| 5812.12 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .76506E+07 |
| 5881.99 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .77426E+07 |
| 5951.87 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .78346E+07 |
| 6021.74 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .79265E+07 |
| 6091.62 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .80185E+07 |
| 6161.50 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .81105E+07 |
| 6231.37 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .82025E+07 |
| 6301.25 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .82944E+07 |
| 6371.12 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .83864E+07 |
| 6441.00 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .84784E+07 |
| 6510.88 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .85704E+07 |
| 6580.75 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .86623E+07 |
| 6650.63 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .87543E+07 |
| 6720.50 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .88463E+07 |
| 6790.38 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .89383E+07 |
| 6860.26 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .90302E+07 |
| 6930.13 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .91222E+07 |
| 7000.01 | 104.67 | 1.52 | 7.6 | 0.131E+02 | 1.52 | 104.80 | 1.52 | 0.00 | .92142E+07 |

Cumulative travel time = 9214182.0000 sec ( 2559.50 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX1 PREDICTION FILE:
111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
                  CORMIX MIXING ZONE EXPERT SYSTEM
               Subsystem CORMIX1: Single Port Discharges
                       CORMIX Version 12.0GTD
                 HYDRO1 Version 12.0.0.0 December 2020
------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro East Pit
 Design case:       Year 37
 FILE NAME:        C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y37-EastPit.prd
 Time stamp:       04/06/2022--22:15:25

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =     64.60  AS    =     78.76  QA    =      0.12  ICHREG= 2
 HA    =      1.22  HD    =      1.22
 UA    =      0.002 F     =      0.118 USTAR =0.1865E-03
 UW    =      2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U        RHOAM =  998.1636

DISCHARGE PARAMETERS (metric units)
 Above Surface Discharge:
 Re-computed discharge conditions at entry point at water surface.
 BANK  =  LEFT      DISTB =      0.12
 D0    =      0.089 A0    =      0.006 H0    =      1.22  SUB0  =      0.00
 THETA =      0.00  SIGMA =    270.00
 U0    =      1.411 Q0    =      0.009       =0.8700E-02
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1        KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES (metric units)
 Q0    =0.8700E-02  M0    =0.1227E-01  J0    =0.0000E+00  SIGNJ0=      1.0
 Associated length scales (meters)
 LQ    =      0.08  LM    =  99999.00  Lm    =     71.99  Lb    =      0.00
                          Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  R     =    916.79

FLOW CLASSIFICATION
 111111111111111111111111111111111111111111111
 1  Flow class (CORMIX1)      =    IPV4        1
 1  Applicable layer depth HS =    1.22        1
 1  Limiting Dilution S=QA/Q0 + 1=    14.93     1
 111111111111111111111111111111111111111111111

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
```

NSTD = 0
REGMZ = 0
XINT = 7000.00 XMAX = 7000.00

X-Y-Z COORDINATE SYSTEM:
ORIGIN is located at the bottom and below the center of the port:
0.12 m from the LEFT bank/shore.
X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN MOD101: DISCHARGE MODULE

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.04 | 1.411 | .00000E+00 |

END OF MOD101: DISCHARGE MODULE

-----------------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------------

BEGIN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet-like motion in weak crossflow.
UNSTABLE NEAR-FIELD: Jet/plume will mix over full layer depth.
Following MOD133 will include recirculation into jet region.

Zone of flow establishment: THETAE= -83.00 SIGMAE= 270.21
LE = 0.44 XE = 0.00 YE = -0.05 ZE = 0.78

Profile definitions:
B = Gaussian 1/e (37%) half-width, normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
Uc = Local centerline excess velocity (above ambient)
TT = Cumulative travel time

| X | Y | Z | S | C | B | Uc | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 1.22 | 1.0 | 0.100E+03 | 0.04 | 1.411 | .00000E+00 |
| 0.00 | -0.05 | 0.78 | 1.0 | 0.100E+03 | 0.04 | 1.411 | .16884E-02 |
| 0.00 | -0.05 | 0.78 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .33906E-02 |
| 0.00 | -0.06 | 0.77 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .85808E-02 |
| 0.00 | -0.06 | 0.76 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .12110E-01 |
| 0.00 | -0.06 | 0.75 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .15695E-01 |
| 0.00 | -0.06 | 0.75 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .19336E-01 |
| 0.00 | -0.06 | 0.74 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .23032E-01 |
| 0.00 | -0.06 | 0.73 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .26784E-01 |
| 0.00 | -0.06 | 0.73 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .30591E-01 |
| 0.00 | -0.06 | 0.72 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .34454E-01 |
| 0.00 | -0.06 | 0.72 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .36406E-01 |
| 0.00 | -0.06 | 0.71 | 1.0 | 0.100E+03 | 0.05 | 1.411 | .40353E-01 |
| 0.00 | -0.06 | 0.70 | 1.0 | 0.999E+02 | 0.05 | 1.411 | .44354E-01 |
| 0.00 | -0.06 | 0.70 | 1.0 | 0.986E+02 | 0.05 | 1.411 | .48412E-01 |
| 0.00 | -0.06 | 0.69 | 1.0 | 0.972E+02 | 0.05 | 1.411 | .52525E-01 |
| 0.00 | -0.07 | 0.68 | 1.0 | 0.959E+02 | 0.06 | 1.411 | .56693E-01 |
| 0.00 | -0.07 | 0.68 | 1.1 | 0.947E+02 | 0.06 | 1.411 | .60917E-01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.07 | 0.67 | 1.1 | 0.935E+02 | 0.06 | 1.411 | .65197E-01 |
| 0.00 | -0.07 | 0.66 | 1.1 | 0.923E+02 | 0.06 | 1.411 | .69532E-01 |
| 0.00 | -0.07 | 0.66 | 1.1 | 0.911E+02 | 0.06 | 1.411 | .73922E-01 |
| 0.00 | -0.07 | 0.65 | 1.1 | 0.900E+02 | 0.06 | 1.411 | .78369E-01 |
| 0.00 | -0.07 | 0.65 | 1.1 | 0.889E+02 | 0.06 | 1.411 | .82870E-01 |
| 0.00 | -0.07 | 0.64 | 1.1 | 0.878E+02 | 0.06 | 1.411 | .87428E-01 |
| 0.00 | -0.07 | 0.63 | 1.2 | 0.867E+02 | 0.06 | 1.411 | .92041E-01 |
| 0.00 | -0.07 | 0.63 | 1.2 | 0.857E+02 | 0.06 | 1.411 | .96709E-01 |
| 0.00 | -0.07 | 0.62 | 1.2 | 0.847E+02 | 0.06 | 1.410 | .10143E+00 |
| 0.00 | -0.07 | 0.61 | 1.2 | 0.837E+02 | 0.06 | 1.394 | .10621E+00 |
| 0.00 | -0.08 | 0.61 | 1.2 | 0.828E+02 | 0.06 | 1.378 | .11105E+00 |
| 0.00 | -0.08 | 0.60 | 1.2 | 0.818E+02 | 0.06 | 1.362 | .11594E+00 |
| 0.00 | -0.08 | 0.59 | 1.2 | 0.809E+02 | 0.07 | 1.347 | .12088E+00 |
| 0.00 | -0.08 | 0.59 | 1.2 | 0.800E+02 | 0.07 | 1.332 | .12589E+00 |
| 0.00 | -0.08 | 0.58 | 1.3 | 0.791E+02 | 0.07 | 1.318 | .13094E+00 |
| 0.00 | -0.08 | 0.57 | 1.3 | 0.783E+02 | 0.07 | 1.303 | .13606E+00 |
| 0.00 | -0.08 | 0.57 | 1.3 | 0.774E+02 | 0.07 | 1.289 | .14123E+00 |
| 0.00 | -0.08 | 0.56 | 1.3 | 0.766E+02 | 0.07 | 1.276 | .14645E+00 |
| 0.00 | -0.08 | 0.55 | 1.3 | 0.758E+02 | 0.07 | 1.262 | .15173E+00 |
| 0.00 | -0.08 | 0.55 | 1.3 | 0.750E+02 | 0.07 | 1.249 | .15706E+00 |
| 0.00 | -0.08 | 0.54 | 1.3 | 0.742E+02 | 0.07 | 1.236 | .16245E+00 |
| 0.00 | -0.08 | 0.53 | 1.4 | 0.735E+02 | 0.07 | 1.224 | .16790E+00 |
| 0.00 | -0.09 | 0.53 | 1.4 | 0.727E+02 | 0.07 | 1.211 | .17340E+00 |
| 0.00 | -0.09 | 0.52 | 1.4 | 0.720E+02 | 0.07 | 1.199 | .17896E+00 |
| 0.00 | -0.09 | 0.51 | 1.4 | 0.713E+02 | 0.07 | 1.187 | .18457E+00 |
| 0.00 | -0.09 | 0.51 | 1.4 | 0.706E+02 | 0.08 | 1.176 | .19024E+00 |
| 0.00 | -0.09 | 0.50 | 1.4 | 0.699E+02 | 0.08 | 1.164 | .19597E+00 |
| 0.00 | -0.09 | 0.49 | 1.4 | 0.693E+02 | 0.08 | 1.153 | .20174E+00 |
| 0.00 | -0.09 | 0.49 | 1.5 | 0.686E+02 | 0.08 | 1.142 | .20758E+00 |
| 0.00 | -0.09 | 0.48 | 1.5 | 0.680E+02 | 0.08 | 1.132 | .21347E+00 |
| 0.00 | -0.09 | 0.47 | 1.5 | 0.673E+02 | 0.08 | 1.121 | .21942E+00 |
| 0.00 | -0.09 | 0.47 | 1.5 | 0.667E+02 | 0.08 | 1.111 | .22542E+00 |
| 0.00 | -0.09 | 0.46 | 1.5 | 0.661E+02 | 0.08 | 1.101 | .23148E+00 |
| 0.00 | -0.09 | 0.45 | 1.5 | 0.655E+02 | 0.08 | 1.091 | .23759E+00 |
| 0.00 | -0.09 | 0.45 | 1.5 | 0.649E+02 | 0.08 | 1.081 | .24376E+00 |
| 0.00 | -0.10 | 0.44 | 1.6 | 0.643E+02 | 0.08 | 1.071 | .24998E+00 |
| 0.00 | -0.10 | 0.43 | 1.6 | 0.638E+02 | 0.08 | 1.062 | .25626E+00 |
| 0.00 | -0.10 | 0.43 | 1.6 | 0.632E+02 | 0.08 | 1.052 | .26260E+00 |
| 0.00 | -0.10 | 0.42 | 1.6 | 0.627E+02 | 0.08 | 1.043 | .26899E+00 |
| 0.00 | -0.10 | 0.41 | 1.6 | 0.621E+02 | 0.09 | 1.034 | .27543E+00 |
| 0.00 | -0.10 | 0.41 | 1.6 | 0.616E+02 | 0.09 | 1.025 | .28194E+00 |
| 0.00 | -0.10 | 0.40 | 1.6 | 0.611E+02 | 0.09 | 1.017 | .28849E+00 |
| 0.00 | -0.10 | 0.39 | 1.7 | 0.606E+02 | 0.09 | 1.008 | .29511E+00 |
| 0.00 | -0.10 | 0.39 | 1.7 | 0.600E+02 | 0.09 | 1.000 | .30177E+00 |
| 0.00 | -0.10 | 0.38 | 1.7 | 0.596E+02 | 0.09 | 0.992 | .30850E+00 |
| 0.00 | -0.10 | 0.37 | 1.7 | 0.591E+02 | 0.09 | 0.984 | .31528E+00 |
| 0.00 | -0.10 | 0.37 | 1.7 | 0.586E+02 | 0.09 | 0.976 | .32211E+00 |
| 0.00 | -0.11 | 0.36 | 1.7 | 0.581E+02 | 0.09 | 0.968 | .32900E+00 |
| 0.00 | -0.11 | 0.35 | 1.7 | 0.577E+02 | 0.09 | 0.960 | .33595E+00 |
| 0.00 | -0.11 | 0.35 | 1.7 | 0.572E+02 | 0.09 | 0.952 | .34295E+00 |
| 0.00 | -0.11 | 0.34 | 1.8 | 0.567E+02 | 0.09 | 0.945 | .35001E+00 |
| 0.00 | -0.11 | 0.33 | 1.8 | 0.563E+02 | 0.09 | 0.938 | .35712E+00 |
| 0.00 | -0.11 | 0.33 | 1.8 | 0.559E+02 | 0.10 | 0.930 | .36429E+00 |
| 0.00 | -0.11 | 0.32 | 1.8 | 0.554E+02 | 0.10 | 0.923 | .37152E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.00 | -0.11 | 0.31 | 1.8 | 0.550E+02 | 0.10 | 0.916 | .37879E+00 |
| 0.00 | -0.11 | 0.31 | 1.8 | 0.546E+02 | 0.10 | 0.909 | .38613E+00 |
| 0.00 | -0.11 | 0.30 | 1.8 | 0.542E+02 | 0.10 | 0.902 | .39352E+00 |
| 0.00 | -0.11 | 0.29 | 1.9 | 0.538E+02 | 0.10 | 0.896 | .40097E+00 |
| 0.00 | -0.11 | 0.29 | 1.9 | 0.534E+02 | 0.10 | 0.889 | .40847E+00 |
| 0.00 | -0.12 | 0.28 | 1.9 | 0.530E+02 | 0.10 | 0.883 | .41603E+00 |
| 0.00 | -0.12 | 0.27 | 1.9 | 0.526E+02 | 0.10 | 0.876 | .42364E+00 |
| 0.00 | -0.12 | 0.27 | 1.9 | 0.522E+02 | 0.10 | 0.870 | .43131E+00 |
| 0.00 | -0.12 | 0.26 | 1.9 | 0.519E+02 | 0.10 | 0.863 | .43903E+00 |
| 0.00 | -0.12 | 0.25 | 1.9 | 0.515E+02 | 0.10 | 0.857 | .44681E+00 |
| 0.00 | -0.12 | 0.25 | 2.0 | 0.511E+02 | 0.10 | 0.851 | .45465E+00 |
| 0.00 | -0.12 | 0.24 | 2.0 | 0.508E+02 | 0.10 | 0.845 | .46254E+00 |
| 0.00 | -0.12 | 0.23 | 2.0 | 0.504E+02 | 0.11 | 0.839 | .47048E+00 |
| 0.00 | -0.12 | 0.23 | 2.0 | 0.501E+02 | 0.11 | 0.834 | .47849E+00 |
| 0.00 | -0.12 | 0.22 | 2.0 | 0.497E+02 | 0.11 | 0.828 | .48654E+00 |
| 0.00 | -0.12 | 0.21 | 2.0 | 0.494E+02 | 0.11 | 0.822 | .49466E+00 |
| 0.00 | -0.12 | 0.21 | 2.0 | 0.490E+02 | 0.11 | 0.817 | .50283E+00 |
| 0.00 | -0.13 | 0.20 | 2.1 | 0.487E+02 | 0.11 | 0.811 | .51105E+00 |
| 0.00 | -0.13 | 0.19 | 2.1 | 0.484E+02 | 0.11 | 0.806 | .51933E+00 |
| 0.00 | -0.13 | 0.19 | 2.1 | 0.481E+02 | 0.11 | 0.800 | .52766E+00 |
| 0.00 | -0.13 | 0.18 | 2.1 | 0.477E+02 | 0.11 | 0.795 | .53606E+00 |
| 0.00 | -0.13 | 0.17 | 2.1 | 0.474E+02 | 0.11 | 0.790 | .54450E+00 |
| 0.00 | -0.13 | 0.17 | 2.1 | 0.471E+02 | 0.11 | 0.785 | .55300E+00 |
| 0.00 | -0.13 | 0.16 | 2.1 | 0.468E+02 | 0.11 | 0.780 | .56156E+00 |
| 0.00 | -0.13 | 0.15 | 2.1 | 0.465E+02 | 0.11 | 0.775 | .57017E+00 |
| 0.00 | -0.13 | 0.15 | 2.2 | 0.462E+02 | 0.11 | 0.770 | .57884E+00 |
| 0.00 | -0.13 | 0.14 | 2.2 | 0.459E+02 | 0.12 | 0.765 | .58757E+00 |
| 0.00 | -0.13 | 0.13 | 2.2 | 0.456E+02 | 0.12 | 0.760 | .59635E+00 |
| 0.00 | -0.13 | 0.13 | 2.2 | 0.453E+02 | 0.12 | 0.755 | .60518E+00 |
| 0.00 | -0.13 | 0.12 | 2.2 | 0.451E+02 | 0.12 | 0.750 | .61407E+00 |

Cumulative travel time = 0.6141 sec ( 0.00 hrs)

END OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

Control volume inflow:

| X | Y | Z | S | C | B | TT |
|---|---|---|---|---|---|---|
| 0.00 | -0.13 | 0.12 | 2.2 | 0.451E+02 | 0.12 | .61407E+00 |

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| -0.12 | -24.81 | 1.22 | 2.2 | 0.451E+02 | 0.00 | 0.00 | 1.22 | 1.22 | .61407E+00 |
| 0.02 | -24.81 | 1.22 | 2.2 | 0.450E+02 | 1.22 | 2.28 | 1.22 | 0.00 | .10944E+02 |
| 0.15 | -24.81 | 1.22 | 2.3 | 0.440E+02 | 1.22 | 3.22 | 1.22 | 0.00 | .97827E+02 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0.28 | -24.81 | 1.22 | 2.4 | 0.418E+02 | 1.22 | 3.95 | 1.22 | 0.00 | .18471E+03 |
| 0.42 | -24.81 | 1.22 | 2.6 | 0.392E+02 | 1.22 | 4.56 | 1.22 | 0.00 | .27159E+03 |
| 0.55 | -24.81 | 1.22 | 2.7 | 0.368E+02 | 1.22 | 5.09 | 1.22 | 0.00 | .35848E+03 |
| 0.69 | -24.81 | 1.22 | 2.9 | 0.350E+02 | 1.22 | 5.58 | 1.22 | 0.00 | .44536E+03 |
| 0.82 | -24.81 | 1.22 | 3.0 | 0.338E+02 | 1.22 | 6.03 | 1.22 | 0.00 | .53225E+03 |
| 0.95 | -24.81 | 1.22 | 3.0 | 0.330E+02 | 1.22 | 6.44 | 1.22 | 0.00 | .61913E+03 |
| 1.09 | -24.81 | 1.22 | 3.1 | 0.326E+02 | 1.22 | 6.83 | 1.22 | 0.00 | .70601E+03 |
| 1.22 | -24.81 | 1.22 | 3.1 | 0.322E+02 | 1.22 | 7.20 | 1.22 | 0.00 | .79290E+03 |

Cumulative travel time = 792.8961 sec ( 0.22 hrs)

END OF MOD133: LAYER BOUNDARY IMPINGEMENT/FULL VERTICAL MIXING

-----------------------------------------------------------------------------------------

** End of NEAR-FIELD REGION (NFR) **

-----------------------------------------------------------------------------------------

BEGIN MOD141: BUOYANT AMBIENT SPREADING

Discharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD141: BUOYANT AMBIENT SPREADING

-----------------------------------------------------------------------------------------

-----------------------------------------------------------------------------------------

BEGIN MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.536E-03 m^2/s
Horizontal diffusivity (initial value) = 0.134E-02 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

Profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed
BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction
ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)
TT = Cumulative travel time

Plume Stage 1 (not bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 1.22 | -24.81 | 1.22 | 3.1 | 0.322E+02 | 1.22 | 7.20 | 1.22 | 0.00 | .79290E+03 |
| 3.45 | -24.81 | 1.22 | 3.3 | 0.306E+02 | 1.22 | 7.59 | 1.22 | 0.00 | .21457E+04 |
| 5.68 | -24.81 | 1.22 | 3.4 | 0.291E+02 | 1.22 | 7.96 | 1.22 | 0.00 | .34986E+04 |
| 7.91 | -24.81 | 1.22 | 3.6 | 0.279E+02 | 1.22 | 8.31 | 1.22 | 0.00 | .48515E+04 |
| 10.15 | -24.81 | 1.22 | 3.7 | 0.268E+02 | 1.22 | 8.64 | 1.22 | 0.00 | .62043E+04 |
| 12.38 | -24.81 | 1.22 | 3.9 | 0.259E+02 | 1.22 | 8.97 | 1.22 | 0.00 | .75572E+04 |
| 14.61 | -24.81 | 1.22 | 4.0 | 0.250E+02 | 1.22 | 9.28 | 1.22 | 0.00 | .89100E+04 |
| 16.84 | -24.81 | 1.22 | 4.1 | 0.242E+02 | 1.22 | 9.58 | 1.22 | 0.00 | .10263E+05 |
| 19.07 | -24.81 | 1.22 | 4.3 | 0.235E+02 | 1.22 | 9.87 | 1.22 | 0.00 | .11616E+05 |
| 21.30 | -24.81 | 1.22 | 4.4 | 0.228E+02 | 1.22 | 10.16 | 1.22 | 0.00 | .12969E+05 |
| 23.53 | -24.81 | 1.22 | 4.5 | 0.222E+02 | 1.22 | 10.43 | 1.22 | 0.00 | .14321E+05 |
| 25.76 | -24.81 | 1.22 | 4.6 | 0.217E+02 | 1.22 | 10.70 | 1.22 | 0.00 | .15674E+05 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 28.00 | -24.81 | 1.22 | 4.7 | 0.211E+02 | 1.22 | 10.97 | 1.22 | 0.00 | .17027E+05 |
| 30.23 | -24.81 | 1.22 | 4.8 | 0.207E+02 | 1.22 | 11.22 | 1.22 | 0.00 | .18380E+05 |
| 32.46 | -24.81 | 1.22 | 4.9 | 0.202E+02 | 1.22 | 11.47 | 1.22 | 0.00 | .19733E+05 |
| 34.69 | -24.81 | 1.22 | 5.1 | 0.198E+02 | 1.22 | 11.72 | 1.22 | 0.00 | .21086E+05 |
| 36.92 | -24.81 | 1.22 | 5.2 | 0.194E+02 | 1.22 | 11.96 | 1.22 | 0.00 | .22439E+05 |
| 39.15 | -24.81 | 1.22 | 5.3 | 0.190E+02 | 1.22 | 12.20 | 1.22 | 0.00 | .23791E+05 |
| 41.38 | -24.81 | 1.22 | 5.4 | 0.187E+02 | 1.22 | 12.43 | 1.22 | 0.00 | .25144E+05 |
| 43.61 | -24.81 | 1.22 | 5.5 | 0.183E+02 | 1.22 | 12.66 | 1.22 | 0.00 | .26497E+05 |
| 45.85 | -24.81 | 1.22 | 5.6 | 0.180E+02 | 1.22 | 12.88 | 1.22 | 0.00 | .27850E+05 |
| 48.08 | -24.81 | 1.22 | 5.6 | 0.177E+02 | 1.22 | 13.10 | 1.22 | 0.00 | .29203E+05 |
| 50.31 | -24.81 | 1.22 | 5.7 | 0.174E+02 | 1.22 | 13.31 | 1.22 | 0.00 | .30556E+05 |
| 52.54 | -24.81 | 1.22 | 5.8 | 0.171E+02 | 1.22 | 13.53 | 1.22 | 0.00 | .31909E+05 |
| 54.77 | -24.81 | 1.22 | 5.9 | 0.169E+02 | 1.22 | 13.74 | 1.22 | 0.00 | .33261E+05 |
| 57.00 | -24.81 | 1.22 | 6.0 | 0.166E+02 | 1.22 | 13.94 | 1.22 | 0.00 | .34614E+05 |
| 59.23 | -24.81 | 1.22 | 6.1 | 0.164E+02 | 1.22 | 14.14 | 1.22 | 0.00 | .35967E+05 |
| 61.46 | -24.81 | 1.22 | 6.2 | 0.162E+02 | 1.22 | 14.34 | 1.22 | 0.00 | .37320E+05 |
| 63.70 | -24.81 | 1.22 | 6.3 | 0.159E+02 | 1.22 | 14.54 | 1.22 | 0.00 | .38673E+05 |
| 65.93 | -24.81 | 1.22 | 6.4 | 0.157E+02 | 1.22 | 14.74 | 1.22 | 0.00 | .40026E+05 |
| 68.16 | -24.81 | 1.22 | 6.4 | 0.155E+02 | 1.22 | 14.93 | 1.22 | 0.00 | .41378E+05 |
| 70.39 | -24.81 | 1.22 | 6.5 | 0.153E+02 | 1.22 | 15.12 | 1.22 | 0.00 | .42731E+05 |
| 72.62 | -24.81 | 1.22 | 6.6 | 0.151E+02 | 1.22 | 15.31 | 1.22 | 0.00 | .44084E+05 |
| 74.85 | -24.81 | 1.22 | 6.7 | 0.150E+02 | 1.22 | 15.49 | 1.22 | 0.00 | .45437E+05 |
| 77.08 | -24.81 | 1.22 | 6.8 | 0.148E+02 | 1.22 | 15.67 | 1.22 | 0.00 | .46790E+05 |
| 79.31 | -24.81 | 1.22 | 6.8 | 0.146E+02 | 1.22 | 15.85 | 1.22 | 0.00 | .48143E+05 |
| 81.55 | -24.81 | 1.22 | 6.9 | 0.145E+02 | 1.22 | 16.03 | 1.22 | 0.00 | .49496E+05 |
| 83.78 | -24.81 | 1.22 | 7.0 | 0.143E+02 | 1.22 | 16.21 | 1.22 | 0.00 | .50848E+05 |
| 86.01 | -24.81 | 1.22 | 7.1 | 0.142E+02 | 1.22 | 16.38 | 1.22 | 0.00 | .52201E+05 |
| 88.24 | -24.81 | 1.22 | 7.1 | 0.140E+02 | 1.22 | 16.56 | 1.22 | 0.00 | .53554E+05 |
| 90.47 | -24.81 | 1.22 | 7.2 | 0.139E+02 | 1.22 | 16.73 | 1.22 | 0.00 | .54907E+05 |
| 92.70 | -24.81 | 1.22 | 7.3 | 0.137E+02 | 1.22 | 16.90 | 1.22 | 0.00 | .56260E+05 |
| 94.93 | -24.81 | 1.22 | 7.4 | 0.136E+02 | 1.22 | 17.07 | 1.22 | 0.00 | .57613E+05 |
| 97.17 | -24.81 | 1.22 | 7.4 | 0.135E+02 | 1.22 | 17.23 | 1.22 | 0.00 | .58966E+05 |
| 99.40 | -24.81 | 1.22 | 7.5 | 0.133E+02 | 1.22 | 17.40 | 1.22 | 0.00 | .60318E+05 |
| 101.63 | -24.81 | 1.22 | 7.6 | 0.132E+02 | 1.22 | 17.56 | 1.22 | 0.00 | .61671E+05 |
| 103.86 | -24.81 | 1.22 | 7.6 | 0.131E+02 | 1.22 | 17.72 | 1.22 | 0.00 | .63024E+05 |
| 106.09 | -24.81 | 1.22 | 7.7 | 0.130E+02 | 1.22 | 17.88 | 1.22 | 0.00 | .64377E+05 |
| 108.32 | -24.81 | 1.22 | 7.8 | 0.129E+02 | 1.22 | 18.04 | 1.22 | 0.00 | .65730E+05 |
| 110.55 | -24.81 | 1.22 | 7.8 | 0.127E+02 | 1.22 | 18.20 | 1.22 | 0.00 | .67083E+05 |
| 112.78 | -24.81 | 1.22 | 7.9 | 0.126E+02 | 1.22 | 18.35 | 1.22 | 0.00 | .68436E+05 |
| 115.02 | -24.81 | 1.22 | 8.0 | 0.125E+02 | 1.22 | 18.51 | 1.22 | 0.00 | .69788E+05 |
| 117.25 | -24.81 | 1.22 | 8.0 | 0.124E+02 | 1.22 | 18.66 | 1.22 | 0.00 | .71141E+05 |
| 119.48 | -24.81 | 1.22 | 8.1 | 0.123E+02 | 1.22 | 18.81 | 1.22 | 0.00 | .72494E+05 |
| 121.71 | -24.81 | 1.22 | 8.2 | 0.122E+02 | 1.22 | 18.96 | 1.22 | 0.00 | .73847E+05 |
| 123.94 | -24.81 | 1.22 | 8.2 | 0.121E+02 | 1.22 | 19.11 | 1.22 | 0.00 | .75200E+05 |
| 126.17 | -24.81 | 1.22 | 8.3 | 0.120E+02 | 1.22 | 19.26 | 1.22 | 0.00 | .76553E+05 |
| 128.40 | -24.81 | 1.22 | 8.4 | 0.119E+02 | 1.22 | 19.41 | 1.22 | 0.00 | .77906E+05 |
| 130.63 | -24.81 | 1.22 | 8.4 | 0.119E+02 | 1.22 | 19.56 | 1.22 | 0.00 | .79258E+05 |
| 132.87 | -24.81 | 1.22 | 8.5 | 0.118E+02 | 1.22 | 19.70 | 1.22 | 0.00 | .80611E+05 |
| 135.10 | -24.81 | 1.22 | 8.6 | 0.117E+02 | 1.22 | 19.84 | 1.22 | 0.00 | .81964E+05 |
| 137.33 | -24.81 | 1.22 | 8.6 | 0.116E+02 | 1.22 | 19.99 | 1.22 | 0.00 | .83317E+05 |
| 139.56 | -24.81 | 1.22 | 8.7 | 0.115E+02 | 1.22 | 20.13 | 1.22 | 0.00 | .84670E+05 |
| 141.79 | -24.81 | 1.22 | 8.7 | 0.114E+02 | 1.22 | 20.27 | 1.22 | 0.00 | .86023E+05 |
| 144.02 | -24.81 | 1.22 | 8.8 | 0.114E+02 | 1.22 | 20.41 | 1.22 | 0.00 | .87375E+05 |
| 146.25 | -24.81 | 1.22 | 8.9 | 0.113E+02 | 1.22 | 20.55 | 1.22 | 0.00 | .88728E+05 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 148.48 | -24.81 | 1.22 | 8.9 | 0.112E+02 | 1.22 | 20.69 | 1.22 | 0.00 | .90081E+05 |
| 150.72 | -24.81 | 1.22 | 9.0 | 0.111E+02 | 1.22 | 20.83 | 1.22 | 0.00 | .91434E+05 |
| 152.95 | -24.81 | 1.22 | 9.0 | 0.111E+02 | 1.22 | 20.96 | 1.22 | 0.00 | .92787E+05 |
| 155.18 | -24.81 | 1.22 | 9.1 | 0.110E+02 | 1.22 | 21.10 | 1.22 | 0.00 | .94140E+05 |
| 157.41 | -24.81 | 1.22 | 9.2 | 0.109E+02 | 1.22 | 21.23 | 1.22 | 0.00 | .95493E+05 |
| 159.64 | -24.81 | 1.22 | 9.2 | 0.109E+02 | 1.22 | 21.37 | 1.22 | 0.00 | .96845E+05 |
| 161.87 | -24.81 | 1.22 | 9.3 | 0.108E+02 | 1.22 | 21.50 | 1.22 | 0.00 | .98198E+05 |
| 164.10 | -24.81 | 1.22 | 9.3 | 0.107E+02 | 1.22 | 21.63 | 1.22 | 0.00 | .99551E+05 |
| 166.33 | -24.81 | 1.22 | 9.4 | 0.107E+02 | 1.22 | 21.76 | 1.22 | 0.00 | .10090E+06 |
| 168.57 | -24.81 | 1.22 | 9.4 | 0.106E+02 | 1.22 | 21.89 | 1.22 | 0.00 | .10226E+06 |
| 170.80 | -24.81 | 1.22 | 9.5 | 0.105E+02 | 1.22 | 22.02 | 1.22 | 0.00 | .10361E+06 |
| 173.03 | -24.81 | 1.22 | 9.6 | 0.105E+02 | 1.22 | 22.15 | 1.22 | 0.00 | .10496E+06 |
| 175.26 | -24.81 | 1.22 | 9.6 | 0.104E+02 | 1.22 | 22.28 | 1.22 | 0.00 | .10632E+06 |
| 177.49 | -24.81 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 22.41 | 1.22 | 0.00 | .10767E+06 |
| 179.72 | -24.81 | 1.22 | 9.7 | 0.103E+02 | 1.22 | 22.53 | 1.22 | 0.00 | .10902E+06 |
| 181.95 | -24.81 | 1.22 | 9.8 | 0.102E+02 | 1.22 | 22.66 | 1.22 | 0.00 | .11037E+06 |
| 184.18 | -24.81 | 1.22 | 9.8 | 0.102E+02 | 1.22 | 22.79 | 1.22 | 0.00 | .11173E+06 |
| 186.42 | -24.81 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 22.91 | 1.22 | 0.00 | .11308E+06 |
| 188.65 | -24.81 | 1.22 | 9.9 | 0.101E+02 | 1.22 | 23.03 | 1.22 | 0.00 | .11443E+06 |
| 190.88 | -24.81 | 1.22 | 10.0 | 0.100E+02 | 1.22 | 23.16 | 1.22 | 0.00 | .11579E+06 |
| 193.11 | -24.81 | 1.22 | 10.0 | 0.996E+01 | 1.22 | 23.28 | 1.22 | 0.00 | .11714E+06 |
| 195.34 | -24.81 | 1.22 | 10.1 | 0.991E+01 | 1.22 | 23.40 | 1.22 | 0.00 | .11849E+06 |
| 197.57 | -24.81 | 1.22 | 10.1 | 0.986E+01 | 1.22 | 23.52 | 1.22 | 0.00 | .11984E+06 |
| 199.80 | -24.81 | 1.22 | 10.2 | 0.981E+01 | 1.22 | 23.64 | 1.22 | 0.00 | .12120E+06 |
| 202.04 | -24.81 | 1.22 | 10.2 | 0.976E+01 | 1.22 | 23.76 | 1.22 | 0.00 | .12255E+06 |
| 204.27 | -24.81 | 1.22 | 10.3 | 0.971E+01 | 1.22 | 23.88 | 1.22 | 0.00 | .12390E+06 |
| 206.50 | -24.81 | 1.22 | 10.4 | 0.966E+01 | 1.22 | 24.00 | 1.22 | 0.00 | .12526E+06 |
| 208.73 | -24.81 | 1.22 | 10.4 | 0.961E+01 | 1.22 | 24.12 | 1.22 | 0.00 | .12661E+06 |
| 210.96 | -24.81 | 1.22 | 10.5 | 0.957E+01 | 1.22 | 24.24 | 1.22 | 0.00 | .12796E+06 |
| 213.19 | -24.81 | 1.22 | 10.5 | 0.952E+01 | 1.22 | 24.36 | 1.22 | 0.00 | .12931E+06 |
| 215.42 | -24.81 | 1.22 | 10.6 | 0.947E+01 | 1.22 | 24.47 | 1.22 | 0.00 | .13067E+06 |
| 217.65 | -24.81 | 1.22 | 10.6 | 0.943E+01 | 1.22 | 24.59 | 1.22 | 0.00 | .13202E+06 |
| 219.89 | -24.81 | 1.22 | 10.7 | 0.938E+01 | 1.22 | 24.71 | 1.22 | 0.00 | .13337E+06 |
| 222.12 | -24.81 | 1.22 | 10.7 | 0.934E+01 | 1.22 | 24.82 | 1.22 | 0.00 | .13473E+06 |
| 224.35 | -24.81 | 1.22 | 10.8 | 0.930E+01 | 1.22 | 24.94 | 1.22 | 0.00 | .13608E+06 |

Cumulative travel time = 136078.2188 sec ( 37.80 hrs)

-----------------------------------------------------------------------------------------

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT |
|---|---|---|---|---|---|---|---|---|---|
| 224.35 | 0.12 | 1.22 | 10.8 | 0.930E+01 | 1.22 | 49.87 | 1.22 | 0.00 | .13608E+06 |
| 292.10 | 0.12 | 1.22 | 11.1 | 0.899E+01 | 1.22 | 51.58 | 1.22 | 0.00 | .17716E+06 |
| 359.86 | 0.12 | 1.22 | 11.5 | 0.871E+01 | 1.22 | 53.23 | 1.22 | 0.00 | .21824E+06 |
| 427.62 | 0.12 | 1.22 | 11.8 | 0.846E+01 | 1.22 | 54.83 | 1.22 | 0.00 | .25932E+06 |
| 495.37 | 0.12 | 1.22 | 12.2 | 0.822E+01 | 1.22 | 56.38 | 1.22 | 0.00 | .30041E+06 |
| 563.13 | 0.12 | 1.22 | 12.5 | 0.801E+01 | 1.22 | 57.90 | 1.22 | 0.00 | .34149E+06 |
| 630.89 | 0.12 | 1.22 | 12.8 | 0.781E+01 | 1.22 | 59.37 | 1.22 | 0.00 | .38257E+06 |
| 698.64 | 0.12 | 1.22 | 13.1 | 0.763E+01 | 1.22 | 60.81 | 1.22 | 0.00 | .42365E+06 |
| 766.40 | 0.12 | 1.22 | 13.4 | 0.745E+01 | 1.22 | 62.22 | 1.22 | 0.00 | .46473E+06 |
| 834.16 | 0.12 | 1.22 | 13.7 | 0.729E+01 | 1.22 | 63.60 | 1.22 | 0.00 | .50581E+06 |

The passive diffusion plume becomes LATERALLY FULLY MIXED over the channel width during the current prediction interval.

The x-coordinate of bank attachment is 884.54 m.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 901.91 | 0.12 | 1.22 | 14.0 | 0.714E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .54690E+06 |

Effluent is FULLY MIXED over the entire channel cross-section.
Except for possible far-field decay or reaction processes, there are
NO FURTHER CHANGES with downstream direction.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 969.67 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .58798E+06 |
| 1037.43 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .62906E+06 |
| 1105.18 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .67014E+06 |
| 1172.94 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .71122E+06 |
| 1240.70 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .75231E+06 |
| 1308.45 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .79339E+06 |
| 1376.21 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .83447E+06 |
| 1443.96 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .87555E+06 |
| 1511.72 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .91663E+06 |
| 1579.48 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .95771E+06 |
| 1647.23 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .99880E+06 |
| 1714.99 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .10399E+07 |
| 1782.75 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .10810E+07 |
| 1850.50 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .11220E+07 |
| 1918.26 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .11631E+07 |
| 1986.02 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .12042E+07 |
| 2053.77 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .12453E+07 |
| 2121.53 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .12864E+07 |
| 2189.29 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .13274E+07 |
| 2257.04 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .13685E+07 |
| 2324.80 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .14096E+07 |
| 2392.56 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .14507E+07 |
| 2460.31 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .14918E+07 |
| 2528.07 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .15329E+07 |
| 2595.83 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .15739E+07 |
| 2663.58 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .16150E+07 |
| 2731.34 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .16561E+07 |
| 2799.10 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .16972E+07 |
| 2866.85 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .17383E+07 |
| 2934.61 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .17794E+07 |
| 3002.37 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .18204E+07 |
| 3070.12 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .18615E+07 |
| 3137.88 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .19026E+07 |
| 3205.64 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .19437E+07 |
| 3273.39 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .19848E+07 |
| 3341.15 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .20258E+07 |
| 3408.91 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .20669E+07 |
| 3476.66 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .21080E+07 |
| 3544.42 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .21491E+07 |
| 3612.17 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .21902E+07 |
| 3679.93 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .22313E+07 |
| 3747.69 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .22723E+07 |
| 3815.44 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .23134E+07 |
| 3883.20 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .23545E+07 |
| 3950.96 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .23956E+07 |
| 4018.71 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .24367E+07 |
| 4086.47 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .24777E+07 |
| 4154.23 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .25188E+07 |
| 4221.98 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .25599E+07 |
| 4289.74 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .26010E+07 |
| 4357.50 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .26421E+07 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4425.25 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .26832E+07 |
| 4493.01 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .27242E+07 |
| 4560.77 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .27653E+07 |
| 4628.52 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .28064E+07 |
| 4696.28 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .28475E+07 |
| 4764.03 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .28886E+07 |
| 4831.79 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .29296E+07 |
| 4899.55 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .29707E+07 |
| 4967.30 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .30118E+07 |
| 5035.06 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .30529E+07 |
| 5102.82 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .30940E+07 |
| 5170.57 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .31350E+07 |
| 5238.33 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .31761E+07 |
| 5306.09 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .32172E+07 |
| 5373.84 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .32583E+07 |
| 5441.60 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .32994E+07 |
| 5509.35 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .33405E+07 |
| 5577.11 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .33815E+07 |
| 5644.87 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .34226E+07 |
| 5712.62 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .34637E+07 |
| 5780.38 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .35048E+07 |
| 5848.14 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .35459E+07 |
| 5915.89 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .35869E+07 |
| 5983.65 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .36280E+07 |
| 6051.41 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .36691E+07 |
| 6119.16 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .37102E+07 |
| 6186.92 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .37513E+07 |
| 6254.67 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .37924E+07 |
| 6322.43 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .38334E+07 |
| 6390.19 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .38745E+07 |
| 6457.94 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .39156E+07 |
| 6525.70 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .39567E+07 |
| 6593.46 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .39978E+07 |
| 6661.21 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .40388E+07 |
| 6728.97 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .40799E+07 |
| 6796.73 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .41210E+07 |
| 6864.48 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .41621E+07 |
| 6932.24 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .42032E+07 |
| 6999.99 | 0.12 | 1.22 | 13.9 | 0.718E+01 | 1.22 | 64.60 | 1.22 | 0.00 | .42443E+07 |

Cumulative travel time = 4244258.0000 sec ( 1178.96 hrs)

Note:
CORMIX is a steady state model and assumes discharge and ambient conditions do not vary over time. The predicted plume cumulative travel time exceeds 48 hours at this trajectory distance. Keep in mind that ambient and discharge conditions are likely to vary over large space and time scales. Predictions at such large space and time scales may be inconsistent with CORMIX modeling assumptions.

Please carefully evaluate your simulation results and limit model interpretation to space and time scales consistent with steady state assumptions and ambient schematization.

Simulation limit based on maximum specified distance = 7000.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD161: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
----------------------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------------------
CORMIX1: Single Port Discharges            End of Prediction File
11111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111

```
CORMIX2 PREDICTION FILE:
22222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
                    CORMIX MIXING ZONE EXPERT SYSTEM
             Subsystem CORMIX2: Multiport Diffuser Discharges
                          CORMIX Version 12.0GTD
                    HYDRO2 Version 12.0.0.0 December 2020
-------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   Goldboro Southeast Area
 Design case:       Year 37
 FILE NAME:         C:\...385 - Goldboro\Mar 2022 EARD\rev7\Y37-SE_Pond.prd
 Time stamp:        04/06/2022--22:09:52

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    24.60  AS    =     0.66  QA    =     0.15  ICHREG= 2
 HA    =     0.03  HD    =     0.03
 UA    =     0.224 F     =     0.419 USTAR =0.5127E-01
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U        RHOAM =  998.1636

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_parallel
 BANK  =  LEFT      DISTB =     0.00  YB1   =     0.10  YB2   =     0.10
 LD    =     1.00  NOPEN =  100      NRISER=  100      SPAC  =     0.01    NPPERR =    1
 D0    =     0.016 A0    =     0.000 H0    =     0.03  SUB0  =     0.00
 D0INP =     0.016 CR0   =     1.000 B0    =0.2117E-01
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     0.00  THETA =     0.00  SIGMA =   270.00  BETA  =    90.00
 U0    =     0.178 Q0    =     0.004 Q0A   =0.3800E-02
 RHO0  =  998.1636  DRHO0 =0.0000E+00  GP0   =0.0000E+00
 C0    =0.1000E+03  CUNITS=  %
 IPOLL =  1        KS    =0.0000E+00  KD    =0.0000E+00

DIFFUSER PARAMETERS WITH IMAGE EFFECTS (metric units)
 The bank/shore proximity effect is accounted for by the following flow
 variables and definitions of length scales and parameters.
 LD    =     1.00  Q0    =     0.008 Q0A   =0.3800E-02

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.1520E-01        SIGNJ0=     1.0
 m0 =U0^2*B0 =0.6686E-03   j0 =U0*GP0*B0 =0.0000E+00   (based on slot width B0)
 m0 =U0*q0   =0.2701E-02   j0 =q0*GP0    =0.0000E+00   (based on volume flux q0)
 Associated 2-d length scales (meters)
 lQ=B  =     0.086 lM    =  99999.00  lm    =     0.03
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.7600E-02  M0    =0.6686E-03  J0    =0.0000E+00
 Associated 3-d length scales (meters)
 LQ    =     0.01  LM    =  99999.00  Lm    =     0.16  Lb    =     0.00
```

```
                               Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =  99999.00  FRD0  =  99999.00  R     =      0.79  PL    =  140.00
 (slot)            (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =      0.178 D0    =      0.016 A0    =      0.000 THETA =      0.00
 FR0   =  99999.00  FRD0  =  99999.00  R     =      0.79
 (slot)            (riser group)

FLOW CLASSIFICATION
 222222222222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    IMPU9       2
 2  Applicable layer depth HS =     0.03       2
 2  Limiting Dilution S=QA/Q0 + 1=    20.46     2
 222222222222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.1000E+03  CUNITS=  %
 NTOX  =  0
 NSTD  =  0
 REGMZ =  0
 XINT  =    500.00  XMAX  =    500.00

X-Y-Z COORDINATE SYSTEM:
  because of bank/shore proximity, the ORIGIN is located directly
   at the LEFT  bank/shore.
  the bank/shore acts as a plane of symmetry for the predicted
  plume geometry.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 100 display intervals per module
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   Uc = Local centerline excess velocity (above ambient)
   TT = Cumulative travel time

      X        Y       Z        S       C        BV       BH       Uc        TT
     0.00     0.00    0.03     1.0 0.100E+03   0.02     0.50     0.178   .00000E+00

END OF MOD201: DIFFUSER DISCHARGE MODULE
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
BEGIN MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
```

The diffuser near-field dilution is REDUCED because of the PROXIMITY
of the shoreline.
Because of the strong ambient current the diffuser plume of this crossflowing
discharge gets RAPIDLY DEFLECTED.
A near-field zone is formed that is VERTICALLY FULLY MIXED over the entire
layer depth. Full mixing is achieved at a downstream distance of about
2.5 times (for alternating designs) to 5 times(for unidirectional and staged designsd) the layer depth.

Profile definitions:
BV = layer depth (vertically mixed)
BH = top-hat half-width, measured horizontally in Y-direction
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)
TT = Cumulative travel time

| X | Y | Z | S | C | BV | BH | TT |
|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.03 | 1.0 | 0.100E+03 | 0.02 | 0.50 | .00000E+00 |
| 0.00 | -0.01 | 0.03 | 1.0 | 0.960E+02 | 0.02 | 0.51 | .59866E-02 |
| 0.00 | -0.01 | 0.03 | 1.1 | 0.945E+02 | 0.02 | 0.52 | .11973E-01 |
| 0.00 | -0.02 | 0.03 | 1.1 | 0.933E+02 | 0.02 | 0.52 | .17960E-01 |
| 0.01 | -0.02 | 0.03 | 1.1 | 0.923E+02 | 0.02 | 0.53 | .23946E-01 |
| 0.01 | -0.03 | 0.03 | 1.1 | 0.915E+02 | 0.02 | 0.54 | .29933E-01 |
| 0.01 | -0.03 | 0.03 | 1.1 | 0.908E+02 | 0.02 | 0.55 | .35919E-01 |
| 0.01 | -0.04 | 0.03 | 1.1 | 0.901E+02 | 0.02 | 0.55 | .41906E-01 |
| 0.01 | -0.04 | 0.03 | 1.1 | 0.895E+02 | 0.02 | 0.56 | .47893E-01 |
| 0.01 | -0.05 | 0.03 | 1.1 | 0.889E+02 | 0.02 | 0.57 | .53879E-01 |
| 0.01 | -0.05 | 0.03 | 1.1 | 0.884E+02 | 0.02 | 0.58 | .59866E-01 |
| 0.01 | -0.06 | 0.03 | 1.1 | 0.879E+02 | 0.02 | 0.58 | .65852E-01 |
| 0.02 | -0.06 | 0.03 | 1.1 | 0.875E+02 | 0.02 | 0.59 | .71839E-01 |
| 0.02 | -0.07 | 0.03 | 1.1 | 0.870E+02 | 0.02 | 0.60 | .77825E-01 |
| 0.02 | -0.07 | 0.03 | 1.2 | 0.866E+02 | 0.02 | 0.61 | .83812E-01 |
| 0.02 | -0.08 | 0.03 | 1.2 | 0.862E+02 | 0.02 | 0.61 | .89799E-01 |
| 0.02 | -0.08 | 0.03 | 1.2 | 0.858E+02 | 0.02 | 0.62 | .95785E-01 |
| 0.02 | -0.09 | 0.03 | 1.2 | 0.854E+02 | 0.02 | 0.63 | .10177E+00 |
| 0.02 | -0.09 | 0.03 | 1.2 | 0.851E+02 | 0.02 | 0.64 | .10776E+00 |
| 0.03 | -0.10 | 0.03 | 1.2 | 0.847E+02 | 0.02 | 0.65 | .11374E+00 |
| 0.03 | -0.10 | 0.03 | 1.2 | 0.844E+02 | 0.02 | 0.65 | .11973E+00 |
| 0.03 | -0.11 | 0.03 | 1.2 | 0.840E+02 | 0.02 | 0.66 | .12572E+00 |
| 0.03 | -0.11 | 0.03 | 1.2 | 0.837E+02 | 0.02 | 0.67 | .13170E+00 |
| 0.03 | -0.12 | 0.03 | 1.2 | 0.834E+02 | 0.02 | 0.68 | .13769E+00 |
| 0.03 | -0.12 | 0.03 | 1.2 | 0.831E+02 | 0.02 | 0.68 | .14368E+00 |
| 0.03 | -0.13 | 0.03 | 1.2 | 0.828E+02 | 0.02 | 0.69 | .14966E+00 |
| 0.03 | -0.13 | 0.03 | 1.2 | 0.826E+02 | 0.02 | 0.70 | .15565E+00 |
| 0.04 | -0.14 | 0.03 | 1.2 | 0.823E+02 | 0.02 | 0.71 | .16164E+00 |
| 0.04 | -0.14 | 0.03 | 1.2 | 0.820E+02 | 0.02 | 0.71 | .16762E+00 |
| 0.04 | -0.15 | 0.03 | 1.2 | 0.818E+02 | 0.02 | 0.72 | .17361E+00 |
| 0.04 | -0.15 | 0.03 | 1.2 | 0.815E+02 | 0.02 | 0.73 | .17960E+00 |
| 0.04 | -0.16 | 0.03 | 1.2 | 0.813E+02 | 0.02 | 0.74 | .18558E+00 |
| 0.04 | -0.16 | 0.03 | 1.2 | 0.810E+02 | 0.02 | 0.74 | .19157E+00 |
| 0.04 | -0.17 | 0.03 | 1.2 | 0.808E+02 | 0.02 | 0.75 | .19756E+00 |
| 0.05 | -0.17 | 0.03 | 1.2 | 0.805E+02 | 0.02 | 0.76 | .20354E+00 |
| 0.05 | -0.18 | 0.03 | 1.2 | 0.803E+02 | 0.02 | 0.77 | .20953E+00 |
| 0.05 | -0.18 | 0.03 | 1.2 | 0.801E+02 | 0.02 | 0.78 | .21552E+00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | -0.19 | 0.03 | 1.3 | 0.799E+02 | 0.02 | 0.78 | .22150E+00 |
| 0.05 | -0.19 | 0.03 | 1.3 | 0.797E+02 | 0.02 | 0.79 | .22749E+00 |
| 0.05 | -0.20 | 0.03 | 1.3 | 0.794E+02 | 0.02 | 0.80 | .23348E+00 |
| 0.05 | -0.20 | 0.03 | 1.3 | 0.792E+02 | 0.02 | 0.81 | .23946E+00 |
| 0.06 | -0.21 | 0.03 | 1.3 | 0.790E+02 | 0.02 | 0.81 | .24545E+00 |
| 0.06 | -0.21 | 0.03 | 1.3 | 0.788E+02 | 0.02 | 0.82 | .25144E+00 |
| 0.06 | -0.22 | 0.03 | 1.3 | 0.786E+02 | 0.02 | 0.83 | .25742E+00 |
| 0.06 | -0.22 | 0.03 | 1.3 | 0.784E+02 | 0.02 | 0.84 | .26341E+00 |
| 0.06 | -0.23 | 0.03 | 1.3 | 0.783E+02 | 0.02 | 0.84 | .26940E+00 |
| 0.06 | -0.23 | 0.03 | 1.3 | 0.781E+02 | 0.02 | 0.85 | .27538E+00 |
| 0.06 | -0.24 | 0.03 | 1.3 | 0.779E+02 | 0.02 | 0.86 | .28137E+00 |
| 0.06 | -0.24 | 0.03 | 1.3 | 0.777E+02 | 0.02 | 0.87 | .28736E+00 |
| 0.07 | -0.25 | 0.03 | 1.3 | 0.775E+02 | 0.02 | 0.87 | .29334E+00 |
| 0.07 | -0.25 | 0.03 | 1.3 | 0.773E+02 | 0.02 | 0.88 | .29933E+00 |
| 0.07 | -0.26 | 0.03 | 1.3 | 0.772E+02 | 0.02 | 0.89 | .30532E+00 |
| 0.07 | -0.26 | 0.03 | 1.3 | 0.770E+02 | 0.02 | 0.90 | .31130E+00 |
| 0.07 | -0.27 | 0.03 | 1.3 | 0.768E+02 | 0.02 | 0.90 | .31729E+00 |
| 0.07 | -0.27 | 0.03 | 1.3 | 0.767E+02 | 0.02 | 0.91 | .32327E+00 |
| 0.07 | -0.28 | 0.03 | 1.3 | 0.765E+02 | 0.02 | 0.92 | .32926E+00 |
| 0.08 | -0.28 | 0.03 | 1.3 | 0.763E+02 | 0.02 | 0.93 | .33525E+00 |
| 0.08 | -0.29 | 0.03 | 1.3 | 0.762E+02 | 0.02 | 0.94 | .34123E+00 |
| 0.08 | -0.29 | 0.03 | 1.3 | 0.760E+02 | 0.02 | 0.94 | .34722E+00 |
| 0.08 | -0.30 | 0.03 | 1.3 | 0.759E+02 | 0.02 | 0.95 | .35321E+00 |
| 0.08 | -0.30 | 0.03 | 1.3 | 0.757E+02 | 0.02 | 0.96 | .35919E+00 |
| 0.08 | -0.31 | 0.03 | 1.3 | 0.756E+02 | 0.02 | 0.97 | .36518E+00 |
| 0.08 | -0.31 | 0.03 | 1.3 | 0.754E+02 | 0.02 | 0.97 | .37117E+00 |
| 0.08 | -0.32 | 0.03 | 1.3 | 0.753E+02 | 0.02 | 0.98 | .37715E+00 |
| 0.09 | -0.32 | 0.03 | 1.3 | 0.751E+02 | 0.02 | 0.99 | .38314E+00 |
| 0.09 | -0.33 | 0.03 | 1.3 | 0.750E+02 | 0.02 | 1.00 | .38913E+00 |
| 0.09 | -0.33 | 0.03 | 1.3 | 0.748E+02 | 0.02 | 1.00 | .39511E+00 |
| 0.09 | -0.34 | 0.03 | 1.3 | 0.747E+02 | 0.02 | 1.01 | .40110E+00 |
| 0.09 | -0.34 | 0.03 | 1.3 | 0.745E+02 | 0.02 | 1.02 | .40709E+00 |
| 0.09 | -0.35 | 0.03 | 1.3 | 0.744E+02 | 0.02 | 1.03 | .41307E+00 |
| 0.09 | -0.35 | 0.03 | 1.3 | 0.743E+02 | 0.02 | 1.03 | .41906E+00 |
| 0.10 | -0.36 | 0.03 | 1.3 | 0.741E+02 | 0.02 | 1.04 | .42505E+00 |
| 0.10 | -0.36 | 0.03 | 1.4 | 0.740E+02 | 0.02 | 1.05 | .43103E+00 |
| 0.10 | -0.37 | 0.03 | 1.4 | 0.739E+02 | 0.02 | 1.06 | .43702E+00 |
| 0.10 | -0.37 | 0.03 | 1.4 | 0.737E+02 | 0.02 | 1.07 | .44301E+00 |
| 0.10 | -0.38 | 0.03 | 1.4 | 0.736E+02 | 0.02 | 1.07 | .44899E+00 |
| 0.10 | -0.38 | 0.03 | 1.4 | 0.735E+02 | 0.02 | 1.08 | .45498E+00 |
| 0.10 | -0.39 | 0.03 | 1.4 | 0.733E+02 | 0.02 | 1.09 | .46097E+00 |
| 0.10 | -0.39 | 0.03 | 1.4 | 0.732E+02 | 0.02 | 1.10 | .46695E+00 |
| 0.11 | -0.40 | 0.03 | 1.4 | 0.731E+02 | 0.02 | 1.10 | .47294E+00 |
| 0.11 | -0.40 | 0.03 | 1.4 | 0.730E+02 | 0.02 | 1.11 | .47893E+00 |
| 0.11 | -0.41 | 0.03 | 1.4 | 0.728E+02 | 0.02 | 1.12 | .48491E+00 |
| 0.11 | -0.41 | 0.03 | 1.4 | 0.727E+02 | 0.03 | 1.13 | .49090E+00 |
| 0.11 | -0.42 | 0.03 | 1.4 | 0.726E+02 | 0.03 | 1.13 | .49689E+00 |
| 0.11 | -0.42 | 0.03 | 1.4 | 0.725E+02 | 0.03 | 1.14 | .50287E+00 |
| 0.11 | -0.43 | 0.03 | 1.4 | 0.724E+02 | 0.03 | 1.15 | .50886E+00 |
| 0.12 | -0.43 | 0.03 | 1.4 | 0.722E+02 | 0.03 | 1.16 | .51485E+00 |
| 0.12 | -0.44 | 0.03 | 1.4 | 0.721E+02 | 0.03 | 1.16 | .52083E+00 |
| 0.12 | -0.44 | 0.03 | 1.4 | 0.720E+02 | 0.03 | 1.17 | .52682E+00 |
| 0.12 | -0.45 | 0.03 | 1.4 | 0.719E+02 | 0.03 | 1.18 | .53280E+00 |
| 0.12 | -0.45 | 0.03 | 1.4 | 0.718E+02 | 0.03 | 1.19 | .53879E+00 |

```
     0.12    -0.46    0.03     1.4 0.717E+02   0.03     1.20 .54478E+00
     0.12    -0.46    0.03     1.4 0.716E+02   0.03     1.20 .55076E+00
     0.12    -0.47    0.03     1.4 0.715E+02   0.03     1.21 .55675E+00
     0.13    -0.47    0.03     1.4 0.713E+02   0.03     1.22 .56274E+00
     0.13    -0.48    0.03     1.4 0.712E+02   0.03     1.23 .56872E+00
     0.13    -0.48    0.03     1.4 0.711E+02   0.03     1.23 .57471E+00
     0.13    -0.49    0.03     1.4 0.710E+02   0.03     1.24 .58070E+00
     0.13    -0.49    0.03     1.4 0.709E+02   0.03     1.25 .58668E+00
     0.13    -0.50    0.03     1.4 0.708E+02   0.03     1.26 .59267E+00
     0.13    -0.50    0.03     1.4 0.707E+02   0.03     1.26 .59866E+00
 Cumulative travel time =           0.5987 sec  (     0.00 hrs)
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD273: UNIDIRECTIONAL CROSS-FLOWING DIFFUSER (TEE) IN STRONG CURRENT
-----------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **

 WAKE FLOW CONDITIONS: The discharge velocity (U0) is less than or equal to the
 ambient velocity (Ua) and results in wake flow conditions. There is no discharge
 momentum induced mixing. The mixing characteristics are UNDESIRABLE.

 Recall that the plume is symmetric to the bank/shore on which the centerline
   (X-axis) is located.
-----------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Plume is ATTACHED to LEFT  bank/shore.
   Plume width is now determined from LEFT  bank/shore.

 Discharge is non-buoyant or weakly buoyant.
   Therefore BUOYANT SPREADING REGIME is ABSENT.

END OF MOD241: BUOYANT AMBIENT SPREADING
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

  Vertical diffusivity (initial value)   = 0.275E-03 m^2/s
  Horizontal diffusivity (initial value) = 0.688E-03 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)
   TT = Cumulative travel time
```

Plume Stage 2 (bank attached):

| X | Y | Z | S | C | BV | BH | ZU | ZL | TT | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.13 | 0.00 | 0.03 | 1.4 | 0.707E+02 | 0.02 | 1.77 | 0.03 | 0.01 | .59866E+00 | |
| 5.13 | 0.00 | 0.03 | 1.4 | 0.702E+02 | 0.02 | 1.78 | 0.03 | 0.01 | .22347E+02 | |
| 10.13 | 0.00 | 0.03 | 1.4 | 0.697E+02 | 0.02 | 1.79 | 0.03 | 0.01 | .44095E+02 | |
| 15.13 | 0.00 | 0.03 | 1.4 | 0.692E+02 | 0.02 | 1.80 | 0.03 | 0.01 | .65843E+02 | |
| 20.13 | 0.00 | 0.03 | 1.5 | 0.687E+02 | 0.02 | 1.82 | 0.03 | 0.01 | .87592E+02 | |
| 25.13 | 0.00 | 0.03 | 1.5 | 0.682E+02 | 0.02 | 1.83 | 0.03 | 0.01 | .10934E+03 | |
| 30.13 | 0.00 | 0.03 | 1.5 | 0.677E+02 | 0.02 | 1.84 | 0.03 | 0.01 | .13109E+03 | |
| 35.12 | 0.00 | 0.03 | 1.5 | 0.672E+02 | 0.02 | 1.86 | 0.03 | 0.01 | .15284E+03 | |
| 40.12 | 0.00 | 0.03 | 1.5 | 0.668E+02 | 0.02 | 1.87 | 0.03 | 0.01 | .17458E+03 | |
| 45.12 | 0.00 | 0.03 | 1.5 | 0.664E+02 | 0.02 | 1.88 | 0.03 | 0.01 | .19633E+03 | |
| 50.12 | 0.00 | 0.03 | 1.5 | 0.659E+02 | 0.02 | 1.89 | 0.03 | 0.01 | .21808E+03 | |
| 55.12 | 0.00 | 0.03 | 1.5 | 0.655E+02 | 0.02 | 1.91 | 0.03 | 0.01 | .23983E+03 | |
| 60.12 | 0.00 | 0.03 | 1.5 | 0.651E+02 | 0.02 | 1.92 | 0.03 | 0.01 | .26158E+03 | |
| 65.12 | 0.00 | 0.03 | 1.5 | 0.647E+02 | 0.02 | 1.93 | 0.03 | 0.01 | .28333E+03 | |
| 70.12 | 0.00 | 0.03 | 1.6 | 0.643E+02 | 0.02 | 1.94 | 0.03 | 0.01 | .30507E+03 | |
| 75.11 | 0.00 | 0.03 | 1.6 | 0.639E+02 | 0.02 | 1.95 | 0.03 | 0.01 | .32682E+03 | |
| 80.11 | 0.00 | 0.03 | 1.6 | 0.635E+02 | 0.02 | 1.97 | 0.03 | 0.01 | .34857E+03 | |
| 85.11 | 0.00 | 0.03 | 1.6 | 0.631E+02 | 0.02 | 1.98 | 0.03 | 0.01 | .37032E+03 | |
| 90.11 | 0.00 | 0.03 | 1.6 | 0.627E+02 | 0.02 | 1.99 | 0.03 | 0.01 | .39207E+03 | |
| 95.11 | 0.00 | 0.03 | 1.6 | 0.623E+02 | 0.02 | 2.00 | 0.03 | 0.01 | .41381E+03 | |
| 100.11 | 0.00 | 0.03 | 1.6 | 0.620E+02 | 0.02 | 2.01 | 0.03 | 0.01 | .43556E+03 | |
| 105.11 | 0.00 | 0.03 | 1.6 | 0.616E+02 | 0.02 | 2.03 | 0.03 | 0.01 | .45731E+03 | |
| 110.10 | 0.00 | 0.03 | 1.6 | 0.613E+02 | 0.02 | 2.04 | 0.03 | 0.01 | .47906E+03 | |
| 115.10 | 0.00 | 0.03 | 1.6 | 0.609E+02 | 0.02 | 2.05 | 0.03 | 0.01 | .50081E+03 | |
| 120.10 | 0.00 | 0.03 | 1.7 | 0.606E+02 | 0.02 | 2.06 | 0.03 | 0.01 | .52256E+03 | |
| 125.10 | 0.00 | 0.03 | 1.7 | 0.603E+02 | 0.02 | 2.07 | 0.03 | 0.01 | .54430E+03 | |
| 130.10 | 0.00 | 0.03 | 1.7 | 0.599E+02 | 0.02 | 2.08 | 0.03 | 0.01 | .56605E+03 | |
| 135.10 | 0.00 | 0.03 | 1.7 | 0.596E+02 | 0.02 | 2.09 | 0.03 | 0.01 | .58780E+03 | |
| 140.10 | 0.00 | 0.03 | 1.7 | 0.593E+02 | 0.02 | 2.11 | 0.03 | 0.01 | .60955E+03 | |
| 145.10 | 0.00 | 0.03 | 1.7 | 0.590E+02 | 0.02 | 2.12 | 0.03 | 0.01 | .63130E+03 | |
| 150.09 | 0.00 | 0.03 | 1.7 | 0.587E+02 | 0.02 | 2.13 | 0.03 | 0.01 | .65305E+03 | |
| 155.09 | 0.00 | 0.03 | 1.7 | 0.584E+02 | 0.02 | 2.14 | 0.03 | 0.01 | .67479E+03 | |
| 160.09 | 0.00 | 0.03 | 1.7 | 0.581E+02 | 0.02 | 2.15 | 0.03 | 0.01 | .69654E+03 | |
| 165.09 | 0.00 | 0.03 | 1.7 | 0.578E+02 | 0.02 | 2.16 | 0.03 | 0.01 | .71829E+03 | |
| 170.09 | 0.00 | 0.03 | 1.7 | 0.575E+02 | 0.02 | 2.17 | 0.03 | 0.01 | .74004E+03 | |
| 175.09 | 0.00 | 0.03 | 1.7 | 0.572E+02 | 0.02 | 2.18 | 0.03 | 0.01 | .76179E+03 | |
| 180.09 | 0.00 | 0.03 | 1.8 | 0.569E+02 | 0.02 | 2.19 | 0.03 | 0.01 | .78353E+03 | |
| 185.08 | 0.00 | 0.03 | 1.8 | 0.566E+02 | 0.02 | 2.20 | 0.03 | 0.01 | .80528E+03 | |
| 190.08 | 0.00 | 0.03 | 1.8 | 0.564E+02 | 0.02 | 2.21 | 0.03 | 0.01 | .82703E+03 | |
| 195.08 | 0.00 | 0.03 | 1.8 | 0.561E+02 | 0.02 | 2.22 | 0.03 | 0.01 | .84878E+03 | |
| 200.08 | 0.00 | 0.03 | 1.8 | 0.558E+02 | 0.02 | 2.24 | 0.03 | 0.01 | .87053E+03 | |
| 205.08 | 0.00 | 0.03 | 1.8 | 0.556E+02 | 0.02 | 2.25 | 0.03 | 0.01 | .89228E+03 | |
| 210.08 | 0.00 | 0.03 | 1.8 | 0.553E+02 | 0.02 | 2.26 | 0.03 | 0.01 | .91402E+03 | |
| 215.08 | 0.00 | 0.03 | 1.8 | 0.551E+02 | 0.02 | 2.27 | 0.03 | 0.01 | .93577E+03 | |
| 220.08 | 0.00 | 0.03 | 1.8 | 0.548E+02 | 0.02 | 2.28 | 0.03 | 0.01 | .95752E+03 | |
| 225.07 | 0.00 | 0.03 | 1.8 | 0.546E+02 | 0.02 | 2.29 | 0.03 | 0.01 | .97927E+03 | |
| 230.07 | 0.00 | 0.03 | 1.8 | 0.543E+02 | 0.02 | 2.30 | 0.03 | 0.01 | .10010E+04 | |
| 235.07 | 0.00 | 0.03 | 1.8 | 0.541E+02 | 0.02 | 2.31 | 0.03 | 0.01 | .10228E+04 | |
| 240.07 | 0.00 | 0.03 | 1.9 | 0.539E+02 | 0.02 | 2.32 | 0.03 | 0.01 | .10445E+04 | |
| 245.07 | 0.00 | 0.03 | 1.9 | 0.536E+02 | 0.02 | 2.33 | 0.03 | 0.01 | .10663E+04 | |
| 250.07 | 0.00 | 0.03 | 1.9 | 0.534E+02 | 0.02 | 2.34 | 0.03 | 0.01 | .10880E+04 | |
| 255.07 | 0.00 | 0.03 | 1.9 | 0.532E+02 | 0.02 | 2.35 | 0.03 | 0.01 | .11098E+04 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 260.06 | 0.00 | 0.03 | 1.9 | 0.529E+02 | 0.02 | 2.36 | 0.03 | 0.01 | .11315E+04 |
| 265.06 | 0.00 | 0.03 | 1.9 | 0.527E+02 | 0.02 | 2.37 | 0.03 | 0.01 | .11533E+04 |
| 270.06 | 0.00 | 0.03 | 1.9 | 0.525E+02 | 0.02 | 2.38 | 0.03 | 0.01 | .11750E+04 |
| 275.06 | 0.00 | 0.03 | 1.9 | 0.523E+02 | 0.02 | 2.39 | 0.03 | 0.01 | .11968E+04 |
| 280.06 | 0.00 | 0.03 | 1.9 | 0.521E+02 | 0.02 | 2.40 | 0.03 | 0.01 | .12185E+04 |
| 285.06 | 0.00 | 0.03 | 1.9 | 0.519E+02 | 0.02 | 2.41 | 0.03 | 0.01 | .12402E+04 |
| 290.06 | 0.00 | 0.03 | 1.9 | 0.516E+02 | 0.02 | 2.42 | 0.03 | 0.01 | .12620E+04 |
| 295.05 | 0.00 | 0.03 | 1.9 | 0.514E+02 | 0.02 | 2.43 | 0.03 | 0.01 | .12837E+04 |
| 300.05 | 0.00 | 0.03 | 2.0 | 0.512E+02 | 0.02 | 2.44 | 0.03 | 0.01 | .13055E+04 |
| 305.05 | 0.00 | 0.03 | 2.0 | 0.510E+02 | 0.02 | 2.45 | 0.03 | 0.01 | .13272E+04 |
| 310.05 | 0.00 | 0.03 | 2.0 | 0.508E+02 | 0.02 | 2.46 | 0.03 | 0.01 | .13490E+04 |
| 315.05 | 0.00 | 0.03 | 2.0 | 0.506E+02 | 0.02 | 2.47 | 0.03 | 0.01 | .13707E+04 |
| 320.05 | 0.00 | 0.03 | 2.0 | 0.504E+02 | 0.02 | 2.47 | 0.03 | 0.01 | .13925E+04 |
| 325.05 | 0.00 | 0.03 | 2.0 | 0.502E+02 | 0.02 | 2.48 | 0.03 | 0.01 | .14142E+04 |
| 330.05 | 0.00 | 0.03 | 2.0 | 0.501E+02 | 0.02 | 2.49 | 0.03 | 0.01 | .14360E+04 |
| 335.04 | 0.00 | 0.03 | 2.0 | 0.499E+02 | 0.02 | 2.50 | 0.03 | 0.01 | .14577E+04 |
| 340.04 | 0.00 | 0.03 | 2.0 | 0.497E+02 | 0.02 | 2.51 | 0.03 | 0.01 | .14795E+04 |
| 345.04 | 0.00 | 0.03 | 2.0 | 0.495E+02 | 0.02 | 2.52 | 0.03 | 0.01 | .15012E+04 |
| 350.04 | 0.00 | 0.03 | 2.0 | 0.493E+02 | 0.02 | 2.53 | 0.03 | 0.01 | .15230E+04 |
| 355.04 | 0.00 | 0.03 | 2.0 | 0.491E+02 | 0.02 | 2.54 | 0.03 | 0.01 | .15447E+04 |
| 360.04 | 0.00 | 0.03 | 2.0 | 0.490E+02 | 0.02 | 2.55 | 0.03 | 0.01 | .15665E+04 |
| 365.04 | 0.00 | 0.03 | 2.0 | 0.488E+02 | 0.02 | 2.56 | 0.03 | 0.01 | .15882E+04 |
| 370.03 | 0.00 | 0.03 | 2.1 | 0.486E+02 | 0.02 | 2.57 | 0.03 | 0.01 | .16100E+04 |
| 375.03 | 0.00 | 0.03 | 2.1 | 0.484E+02 | 0.02 | 2.58 | 0.03 | 0.01 | .16317E+04 |
| 380.03 | 0.00 | 0.03 | 2.1 | 0.483E+02 | 0.02 | 2.59 | 0.03 | 0.01 | .16535E+04 |
| 385.03 | 0.00 | 0.03 | 2.1 | 0.481E+02 | 0.02 | 2.60 | 0.03 | 0.01 | .16752E+04 |
| 390.03 | 0.00 | 0.03 | 2.1 | 0.479E+02 | 0.02 | 2.60 | 0.03 | 0.01 | .16970E+04 |
| 395.03 | 0.00 | 0.03 | 2.1 | 0.478E+02 | 0.02 | 2.61 | 0.03 | 0.01 | .17187E+04 |
| 400.03 | 0.00 | 0.03 | 2.1 | 0.476E+02 | 0.02 | 2.62 | 0.03 | 0.01 | .17405E+04 |
| 405.03 | 0.00 | 0.03 | 2.1 | 0.474E+02 | 0.02 | 2.63 | 0.03 | 0.01 | .17622E+04 |
| 410.02 | 0.00 | 0.03 | 2.1 | 0.473E+02 | 0.02 | 2.64 | 0.03 | 0.01 | .17840E+04 |
| 415.02 | 0.00 | 0.03 | 2.1 | 0.471E+02 | 0.02 | 2.65 | 0.03 | 0.01 | .18057E+04 |
| 420.02 | 0.00 | 0.03 | 2.1 | 0.470E+02 | 0.02 | 2.66 | 0.03 | 0.01 | .18274E+04 |
| 425.02 | 0.00 | 0.03 | 2.1 | 0.468E+02 | 0.02 | 2.67 | 0.03 | 0.01 | .18492E+04 |
| 430.02 | 0.00 | 0.03 | 2.1 | 0.467E+02 | 0.02 | 2.68 | 0.03 | 0.01 | .18709E+04 |
| 435.02 | 0.00 | 0.03 | 2.2 | 0.465E+02 | 0.02 | 2.68 | 0.03 | 0.01 | .18927E+04 |
| 440.02 | 0.00 | 0.03 | 2.2 | 0.464E+02 | 0.02 | 2.69 | 0.03 | 0.01 | .19144E+04 |
| 445.01 | 0.00 | 0.03 | 2.2 | 0.462E+02 | 0.02 | 2.70 | 0.03 | 0.01 | .19362E+04 |
| 450.01 | 0.00 | 0.03 | 2.2 | 0.461E+02 | 0.02 | 2.71 | 0.03 | 0.01 | .19579E+04 |
| 455.01 | 0.00 | 0.03 | 2.2 | 0.459E+02 | 0.02 | 2.72 | 0.03 | 0.01 | .19797E+04 |
| 460.01 | 0.00 | 0.03 | 2.2 | 0.458E+02 | 0.02 | 2.73 | 0.03 | 0.01 | .20014E+04 |
| 465.01 | 0.00 | 0.03 | 2.2 | 0.456E+02 | 0.02 | 2.74 | 0.03 | 0.01 | .20232E+04 |
| 470.01 | 0.00 | 0.03 | 2.2 | 0.455E+02 | 0.02 | 2.75 | 0.03 | 0.01 | .20449E+04 |
| 475.01 | 0.00 | 0.03 | 2.2 | 0.453E+02 | 0.02 | 2.75 | 0.03 | 0.01 | .20667E+04 |
| 480.01 | 0.00 | 0.03 | 2.2 | 0.452E+02 | 0.02 | 2.76 | 0.03 | 0.01 | .20884E+04 |
| 485.00 | 0.00 | 0.03 | 2.2 | 0.451E+02 | 0.02 | 2.77 | 0.03 | 0.01 | .21102E+04 |
| 490.00 | 0.00 | 0.03 | 2.2 | 0.449E+02 | 0.02 | 2.78 | 0.03 | 0.01 | .21319E+04 |
| 495.00 | 0.00 | 0.03 | 2.2 | 0.448E+02 | 0.02 | 2.79 | 0.03 | 0.01 | .21537E+04 |
| 500.00 | 0.00 | 0.03 | 2.2 | 0.446E+02 | 0.02 | 2.80 | 0.03 | 0.01 | .21754E+04 |

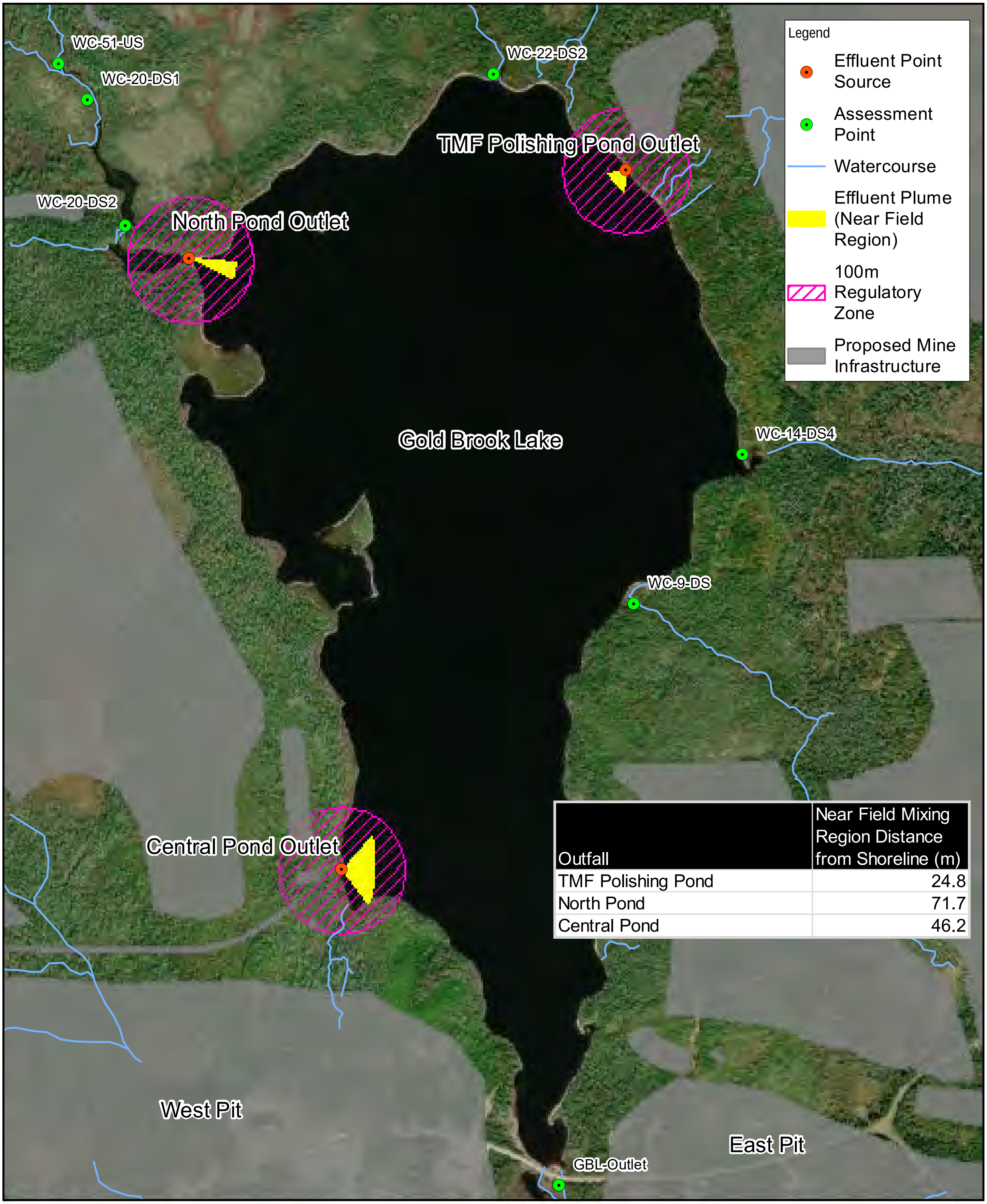
Cumulative travel time = 2175.4204 sec ( 0.60 hrs)

Simulation limit based on maximum specified distance = 500.00 m.
This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
-----------------------------------------------------------------------------------------------
-----------------------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
2222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222

# Attachment 3

## Initial Dilution Zone Modelling Figures




| Outfall | Near Field Mixing Region Distance from Shoreline (m) |
|---|---|
| TMF Polishing Pond | 24.8 |
| North Pond | 71.7 |
| Central Pond | 46.2 |

Paper Size ANSI A

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

GHD

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
PREDICTIVE WATER QUALITY ASSESSMENT

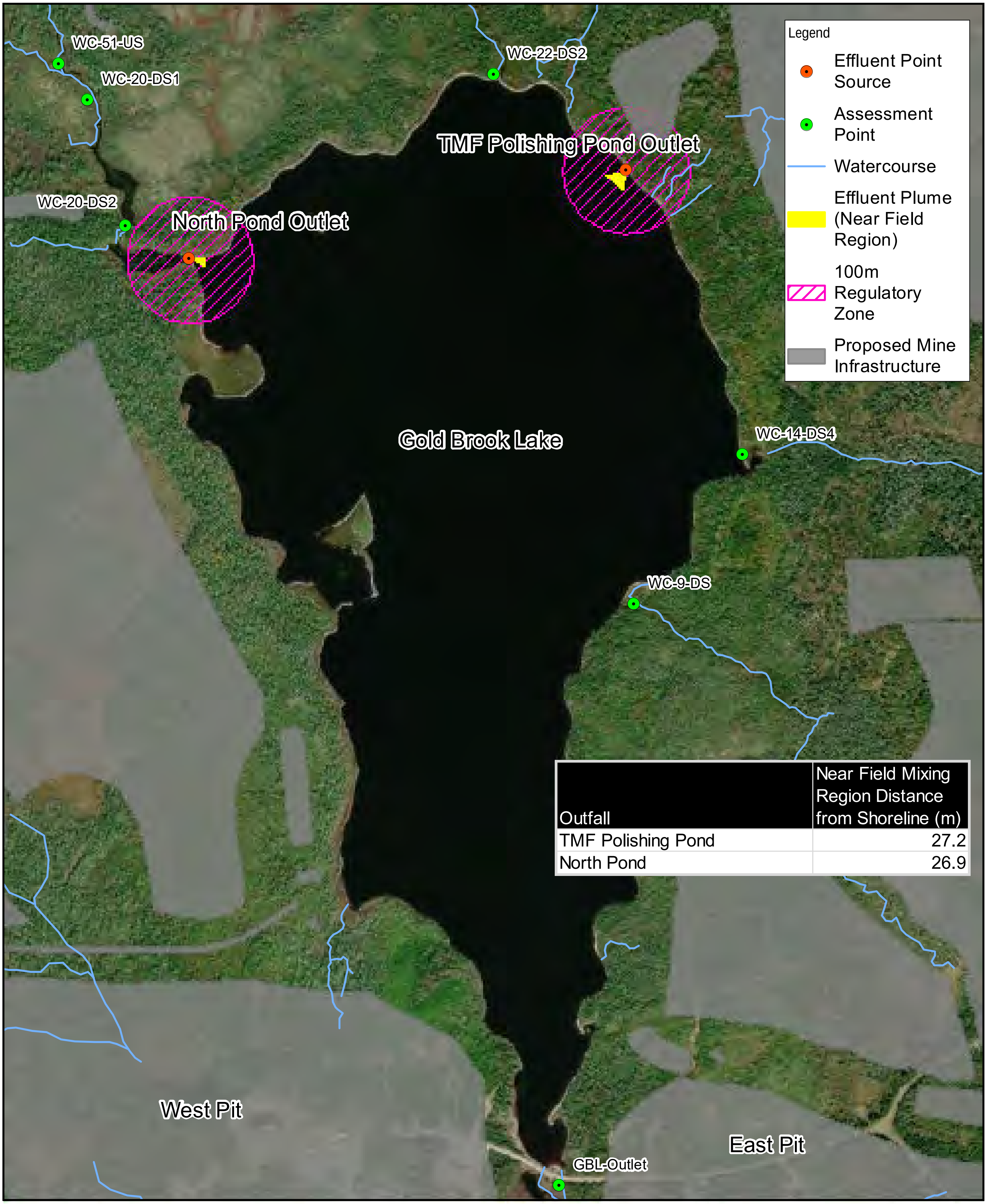
EAST PIT EOM
GOLD BROOK LAKE
NEAR FIELD MIXING ZONES

Project No. 11222385 (7)
Revision No. -
Date Apr 7, 2022

FIGURE 1

C:\Projects\11222385 Goldboro\GIS\CORMIX\Year8_LakeNFR.mxd
Print date: 07 Apr 2022 - 11:18

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering




| Outfall | Near Field Mixing Region Distance from Shoreline (m) |
|---|---|
| TMF Polishing Pond | 27.2 |
| North Pond | 26.9 |

Paper Size ANSI A

0 50 100 150 200
Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

GHD

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
PREDICTIVE WATER QUALITY ASSESSMENT

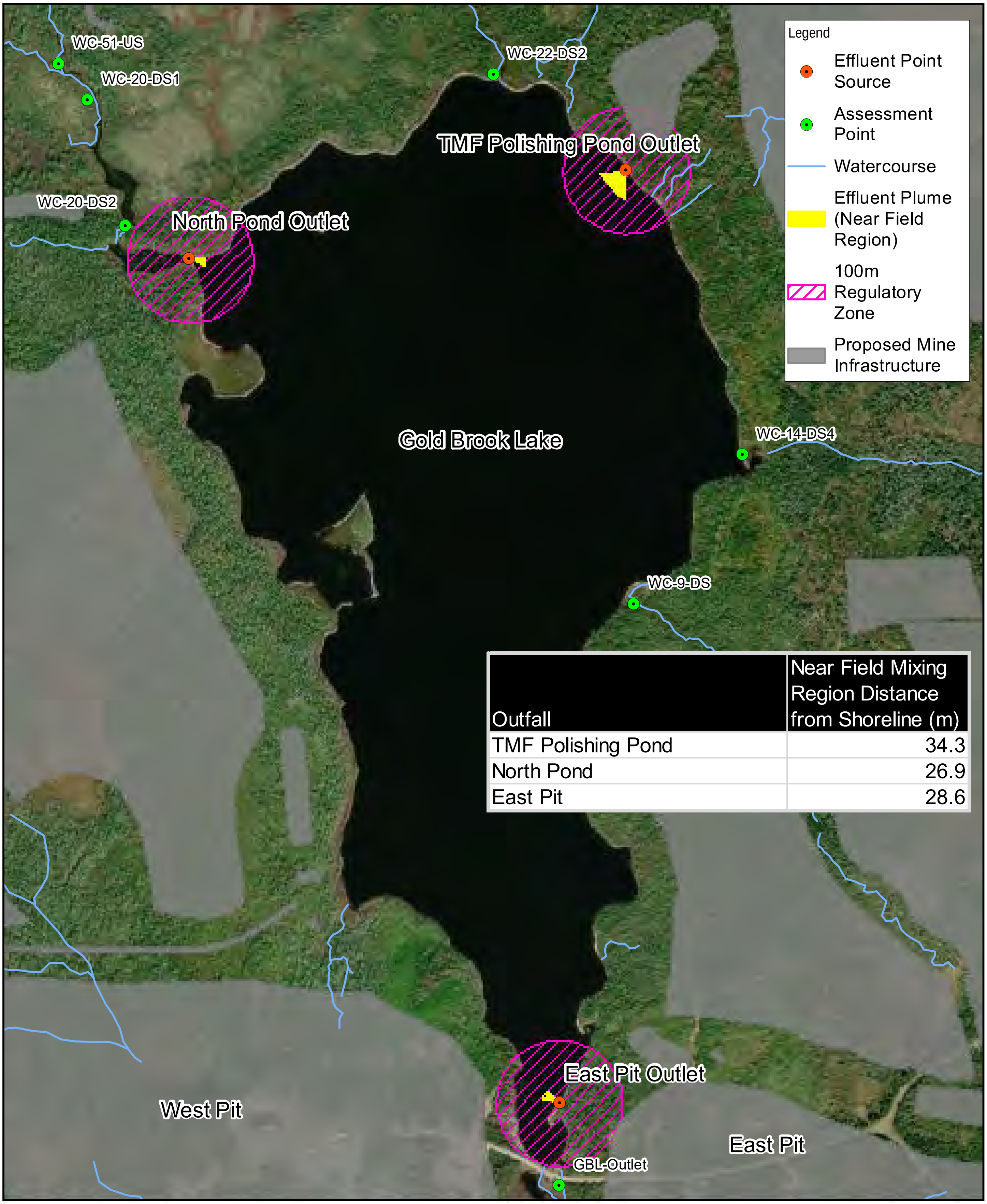
WEST PIT EOM
GOLD BROOK LAKE
NEAR FIELD MIXING ZONES

Project No. 11222385 (7)
Revision No. -
Date Apr 7, 2022

FIGURE 2

C:\Projects\11222385 Goldboro\GIS\CORMIX\Year11_LakeNFR.mxd
Print date: 07 Apr 2022 - 11:24

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering




| Outfall | Near Field Mixing Region Distance from Shoreline (m) |
|---|---|
| TMF Polishing Pond | 34.3 |
| North Pond | 26.9 |
| East Pit | 28.6 |

Paper Size ANSI A

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

GHD

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
PREDICTIVE WATER QUALITY ASSESSMENT

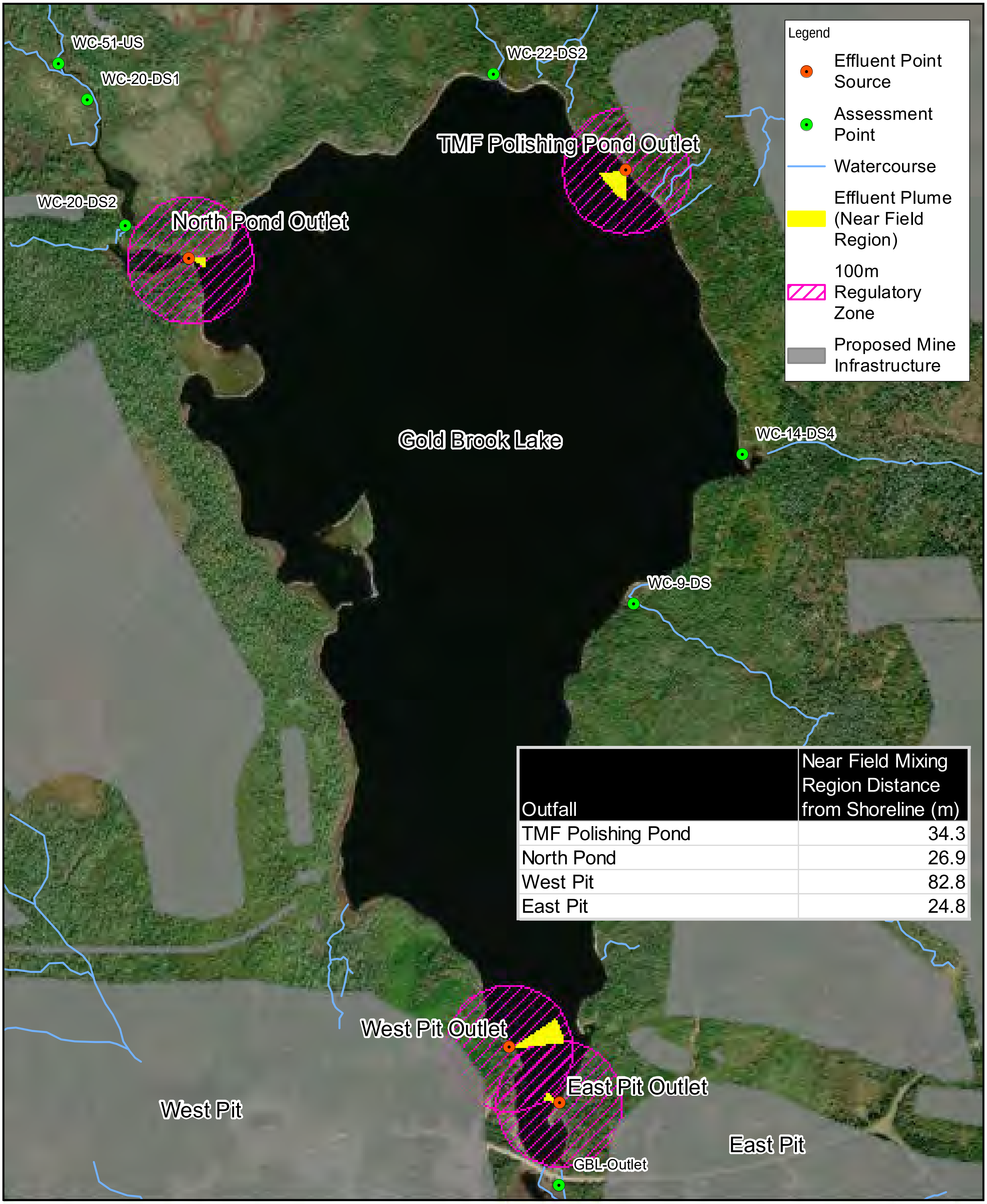
EAST PIT DISCHARGING (Y21)
GOLD BROOK LAKE
NEAR FIELD MIXING ZONES

Project No. 11222385 (7)
Revision No. -
Date Apr 7, 2022

FIGURE 3

C:\Projects\11222385 Goldboro\GIS\CORMIX\Year21_LakeNFR.mxd
Print date: 07 Apr 2022 - 11:35

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering




| Outfall | Near Field Mixing Region Distance from Shoreline (m) |
|---|---|
| TMF Polishing Pond | 34.3 |
| North Pond | 26.9 |
| West Pit | 82.8 |
| East Pit | 24.8 |

Paper Size ANSI A

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

N

GHD

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
PREDICTIVE WATER QUALITY ASSESSMENT

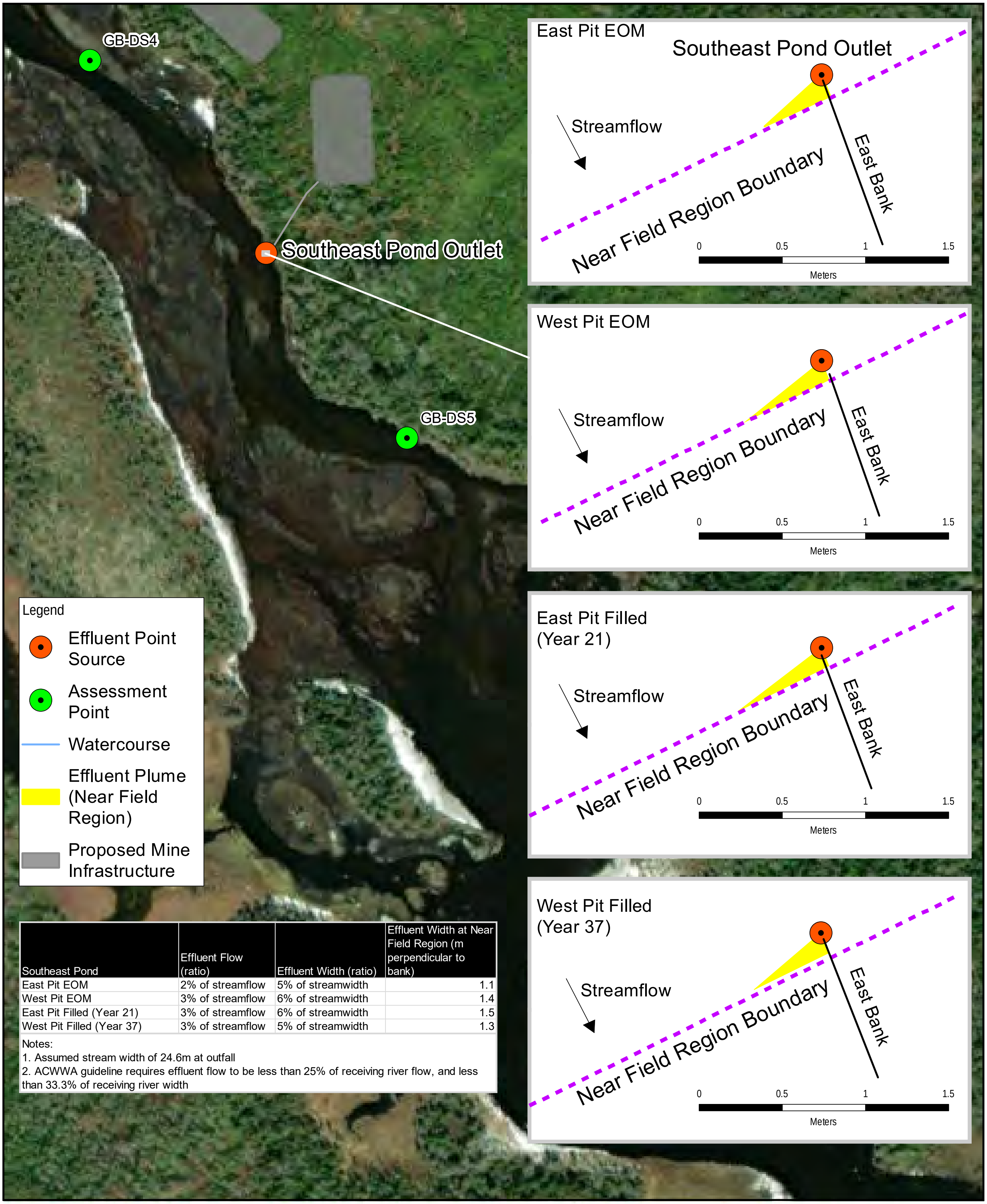
WEST PIT DISCHARGING (Y37)
GOLD BROOK LAKE
NEAR FIELD MIXING ZONES

Project No. 11222385 (7)
Revision No. -
Date Apr 7, 2022

FIGURE 4

C:\Projects\11222385 Goldboro\GIS\CORMIX\Year37_LakeNFR.mxd
Print date: 20 Apr 2022 - 22:49

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering




| Southeast Pond | Effluent Flow (ratio) | Effluent Width (ratio) | Effluent Width at Near Field Region (m perpendicular to bank) |
|---|---|---|---|
| East Pit EOM | 2% of streamflow | 5% of streamwidth | 1.1 |
| West Pit EOM | 3% of streamflow | 6% of streamwidth | 1.4 |
| East Pit Filled (Year 21) | 3% of streamflow | 6% of streamwidth | 1.5 |
| West Pit Filled (Year 37) | 3% of streamflow | 5% of streamwidth | 1.3 |

Notes:
1. Assumed stream width of 24.6m at outfall
2. ACWWA guideline requires effluent flow to be less than 25% of receiving river flow, and less than 33.3% of receiving river width

Paper Size ANSI A

0 10 20 30 40 50 60 70 80 90 100
Meters

N

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 20N

ANACONDA MINING INC.
GOLDBORO GOLD PROJECT
PREDICTIVE WATER QUALITY ASSESSMENT

EAST PIT EOM TO WEST PIT FILLED
SOUTHEAST SETTLING POND - GOLD BROOK
NEAR FIELD MIXING ZONES

Project No. 11222385 (7)
Revision No. -
Date Apr 7, 2022

FIGURE 5

C:\Projects\11222385 Goldboro\GIS\CORMIX\Years_allSE_BrookNFR.mxd
Print date: 20 Apr 2022 - 22:53

Data source: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ebowering

# Appendix F.9

## Impacted Water Treatment System

# Technical Memorandum

**May 20, 2022**

| | | | |
|---|---|---|---|
| **To** | Deidre Puddister, Anaconda | **Tel** | |
| **Copy to** | Callie Andrews, GHD | **Email** | dpuddister@anacondamining.com |
| **From** | Hojat Seyedy, GHD | **Ref. No.** | 11222385 |
| **Subject** | Goldboro Impacted Water Treatment Systems (IWTS) | | |

## 1. Introduction

Impacted water is expected to be generated as the result of runoff from Waste Rock Storage Areas (WRSA), as well as Tailings Management Facility (TMF) excess water that will require treated before discharge to the receiving environment. WRSA runoff will be collected in several settling ponds across the Project Area. North, southeast, east and central settling ponds are the four locations that will collect impacted WRSA runoff. The impacted water collected at the east settling pond is planned to be pumped into the central settling pond for treatment before discharge to the Gold Brook Lake. However, effluent from the other settling ponds will be discharged directly into the receiving environment and based on predictive water quality modelling, all may require treatment. North and central settling pond discharge will flow to Gold Brook Lake, while the southeast settling pond will be discharged into Gold Brook. Effluent from the TMF pond is predicted to require treated before discharging into Gold Brook Lake. The TMF will receive pre-treated process wastewater/slurry, as well as runoff from the potential acid generating (PAG) waste rock that will be disposed of within the TMF. The models predict concentration of metals, including arsenic, nitrogen-containing compounds and cyanide at the TMF pond which will require treatment before discharge to the Gold Brook Lake.

This Technical Memorandum is intended to support the predictive water quality modelling report by proposing water treatment systems that are proven effective in treating metals, nitrogen-containing compounds and cyanide. For the purpose of this memo, post-closure conditions are assumed to begin once the TMF has been covered with the topsoil cap (occurring 13 years after commencement of mining operations).

## 2. Exceeded Elements and Discharge Limits

To determine the elements requiring treatment, it was assumed that the discharge water at the end of each treatment system must meet MDMER discharge limits. Furthermore, CCME, NSE Tier 1 EQS or site-specific discharge limits (based on a hazard assessment or the 95$^{th}$ percentile of background concentrations) must be met at assessment points in Gold Brook Lake and Gold Brook. Details on the Water Quality assessment points and the calculation of applicable regulatory criteria can be found in the Predictive Water Quality Assessment (GHD, 2022). The applicable regulatory criteria or selected parameters are summarized in **Table 1**. Background concentration of selected parameters are summarized in **Table 2**.

*Table 1 Applicable criteria and background concentrations*

| Constituent | MDMER (µg/L) | CCME (µg/L) | Tier 1 EQS (µg/L) | SSWQG Gold Brook Lake (µg/L) | SSWQG Gold Brook (µg/L) | Applicable Downstream Regulatory Criteria (µg/L) |
|---|---|---|---|---|---|---|
| Aluminum | -- | 5.00 | 5.00 | 504 | 430 | 504[i] or 430 |
| Antimony | -- | 20 | 9.00 | -- | -- | 9.00 |
| Arsenic | 100 | 5.00 | 5.00 | 61.8 | 677 | 61.8 or 677 |
| Barium | -- | -- | 1000 | -- | -- | 1000 |
| Beryllium | -- | -- | 0.15 | 0.675 | 0.500 | 0.675 or 0.500 |
| Cadmium | -- | 0.04 | 0.09 | 0.09 | 0.09 | 0.09 |
| Chromium | -- | -- | 1.00 | -- | -- | 1.00 |
| Cobalt | -- | -- | 1.00 | 2.00 | 2.00 | 2.00 |
| Copper | 100 | 2.00 | 2.00 | -- | -- | 2.00 |
| Iron | -- | 300 | 300 | 698 | 1,170 | 698 or 1,170 |
| Lead | 80 | 1.00 | 1.00 | 1.42 | 1.00 | 1.42 or 1 |
| Manganese | -- | 190 | 430 | -- | -- | 190 |
| Mercury | -- | 0.026 | 0.026 | -- | -- | 0.026 |
| Nickel | 250 | 25.0 | 25.0 | -- | -- | 25.0 |
| Selenium | -- | 1.00 | 1.00 | -- | -- | 1.00 |
| Silver | -- | 0.25 | 0.25 | -- | -- | 0.25 |
| Thallium | -- | 0.80 | 0.80 | -- | -- | 0.80 |
| Uranium | -- | 15.0 | 15.0 | -- | -- | 15.0 |
| Vanadium | -- | -- | 120 | -- | -- | 120 |
| Zinc | 400 | 7.00 | 7.00 | 92.0 | 18.0 | 92.0 or 18.0 |
| Ammonia (µg N/L) | -- | 69.7 | -- | -- | -- | 69.7 |
| Un-ionized Ammonia (µg N/L | -- | 19.0 | -- | -- | -- | 19.0 |
| Nitrate (µg N/L) | -- | 13,000 | -- | -- | -- | 13.0 |
| Nitrite (µg N/L) | -- | 60.0 | -- | 197 | 197 | 197 |
| Cyanide | 500 | 5.00 | -- | -- | | 5.0 |

*Table 2 Background concentration of selected parameters*

| Constituent | Gold Brook Lake | | Gold Brook | |
|---|---|---|---|---|
| | Average Concentration (µg/L) | 95th Percentile Concentration (µg/L) | Average Concentration (µg/L) | 95th Percentile Concentration (µg/L) |
| Aluminum | 329 | 504 | 257 | 430 |
| Antimony | 0.529 | 0.675 | 0.507 | 0.500 |
| Arsenic | 19.3 | 61.8 | 184 | 677 |
| Barium | 2.54 | 3.37 | 2.47 | 3.60 |
| Beryllium | 0.424 | 0.675 | 0.476 | 0.500 |
| Cadmium | 0.015 | 0.037 | 0.013 | 0.025 |
| Chromium | 0.515 | 0.500 | 0.700 | 1.30 |
| Cobalt | 0.218 | 0.305 | 0.208 | 0.200 |
| Copper | 0.574 | 1.00 | 0.788 | 1.74 |
| Iron | 493 | 698 | 620 | 1,170 |
| Lead | 0.514 | 0.970 | 0.449 | 0.762 |
| Manganese | 18.9 | 25.5 | 33.5 | 80.3 |
| Mercury | 0.006 | 10.3 | 0.033 | 136 |
| Nickel | 1.00 | 1.00 | 1.08 | 1.00 |
| Selenium | 0.324 | 0.500 | 0.401 | 0.500 |
| Silver | 0.050 | 0.050 | 0.050 | 0.050 |
| Thallium | 0.050 | 0.050 | 0.050 | 0.050 |
| Uranium | 0.053 | 0.067 | 0.051 | 0.050 |
| Vanadium | 1.00 | 1.00 | 1.01 | 1.00 |
| Zinc | 5.94 | 11.8 | 4.44 | 9.76 |
| Ammonia (µg N/L) | 30.9 | 65.5 | 59.4 | 178 |
| Un-ionized Ammonia (µg N/L) | 0.120 | 0.255 | 0.232 | 0.694 |
| Nitrate (µg N/L) | 6.35 | 15.9 | 5.92 | 10.6 |
| Nitrite (µg N/L) | 28.9 | 62.35 | 71.6 | 234 |
| Cyanide | NA | NA | NA | NA |

Considering applicable discharge limits provided above and predictive water quality modelling results, several exceedances are identified at different locations. Arsenic is the element exceeding applicable criteria at north, central, southeast and TMF pond. Cyanide is the other element exceeding applicable criteria at TMF. Other metals such as cobalt, zinc, and chromium are identified as exceedances within the Gold Brook Lake and at DS2 assessment point. Other elements that exceed the applicable criteria at Gold Brook Lake, as well as DS2, are nitrite, ammonia, and cyanide. As the TMF is the only main source of cyanide, it is expected that cyanide treatment at TMF will address high cyanide concentration at Gold Brook Lake and at the downstream assessment points. Expected exceeded parameters during different stages of mine operation are summarized in **Table 2**.

*Table 3 Expected exceeded elements at each treatment pond, as well as Gold brook Lake and downstream assessment points*

| Location | Mid-Extraction - Year 8 | | Full-Extraction - Year 12 | | East Pit Filled - Year 21 | | West Pit Filled - Year 37 | | Perpetuity - Year 50 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case |
| North Settling Pond | Arsenic | Arsenic | -- | Arsenic | NA | NA | NA | NA | NA | NA |
| TMF | Arsenic | Arsenic, Cyanide | Arsenic | Arsenic, Cyanide | NA | NA | NA | NA | NA | NA |
| Central Settling Pond | Arsenic | Arsenic | NA | NA | NA | NA | NA | NA | NA | NA |
| West Pit | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| East Pit | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Southeast Settling Pond | -- | Arsenic | -- | -- | NA | NA | NA | NA | NA | NA |
| Southwest Settling Pond | -- | -- | -- | -- | NA | NA | NA | NA | NA | NA |
| Gold Brook Lake | Arsenic, Cobalt, Ammonia, Cyanide | Arsenic, Cobalt, Ammonia, Unionized Ammonia, Nitrite, Cyanide | Arsenic, Cobalt, Copper, Cyanide | Arsenic, Cobalt, Copper, Ammonia, Cyanide | -- | -- | -- | -- | -- | -- |
| Gold Brook DS2 | Cobalt, Ammonia, Cyanide | Cobalt, Ammonia, Un-ionized Ammonia, Nitrite, Cyanide | Cobalt, Copper, Cyanide | Cobalt, Copper, Ammonia, Cyanide | -- | Lead[1] | -- | -- | -- | -- |
| Gold Brook DS4 | Ammonia, Cyanide | Ammonia, Cyanide | Cyanide | Cyanide | -- | -- | -- | -- | -- | -- |
| Gold Brook DS6 | Ammonia, Cyanide | Ammonia, Cyanide | Cyanide | Cyanide | -- | -- | -- | -- | -- | -- |

NA - No discharge from this location during this scenario
-- - No predicted exceedances from this location

[1] Refer to Section 3.5.3 of the Predictive Water Quality Report (GHD, 2022) for further discussion regarding the predicted exceedance of applicable regulatory limits by Lead in Upper Case conditions of the East Pit Filled scenario

# 3. TMF Wastewater Treatment System

A predictive water quality model for the TMF was completed to support feasibility level design of the water management systems for the Project (KP, 2022). The objective was to establish a preliminary understanding of the water quality of the monthly effluent discharged from the TMF to the TMF Impacted Water Treatment System (IWTS) over the life of the Project. Deterministic mass balance models were developed to predict the quality of the effluent during operations and closure (active and post-closure). Source terms were provided by Lorax for the component inputs for the model (i.e., PAG1 waste rock, NPAG waste rock, tailings process water, and topsoil stockpile material). The predicted water quality results were used to design the proposed TMF IWTS. The modelling suggests that naturally occurring cyanide degradation is not effective within the TMF and it needs to be addressed within the IWTS. Metals such as arsenic, as well as cyanide will require treatment at TMF IWTS. The proposed TMF IWTS discussed below is an example of the type of system that could be used to treat predicted water quality concerns associated with the Project. Further design of the TMF IWTS will occur during the detailed design phase of the Project.

TMF IWTS includes three main sections. In the first step, residual cyanide compounds are removed through an oxidation process by adding sodium chlorite dioxide. A reaction tank will provide enough retention time and proper mixing for an efficient oxidation. Weak acid dissociable (WAD) cyanide and unstable metal-cyanide complexes could be removed efficiently by an oxidation technique. WAD cyanide includes free cyanide anion (CN-) and hydrogen cyanide (HCN), as well as unstable metal-cyanide complexes include complexes of cadmium, copper, nickel, silver and zinc. The initial TMF supernatant water predictions (KP, 2022) show more than 95% of the cyanide will present in WAD forms which are oxidizable by proposed technique. In the second step, a high-density sludge (HDS) process will be utilized for metal precipitation. Lime will be added to increase the pH to the desired setpoint to precipitate metals in their hydroxide forms in a rapid mixing tank. Ferric sulphate then will be added as coagulant to co-precipitate arsenic to reduce its concentration to the acceptable levels. A flocculant (polymer) will be added to accelerate the precipitation of generated fine suspended particles and create larger flocs. The generated sludge as the result of adding lime, coagulant and flocculant will be fed into a slow-mixing tank (flocculation tank) to adsorb the particles to a flocculant and properly agglomerate all precipitates and promote an efficient settling in the clarifier. Then the mixed slurry will be fed into a clarifier for sludge settling and clarification. The settled sludge from the bottom of the clarifier then will be recycled back to the initial part of the process. To do this, the sludge from the clarifier bottom is pumped to a lime/sludge slow mixing tank where sufficient mixing is provided for capturing newly generated suspended solids. A portion of the sludge will be wasted to keep the solid percentage at the desire level. The wasted sludge will be pumped into the TMF. The third step of the TMF IWTS will include biological nitrification/denitrification to address ammonia, nitrate and nitrite exceedances. The water needs to be conditioned before feeding into the biological unit. The pH of the water will need to be lowered to a neutral level, and nutrients such as external carbon and phosphorous sources will require dosing. The biological treatment unit will be divided into two sections, an anoxic followed by an aerated part. This configuration will provide an environment for nitrification and denitrification which will be needed in order to remove ammonia, as well as nitrate/nitrite compounds below discharge limits.

The effluent of the TMF IWTS will be stored in a polishing pond as an equalization basin for further clarification before discharging into Gold Brook Lake. The polishing pond will be constructed southwest of the TMF. The polishing pond has been designed to store approximately 20,000 $m^3$ of water, which is equivalent to approximately four days of TMF IWTS discharge capacity. The process flow chart of TMF IWTS is presented in **Figure 1**.

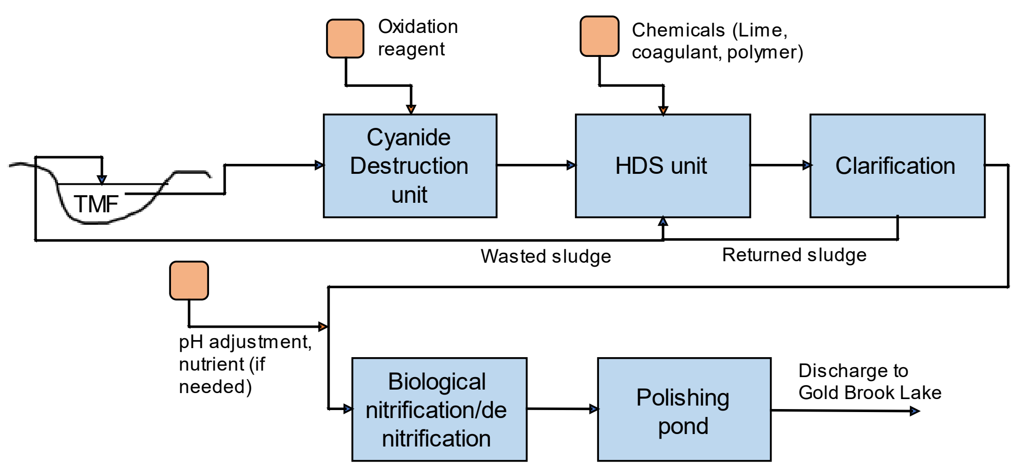



***Figure 1 TMF wastewater treatment system process flow chart***

# 4. Central Settling Pond Treatment System

Modelling results show that arsenic concentrations in the central pond exceed MDMER criteria and as such, require treatment prior to discharge. In addition, other metals such as cobalt, copper, zinc, and nitrogen containing compounds such as nitrite, ammonia and un-ionized ammonia have high concentrations in the receiving water body which will be treated to meet the applicable criteria at the downstream assessment point. Nitrogen-containing species are the result of blasting material used during mining activities. The treatment system presented for the central settling pond is an example of the type of system that could be used to treat predicted water quality concerns. Further design of the central settling pond treatment system will occur during the detailed design phase of the Project.

The water treatment system at the central pond will include a lime and coagulant dosing unit upstream of the settling pond. Metals including arsenic will precipitate in their hydroxide form and with the help of the coagulant (co-precipitation) within the settling pond. The chemically dosed water then will pass through a mixing channel before entering the settling pond. The settling pond will include two parts, the initial settling part which will capture the bulk of solids and needs sludge excavation every so often, and then the second part which will provide enough retention time for settling of the finer particles.

The effluent of the settling pond will be conditioned by adjusting its pH and will fed into a biological treatment system for nitrate/nitrite removal. The effluent of the biological treatment unit will enter a polishing pond for clarification and final polishing. The effluent of the polishing pond then will be discharged into Gold Brook Lake. A simplified process flow chart of the proposed treatment system is presented in **Figure 2**.

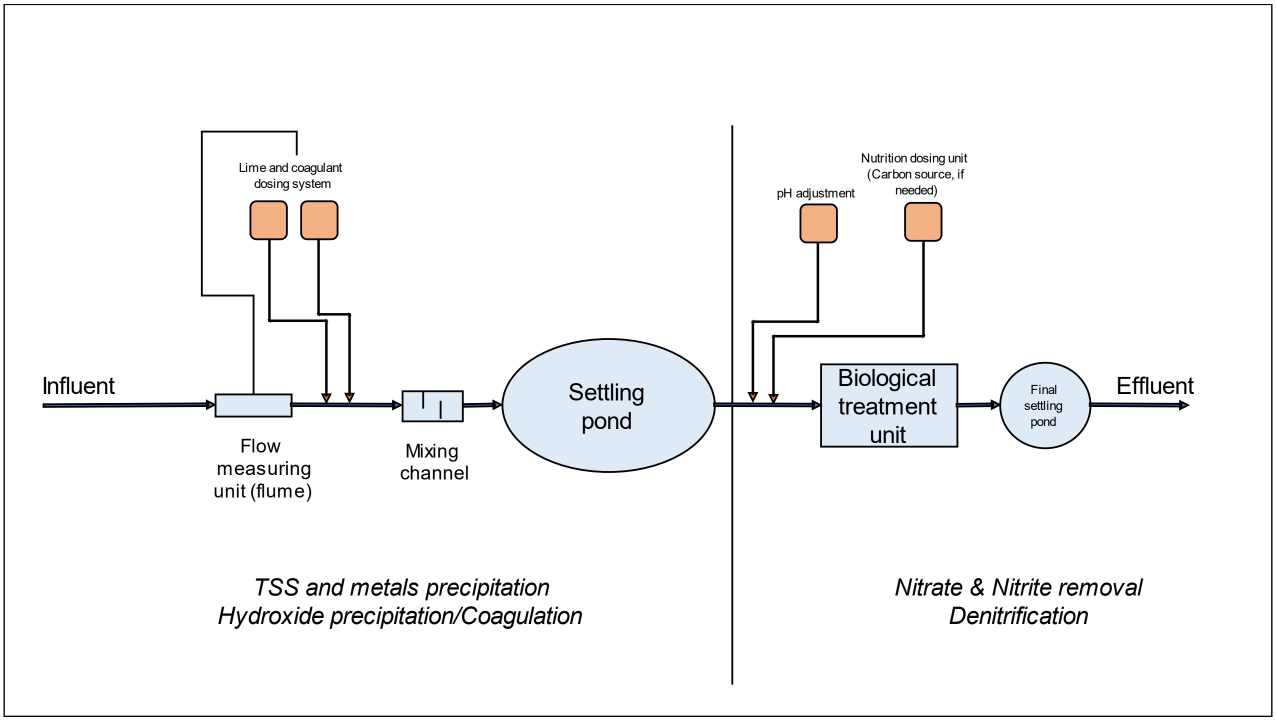



***Figure 2 Central Pond waste-rock stockpile runoffs treatment system***

# 5. North and Southeast Treatment Systems

The modelling water quality data shows that the impacted water in both north and southeast ponds will have the same exceeded elements as central pond. Metals such has arsenic and nitrite/nitrate are among main exceeded elements for both north and southeast ponds. As a result, the water treatment system for both locations will use the same treatment concepts. The treatment system presented for the north and southeast settling ponds is an example of the type of system that could be used to treat predicted water quality concerns for the Project. Further design of the north and southeast settling pond treatment systems will occur during the detailed design phase of the project.

The IWTS for the north and southeast waste-rock stockpiles runoffs will be pond treatment style. Lime will be dosed ahead of the settling pond to increase the pH to precipitate exceeded metals in their insoluble hydroxide form. Coagulant is also added to accelerate precipitation of formed fine particles during higher flow events and help further reduction of exceeded elements through co-precipitation. A flow monitoring unit ahead of the settling pond will control chemical dosing pumps. The chemically dosed impacted water then will pass through a mixing unit and will discharge into the settling pond. The pond will be divided into a primary and secondary section. The primary pond serves to accumulate the precipitated sludge. The secondary pond is larger and requires a long retention time with laminar conditions to allow for further settling of fine particles and clarification. The effluent of the settling pond will be dosed with acid for pH adjustment and then will pass through an engineered wetland for final polishing before discharging to the environment. An engineered wetland is selected as the alternative polishing step for both north and southeast ponds because of lower flow and available space. The effluent of the engineered wetland then will flow into Gold Brook Lake for the north pond and to Gold Brook for the southeast pond. A simplified flow chart of the water treatment system is presented in **Figure 3**.

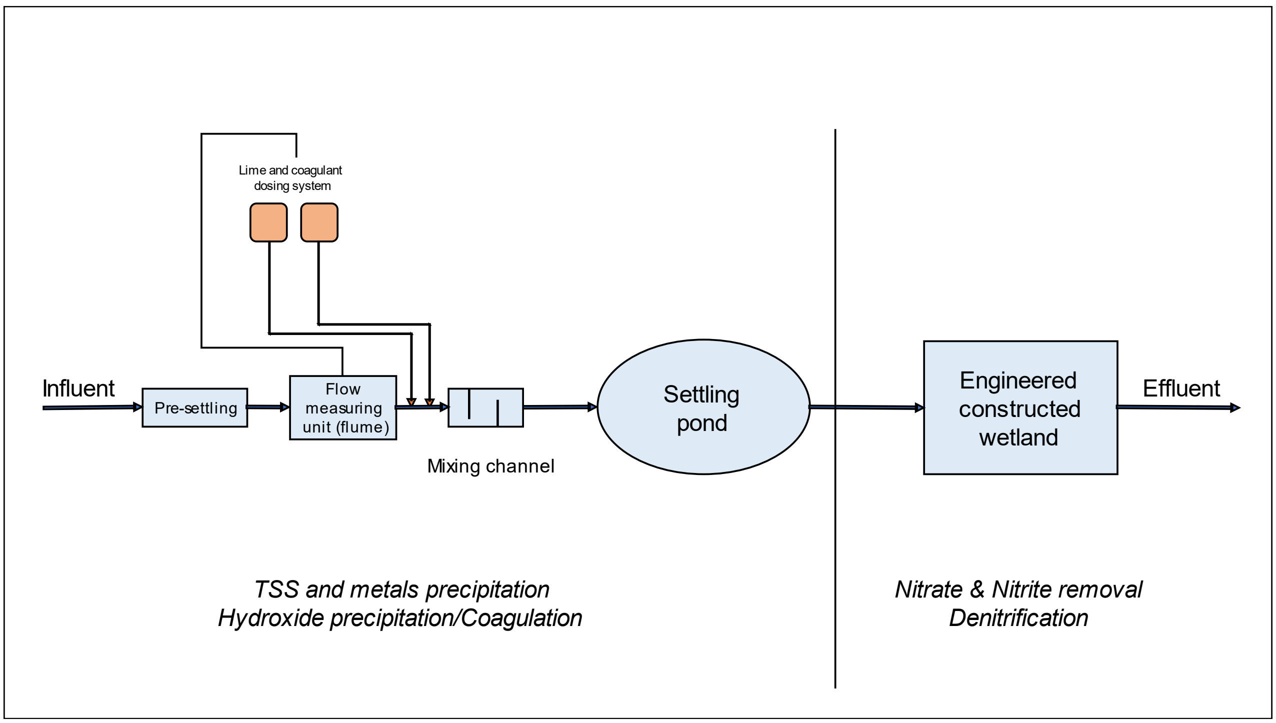



***Figure 3*** ***North and Southeast Waste-rock runoffs treatment system***

# 6. Post-Closure Water Treatment Systems

During post-closure, east and central WRSA runoff will be directed to the east and west pits, respectively. The overflow of east and west pit will then be discharged into Gold Brook Lake by gravity. It is expected that chromium, copper, lead and zinc concentrations will exceed applicable regulatory criteria for 5 years following end of operations. No elements are predicted to exceed regulatory limits 5 years following end of operations. The treatment system presented for the post-closure phase of mine development is predicted to be a passive treatment system and will remain in place for 5 years following closure of the Mine Site. The treatment system for the post-closure conditions is an example of the type of system that could be used to treat predicted water quality concerns at the Site. Further design of the post-closure treatment system will occur during the detailed design phase of the project. The post-closure IWTS will be installed at the TMF, north and southeast settling ponds as these are the only discharge point from the Site for the 5 years following post-closure. Previously used IWTS will be decommissioned and removed from Site.

Passive anoxic limestone drains (ALDs) are assumed to provide sufficient treatment for each settling pond overflow present during post-closure conditions. The ALDs involve the burial of limestone in oxygen-depleted trenches. An ALD consists of a trench containing limestone encapsulated in an impermeable liner that is covered with clay or compacted soil. Surrounding the limestone with an impervious liner also helps maintain anoxic conditions in the drain. The cap also prevents water infiltration and helps prevent carbon dioxide from escaping. Prior to the development and installation of an ALD, influent water must be characterized to ensure effective system design. This includes evaluating seasonal variations. In addition to flow rate, important influent characteristics include dissolved oxygen content, acidity and alkalinity, and contaminant concentrations. Limestone used in ALDs is usually in the form of pebbles or rocks, with a particle spectrum ranging from 1.5 to 4 inches. Small-size particles provide more surface area for more rapid dissolution and alkalinity generation, while the larger-size particles will dissolve more slowly and provide system longevity and maintain distributed water movement through the drain. The pits overflow water will convey into these trenches. ALDs will generate alkalinity and will increase the water pH which will precipitate metals such as zinc. Each drain is followed by an aerated cascade at its end followed by a settling/polishing pond to remove precipitated/oxidized metals before discharge to the Gold Brook.

# 7. References


GHD, 2022, Predictive Water Quality Assessment

Knight Piesold Consulting (KP), 2022, Feasibility Level Waste and Water Management Design


Regards,

H. Seyedy

**Hojat Seyedy, PhD, Peng.**
Process Engineer

**Andrew Betts, P.ENG. (NS, ON)**
Senior Water Resources Engineer

# Appendix F.10

## Erosion and Sediment Control Plan

# Erosion and Sediment Control Plan

## Goldboro Gold Project

Anaconda Mining

24 May 2022

→ The Power of Commitment

**GHD**
110, 120 Western Parkway
Bedford, Nova Scotia B4B 0V2, Canada
**T** +1 902 468 1248 | **F** +1 902 468 2207 | **E** info-northamerica@ghd.com | **ghd.com**

**Document status**

| Status Code | Revision | Author | Reviewer | | Approved for issue | | |
|---|---|---|---|---|---|---|---|
| | | | Name | Signature | Name | Signature | Date |
| S4 | 00 | Tochi Azubuike | Andrew Betts | | Andrew Betts | Andrew Betts | 24-May-2022 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



**The Power of Commitment**

# Contents

## Table index



## Figure index



## Appendices

# List of Acronyms

| | |
|---|---|
| BMP | Best Management Practice |
| ESC | Erosion and Sediment Controls |
| ESCP | Erosion and Sediment Control Plan |
| Ha | Hectares |
| MWMP | Mine Water Management Plan |
| ROM | Run of Mill |
| SWM | Stormwater Management |
| TMF | Tailings Management Facility |
| USLE | Universal Soil Loss Equation |
| WRSA | Waste Rock Storage Area |
| WTS | Water Treatment System |

# 1. Introduction

GHD Limited (GHD) was retained by Anaconda Mining Inc. (Anaconda) to develop a Mine Water Management Plan (MWMP) for the Goldboro Gold Project (the Project) located in Guysborough County, Nova Scotia (NS), Canada. The MWMP is being developed in support of the Environmental Assessment Registration Document (EARD) for the mine. As part of the MWMP, GHD has developed an Erosion and Sediment Control Plan (ESCP) for the Mine Water Infrastructure for construction of the Project and during operations. The Mine Water Infrastructure is defined as the contact and non-contact constructed surface water ditches, culverts, settling ponds and outfalls.

The Project comprises approximately 592 hectares (ha) of lakes, rivers, and forested lands that are in varying degrees of re-growth due to historical logging. The Project is proposed to operate as a 4,000 tonne per day (tpd) mine and processing facility. The ore that is mined will be processed on-site at the Mill infrastructure area. It is anticipated that once all permits are received construction will commence and will take 18 months to two years to complete. The Project will operate two open pits located on the east and west of Gold Brook (East Pit and West Pit). The anticipated mine life for extraction of ore is approximately 8 years for the East Pit and 11 years for the West Pit. For the purposes of this assessment, a Project Area (PA) was defined as the footprint of Project related infrastructure plus a buffer of 100 – 200 m. The location of the Project is presented in Drawing C-0101 in Appendix A.

## 1.1 Key Project Components

An open pit mine requires many components to function and operate. The proposed Project layout is displayed in Drawing C-0101 in Appendix A. The key infrastructure of the Project are as follows:

– East Pit and West Pit
– Waste Rock Storage Areas (WRSAs)
– Till and organic material stockpiles
– Explosive storage pad and emulsion transfer tank pad
– Employee accommodation and mill infrastructure area (Administrative)
– Run of mill (ROM) stockpile
– Haul roads, parking areas and haul roads
– Tailings Management Facility (TMF)
– Settling ponds, stormwater (SWM) ditches (contact water and non-contact water), culverts and watercourse crossings
– Water Treatment System (WTS)

This report provides details on the potential sources of erosion at the Project, outlines a risk assessment methodology on erosion susceptibility and identifies best management practices (BMPs) for the Mine Water Infrastructure during construction and operation of the Project. The Mine Water Infrastructure includes the contact and non-contact SWM ditches, settling ponds, culverts, watercourse crossings and associated areas to be graded.

# 2. Erosion and Sediment Management

## 2.1 Objective

Erosion is defined as the detachment and transport of sediment by water, wind, ice, or gravity. Sedimentation is the deposition of those transported materials. Construction and mining activities can adversely affect the aquatic environment due to sediment-laden water being released to natural receiving waters. The prevention and management of erosion and sediment movement on an active mine site involves many critical paths, including planning, material source selection, soil composition, equipment handling, and risk management.

The ESCP provides direction to mitigate erosion and sedimentation associated with the construction and operations of the Project. Adherence to this document will be a specified requirement under all construction contracts related to the Project. It will also provide guidance to the construction contractor(s) in the development of more detailed, site specific erosion and sediment standard operating procedures (SOP). This plan includes:

– Reference documents and summary of Best Management Practices (BMPs) used to control erosion and sedimentation
– Identification of potential erosion and sediment sources at the Site and strategies to control erosion and sedimentation at these sites
– Incident Management
– Record Keeping
– Reporting to Responsible Authorities

For this ESCP, erosion management will focus on preventing erosion within the PA. Sediment management will focus on supplementing erosion control methods and controlling sediment supplied by other Site infrastructure such as stockpiles or roads while preventing sediment from travelling off-Site.

## 2.2 Erosion Risk Assessment Methodology

### 2.2.1 Activity Erosion Potential

The various factors that affect erosion potential over extended periods of time include:

– Soil Characteristics
  - Particle size and texture, organic matter, water content, and permeability of the soils will all influence soil erodibility. Soil texture refers to the sizes and proportions of the materials making up the soil. In general, soil with high silt content tends to be most susceptible to erosion and soil with high sand content or high organic content has a low erosion potential.
– Topography
  - Topographic features can have a significant impact on the erosion potential of a Site. Slope length and steepness are two major factors which affect erosion potential. For example, long, steep slopes have a higher erosion potential than short and/or flat slopes.
– Climate
  - Climate, particularly rainfall frequency, duration, intensity, and type, affects the rate of erosion. Climate also effects growth rates and density of plants and development of vegetation cover, which influences erosion potential.

## 2.2.2 On Land Soil Erosion Risk Assessment Methods

A risk assessment is essential to determining the appropriate level of effort to be applied to erosion and sediment control (ESC) on a site-specific basis (TAC 2005). Risk is commonly defined as the product of the likelihood of an event occurring and its consequences. The general approach to perform the erosion risk assessment is by applying the modified universal soil loss equation (USLE) as described by Tajek et al. (1985). The basic universal soil loss equation is:

$$A = R \times K \times LS \times C \times P$$

Where: A = average annual soil loss; R = rainfall-runoff density; K = soil erodibility; L = slope length; S = slope steepness; C = cover management; and P = erosion control practices.

The USLE method was developed for agricultural soils, and it is commonly calculated based on bare soil using the R, K, and LS factors only. This approach is applicable to other disturbed soil situations where the greatest risk of erosion occurs on bare soils resulting from recent disturbance and on stockpiled soils.

To estimate the maximum potential soil loss that may occur at the Mine Site, the cover management factor (C) and the erosion control practices factor (P) were not used in calculating the erosion risk. The R, K, and LS factors cannot be changed and represent the erosion risk for a given soil or map unit when it is left unprotected.

Soil texture and related characteristics affecting erodibility include grain size, permeability, and chemistry (K factor). Table 2.2-1 presents the classification of erodibility by soil type used in the risk assessment.

*Table 2.2-1 Classification of Erodibility by Soil Type*

| Erodibility Classification | Soil Type | Soil Erodibility Rating |
|---|---|---|
| Most | Silt | High |
| | Silty Loam | High |
| | Loam | High |
| | Silty Sand | High |
| | Sandy Loam | Medium |
| | Silty Clay Loam | Medium |
| | Sandy Clay Loam | Medium |
| | Silty Clay | Medium |
| | Sandy Clay | Low |
| | Clay | Low |
| | Heavy Clay | Low |
| | Loamy Sand | Low |
| | Sand | Low |
| | Poor Graded Gravel | Low |
| Least | Well Graded Gravel | Low |
| Source: Adapted from Alberta Transportation (2003). | | |

Slope length and gradient (LS factor) are site specific factors, which are governed by the site topography. Table 2.2-2 provides a matrix for assessing erosion risk based on the soil loss class (Table 2.2-1), slope gradient, and slope length.

*Table 2.2-2 Erosion Potential Associated with Slope Length, Slope Gradient, and Soil Erodibility Rating*

| Slope Gradient | Soil Erodibility | Slope Length | |
|---|---|---|---|
| | | <70m | >70m |
| 0-10% | Low | Low | Low |
| | Medium | Low | Moderate |
| | High | Moderate | High |
| 10-20% | Low | Low | Moderate |
| | Medium | Moderate | High |
| | High | High | High |
| >20% | Low | Moderate | Moderate |
| | Medium | High | High |
| | High | High | High |

The erosion risk classes, and their potential soil losses, are listed in Table 2.2-3. The system's six categories were simplified to three (Low, Moderate, and High) for the Project Area to facilitate rating of soils for which there is relatively little data. Erosion risk (Tajek et al. 1985) determined based on R, K, and LS factors, was applied in determining the susceptibility to erosion for soils in the local assessment area (LAA).

*Table 2.2-3 Erosion Risk Classes and Potential Soil Losses*

| **Erosion Risk Classes** | **System Category** | **Potential Soil Loss (t/ha/y)** |
|---|---|---|
| Low | Negligible | <6 |
| Low | Slight | 6 to 11 |
| Moderate | Moderate | 11 to 22 |
| High | Severe | 22 to 33 |
| High | Very Severe | 33 to 55 |
| High | Extreme | >55 |
| Notes:<br>t/ha/y = tonnes per hectare per year, <= less than, >= greater than | | |

## 2.2.3 Consequence of Erosion Risk Assessment

The risk assessment should consider potential ecological, legal, and mine schedule and budget consequences.

– **Ecological Consequence**: related to the introduction of sediment to the aquatic environment and low-lying areas, notably wetlands, floodplains, and meadows
– **Project Consequence**: related to the need to respond to and repair erosion damage and the implications for the project schedule and finances
– **Legal consequence**: associated with the deposition of sediment in receiving waterbodies and ecological significant area, which could potentially result in charges laid under the *Fisheries Act*

For a project to have low consequence of erosion and sedimentation there should be:

– No environmentally sensitive area that could be disturbed by discharge of water and sediment from the site
– No project schedules that would be significantly affected by erosion or sedimentation
– No risk of legal consequence due to regulatory violations, including sediment deposition or violations of provincial or municipal regulations

If the level of any of the three listed consequence is significant, then the consequence will be rated as high.

Higher levels of effort for ESC are appropriate for higher levels of risk, which are based on the site erosion potential and the consequences of erosion and sedimentation. A framework for assessing mine risk and the appropriate level of effort for ESC is shown in Table 2.2-4 and is discussed in detail in TAC (2005).

*Table 2.2-4 Risk Assessment Framework for Erosion and Sediment Control*

| Erosion Potential | Consequences of Erosion and Sedimentation | Level of Erosion and Sediment Control | | | Level of Erosion and Sediment Control | | |
|---|---|---|---|---|---|---|---|
| | | Procedural BMPs | ESC Plan and Structural BMPs | Water Management BMPs | Staged construction and Progressive Rehabilitation | More Intensive Sediment Control BMPs | Monitor Water Quality (TSS and Turbidity) |
| Low | Low | recommended | - | - | - | - | - |
| | High | required | required | - | - | - | - |
| Moderate | Low | required | - | - | - | - | - |
| | High | required | required | recommended | recommended | recommended | recommended |
| High | Low | required | required | required | required | required | recommended |
| | High | required | required | required | required | required | required |

Notes:

Source: TAC, 2005

BMP = Best Management Practices, TSS = Total Suspended Solids

## 2.3 Best Management Practices

Project infrastructure will be designed to minimize erosion during construction and operations, so as to preserve the stability of the ground surface surrounding mine infrastructure, SWM ditches, settling ponds and conveyance pathways, dykes, berms and any other installations. The potential for scouring downstream of structures and the potential impacts of sudden changes in flow volume will also be considered.

Short courses on erosion and sediment control inspection will be given to relevant managers and supervisors prior to activities that may cause erosion or sediment movement and deposition. Environmental advisors will participate in a short course or seminar on inspection activities associated with erosion and sediment control. An ‘Erosion Awareness and Identification’ module will be a component of the Project specific training provided to all workers associated with earthwork activities.

The BMPs presented in NS Environment Erosion and Sedimentation Control Handbook for Construction Sites (Nova Scotia Environment, 1988), Alberta Transportation Erosion and Sediment Control Manual (Alberta Transportation, 2011), British Columbia’s Dyke Design and Construction Guide Best Management Practices for British Columbia (British Columbia Ministry of Water Land & Air Protection, 2003), Ministry of Transportation Environmental Guide for Erosion and Sediment Control for Construction of Highway Projects (MTO, 2015), Toronto and Region Conservation Authority Erosion and Sediment Control Guide for Urban Construction (TRCA ESC, 2019) and Greater Golden Horseshoe Conservation Authorities (GGHACAs) Erosion and Sediment Control Guideline for Urban Construction (2006) will act as general reference. These BMPs are comprehensive in their coverage of erosion and sediment control practices on land and in and around water.

The principles by which the ESCP has been developed are based on those presented in the NS Environment Erosion and Sediment Control Handbook for Construction Sites (Nova Scotia Environment, 1988). Principles for the ESCP for the Project include:

1. Fit the activity to the existing topography, soils, waterways, and natural vegetation of the Site
2. Expose the smallest practical area of land for the shortest possible time
3. Apply erosion control practices as the primary method to prevent on-site damage
4. Apply sediment control practices as perimeter protection to prevent off-site damage
5. Implement a thorough maintenance plan during construction and operations

Each of these principles will be discussed in greater detail in Section 3.1.

# 3. Project Erosion & Sediment Control Plan

The purpose of the Project ESCP is to provide measures and BMPs for the Mine Water Infrastructure to minimize erosion and protect nearby waterbodies from sedimentation. Objectives and targets are established to drive continuous improvement in environmental performance and are consistent with the overall strategic goals of the Project.

The ESCP’s key objectives include:

– Prevent the uncontrolled release of sediment to natural watercourses
– Compliance with the environmental inspection criteria established as a part of the environmental approvals process
– Effectively minimize the potential impact of earthwork and other activities on the surrounding environment by:
  - Managing surface water runoff across the Site
  - Designing Mine Water Infrastructure to include erosion and sediment control measures where necessary

- Identifying potential impacts of erosion and sedimentation
- Identifying mitigation measures for erosion and sedimentation
- Sequence mitigation measures with required Site work to prevent erosion and sedimentation issues

The Project ESCP identifies a series of erosion and sediment control measures related to the Mine Water Infrastructure that should be put in place including location, design, and construction sequencing for each measure. The Project ESCP should be considered a 'living' document to be updated and adjusted throughout the life of the Project to be effective.

Changes or updates to the Project ESCP may occur if:

1. Erosion and sediment control issues are present.
2. Project scheduling changes the sequence of earthwork activities (e.g., hydroseeding cannot be completed due to a missed growing season).
3. The contractor, Anaconda, or other project personnel identify or present an alternative procedure for erosion and sediment control for a specific area of the Project which meets the original intent of the Project ESCP and conforms to approvals and permits.

## 3.1 Principles of Erosion and Sediment Control

The approach taken for the Project ESCP for Mine Water Infrastructure is to emphasize erosion control techniques in an effort to eliminate and/or minimize the amount of sediment mobilized due to earthwork activities. Sediment control BMP will be included in case of erosion of the Mine Water Infrastructure or of other infrastructure such as stockpiles or haul roads. The main principles of erosion and sediment control included in the Project ESCP are as follows:

1. **Keep Clean Water Clean**

   All attempts should be made to prevent sediment from entering clean water runoff. This can be accomplished by diverting water away from exposed soils while isolating runoff from actively disturbed areas from the Site.

2. **Minimize Exposed Soil**

   The chance of erosion occurring drastically increases with exposed soil. Soil should be left undisturbed until disruption is absolutely necessary. The more soil that is exposed at any given time, the greater change for erosion. Cover management and erosion control practices (e.g., erosion control blankets, hydroseed, turf reinforcement matting) are the most practical and cost-effective measures to control erosion.

3. **Minimize Time of Exposure**

   The chance of erosion occurring also increases significantly the longer exposed soil is left exposed. Construction sequencing should occur in such a manner as to cover exposed/disturbed soils as soon as possible. Cover management is integral to preventing erosion at the Site.

4. **Keep Sediment on Site**

   When erosion does inevitably occur, sediment will be prevented from leaving the Site. This will occur through a series of sediment control practices such as settling ponds, check dams and other BMPs.

## 3.2 Erosion and Sediment Sources and Receptors

During construction, operations, and post-closure phases there will be several sources of sediment associated with the Project. These sources include:

– Exposed stockpiles;
– Laydown areas for equipment;
– Disturbed areas such as cleared/grubbed areas and recently graded ditches; and,
– Haul and access roads.

The Mine Water Infrastructure includes the contact and non-contact SWM ditches, settling ponds, culverts, watercourse crossings and associated areas to be graded. The Project ESCP will focus on the design of erosion and sediment control measures within and around the Mine Water Infrastructure. All efforts should be made to reduce the erosion at the source such as stockpiles, ditches and the haul road.

There are a number of sensitive receptors on or adjacent to the Project which require protection from sediment-laden runoff generated during construction and operations. The sensitive on-Site receptors include:

– Gold Brook Lake; and,
– Gold Brook

## 3.3 Selection of Best Management Practices

The BMPs presented in the Project ESCP focus on the Mine Water Infrastructure. BMPs for sequencing of construction or other components of the Mine Site are not included. The two main components of the Mine Water Infrastructure include SWM ditches (including culverts) and settling ponds. The methodology for selecting BMPs for each component of the Mine Water Infrastructure are discussed below. Recommended BMPs are presented on Drawing C-0101 in Appendix A.

### 3.3.1 Stormwater Management (SWM) Ditch BMPs

SWM ditch BMPs apply to both contact water and non-contact water ditches, culverts and any grading that is required around the ditches or culverts. This includes disturbed soils which need to be sloped to existing grade. The erosion control BMPs for the SWM ditches and culverts focus on preventing erosion within the ditches, around the culverts and on any associated disturbed slopes. Preventing erosion from occurring within and around the ditches and culverts reduces the amount of sediment that needs to be managed downstream.

In addition to preventing erosion, the BMPs for the SWM ditches and culvert include sediment control BMPs to prevent further downstream travel of sediment generated from the stockpiles, haul road or other mine infrastructure.

### 3.3.2 Settling Pond BMPs

The settling ponds are the ultimate perimeter control point for sediment for the Project. The settling ponds have been designed to prevent off-site travel of sediment through BMPs such as energy dissipater blocks/berms and retention time (>24 hours) for larger storm events. The goal of the settling ponds is to prevent reportable sediment releases from occurring in the downstream natural watercourses.

# 4. Construction Erosion & Sediment Control

## 4.1 Construction Phase of Mine Water Infrastructure

Construction is when majority of the Project development outside of the open pit is to commence which includes clearing and grubbing of the pit area, operational facilities location and TMF area and stockpiling of overburden soils. Waste rock from the pit development will be used for construction of new roads, modification of existing roads, initial construction of the TMF and general construction. There will be some overlap between construction and operation since pre-stripping materials from the pit will be utilized in the construction phase.

The mill area is a major piece of infrastructure and will be constructed simultaneously with the pit and roads. Therefore, to prevent discharge of sediment laden water from the Project during construction, the initial Project infrastructures to be constructed should be the central, east, and southeast settling ponds (shown on Drawing C-0101 in Appendix A). All Project water will be directed towards the settling ponds (via an expanding network of surface water ditches or via pumping) prior to discharge. The central, east, and southeast (initial) settling ponds are to be constructed prior to any clearing or grubbing for other components of the Mine Site.

Following the development of the initial settling ponds, other aspects of the mine will be developed including the TMF area, employee accommodation, and other WRSAs. Prior to the development of other aspects of the mine, the associated Mine Water Infrastructure components are to be developed as well. For example, prior to clearing, grubbing and development of the north WRSA and organics stockpile areas, the north settling pond must be constructed first. The contact water ditch network is to be developed in conjunction with the stockpile and haul road development, starting at the downstream end and working upstream.

## 4.2 Construction Erosion & Sediment Control Measures

The first step in erosion and sediment control is to source appropriate road and Project infrastructure construction materials.  Construction materials will be sourced from the till and waste rocks within the Project Area. Materials will be mechanically (i.e., strength) tested as well as chemically tested to determine its suitability for Goldboro Gold Mine mining and hauling operations. Figure 4.2-1 provides a typical cross-section of road.

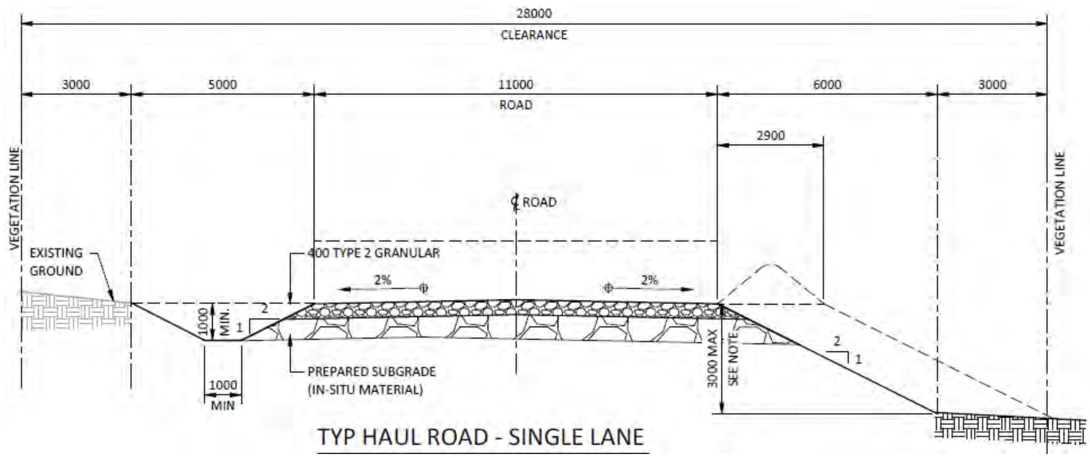



*Figure 4.2-1 Typical Road Profile Cross-section*

The haul roads will be constructed to withstand frequent heavy traffic between the proposed open pit, ROM stockpile, and TMF. Where necessary a geotextile material will be used to provide additional impermeability where organics are present, and rock lining is required for ditch slopes greater than 4%. Culvert installation will follow the guidelines (DFO 2015).

Specific erosion and sediment controls will need to be implemented during construction of the initial settling ponds (central, east, southeast) as there is no downstream infrastructure to prevent off-site travel of sediment. During construction of these settling ponds, sediment fence and fiber rolls or straw wattles will be placed on the downstream side of the construction extents to prevent off-site runoff containing significant amount of TSS. Sediment fence and fiber rolls or straw wattle prevent runoff from directly exiting the Site and allow time for suspended sediment to settle out of the runoff (MTO 2015).

Exposed soils around the settling ponds with slope of greater than 4:1 (H:V) are to be covered with erosion control blanket (or equivalent) to reduce the potential for erosion once they have reached final grade. All disturbed areas are to be seeded once they have reached final grade elevations. Similar methodology for the north and southwest settling ponds will be followed.

During construction of SWM ditches, check dams (straw or rock), or equivalent, should be put in place downstream of the active construction area. Check dams will reduce the runoff velocities within the active construction portion of the SWM ditches, preventing excess sediment from travelling to the downstream settling ponds (contact water ditches) or natural watercourse (non-contact water ditches). Erosion control blankets may be placed on extent of grading around

SWM ditches to provide an additional tractive resistance cover (MTO 2015). Once a section of the ditch has been completed the check dams will be removed and any accumulated sediment will be excavated from the ditch.

The purpose of all culverts, except for the non-mine contact water (i.e., clean water), is to convey stormwater below mine infrastructure (i.e., haul roads). The clean water culverts will experience flow while construction is occurring and as such will require specific erosion and sediment control measures which will be designed and installed to meet the requirements in NS Watercourse Alterations Standard (NSWAS). The natural watercourses will be isolated and temporarily diverted from the culvert construction. Waterproof isolation barriers will be installed on the upstream and downstream ends of the culvert construction to create a coffer dam around work area. Then the watercourse will be pumped around the work area from the upstream to the downstream sides of the construction, thereby preventing sediment laden runoff from discharging into Gold Brook and Gold Brook Lake. Examples of and design criteria for temporary diversion measures are provided Nova Scotia Environment and Climate change in Certification Manual for Watercourse Alteration Installers Section 5, January 2015.

Culverts in fish bearing streams will be constructed according to DFO (2015) guidelines, including a riprap apron on the upstream and downstream sides to prevent erosion and scour around the inlet and outlet. Once the culvert installation is completed, sediment fence and straw wattle will be connected on the embankments surrounding the entrance and exit of the culvert to prevent any sediment from entering the watercourse and culvert while the embankment and road construction is completed. Additional details and locations for erosion and sediment control measures will be determined during detailed design.

Stockpile locations should be setback at least 30m from any waterbody GGHACAs (2006).

# 5. Operations Erosion & Sediment Control Measures

Mine Water Infrastructure will continue to be constructed during the operational phase when new WRSAs and stockpiles are constructed. Therefore, erosion and sediment control measures will function as a treatment train approach. Treatment begins in the SWM ditches which includes contact water and clean water ditches.

The contact water ditches collect and convey runoff from all mine infrastructures except the TMF. Each contact water ditch will be lined with a HDPE liner, underlain by geotextile, followed by a layer of sand and a layer of riprap to prevent infiltration of stormwater into the surficial groundwater and protect the ditch from erosion. The channel lining also increases roughness of the channel bed, leading to reduced channel velocities, encouraging settling of sediment. The riprap layer will be sized based on the detailed design flows and shear stress calculations. Rock check dams will be constructed within the ditches with slopes greater than 3% while straw bale and filter sock check dams are to be placed in ditches with a slope of 0.5% to 3% as required. Rock check dams decrease the overall slope of the ditch, decreasing velocities and allowing time for suspended sediment to settle out. The clean surface water ditches collect water from the TMF embankment which does not come in contact with mine waste and direct it away from the project Site.

Surface water runoff from the contact SWM ditches will then discharge into one of the five settling ponds. Each settling pond consists of a main cell, multi-orifice outlet structure (excluding the east pond which is pumped directly to the central pond) and an emergency overflow spillway sized to convey Hurricane Beth sized storm event. The settling ponds have been designed specifically to remove suspended sediment. The ponds will be lined with an HDPE liner, underlain by geotextile. A layer of sand will be placed on top of the HDPE liner to protect against punctures and a layer of riprap on top of the sand layer. The riprap is to act as ballast to prevent the liner from being impacted by buoyancy forces of the nearby groundwater as well as provide erosion protection.

The settling ponds will incorporate coagulants to treat arsenic. Refer to water treatment memorandum (GHD, 2022e) for more details on treatment. As the stormwater runoff enters the pond, energy dissipater blocks will be used at the inlet of the ponds to reduce the inflow velocity and increase the flow path, facilitating sediment settling in the ponds.

Finally, the pond concrete outlet structures have been designed to control all storm events up to and including the 100-year design storm event through a series of orifices to achieve a minimum of 24 hours detention time for TSS settling. The detention time allows any remaining suspended sediment to settle out of the water column prior to discharge into the downstream receiving environment. A layer of riprap will be placed around the concrete outlet structure to reduce exit velocities and further assist with TSS settling. In order to reduce the risk of uncontrolled discharge from the Project, central and east settling ponds will direct the emergency overflow spillway toward the west and east open pits respectively. To further mitigate impacts to fish and fish habitat downstream of the settling ponds, all pond outlet structures will be equipped with emergency shut-off valves that can be closed if any water quality parameter exceedances are triggered.

The erosion control measures in the contact water ditches and settling ponds are to be maintained during operations including replacement of riprap, restoration of check dams if damaged, and general visual inspection of the ditches and settling ponds. Haul Road culverts will be inspected regularly to ensure adequate water conveyance and that there are no obstructions to fish passage. Inspection logs will be maintained, and water quality will be routinely sampled as described in Section 6.7. When necessary, the Site will be adaptively managed to include additional Site-specific mitigations such as water pumping, sediment fencing, coir logs, and straw bales.

The reclamation of WRSAs will commence immediately once completely developed.

# 6. Monitoring and Maintenance

It is necessary throughout the implementation of this ESCP that communication between all parties be maintained. The following are key lines of communication to be understood by Project personnel.

– Prior to installation of environmental structures, an on-Site Environmental Advisor must communicate the intention and details of the ESCP to the Contractor. The Contractor will provide feedback if a measure appears to be ineffective when constructed.
– In the event that an erosion and/or sediment control measure fails, Anaconda and other relevant regulatory agencies are to be notified per incident management protocols. The Contractor is to be instructed to make repairs within 12 hours.

Field records of all erosion and sediment control related activities are to be kept. These records may be shared with relevant regulatory agencies at any time. Field records are to be kept on standard forms for ease of comparison and identification of deficiencies.

## 6.1 Review of Erosion and Sediment Control Measures

All erosion and sediment control measures must be installed as per the manufacturer's recommendations and specifications. Improper installations may not be effective in controlling erosion or sediment on-Site, resulting in the potential for transport of sediment off-Site.

Environmental control measures will be reviewed and inspected by an on-Site Environmental Advisor during construction for deficiencies. Any noted deficiencies must be corrected as soon as possible. The Environmental Advisor can be a CISEC trained Environmental Department team member or an independent professional engineer.

Weather forecasts are to be consulted daily during preparation activities. In the event of a forecasted precipitation event in excess of 15 millimeters (mm) in 24 hours or 5-10 mm in three hours, environmental controls will be inspected in the field by the on-Site Environmental Inspector and preventative maintenance will be performed by the Contractor in advance of the storm event.

If deficiencies are noted during regular inspections which cannot be solved by routine maintenance a professional engineer should be retained to advise on how to resolve the deficiency.

## 6.2 Construction Monitoring and Maintenance

Effective monitoring of erosion and sediment control measures is vital to the success of the ESCP. Early detection of deficiencies can prevent the need for drastic repair measures and overall improve the outcomes of the ESCP.

Monitoring of the erosion and sediment control measures will take place daily during each day of active construction. A detailed examination of erosion and sediment control measures will be carried out prior to and immediately after a rainfall event; a snowmelt event; or a combination of the two (where the combined total is greater than 15 mm). Areas to be routinely monitored include:

- Areas of exposed soils
- Erosion and sediment control measures such as sediment fence, straw wattles etc.
- Areas adjacent to the sensitive receptors identified in Section 3.2

Maintenance activities should be carried out in accordance with this ESCP.

Check dams and settling ponds require sediment removal when the sediment reaches the lesser of a height of 0.3 m or one third of the effective height of the control measure.

Monitoring of TSS in the downstream environment may suggest existing Project erosion and sediment controls are ineffective or additional controls need to be implemented. A professional engineer will be consulted to develop remedial erosion and sediment control measures as necessary.

## 6.3 Operations Monitoring and Maintenance

Regular monitoring of established erosion and sediment control measures is essential to prevent failure and minimize the chance of significant erosion or sediment transport off-Site. Erosion control measures in the contact water ditches and settling ponds are to be maintained during operations. If problem areas are identified through repeated inspections, a remediation plan will be prepared to address the deficiencies. On-Site monitoring and inspections are the responsibility of the Environmental Inspector.

## 6.4 Contingency and Deficiency Identification

In the case the erosion and sediment control measures are found to be ineffective or overwhelmed by significant or unexpected flow events, a contingency plan will be in place including back up erosion and sediment control measure materials. Contingency planning should include:

- Location and quantity of back up erosion and sediment control mitigation materials on-Site
- Details on appropriate construction equipment to be used for repair/dewatering and location of applicable construction resources
- Plan to prevent discharge of sediment-laden water off-Site
- An emergency action plan including sequence events and Site-wide protocols
- Daily monitoring of weather reports for forecasted storm events

Anaconda will maintain a list of Emergency Preparedness supplies and location on-Site, including supplies that could be required to remediate or maintain ESC measures, such as pumps, sediment fencing, coir logs, and straw bales. Mine equipment (e.g., excavator, bobcat) can also be mobilized as required. Also, Anaconda should provide a contact list for emergency situations such as excess TSS discharge into surrounding brooks or lakes.

## 6.5 Incident Reporting

In the event where the release of TSS in Site discharge exceeds provincial guidelines, relevant regulatory agencies will be alerted. Failures which do not result in the release of sediment from the Site should be recorded by the Environmental Department as these failures could lead to a reportable incident in the future.

Reportable incidents include:

– For Clear Flows (Normal background conditions)
  - Maximum increase of 25 mg/L from background levels (24 hours or less); and
  - Maximum average increase of 5 mg/L from background levels (inputs lasting between 24 hours and 30 days)
– For High Flow (Spring freshet and storm events)
  - Maximum increase of 25 mg/L from background levels when background levels are between 25 mg/LO and 250 mg/L; and
  - Shall not increase more than 10% over background levels when background is greater than 250 mg/L

## 6.6 Decommissioning of Environmental Controls

Temporary sediment controls are to be removed at the appropriate time to ensure the success of the Mine Water Infrastructure. These measures are to be removed immediately after the Site Inspector has identified that construction work in this area has been completed, the area is sufficiently stabilized, and the downstream control is no longer required. A control will no longer be necessary when:

– No further activities resulting in disturbance of soil and earthwork is expected in this area
– The upstream area has been sufficiently stabilized and there are no signs of active erosion
– Compliance with provincial guidelines for TSS in runoff can be met.

## 6.7 Documentation

Documentation of all activities related to erosion and sediment control is vital to demonstrate that all reasonable efforts have been made to prevent the release of sediment-laden surface water from the Site. All erosion and sediment control activities are to be documented to indicate that this ESCP is being followed. The documentation should include:

– The ESCP
– Revisions to the ESCP
– Erosion and Sediment Control Inspection Reports
– Surface water sampling results
– Maintenance Reports
– Erosion and Sediment Control Incident Reports
– Erosion and Sediment Control Decommissioning Reports for temporary structures

These documents may be provided to relevant regulatory agencies at any time to demonstrate due diligence regarding erosion and sediment control at the Site.

# 7. Conclusion

This Erosion and Sediment Control Plan includes general principles to govern erosion and sediment control measures implemented at the Goldboro Gold Mine Site along with specific erosion and sediment control measures to be implemented for the Mine Water Infrastructure during construction and operations. Best management practices and principles outlined in this ESCP should be followed when constructing erosion and sediment control measures.

# 8. References


Alberta Transportation. 2011. Erosion and Sediment Control Manual. Government of Alberta – Transportation. Available at: http://www.transportation.alberta.ca/4626.htm. June 2011.

British Columbia Ministry of Water Land & Air Protection. 2003. Dyke Design and Construction Guide: Best Management Practices for British Columbia. Flood Hazard Management Section Environmental Protection Division. Province of British Columbia Ministry of Water, Land and Air Protection. Prepared by Golder Associates Ltd. and Associated Engineering (B.C.) Ltd. Available at: http://www.env.gov.bc.ca/wsd/public_safety/flood/pdfs_word/dyke_des_cons_guide_july-2011.pdf. July 2003.

CCME (Canadian Council of Ministers of the Environment). 2002 (updated from 1999). Canadian Water Quality Guidelines for the Protection of Aquatic Life. Total Particulate Matter.

GGHACAs (Greater Golden Horseshoe Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction (2019).

MTO (Ministry of Transportation Ontario) Environmental Guide for Erosion and Sediment Control for Construction of Highway Projects (2015).

Nova Scotia Certification Manual for Watercourse Alterations Installers 2015. Nova Scotia Environment. Available at: https://www.novascotia.ca/nse/watercourse-alteration/docs/certification-manual-for-watercourse-alteration-installers.pdf.

Nova Scotia Watercourse Alterations Standard 2015. Nova Scotia Environment. Available at: https://novascotia.ca/nse/watercourse-alteration/docs/Watercourse-Alterations-Standard.pdf.

TAC (Transportation Association of Canada). 2005. Transportation Association of Canada National Guide to Erosion and Sediment Control on Roadway Projects. 72 p. + appendices.

Tajek, J., Pettapiece, W. W. and Toogod, K. E. 1985. Water erosion potential of soils in Alberta. Tech. Bull. No. 1985-29. Agriculture Canada, Ottawa, ON.


# 9. Disclaimer

This report has been prepared by GHD for Anaconda Mining Inc. and may only be used and relied on by Anaconda Mining Inc. for the purpose agreed between GHD and Anaconda Mining Inc. as set out in this report.

GHD otherwise disclaims responsibility to any person other than Anaconda Mining Inc. arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

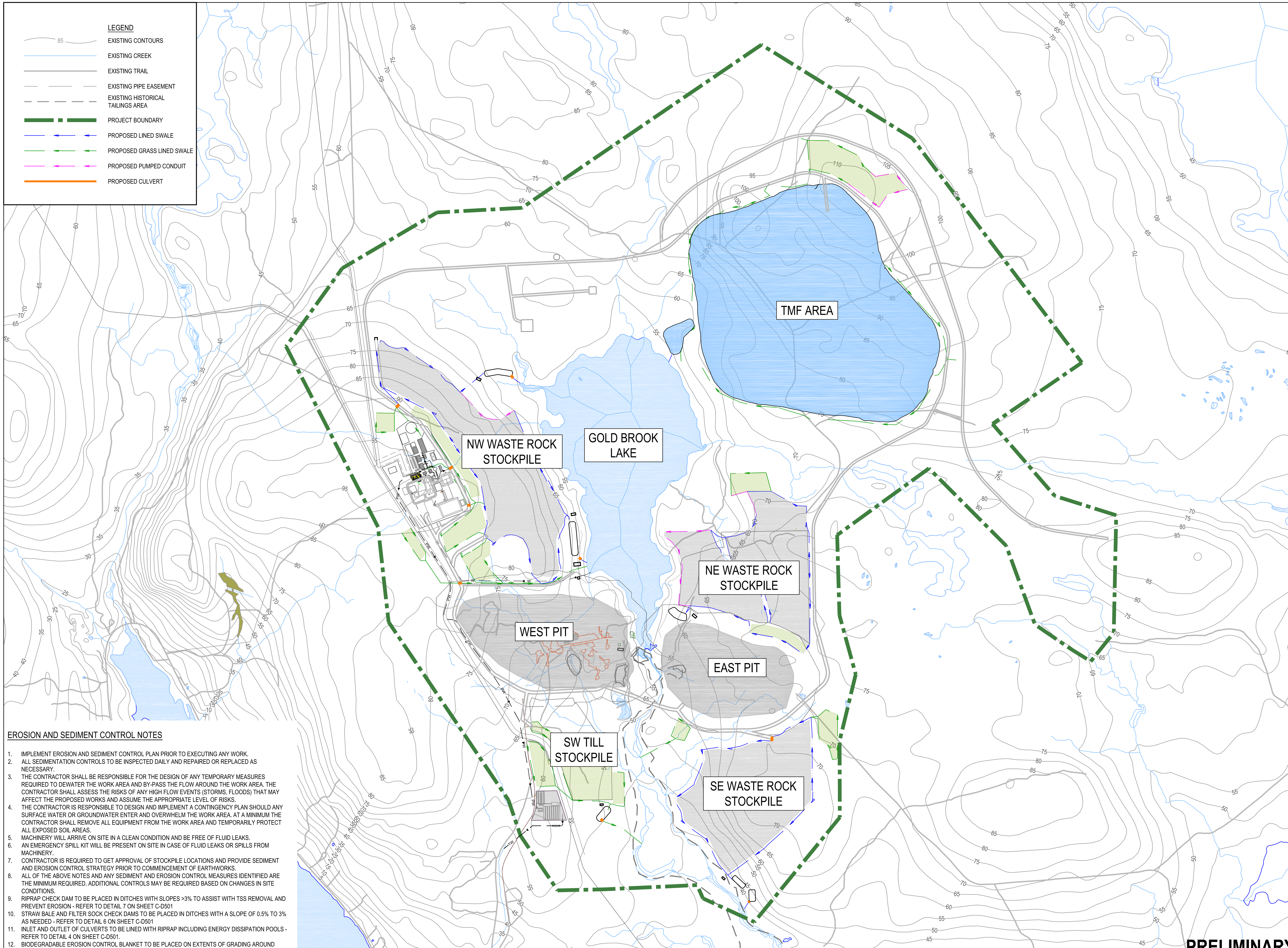
The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

# Appendices

# Appendix A

## Drawing C-0101




## EROSION AND SEDIMENT CONTROL NOTES

1. IMPLEMENT EROSION AND SEDIMENT CONTROL PLAN PRIOR TO EXECUTING ANY WORK.
2. ALL SEDIMENTATION CONTROLS TO BE INSPECTED DAILY AND REPAIRED OR REPLACED AS NECESSARY.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY TEMPORARY MEASURES REQUIRED TO DEWATER THE WORK AREA AND BY-PASS THE FLOW AROUND THE WORK AREA. THE CONTRACTOR SHALL ASSESS THE RISKS OF ANY HIGH FLOW EVENTS (STORMS, FLOODS) THAT MAY AFFECT THE PROPOSED WORKS AND ASSUME THE APPROPRIATE LEVEL OF RISKS.
4. THE CONTRACTOR IS RESPONSIBLE TO DESIGN AND IMPLEMENT A CONTINGENCY PLAN SHOULD ANY SURFACE WATER OR GROUNDWATER ENTER AND OVERWHELM THE WORK AREA. AT A MINIMUM THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT FROM THE WORK AREA AND TEMPORARILY PROTECT ALL EXPOSED SOIL AREAS.
5. MACHINERY WILL ARRIVE ON SITE IN A CLEAN CONDITION AND BE FREE OF FLUID LEAKS.
6. AN EMERGENCY SPILL KIT WILL BE PRESENT ON SITE IN CASE OF FLUID LEAKS OR SPILLS FROM MACHINERY.
7. CONTRACTOR IS REQUIRED TO GET APPROVAL OF STOCKPILE LOCATIONS AND PROVIDE SEDIMENT AND EROSION CONTROL STRATEGY PRIOR TO COMMENCEMENT OF EARTHWORKS.
8. ALL OF THE ABOVE NOTES AND ANY SEDIMENT AND EROSION CONTROL MEASURES IDENTIFIED ARE THE MINIMUM REQUIRED. ADDITIONAL CONTROLS MAY BE REQUIRED BASED ON CHANGES IN SITE CONDITIONS.
9. RIPRAP CHECK DAM TO BE PLACED IN DITCHES WITH SLOPES >3% TO ASSIST WITH TSS REMOVAL AND PREVENT EROSION - REFER TO DETAIL 7 ON SHEET C-D501
10. STRAW BALE AND FILTER SOCK CHECK DAMS TO BE PLACED IN DITCHES WITH A SLOPE OF 0.5% TO 3% AS NEEDED - REFER TO DETAIL 6 ON SHEET C-D501
11. INLET AND OUTLET OF CULVERTS TO BE LINED WITH RIPRAP INCLUDING ENERGY DISSIPATION POOLS - REFER TO DETAIL 4 ON SHEET C-D501.
12. BIODEGRADABLE EROSION CONTROL BLANKET TO BE PLACED ON EXTENTS OF GRADING AROUND SETTLING PONDS AND SWM DITCHES.

GHD Ltd.
455 Phillip Street
Waterloo, Ontario N2L 3X2 Canada
**T** 1 519 884 0510 **F** 1 519 884 0525
www.ghd.com



Bar is 25mm on original size sheet
0 25mm

0 100 200 300m

| No. | Issue | Checked | Approved | Date |
|---|---|---|---|---|
| 1 | FOR EA | L.B. | A.B. | 2022-04-07 |

| | | | |
|---|---|---|---|
| Author | N. QUEHL | Designer | L. BOWERING |
| Drafting Check | J. SPENLER | Design Check | A. BETTS |
| Project Manager | C. ANDREWS | Project Director | T. SMALL |

Client
**ANACONDA MINING**
**GOLDBORO, NOVA SCOTIA**

Project
**WATER MANAGEMENT INFRASTRUCTURE**

Date: **December 1, 2021**
Scale: **1:10000**
Project No. **11222385**

Title
**EROSION & SEDIMENT CONTROL PLAN**

Size **ANSI D**
Sheet No. **C-0101**

Plot Date: 20 May 2022 - 12:43 PM Plotted By: Jason Spenler Path and Filename: \\ghdnet\ghd\CA\Halifax\Projects\661\11222385\Digital_Design\ACAD 2020\Sheets\MEM001\11222385-GHD-00-00-DRG-CI-D101.dwg ghd.com

The Power of Commitment

# Appendix F.11

## Water Monitoring Plan

# Water Monitoring Plan

## Goldboro Gold Project

Anaconda Mining Inc.

20 May 2022

The Power of Commitment

**GHD**
110, 120 Western Parkway
Bedford, Nova Scotia B4B 0V2, Canada | **ghd.com**

**Document status**

| Status Code | Revision | Author | Reviewer | | Approved for issue | | |
|---|---|---|---|---|---|---|---|
| | | | Name | Signature | Name | Signature | Date |
| S4 | 00 | Glen Merkley | Philip Sheffield | | Andrew Betts | | 04/20/2022 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



**The Power of Commitment**

# Contents

# Figure index



# Table index



# Appendices

## List of acronyms

| | |
|---|---|
| CCME | Canadian Council of Ministers of the Environment |
| COD | Chemical Oxygen Demand |
| DOC | Dissolved Organic Carbon |
| EEM | Environmental Effects Monitoring |
| EQS | Environmental Quality Standards |
| IA | Industrial Approval |
| mbgs | Metres below ground surface |
| MDMER | Metal and Diamond Mining Environmental Regulations |
| mTPH | Modified Total Petroleum Hydrocarbons |
| NSECC | Nova Scotia Department of Environment and Climate Change |
| PA | Project Area |
| PVC | Polyvinyl chloride |
| PWQA | Predictive Water Quality Assessment |
| PWQM | Predictive Water Quality Model |
| QA/QC | Quality Assurance/Quality Control |
| TMF | Tailings Management Facility |
| tpd | Tonne per day |
| TSS | Total Suspended Solids |
| WMP | Water Monitoring Plan |
| WRSA | Waste Rock Storage Areas |

# 1. Introduction

GHD Limited (GHD) was retained by Anaconda Mining Inc. (Anaconda) to develop a Water Monitoring Plan (WMP) for the proposed Goldboro Gold Project (the Project). The Project is located approximately 175 kilometres (km) northeast of Halifax, 60 km southeast of Antigonish, and 1.6 km northeast of the community of Goldboro on the eastern shore of Isaacs Harbour, in Guysborough County, Nova Scotia (NS), Canada. Anaconda proposes to develop the Project as a 4,000-tonne per day (tpd) mine and processing facility.

The proposed Water Monitoring Plan includes groundwater quality and elevations monitoring at a network of monitoring wells and surface water quality and quantity monitoring at a network of surface water stations. Monitoring will be completed within the Project Area (PA) to evaluate potential impacts of proposed mining operations on the surrounding groundwater and surface water resources. The results from the monitoring will be used to inform adaptive water management practices to mitigate any adverse impacts that may result from the Project.

Proposed Project activities including development of the open pits, Waste Rock Storage Areas (WRSAs), and tailings management facility (TMF) may have the potential to affect groundwater and surface water quality. Continuous dewatering associated with an open pit also has potential to lower groundwater levels near the pit and reduce the groundwater discharge (baseflow) to nearby surface watercourses. Given the potential impacts associated with the proposed Project activities, the objectives of this Water Monitoring Plan (WMP) are to:

– Identify any long-term surface water and groundwater quality trends and potential cumulative effects from current and future development of the Project.
– Detect any potential surface water and groundwater quality and quantity impacts.
– Increase understanding of background conditions.
– Gain further understanding of groundwater/surface water interaction.
– Identify high risk areas that may require further monitoring.
– Refine the list of analytes based on a review of long-term trends.

In addition to introducing additional monitoring locations as necessary, this WMP recommends using existing groundwater monitoring wells and surface water stations to establish a network of monitoring sites to permit the collection of surface water and groundwater data to geographically cover the extents of the Project activities. Existing and proposed monitoring sites are located adjacent to key infrastructure which has the potential to affect surface water and groundwater conditions. The monitoring program will also be used to address Regulatory requirements as outlined in the Predictive Water Quality Assessment (GHD, 2022c).

Monitoring groundwater and surface water elevations, and surface water flows will document potential impact of Project activities on groundwater elevations and flow directions as well as on surface flow and baseflow conditions in nearby watercourses. Routine groundwater sampling and analysis will provide data to evaluate changes in groundwater quality, especially with respect to baseline conditions prior to active mining. Routine surface water quality sampling and analysis will be applied to confirm compliance with regulatory requirements, confirm predicted impacts to water quality, update predictive modelling, and determine whether additional mitigation or emergency response measures are required at any point over the life of the Project.

Effective water management requires a clear understanding of the interaction between groundwater and surface water. Therefore, to better assess this interaction, the surface water monitoring is coordinated with the groundwater monitoring and both groundwater and surface water monitoring programs are designed to complement each other.

# 2. Surface Water Monitoring

The potential impact of the Project on surface water conditions is anticipated to evolve and progress over the course of the Project's lifecycle. Therefore, a phased approach aligning with the groundwater monitoring program (see Section 3) and lifecycle of the Project is proposed for the surface water monitoring program.

Surface water quantity and quality assessment monitoring locations were selected to monitor baseline, construction, operations, and closure water quality and water quantity.

## 2.1 Existing Surface Water Monitoring Locations

Monitoring locations were selected to coincide with previous surface water monitoring completed by GHD from 2021 onward as part of baseline monitoring (i.e., pre-construction monitoring). These baseline monitoring locations include SW-11-21 through to SW-21-21 and are presented on **Figure 1**.

## 2.2 Proposed Surface Water Monitoring Locations

In addition to the existing monitoring locations established during baseline monitoring (SW-11-21 to SW-21-22), 13 additional monitoring locations are proposed to monitor the surface water regime during the construction, operations and closure phases of the Project. These phases are further described in Section 2.7. These new locations are situated near the settling and polishing ponds, discharge locations, and receiving watercourses and include both surveillance and compliance locations. Compliance locations are further sub-categorized in Section 2.4**.** Locations of these monitoring stations may require adjustments during the detailed design stage and are also subject to field conditions.

The proposed monitoring locations and activities for the construction, operations, and closure phases of the Project are summarized in **Figure 2**, **Figure 3**, and **Figure 4** respectively. It should be noted that monitoring locations identified on a figure may not be monitored for the full duration of each phase. Further details regarding phasing for each activity is provided in Section 2.7.

## 2.3 Surface Water Quantity Monitoring

The full Project development will affect the hydrological regime of many of the watercourses in the local area to varying degrees, including impacts to annual flow and seasonal low flows. Predictive Water Quantity Modelling (PWQM) and groundwater modelling studies indicate that during operations, most nearby watercourses will be significantly impacted both in terms of surface flow and baseflow. Therefore, the monitoring of continuous water level at six existing locations and manual flow data at five of these locations is proposed to continue on a monthly frequency until the end of operations to support and improve the existing stage-discharge relationship/rating curves established and further improve and validate modelling completed for the Project.

As the pits are allowed to fill, most of the watercourses that would have been impacted during operations will begin to recover and the water table will begin to rise, resulting in the drawdown losses to the watercourses being lessened. During closure, water quantity monitoring will likely continue at four existing locations initially and may be reduced to three locations three years after mine closure is finished, the frequency at which can likely reduce from monthly to quarterly events.

Visual monitoring of erosion and sediment control measures to identify pathways to surface water bodies and wetlands will be conducted through all phases.

## 2.4 Surface Water Quality Monitoring

As part of baseline/pre-development monitoring, surface water quality samples were collected through all seasons at ten stations. Within the baseline data collected, elevated metals (including aluminum, arsenic, iron, lead, and zinc) are present. Baseline water quality monitoring will continue at nine of the baseline monitoring locations during construction, operations, and closure. Ocean Lake, located northeast of the PA, was included in the baseline surface water monitoring program as it was initially evaluated as a potential water source for the Project.

Surface water quality may be impacted by runoff that is in contact with the Project infrastructure. Based on the predictive water quality analysis completed for the Project (GHD, 2022), there is potential for exceedances of regulatory limits for several parameters, including ammonia, arsenic, cobalt, copper, cyanide, and nitrite. Water treatment will be designed to meet applicable provincial or federal discharge requirements. Water quality monitoring will be undertaken to confirm compliance with the following regulatory framework:

- Metal and Diamond Mining Environmental Regulations (MDMER) Objectives
- Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life
- Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water
- Site-specific criteria (based on background data and site-specific risk assessment)

An Industrial Approval (IA) has yet to be obtained; additional sampling requirements may apply under the future IA or Environmental Effects Monitoring (EEM) program and are not fully detailed in this monitoring plan. These requirements will be fully determined once the Project becomes subject to MDMER. Final discharge criteria for the Project will be established in the IA.

Based on the above framework, monitoring locations can be sub-categorized as described in **Table 1**.

*Table 1 Surface Water Monitoring Location Categories*

| Monitoring Location Category | Regulatory Framework | Duration and Location |
|---|---|---|
| Baseline/Surveillance Location | Site-specific criteria (based on background data) | Recommended to continue at all (accessible) existing baseline monitoring locations for duration of construction and operations.<br>Number of sites can reduce during closure phase. |
| MDMER Compliance Location | Metal and Diamond Mining Environmental Regulations (MDMER) Objectives<br>Site-specific criteria (based on background data and site-specific risk assessment) | Required for duration of operations.<br>Sampling to be undertaken upstream of any site discharge points (i.e., discharge from settling and polishing ponds). |
| CCME/EQS Compliance Location | Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life<br>Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water<br>Site-specific criteria (based on background data and site-specific risk assessment) | Required during and following completion of operations until compliance can be confirmed (approx. 3 years following end of operations typically).<br>Sampling to be undertaken downstream of any site discharge point, within receiving waterbody. |

Four (4) MDMER compliance locations, six (6) CCME/EQS compliance locations, and two (2) surveillance locations will be introduced during construction, operations, and/or closure to confirm water quality compliance with the above regulatory framework.

## 2.5 Sampling Frequency

Surface water monitoring frequency will vary depending on regulatory framework and site-specific criteria (based on background data and site-specific risk assessment). The sampling frequencies described in **Table 2** are recommended for the monitoring program.

*Table 2 Recommended Sampling Frequencies for Surface Water Monitoring Locations*

| Mine Site Phase | Standard Sampling Frequencies |
|---|---|
| 1. Construction Phase | a. Baseline/Surveillance Monitoring locations:<br>i. Weekly surface water quality monitoring for the first 3 months<br>ii. Monthly surface water quality monitoring for the remainder of the construction phase.<br>iii. Monthly surface water quantity monitoring for the duration of the construction phase. |
| 2. Operations Phase | a. Baseline/Surveillance Monitoring locations:<br>i. Monthly water quality monitoring for the first eight months of the operations phase<br>ii. Quarterly water quality monitoring for the remainder of the operations phase<br>iii. Monthly water quantity monitoring for duration of the operations phase<br>b. MDMER Compliance Locations, which will be commissioned as required throughout phase:<br>i. Monthly water quality monitoring for the duration of the sampling period |
| 3. Closure Phase | a. CCME/EQS Compliance Locations:<br>i. Quarterly water quality sampling for first two years of sampling period<br>ii. Annual sampling for last two years of sampling period<br>b. Baseline/Surveillance Monitoring locations:<br>i. Quarterly water quality and quantity monitoring for the closure phase |

## 2.6 Surface Water Quality Monitoring Parameters

At each monitoring location water quality grab samples are collected. Similar to the sampling frequency, the surface water quality monitoring parameters analysed at each location will vary depending on regulatory requirements and site-specific criteria (based on background data and site-specific risk assessment). A summary of the monitoring parameters recommended to be analysed by monitoring location category is provided in **Table 3**.

*Table 3 Summary of Surface Water Quality Monitoring Parameters to Analyse at Each Monitoring Location Category*

| Monitoring Location Category | Metals(1) | TSS(2) | Radium 226(3) | Mercury(4) | Cyanide(5) | DOC(6) | Chlorop-hyll(7) |
|---|---|---|---|---|---|---|---|
| Baseline Surveillance Location | ✕ | | | ✕ | | ✕ | ✕ |
| MDMER Compliance Location | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ |
| CCME/EQS Compliance Location | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ |

Notes:

(1) Metals include:
  a. Total metals, including but not limited to:
    i. Aluminium, Arsenic, Cadmium, Copper, Iron, Lead, Molybdenum, Nickel, Selenium, Zinc
  b. Total dissolved metals, including but not limited to:
    i. Aluminium, Arsenic, Cadmium, Copper, Iron, Lead, Molybdenum, Nickel, Selenium, Zinc
  c. Select general chemistry parameters, including but not limited to:
    i. Nitrate, Nitrite, Ammonia, pH, Hardness, Alkalinity, Electrical Conductivity

(2) Total Suspended Solids (TSS)

(3) Radium Isotopes (Radium 226)

(4) Mercury (dissolved, total, methyl)

(5) Cyanide (total, free) - concentrations to be recorded if used as a process reagent as per MDMER, therefore should be analysed at TMF polishing pond/discharge location

(6) Dissolved Organic Carbon (DOC)

(7) Chlorophyll A (Chlorophyll)

Quality Assurance and Quality Control (QA/QC) are integral components of proper field and laboratory procedures. As stated in the MDMER (Schedule 5, Section 7(e)), water quality monitoring is to be conducted by implementing quality assurance and quality control measures that will ensure the accuracy of water quality monitoring data. QA/QC is essential to delivering the consistent quality service. Field duplicates will therefore be incorporated into the monitoring program as a blind method of evaluating analytical precision, field precision and sample homogeneity. Laboratory produced trip blanks will also be taken and submitted for analysis during each site visit. Water quality samples will be submitted to accredited laboratories.

# 2.7 Monitoring Life Cycle

The proposed timeline for each monitoring location is presented in **Table A.1** in **Appendix A**. Further detail regarding each phase and specific monitoring locations can be found in the sections to follow.

## 2.7.1 Pre-Construction

The surface water locations being monitored during the pre-construction/baseline phase are presented in **Figure 1**.

As part of baseline/pre-construction monitoring, surface water monitoring has been undertaken monthly at eleven locations. Surface water quality samples have been collected at ten stations, continuous water levels at three stations, and continuous water level and streamflow data at four stations through all seasons (see **Figure 1**).

### 2.7.2 Construction Phase

The proposed surface water locations, to be monitored during (but not necessarily for the entire duration of) the construction phase, are presented in **Figure 2**.

During the construction phase, nine (9) water quality surveillance locations are proposed to be sampled weekly for the first three (3) months of construction, and then monthly from thereon.

SW-15-21 will be discontinued from the water quality monitoring network during the construction phase, as no impact from mine operations is anticipated at this location.

During the construction phase and onward, monitoring location SW-12-21 will need to be decommissioned due to ease of access, and monitoring location SW-22-21 located just downstream will be commissioned and monitored in its place.

Water quality and levels are monitored currently at SW-11-21, which acts as the furthest downstream monitoring location for the Project. However, due to the width and depth of Gold Brook, streamflow data collection at this location was not feasible and therefore SW-11-21 will be decommissioned during the construction phase and SW-24-21 (upstream, to a more confined portion of Gold Brook) should be implemented and streamflow monitoring will be incorporated. Therefore, during construction one additional (5 total) locations will include streamflow monitoring.

The collection of continuous water level is proposed to continue at only one station (SW-21-21) during construction (and through to the end of closure).

During the second year of the construction phase, select MDMER and CCME/EQS compliance monitoring locations will need to be commissioned for several of the settling ponds as well as the TMF (see **Table A.1**).

### 2.7.3 Operations Phase

The proposed surface water locations, to be monitored during (but not necessarily for the entire duration of) the operations phase, are presented in **Figure 3**.

During the operations phase, surface water monitoring locations will adapt to accommodate the phased approach of site operations and as adaptive water management activities require. Following site construction, monitoring at SW-20-21 will no longer be admissible due to the proposed location of the west pit and will therefore be decommissioned.

Five (5) water quality monitoring locations have been identified (TMF-Pond, SE-Pond, CTR-Pond, SW-Pond, and NW-Pond) to monitor settling and polishing pond locations, upstream of their discharge to receiving water bodies/waterways. Note that there is no proposed discharge into a receiving waterway for the northeast settling pond, as it will be pumped to the central settling pond prior to discharge and therefore no compliance location is proposed. Water quality at four of these locations (TMF-Pond, SE-Pond, CTR-Pond, and NW-Pond) will be monitored for MDMER compliance. The SW-Pond location will be monitored for surveillance water quality parameters (see **Table 3)** and TSS, as contact water being treated at this facility is only anticipated to be in contact with an organics material stockpile and a till stockpile.

Five water quality monitoring locations have been identified (SW-23, SW-24, SW-25, SW-26, and SW-27) to monitor downstream of discharge points, within the receiving waterbody. Samples at four of these locations (all but SW-26) will be monitored for CCME/EQS compliance. SW-26, located downstream of the SW-Pond location will only be monitored for surveillance water quality parameters (see **Table 3)** and TSS.

### 2.7.4 Closure Phase

The proposed surface water locations to be monitored during (but not necessarily for the entire duration of) the closure phase are presented in **Figure 4**.

Water quality and quantity monitoring will continue at four locations (SW-14-21, SW-21-21, SW-22, and SW-24) following the completion of the operations phase. SW-14-21 will be monitored for three years after operations is complete, while the remainder will be monitored through to three years following the proposed discharge of the west pit (to year 37).

Monitoring at MDMER compliance locations can be decommissioned following completion of the operations phase. CCME/EQS monitoring locations at the settling and polishing pond discharge points (in the receiving water bodies) will likely continue for another three years, to confirm compliance.

Discharge to the receiving waterbody from the east pit is anticipated to begin in Year 14 (2 years following operations phase is completed). SW-28 will be commissioned at this time to confirm CCME/EQS compliance and will be monitored for three years.

Discharge to the receiving waterbody from the west pit is anticipated to begin in Year 35. SW-29 will be commissioned at this time to confirm CCME/EQS compliance and will be monitored for three years.

# 3. Groundwater Monitoring

## 3.1 Existing Groundwater Monitoring Locations

Borehole drilling and monitoring well installation was completed in 2021 and 2022 by Logan Drilling Group (Logan) with supervision from Terrane Geoscience (Terrane) and technical direction from GHD. The program consisted of drilling and installation of 91 nested monitoring wells at 38 locations (**Figure 5**). At each nested monitoring well location, between two and three monitoring wells were installed within individual boreholes advanced to different depths. Monitoring wells labelled ‘A’ and ‘B’ were installed to approximately 5 and 30 metres below ground surface (mbgs), respectively, and wells labelled ‘C’ were installed to depths ranging from 41.1 to 196.6 mbgs. **Table B.1** in **Appendix B** contains a summary of the well details including coordinates, ground surface elevations, well depths, proposed monitoring, and rationale for placement or continued use.

## 3.2 Monitoring Well Design and Construction

The monitoring locations were nested with either two or three wells in each nest. The boreholes were packer tested to determine the most permeable portions of the bedrock. Screened intervals within the ‘B’ and ‘C’ series monitoring wells were selected based on the results of packer testing.

Monitoring wells were completed using 50-millimeter (2-inch) diameter polyvinyl chloride (PVC) well materials and boreholes were backfilled with silica sand around the well screen and bentonite clay around the riser. A lockable protective casing was installed to secure the monitoring wells.

Following installation, the newly drilled monitoring wells were developed using dedicated Waterra tubing. The purging procedure is intended to promote the collection of representative groundwater samples. Well development also removed any silt or clay fines from the wells in order to minimize sediment inside the well screens.

## 3.3 Groundwater Level Monitoring

Each of the monitoring wells are equipped with a pressure transducer to record water levels at an hourly frequency. Pressure transducer data should be downloaded during the quarterly sampling events and compensated using barometric pressure recordings collected from the barometric transducer (barologger) currently installed on-site.

Groundwater static water levels will be measured relative to surveyed referenced points (top of PVC casing) with an electric water level probe. Surface water elevations should also be measured at the same time to determine the hydraulic relationship between groundwater and surface water.

## 3.4 Groundwater Quality Monitoring

Groundwater samples will be collected quarterly from each monitoring well. Groundwater quality samples will be collected from the 'C' series wells during pre-construction but will be discontinued in the construction, operations, and closure phases of the Project. Prior to collecting groundwater samples, the depth to water and total depth of the well will be measured and used to calculate the volume of standing water in the well.

During well purging, the following stabilization parameters will be measured:

- pH
- Temperature
- Conductivity

Stabilization parameters will be measured after each well volume is removed. Removing a minimum of three well volumes is required before groundwater samples may be collected. Purging may cease when stabilization is achieved. The groundwater is considered stable when three successive measurements meet the criteria in **Table 4**, below.

***Table 4 Groundwater Stabilization Criteria***

| Parameter | Units | Stabilization Criteria |
|---|---|---|
| pH | Standard Units | +/- 1 |
| Specific Conductivity | µS/cm | +/- 10% |
| Temperature | °C | +/- 10% |

If monitoring parameters fail to stabilize after the removal of five well volumes, groundwater sampling may proceed.

Alternately, when well yield is low, stabilization parameters are measured until the well pumps dry. Once the well is pumped dry, purging may cease, and groundwater sampling may proceed when the well has recovered a sufficient volume to fill the sample bottles.

If possible, groundwater samples should be collected at least 24 hours following purging. This will allow sediment in the well mobilized during purging to settle from the water column with a corresponding reduction in of the sample turbidity and associated filtering required to prepare the groundwater samples collected for metals analysis.

One field duplicate sample for every 10 samples (10%) should be collected in accordance with Quality Assurance/Quality Control (QA/QC) protocols. The results of the QA/QC sampling will be used to evaluate the reliability of the sampling and analysis methods.

## 3.5 Sampling Frequency

Anaconda has collected baseline quality data on a quarterly basis and will continue to collect data at this frequency throughout all phases of the Project. This conservative approach is appropriate for the groundwater monitoring frequency, especially at newly installed monitoring wells. Quarterly monitoring can be completed in each season to determine if there are cyclic changes in groundwater quality related to weather/climate. As more groundwater data is collected and evaluated it may be appropriate to reduce the monitoring frequency. More frequent monitoring may be implemented to monitor trends or mine infrastructure changes over shorter durations that may have a potential impact to groundwater.

As surface water quantity monitoring is proposed at a monthly frequency from pre-construction through to active closure, the surface water and groundwater sampling should be collected in conjunction with each other.

Sampling frequency for each monitoring well is also identified in **Table B.1** in **Appendix B**.

## 3.6 Groundwater Quality Monitoring Parameters

**Table 5** provides the recommended groundwater quality monitoring parameters throughout the lifecycle of the Project. Parameters may be adjusted from time to time to meet the needs of the Project as determined from analysis of the analytical data and in consultation with regulators.

***Table 5 Groundwater Quality Monitoring Parameters***

| Phase | Monitoring Parameters |
|---|---|
| Pre-Construction | - Benzene, Ethylbenzene, Toluene, Xylenes / modified Total Petroleum Hydrocarbons (BTEX/mTPH),<br>- Total and Dissolved Cyanide<br>- Total and Dissolved Mercury<br>- Dissolved Metals<br>- General Chemistry<br>- Dissolved Phosphorus<br>- Chemical Oxygen Demand (COD)<br>- Dissolved Organic Carbon (DOC)<br>- Total Suspended Solids (TSS) |
| Construction, Operations, and Closure | - BTEX/mTPH<br>- Total and Dissolved Cyanide<br>- Total and Dissolved Mercury<br>- Dissolved Metals<br>- General Chemistry<br>- Dissolved Phosphorus<br>- COD<br>- DOC<br>- TSS |

## 3.7 Monitoring Life Cycle

The existing monitoring well network was established to document baseline groundwater conditions prior to Project development. The monitoring network will be modified over time as the mine enters different stages of its life cycle. Proposed groundwater monitoring in each phase of the Project is detailed in **Table B.1** in **Appendix B**.

### 3.7.1 Pre-Construction

The existing monitoring well network will be utilized during the pre-construction stage of the mine's life cycle. Groundwater elevation and quality monitoring will continue at all existing monitoring well nests (**Figure 5**).

### 3.7.2 Construction Phase

During construction, GHD assumes existing monitoring well nests MW21 and MW51 will be decommissioned to facilitate construction of the pits and WRSAs (**Figure 6**). Routine groundwater quality monitoring at all 'C' wells (MW15-C, MW16-C, MW18-C, MW20-C, MW22-C, MW23-C, MW24-C, MW26-C, MW27-C, MW28-C, MW32-C, MW33-C, MW34-C, and MW46-C) will cease, but groundwater elevation monitoring is proposed to continue at these locations.

### 3.7.3 Operations Phase

During the operations phase, monitoring well nest MW17 will be decommissioned as the West Pit development will gradually impact the well nest. Routine groundwater quality and elevation monitoring is proposed to continue at all remaining monitoring wells on a quarterly basis (**Figure 7**). Should any significant changes in the mine operations, groundwater quality or levels occur during the operational phase, additional monitoring wells may be added or removed.

### 3.7.4 Closure Phase

During the first three years of the Project's closure phase, earthworks and demolition activities will take place to return the PA to a safe, stable, and vegetated state, and the pits will commence filling with water from both ground and surface sources. Quarterly groundwater monitoring will continue at all remaining monitoring wells.

Following demolition and earthworks activities, groundwater quality and elevation monitoring are proposed on a bi-annual basis for 22 years (i.e., from Year 16 to 37), during which time the East and West Pits will be allowed to flood creating two open waterbodies. Groundwater monitoring may be further reduced over this period as the mine stabilizes. Termination of the groundwater monitoring program would be expected following a satisfactory review of the monitoring data collected during all Project phases and as directed by and/or in consultation with NSECC.

# 4. Closure

All of Which is Respectfully Submitted,

GHD

**Glen Merkley, P.Eng.**
Intermediate Environmental Engineer

**Andrew Betts, P.Eng., MASc.**
Surface Water Engineer

**Philip Sheffield, P.Eng. (BC), MASc.**
Quantitative Hydrogeologist

# 5. References

GHD. 2022. Predictive Water Quality Assessment, Goldboro Gold Project. May 2022.

# 6. Disclaimer

This report has been prepared by GHD for Anaconda Mining Inc. and may only be used and relied on by Anaconda Mining Inc. for the purpose agreed between GHD and Anaconda Mining Inc. as set out in this report.

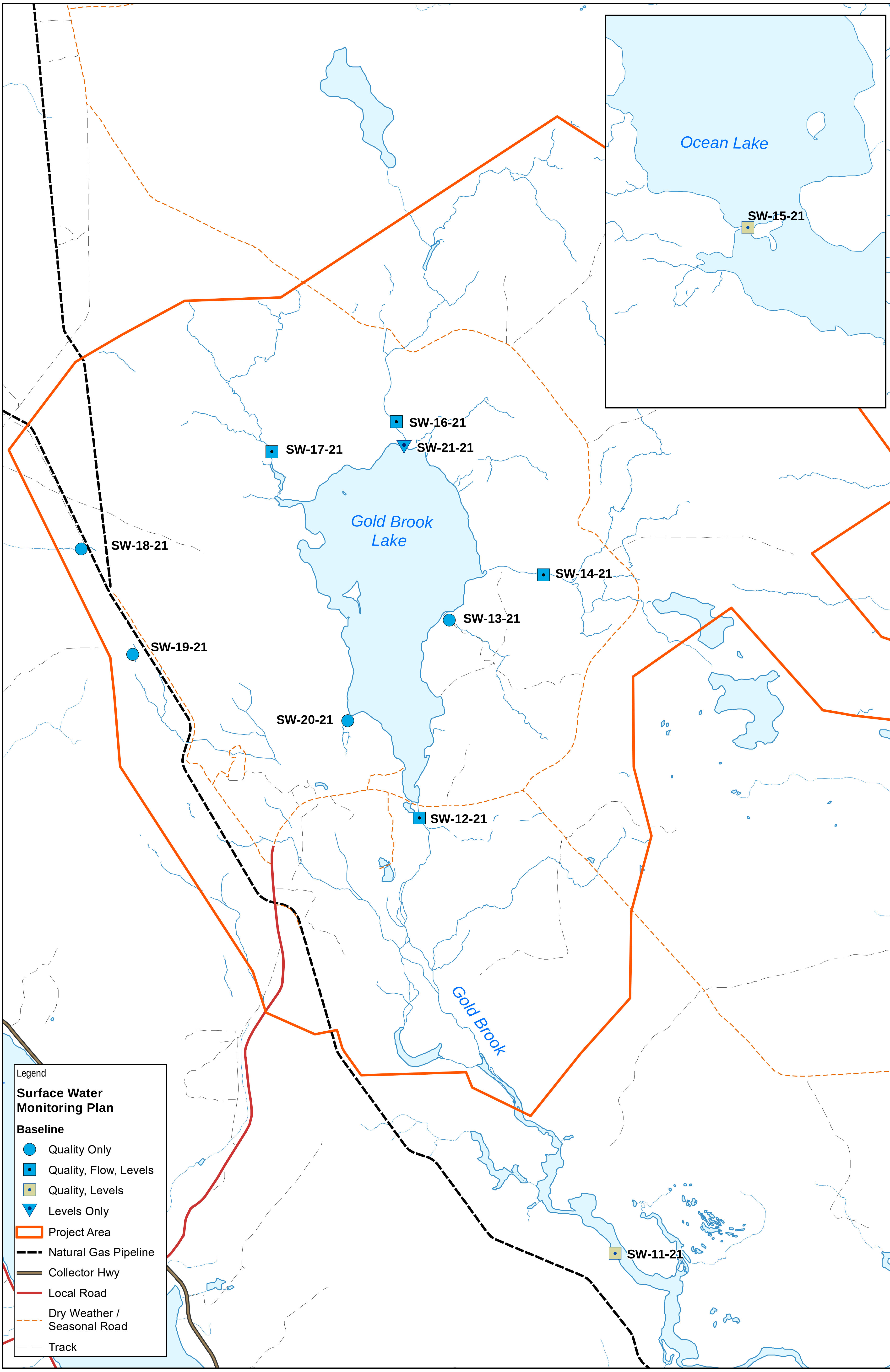
GHD otherwise disclaims responsibility to any person other than Anaconda Mining Inc. arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

# Figures




Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

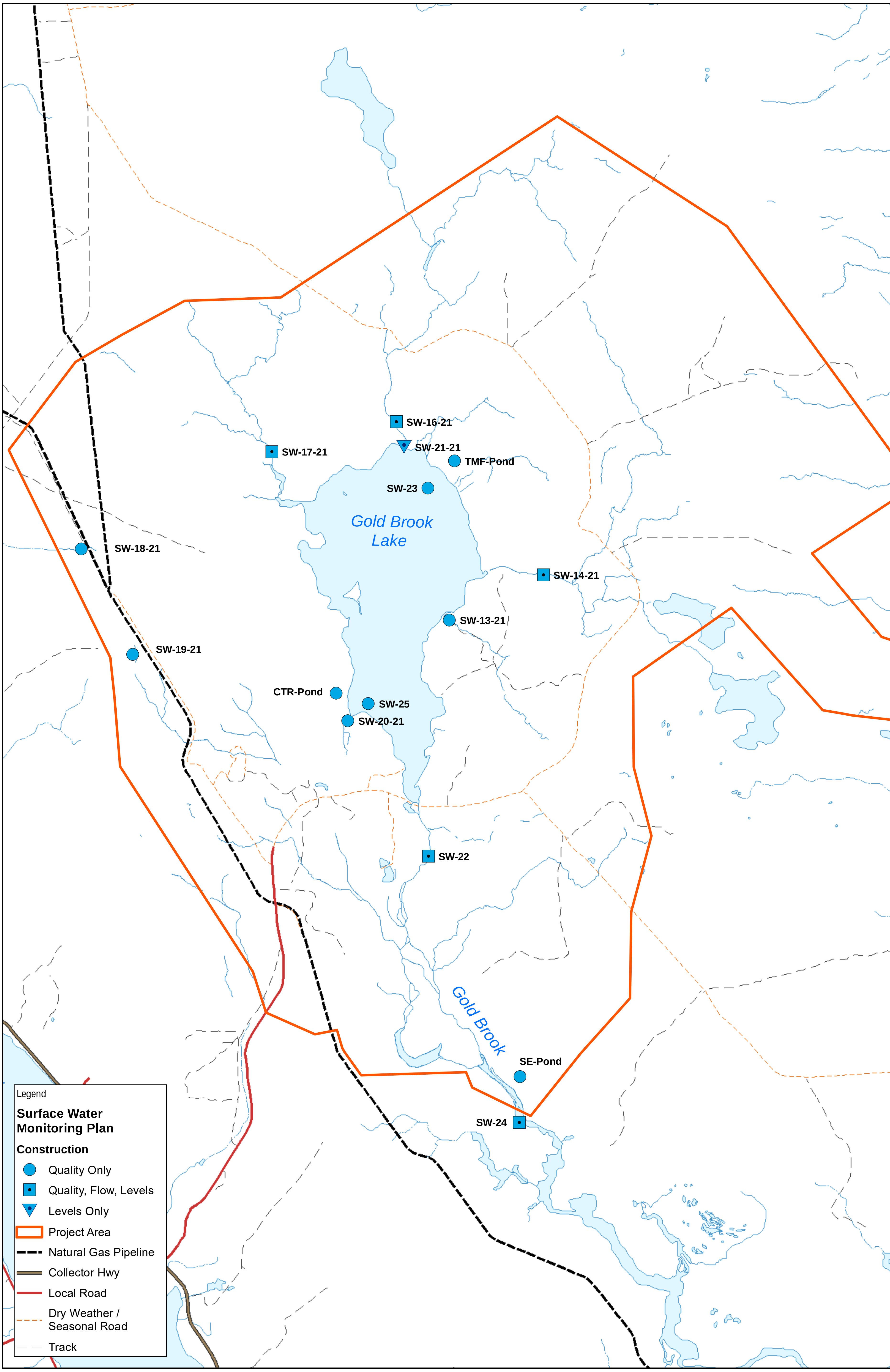
SURFACE WATER MONITORING LOCATIONS BASELINE

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 1

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX001.mxd
Print date: 11 Apr 2022 - 15:09

Data source: GeoNova, GHD, Anaconda . Created by: jjparks




Paper Size ANSI B

0 175 350 525 700

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

N

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

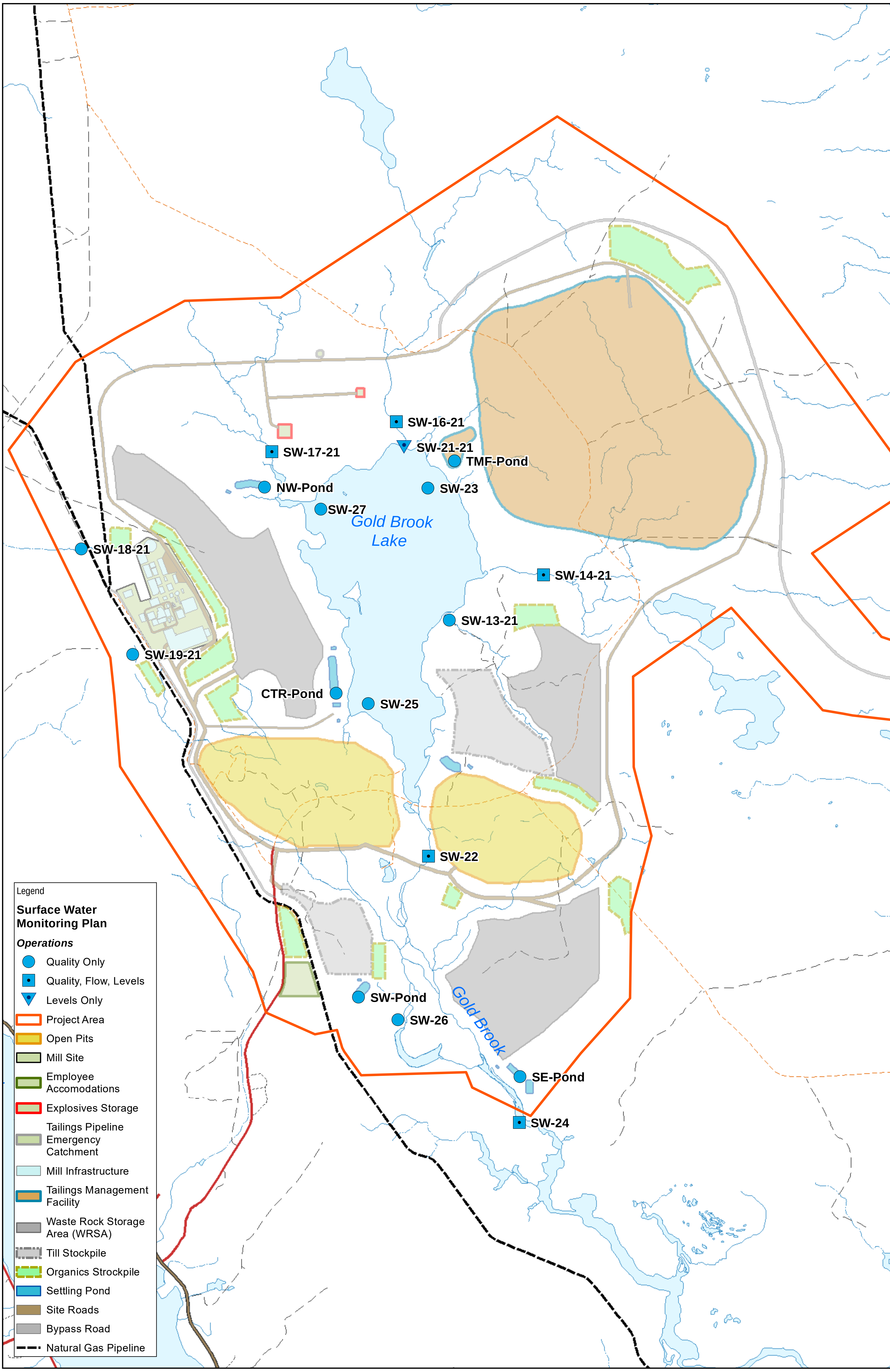
SURFACE WATER
MONITORING LOCATIONS
CONSTRUCTION

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 2

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX002.mxd
Print date: 11 Apr 2022 - 10:09

Data source: GeoNova, GHD, Anaconda . Created by: jjparks




Paper Size ANSI B

0 175 350 525 700

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

N

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

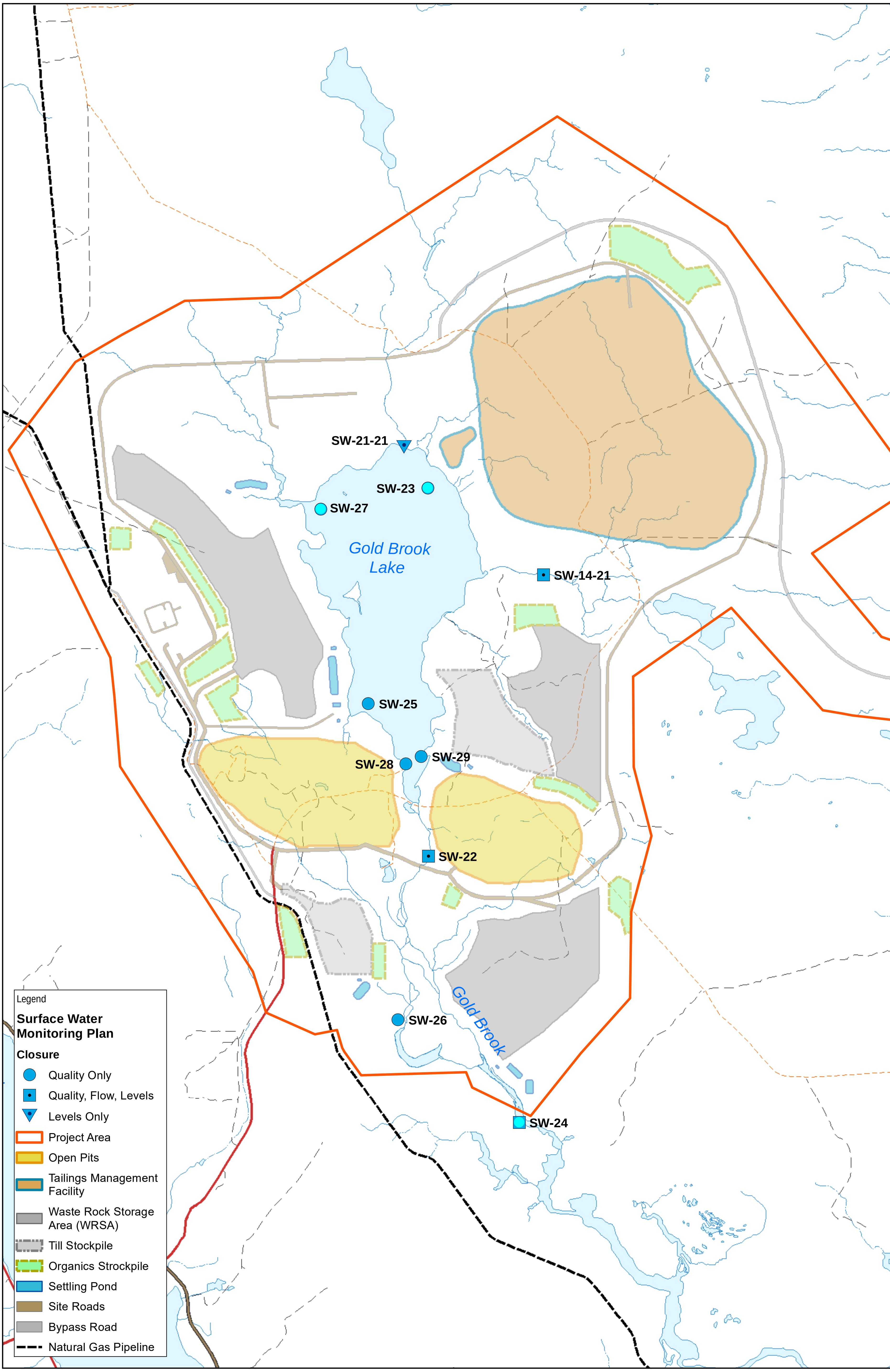
SURFACE WATER
MONITORING LOCATIONS
OPERATIONS

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 3

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX003.mxd
Print date: 11 Apr 2022 - 10:07

Data source: GeoNova, GHD, Anaconda . Created by: jjparks




Paper Size ANSI B

0 175 350 525 700

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

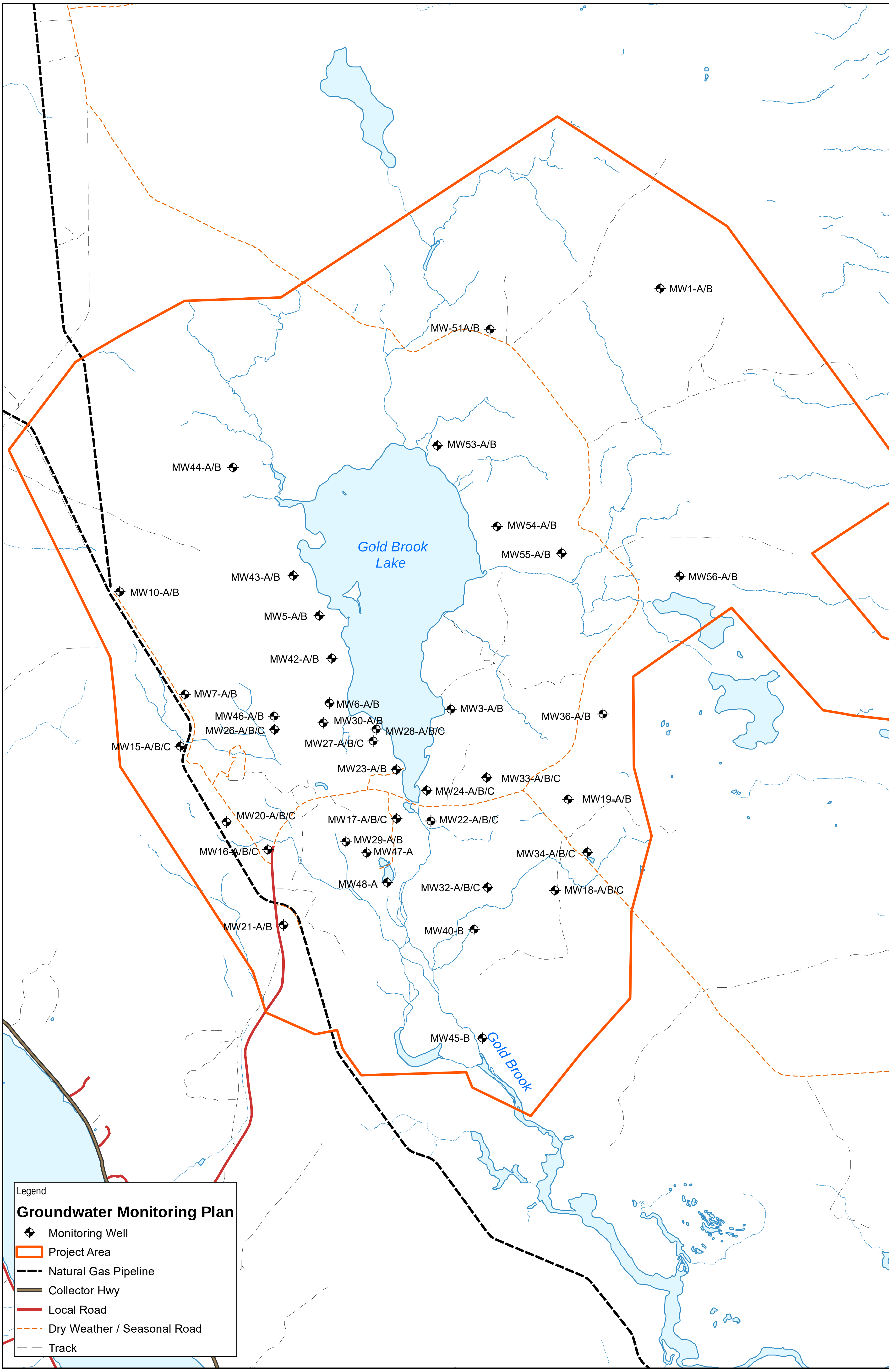
SURFACE WATER MONITORING LOCATIONS CLOSURE

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 4

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX004.mxd
Print date: 11 Apr 2022 - 15:11

Data source: GeoNova, GHD, Anaconda . Created by: jjparks




Paper Size ANSI B

0 175 350 525 700

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

N

GHD

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

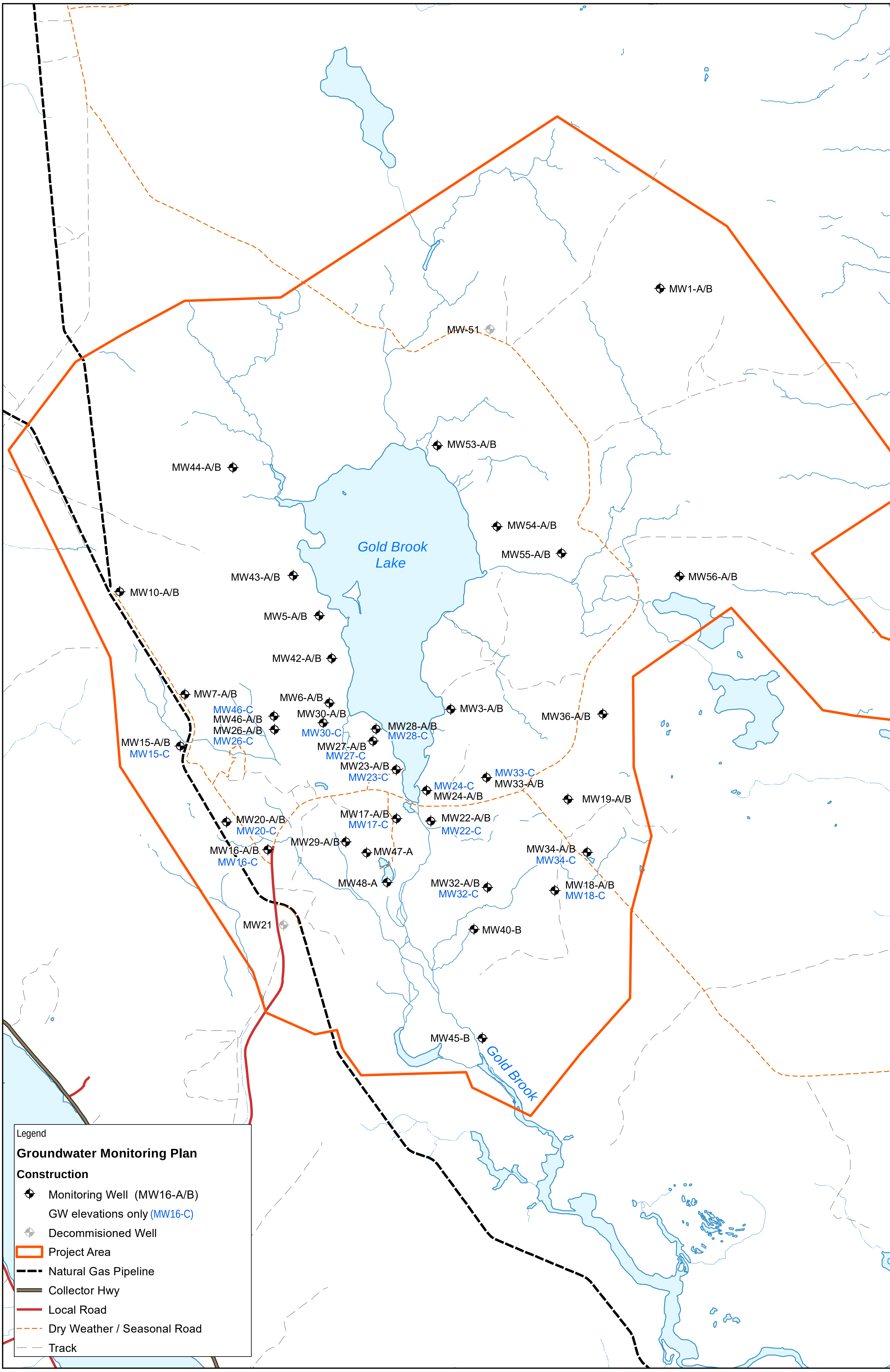
GROUND WATER
MONITORING LOCATIONS
EXISTING

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 5

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX005.mxd
Print date: 21 Apr 2022 - 06:45

Data source: GeoNova, GHD, Anaconda . Created by: jjparks




Paper Size ANSI B

0 175 350 525 700

Metres

N

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

GHD

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

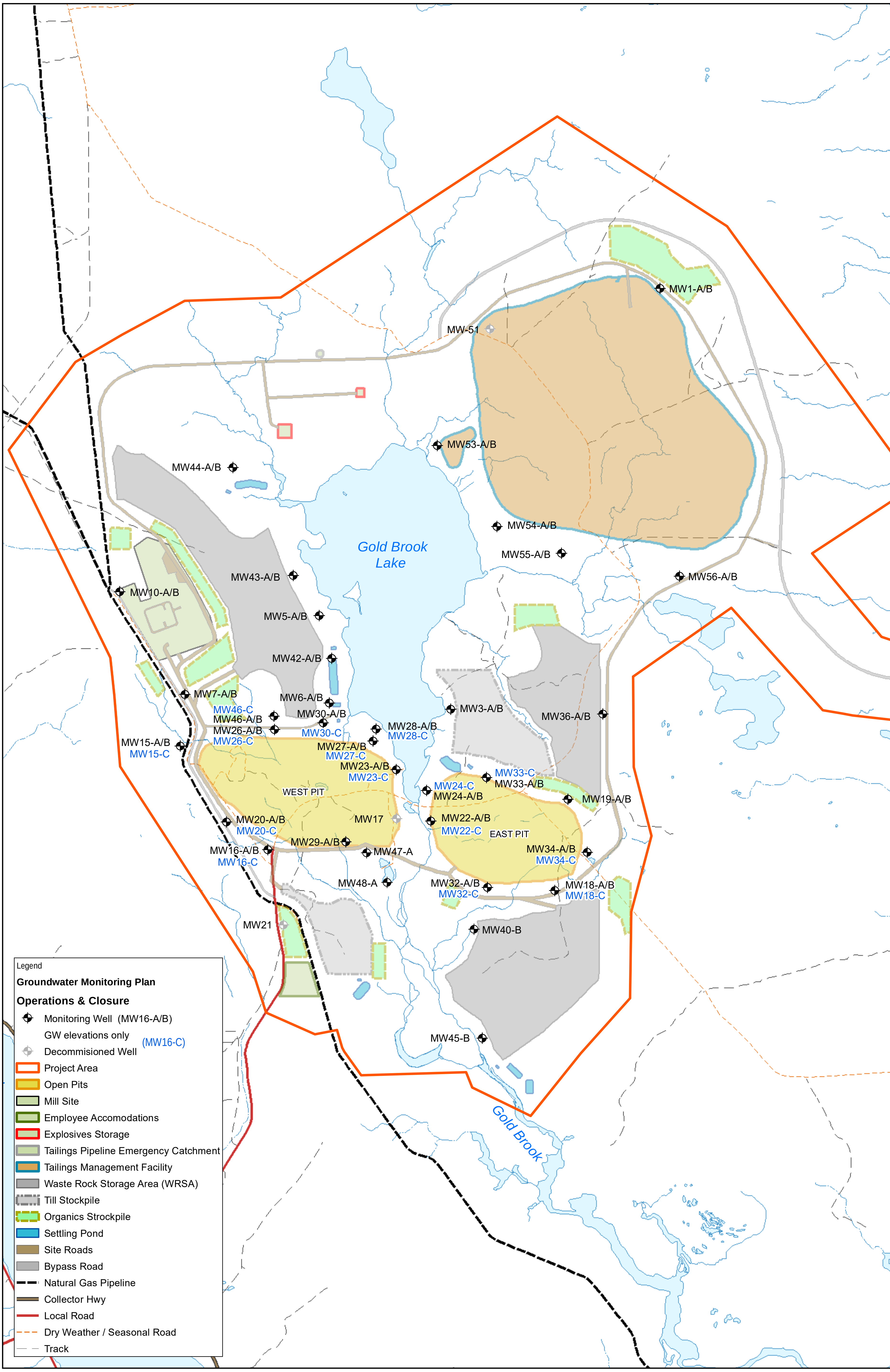
GROUND WATER
MONITORING LOCATIONS
CONSTRUCTION

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 6

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX006.mxd
Print date: 21 Apr 2022 - 06:48

Data source: GeoNova, GHD, Anaconda . Created by: jjparks




Paper Size ANSI B

0 175 350 525 700

Metres

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS MTM 4

N

GHD

ANACONDA MINING INC
GOLDBORO GOLD PROJECT
WATER MONITORING PLAN

GROUND WATER
MONITORING LOCATIONS
OPERATIONS & CLOSURE

Project No. 11222385
Revision No. -
Date 31/03/2022

FIGURE 7

N:\CA\Halifax\Projects\661\11222385\GIS\Maps\Deliverables\RPT09\11222385-RPT09_GIS-HX007.mxd
Print date: 21 Apr 2022 - 06:52

Data source: GeoNova, GHD, Anaconda . Created by: jjparks

# Appendices

# Appendix A

## Surface Water Schedule

| | A.1 SURFACE WATER MONITORING LIFE CYCLE | REVISION | |
|---|---|---|---|
| | Goldboro Gold Project | No. | Date |
| | Anaconda Mining Inc. | 0 | 20/4/2022 |

| SW Monitoring Location IDs | Mine Phases | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BL | Construction | | Operations | | | | | | | | | | | | Closure | | | | | | | | | | | | | | | | | | | | | | | | |
| | | YR1 | YR2 | YR1 | YR2 | YR3 | YR4 | YR5 | YR6 | YR7 | YR8 | YR9 | YR10 | YR11 | YR12 | YR13 | YR14 | YR15 | YR16 | YR17 | YR18 | YR19 | YR20 | YR21 | YR22 | YR23 | YR24 | YR25 | YR26 | YR27 | YR28 | YR29 | YR30 | YR31 | YR32 | YR33 | YR34 | YR35 | YR36 | YR37 |
| SW-11-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-12-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-13-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-14-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-15-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-16-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-17-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-18-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-19-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-20-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-21-21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TMF Pond * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-23 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SE-Pond | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-24 ** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CTR-Pond | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-Pond | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NW-Pond | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SW-29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Monitoring Site Type**

Baseline Monitoring
MDMER Compliance Location
CCME and NS Tier I EQS Compliance Location

**Mine Phases**

BL - Baseline (Pre-construction)
CON - Construction
OP - Operation
CLS - Closure

**Monitoring Site Activity**

Water Level
Water Level/Water Quality
Water Quality
Water Quality/Flow Monitoring/Water Level

**Notes:**

For sampling frequency of each surface water monitoring location, refer to Section 2.6 of the Surface Water and Groundwater Monitoring Plan
* Cyanide monitoring also required in addition to other compliance
** CCME compliance water quality monitoring is also required at this location for YR 13 to YR 15

# Appendix B

## Monitoring Well Network

**Table B.1**

**Monitoring Well Network**
**Water Monitoring Plan**
**Goldboro Gold Project**

| Well ID | UTM_North | UTM_EAST | Surface Elevation | Well Depth (m bgs) | Phase: Current | Construction | Operations | Closure | Post Closure | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| MW1-A | 5008839.0 | 608216.1 | 111.366 | 6.4 | Quality | | | | | Adjacent TMF |
| MW1-B | 5008840.0 | 608218.1 | 111.297 | 22.8 | Quality | | | | | |
| MW3-A | 5006791.8 | 607241.2 | Not Surveyed | 10.0 | Quality | | | | | Adjacent northeast till waste pile and Gold Brook Lake |
| MW3-B | 5006791.8 | 607241.2 | Not Surveyed | 28.7 | Quality | | | | | |
| MW5-A | 5007231.0 | 606590.8 | 58.691 | 4.7 | Quality | | | | | Adjacent NW WRSA and Gold Brook Lake |
| MW5-B | 5007231.0 | 606591.8 | 58.80 | 58.8 | Quality | | | | | |
| MW6-A | 5006806.0 | 606653.9 | 63.691 | 3.8 | Quality | | | | | Adjacent NW WRSA and Gold Brook Lake |
| MW6-B | 5006807.0 | 606653.9 | 63.771 | 29.6 | Quality | | | | | |
| MW7-A | 5006845.0 | 605952.7 | 85.541 | 5.5 | Quality | | | | | Adjacent mill area and organic material stockpile |
| MW7-B | 5006845.0 | 605952.1 | 86.632 | 30.5 | Quality | | | | | |
| MW10-A | 5007329.8 | 605628.6 | Not Surveyed | 5.0 | Quality | | | | | Adjacent mill area |
| MW10-B | 5007329.8 | 605628.6 | Not Surveyed | 30.0 | Quality | | | | | |
| MW15-A | 5006593.0 | 605911.8 | 80.868 | 5.5 | Quality | | | | | Adjacent West Pit |
| MW15-B | 5006593.0 | 605911.1 | 80.906 | 27.0 | Quality | | | | | |
| MW15-C | 5006595.0 | 605909.8 | 80.851 | 189.8 | Quality | Elevations | | | | |
| MW16-A | 5006087 | 606365.9 | 64.619 | 14.0 | Quality | | | | | Adjacent West Pit |
| MW16-B | 5006090.0 | 606367 | 64.609 | 29.0 | Quality | | | | | |
| MW16-C | 5006087.0 | 606371.2 | 64.118 | 41.1 | Quality | Elevations | | | | |
| MW17-A | 5006256.1 | 606989.1 | 54.430 | 5.0 | Quality | | Decommissioned | | | In West Pit area - assumed decommissioned during operations |
| MW17-B | 5006256.1 | 606989.1 | 54.380 | 30.0 | Quality | | Decommissioned | | | |
| MW17-C | 5006256.1 | 606989.1 | 54.400 | 143.0 | Quality | Elevations | Decommissioned | | | |
| MW18-A | 5006517.1 | 607760.6 | 67.800 | 8.8 | Quality | | | | | Adjacent East Pit and West Pit |
| MW18-B | 5006517.1 | 607760.6 | 67.660 | 17.0 | Quality | | | | | |
| MW18-C | 5006364.4 | 607760.6 | 67.700 | 53.0 | Quality | Elevations | | | | |
| MW19-A | 5006364.4 | 607816.6 | 71.210 | 5.0 | Quality | | | | | Adjacent East Pit and organic material stockpile |
| MW19-B | 5006364.4 | 607816.6 | 71.280 | 30.0 | Quality | | | | | |
| MW20-A | 5006226.0 | 606169.7 | 71.955 | 5.6 | Quality | | | | | Adjacent West Pit |
| MW20-B | 5006225.0 | 606169.0 | 71.931 | 29.8 | Quality | | | | | |
| MW20-C | 5006224.0 | 606171.4 | 71.916 | 101.5 | Quality | Elevations | | | | |
| MW21-A | 5005735.0 | 606439.9 | 59.837 | 9.2 | Quality | Decommissioned | | | | In organic material stockpile area - assumed decommissioned during operations |
| MW21-B | 5005734.0 | 606442.1 | 59.582 | 21.4 | Quality | Decommissioned | | | | |
| MW22-A | 5006246.7 | 607154.8 | 52.550 | 5.0 | Quality | | | | | Adjacent East Pit |
| MW22-B | 5006246.7 | 607154.8 | 52.420 | 30.0 | Quality | | | | | |
| MW22-C | 5006246.7 | 607154.8 | 52.370 | 119.4 | Quality | Elevations | | | | |
| MW23-A | 5006474.0 | 606971.0 | 58.447 | 7.1 | Quality | | | | | Adjacent West Pit |
| MW23-B | 5006473.0 | 606973.3 | 57.869 | 30.4 | Quality | | | | | |
| MW23-C | 5006493.8 | 606983.4 | 57.180 | 38.3 | Quality | Elevations | | | | |
| MW24-A | 5007000.6 | 607131.6 | 53.840 | 12.2 | Quality | | | | | Adjacent East Pit |
| MW24-B | 5007000.6 | 607131.6 | 53.770 | 30.5 | Quality | | | | | |
| MW24-C | 5007000.6 | 607131.6 | 53.920 | 80.0 | Quality | Elevations | | | | |
| MW26-A | 5006677.0 | 606402.0 | 72.239 | 6.8 | Quality | | | | | Adjacent West Pit and NW WRSA |
| MW26-B | 5006676.0 | 606403.3 | 72.384 | 25.7 | Quality | | | | | |
| MW26-C | 5006680.0 | 606396.8 | 71.306 | 153 | Quality | Elevations | | | | |

**Table B.1**

**Monitoring Well Network**
**Water Monitoring Plan**
**Goldboro Gold Project**

| Well ID | UTM_North | UTM_EAST | Surface Elevation | Well Depth (m bgs) | Phase<br>Current | Construction | Operations | Closure | Post Closure | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| MW27-A | 5006629.8 | 606867.8 | 60.480 | 5 | Quality | | | | | Between West Pit and Gold Brook Lake |
| MW27-B | 5006629.8 | 606867.8 | 60.770 | 30 | Quality | | | | | |
| MW27-C | 5006629.8 | 606867.8 | 60.490 | 115 | Quality | Elevations | | | | |
| MW28-A | 5006688.5 | 606881.4 | 58.010 | 5 | Quality | | | | | Between West Pit and Gold Brook Lake |
| MW28-B | 5006688.5 | 606881.4 | 58.010 | 30 | Quality | | | | | |
| MW28-C | 5006688.5 | 606881.4 | 58.200 | 26 | Quality | Elevations | | | | |
| MW29-A | 5006140.0 | 606754.2 | 57.294 | 4.9 | Quality | | | | | Adjacent West Pit |
| MW29-B | 5006138.0 | 606751.9 | 57.272 | 7.6 | Quality | | | | | |
| MW29-C | 5006139.4 | 606744.9 | 56.330 | 100.0 | Quality | Elevations | | | | |
| MW30-A | 5006720.0 | 606608.0 | 67.486 | 6.2 | Quality | | | | | Between West Pit and Gold Brook Lake |
| MW30-B | 5006717.0 | 606613.0 | 66.984 | 18.4 | Quality | | | | | |
| MW30-C | 5006715.0 | 606610.0 | 66.271 | 196.6 | Elevations | | | | | |
| MW32-A | 5005930.4 | 607435.2 | 57.100 | 5.0 | Quality | | | | | Adjacent East Pit and SE WRSA |
| MW32-B | 5005930.4 | 607435.2 | 56.990 | 30.0 | Quality | | | | | |
| MW32-C | 5005930.4 | 607435.2 | 56.800 | 44.2 | Quality | Elevations | | | | |
| MW33-A | 5006463.2 | 607420.7 | 65.490 | 5.0 | Quality | | | | | Adjacent East Pit |
| MW33-B | 5006463.2 | 607420.7 | 65.500 | 30.0 | Quality | | | | | |
| MW33-C | 5006463.2 | 607420.7 | 65.590 | 50.9 | Quality | Elevations | | | | |
| MW34-A | 5006110.8 | 607914.6 | 69.020 | 5.0 | Quality | | | | | Adjacent East Pit |
| MW34-B | 5006110.8 | 607914.6 | 69.080 | 30.0 | Quality | | | | | |
| MW34-C | 5006110.8 | 607914.6 | 68.890 | 23.1 | Quality | Elevations | | | | |
| MW36-A | 5006780.5 | 607977.9 | 79.530 | 5.0 | Quality | | | | | Adjacent NW WRSA |
| MW36-B | 5006780.5 | 607977.9 | 79.540 | 30.0 | Quality | | | | | |
| MW40-B | 5005727.0 | 607373.4 | Not Surveyed | 9.3 | Quality | | | | | Adjacent SE WRSA |
| MW42-A | 5007032.0 | 606657.0 | 59.620 | 4.6 | Quality | | | | | Adjacent NW WRSA |
| MW42-B | 5007030.0 | 606659.0 | 59.58 | 24.00 | Quality | | | | | |
| MW43-A | 5007474.0 | 606424.0 | 61.801 | 12.2 | Quality | | | | | Adjacent NW WRSA |
| MW43-B | 5007475.0 | 606423.0 | 61.816 | 19.8 | Quality | | | | | |
| MW44-A | 5007942.4 | 606164.7 | Not Surveyed | 5.0 | Quality | | | | | Adjacent NW WRSA |
| MW44-B | 5007942.4 | 606164.7 | Not Surveyed | 30.0 | Quality | | | | | |
| MW45-A | 5005200.4 | 607423.9 | 38.91 | 10.7 | Quality | | | | | Between SW WRSA and Gold Brook |
| MW45-B | 5005200.4 | 607423.9 | 38.87 | 16.9 | Quality | | | | | |
| MW46-A | 5006747.0 | 606390.0 | 76.047 | 6.1 | Quality | | | | | Adjacent West Pit and NW WRSA |
| MW46-B | 5006748.0 | 606391.0 | 76.042 | 22.2 | Quality | | | | | |
| MW46-C | 5006741.0 | 606389.0 | 74.822 | 114 | Quality | Elevations | | | | |
| MW47-A | 5006088.1 | 606846.9 | 53.55 | 16 | Quality | | | | | Adjacent West Pit |
| MW48-A | 5005945.7 | 606949.2 | 50.35 | 26 | Quality | | | | | Adjacent West Pit |
| MW51-A | 5008623.0 | 607378.0 | 83.408 | 5 | Quality | Decommissioned | | | | In TMF area - assumed decommissioned during operations |
| MW51-B | 5008625.0 | 607379.0 | 83.507 | 10.9 | Quality | Decommissioned | | | | |
| MW53-A | 5008067.2 | 607152.0 | 54.38 | 9.4 | Quality | | | | | Adjacent to TMF and Gold Brook Lake |
| MW53-B | 5008067.2 | 607152.0 | 54.38 | 28.9 | Quality | | | | | |
| MW54-A | 5007673.0 | 607449.0 | 58.021 | 4.8 | Quality | | | | | Adjacent to TMF and Gold Brook Lake |
| MW54-B | 5007674.0 | 607449.0 | 58.154 | 10.8 | Quality | | | | | |
| MW55-A | 5007525.0 | 607760.0 | 71.892 | 7.6 | Quality | | | | | Adjacent to TMF and Gold Brook Lake |
| MW55-B | 5007523.0 | 607758.0 | 71.899 | 14.3 | Quality | | | | | |
| MW56-A | 5007455.0 | 608337.0 | 74.600 | 7.8 | Quality | | | | | Adjacent TMF |
| MW56-B | 5007455.0 | 608337.0 | 74.230 | 28.6 | Quality | | | | | |

# Appendix G.1

## Wetlands Baseline Report

# Goldboro Gold Project - Biophysical Baseline Report: Wetlands

PREPARED FOR

**Anaconda Mining Inc**
Suite 790, Cabot Place, 100 New Gower Street
St. John's, NL
A1C 6K3

PREPARED BY

**McCallum Environmental Ltd.**
2 Bluewater Road, Suite 115
Bedford, Nova Scotia
B4B 1G7

May 2022

McCallum Environmental Ltd.

*This page was intentionally left blank.*

# EXECUTIVE SUMMARY


The Goldboro Gold Project (the Project) is located in Guysborough County, Nova Scotia, Canada. Anaconda Mining Inc. (Anaconda) proposes to develop the Project as a mine and processing facility. For the purposes of this environmental assessment, a Project Area (PA) was defined. The mine plan includes two surface extraction areas (open pits), an ore processing facility, a tailings management facility (TMF), three waste rock storage areas (WRSAs), overburden and organic stockpiles, support buildings including an employee accommodation building, and associated infrastructure. The anticipated mine life for extraction of ore is approximately 11 years. The scope of the Project includes activities associated with construction, operation, and closure.

McCallum Environmental Ltd (MEL) was retained by Anaconda to complete baseline wetland delineation surveys and functional assessments for the proposed Goldboro Gold Project (the Project), located in Goldboro, Nova Scotia. This assessment supports the preparation and submission of the provincial Environmental Assessment Registration Document (EARD).

Wetland surveys were completed for the Project with the key objectives of facilitating avoidance of wetlands where practicable, assessing wetland function, including habitat provisions for species at risk, understanding the potential project interactions with wetlands, and to support wetland regulatory applications and permitting. This was achieved by completing a review of background desktop resources in combination with field studies to identify potential environmental constraints and sensitivities. This report outlines the methods and results of field evaluations completed within the PA.

Following the desktop review of available topographic maps, provincial databases, and aerial photography, wetland field surveys were completed by MEL within the PA from November 2020 through January 2022. Initial wetland assessments were conducted by GEMTEC in 2017 and later field verified by MEL. Wetland functional assessments were completed for each wetland within the PA using the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC) wetland evaluation technique.

A total of 222 freshwater wetlands are present within the PA, totaling 329.033 ha. The majority of the wetlands are treed swamps (71%), with bogs (12%) and fens (4%) to a lesser extent. However, large wetland complexes make up most of the wetland area (74%). Most individual wetlands are hydrological isolated swamps and bogs, in the sense that they do not have defined surface water connections (inlets/outlets/throughflow). Many large wetland complexes are hydrologically connected via throughflow watercourses and Gold Brook Lake. Species at risk were observed in 25 wetlands. It is anticipated that the 22 of these wetlands with observations of blue felt and frosted glass whickers lichen will be classified as WSS and are presented as such herein. Final WSS designation will be determined by NSECC.

This report has been prepared to support the Project's development and understand wetland presence and function across the PA. This report will support the necessary mitigation sequence to reduce and/or avoid impacts to wetlands or wetland functions where possible through the Project's EARD and future permitting processes.

# TABLE OF CONTENTS



## LIST OF TABLES

# 1 INTRODUCTION

McCallum Environmental Ltd (MEL) was retained by Anaconda Mining Inc (Anaconda) to complete baseline wetland delineation surveys and functional assessments for the proposed Goldboro Gold Project (the Project), located in Goldboro, Nova Scotia. This assessment supports the preparation and submission of the provincial Environmental Assessment Registration Document (EARD).

Wetlands provide important ecological functions, such as offering habitat for aquatic and terrestrial species (including priority species), supporting rare plants, managing water storage and flow, and improving downstream water quality. In addition to providing socio-economic value.

Wetland surveys were completed for the Project with the key objectives of facilitating avoidance of wetlands where practicable, assessing wetland function, including habitat provisions for species at risk, understanding the potential project interactions with wetlands, and to support wetland regulatory applications and permitting. This was achieved by completing a review of background desktop resources in combination with field studies to identify potential environmental constraints and sensitivities. This report outlines the methods and results of field evaluations completed within the PA.

## 1.1 Background

The Goldboro Gold Project (the Project) is located approximately 175 kilometres (km) northeast of Halifax, 60 km southeast of Antigonish, and 1.6 km northeast of the community of Goldboro on the eastern shore of Isaac's Harbour, in Guysborough County, Nova Scotia, Canada. Anaconda Mining Inc. (Anaconda) proposes to develop the Project as a 4,000-tonne per day (tpd) mine and processing facility. For the purposes of this environmental assessment, a Project Area (PA) was defined as the footprint of Project related infrastructure plus a buffer of 100 – 200 m. The mine plan includes two surface extraction areas (open pits), an ore processing facility, a tailings management facility (TMF), three waste rock storage areas (WRSAs), overburden and organic stockpiles, support buildings including an employee accommodation building, and associated infrastructure. The anticipated mine life for extraction of ore is approximately 11 years.

The scope of the Project includes activities associated with construction, operation, and closure. Project construction activities will include clearing and grubbing the overburden and organic stockpiles, WRSAs, pit, plant, and TMF areas, and construction of the initial lift of the TMF, plant site, secondary access roads, construction laydowns, Run-of-Mine (ROM) pad, surface water management and other site infrastructure. The operation phase will include conventional ore extraction methods (drilling, blasting, loading, and hauling), ore processing, and waste management. ROM ore will go directly to the crusher while stockpiled high-grade and low-grade ore will be progressively processed throughout the mine life. Non-ore bearing waste rock, not used for construction or backfill, will be stockpiled at its final disposal point, managed and reclaimed in place. The closure phase will include earthworks and demolition required to return the Project Area to a safe, stable, and vegetated state, and all monitoring and treatment, if required.

The Site is primarily disturbed by historical mining activities, road construction and timber harvesting. The region is known for its historic gold deposits and about half of the parcel is currently under mineral exploration licenses including the known Goldboro (Upper Seal Harbour), Isaacs Harbour, Forest Hill, and Lower Seal Harbour deposits.

### 1.2 Regulatory Context

In Nova Scotia, wetlands are protected under the Activities Designation Regulation of the *Environment Act* and the Wetland Conservation Policy (NSE, 2019). The *Environment Act* defines a wetland as "Land referred to as a marsh, swamp, fen, or bog that either periodically or permanently has water table at, near, or above the land surface or that is saturated with water, and sustains aquatic processes as indicated by the presence of poorly drained soils, hydrophytic vegetation, and biological activities adapted to wet conditions".

Nova Scotia's Wetland Conservation Policy (NSE, 2019) applies to all freshwater and certain tidal wetlands with the objectives to prevent net loss of wetland area or function, promote wetland protection and net gain, and enhance impact mitigation efforts. Under this policy and the *Environment Act*, approvals are required to alter wetlands, with certain exceptions (e.g., area <100 $m^2$, specific linear developments).

The policy also provides a mechanism for the province to designate Wetlands of Special Significance, which may include wetlands known to support at-risk species. Species, and their residences, with legal protection under the federal *Species at Risk Act* (SARA) include those listed as extirpated, endangered, or threatened. These same protections apply to endangered and threatened species listed under the Nova Scotia *Endangered Species Act* (NSEA). These legal protections are not afforded to SARA Special Concern and NSESA Vulnerable listed species (e.g., blue felt lichen (*Pectenia plumbea*)). Protection for these species may be managed under other policies, such as the *At-risk Lichens – Special Management Practices* (NSDNRR, 2018).

### 1.3 Project Area

The PA is approximately 1,221 ha which encompasses the Project infrastructure with a 100 – 200 m buffer to account for potential indirect effects to Valued Components (VCs). The PA encompasses both crown and private property, centered around Gold Brook Lake. The PA comprises open water features, wetlands, forested and harvested landscapes, historical and current mine workings, and access roads and trails.

The PA has been expanded from previous iterations to accommodate revisions to infrastructure layouts. This report outlines the methods and results of the wetland assessments completed in the current biophysical PA, as presented in Figure 1 (Appendix A).

# 2 BASELINE PROGRAM METHODOLOGY

## 2.1 Desktop Review Methodology

A desktop review of available topographic maps, provincial databases, and aerial photography was completed to aid in the determination and assessment of wetland habitat in the PA. Predicted wetland areas were identified from the NSECC Wetland Inventory Database. The Nova Scotia Wet Areas Mapping (WAM) database, the provincial flow accumulation data set and LiDAR data was reviewed to identify potential un-mapped wetlands. The predictive Wetland of Special Significance (WSS) layer, provided by NSECC, was consulted for the presence of expected and potential WSS within the PA.

## 2.2 Field Program Methodology

Following the initial desktop review, wetland field surveys were completed by MEL within the PA in November 2020 and from April through August 2022. Initial wetland assessments were conducted by GEMTEC in 2017 and opportunistically verified by MEL during subsequent surveys. Wetland delineation and assessment generally took place within the growing season (June 1st to September 30th). Wetlands that were assessed outside of this period were revisited within the growing season to confirm boundaries, functional assessment conclusions and species assemblages. Wetland characteristics and functional assessments can be completed sufficiently during any time of the growing season, however seasonal factors were considered for the identification of priority species and their habitat. As necessary, targeted species surveys were completed within identified wetland habitat to further support functional assessment. Species assemblages found within wetlands are described in respective Project baseline reports (e.g., Fish and Fish Habitat Baseline Report, Avifauna Baseline Report, etc.).

Targeted wetland surveys were completed within the PA where mapped systems were present to confirm and delineate known wetland habitat. Meandering transects were also completed across the PA to support efforts to delineate wetlands present within the PA, beyond those identified in the available desktop resources (Section 2.1). Trained wetland delineators and evaluators completed all field surveys. Delineated wetlands that extended outside of the PA were only delineated to the PA boundary. An exception to this includes wetlands with observed uniquely important characteristics or functions (e.g., blue felt lichen observed in a wetland contiguous with the PA). Details related to functional assessment methods for wetlands which extend outside of the PA boundary are described in Section 2.4.

Wetland delineation was conducted in accordance with the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the United States Army Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (United States Army Corps of Engineers 2012). In each wetland, vegetation, hydrology, and soils data were recorded at both wetland and upland data points on either side of the wetland boundary in accordance with the Corps of

Engineers Wetland Delineation Manual (Environmental Laboratory, 1987). Wetland classes were determined using the Canadian Wetland Classification System (Warner and Rubec 1997).

Wetland boundaries were documented using a handheld Garmin GPS units, with sub-5 m accuracy. Any inlet and outlet watercourses or other notable features were marked during the delineation processes. All watercourses observed within the boundaries of the wetland were mapped and assessed (see Fish and Fish Habitat Baseline Report). Pink flagging tape was used to mark wetland boundaries in the field. See the Fish and Fish Habitat Baseline Report for more information on watercourse delineation and assessment.

In keeping with the Army Corps of Engineers (Environmental Laboratory, 1987) methodologies for wetland delineation, three criteria are required for a wetland determination to be made:

- Presence of hydrophytic (water loving) vegetation;
- Presence of hydrologic conditions that result in periods of flooding, ponding, or saturation during the growing season; and,
- Presence of hydric soils.

Hydrophytic vegetation is defined as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (Environmental Laboratory, 1987). Hydrophytic vegetation should be the dominant plant type in wetland habitat (Environmental Laboratory, 1987).

Dominant plant species observed at each data point were classified according to their indicator status (probability of occurrence in wetlands) in accordance with the Nova Scotia Wetland Indicator Plant List. Further relevant information was reviewed in Flora of Nova Scotia (Roland 1998) and Nova Scotia Plants (Munro, Newell & Hill 2014).

If the majority (greater than 50%) of the dominant vegetation at a data point is classified as obligate (OBL), facultative wetland (FACW), or facultative (FAC) (excluding FAC-), then the location of the data point is considered to be dominated by hydrophytic vegetation. Wetland vegetation compositions for wetland classes identified within the Project Area during field surveys have been described in Section 3.1.

A hydric soil is defined as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (United States Department of Agriculture 2003). Indicators that a hydric soil is present include soil colour (gleyed soils and soils with bright mottles and/or low matrix chroma), aquic or preaquic moisture regime, reducing soil conditions, sulfidic material (odour), soils listed on the hydric soils list, iron and manganese concretions, organic soils (histosols), histic epipedon, high organic content in surface layer in sandy soils, and organic streaking in sandy soils.

A soil pit was completed at each data point. These pits were excavated to a depth of 40 cm or refusal. The soil in each pit was then examined for hydric soil indicators. The matrix colour and mottle colour (if present) of the soil were determined using the Munsell Soil Colour Charts.

Wetland habitat, by definition, either periodically or permanently, has a water table at, near, or above the land surface or is saturated with water. To be classified as a wetland, a site should have at least one primary indicator or two secondary indicators of wetland hydrology. Examples of primary indicators of wetland hydrology include watermarks, drift lines, sediment deposition, and water-stained leaves. Examples of secondary indicators of wetland hydrology include oxidized root channels, dry season water table, and stunted or stressed plants. Each area of expected wetland habitat was assessed for signs of wetland hydrology through observations across the area and assessment of soil pits at each data point.

Further baseline field surveys were conducted throughout the entire PA to assess the suitability of wetland habitat for wetland specific species, especially those considered to be Species at Risk (SAR) and/or Species of Conservation Interest (SOCI). All surveys conducted for SAR and SOCI were completed in suitable habitat throughout the PA according to species-specific methodologies, such as, both early and late season botany surveys, avian migration and breeding waterfowl surveys and moose surveys. Information on these baseline survey methods, including survey locations and timing, and species observed, can be found in the Flora and Fauna Baseline Report and the Avifauna Baseline Report Priority species were assessed throughout the entire PA, including wetland specific priority species observations and habitat potential, as discussed in Section 3.2. It should be noted that, while it was not possible to confirm a species' absence from the landscape if unobserved, all care was taken to identify the presence of preferred habitat within the PA. Where suitable wetland habitat was observed for SAR, the species was presumed to potentially use this habitat, at least periodically based on seasonal biological requirements, even if presence was not confirmed via observation of that species (or evidence thereof).

### 2.3 Functional Assessment

Wetland functional assessments were completed for each wetland within the PA using the Wetland Ecosystem Services Protocol – Atlantic Canada (WESP-AC) wetland evaluation technique. The WESP-AC process involves the completion of three forms; a desktop review portion (Office Form) that examines the landscape level aerial conditions to which the wetland is situated, and two field forms identifying biophysical characteristics of the wetland (Field Form) and stressors within the wetland (Stressors Form), if any. The process serves as a rapid method for assessing individual wetland functions and values. WESP-AC addresses 17 specific functions wetlands may provide (Table 1).

The specific wetland functions are individually allocated into grouped wetland functions and measured for "functional" and "benefit" scores. Wetland function relates to what a wetland does naturally (i.e., water storage), whereas wetland benefits are benefits of the function, whether it is ecological, social, or economic. The highest functioning wetlands are those that have both high 'function' and 'benefit' scores for a given function. WESP-AC enables a comparison to be made between individual wetlands within a province to gain a sense of the importance each has in providing ecosystem services.

**Table 1: WESP-AC Function Parameters**

| Grouped Wetland Function | Specific Wetland Functions |
|---|---|
| Hydrologic Function | Surface Water Storage |
| Aquatic Support | Aquatic Invertebrate Habitat |
| | Stream Flow Support |
| | Organic Nutrient Export |
| | Water Cooling |
| Water Quality | Sediment Retention & Stabilization |
| | Phosphorus Retention |
| | Nitrate Removal & Retention |
| | Carbon Sequestration |
| Aquatic Habitat | Anadromous Fish Habitat |
| | Resident Fish Habitat |
| | Waterbird Feeding Habitat |
| | Waterbird Nesting Habitat |
| | Amphibian and Turtle Habitat |
| Terrestrial Habitat | Songbird, Raptor, & Mammal Habitat |
| | Pollinator Habitat |
| | Native Plant Habitat |

In addition to the grouped wetland functions above, WESP-AC also measures the following groups, however, these are only evaluated by their benefit scores:

- Wetland Condition; and
- Wetland Risk (i.e,, sensitivity to potential impacts).

The following individual functions are assessed to determine the benefit scores associated with each wetland:

- Public Use & Recognition;
- Wetland Sensitivity;
- Wetland Ecological Condition; and
- Wetland Stressors.

For each wetland evaluated, the WESP-AC process calculates the overall score for the seven grouped wetland functions and the 17 specific wetland functions listed in Table 1 above. One score each is provided for function and benefit. Scores are ranked as ‘Lower’, ‘Moderate’, or ‘Higher’, allowing for analysis of the wetland as compared to calibrated baseline wetland scores in Nova Scotia to date. A ‘Higher’ WESP-AC score means that wetland has a greater capacity to support those processes as compared to other wetlands in the province. A ‘Higher’ WESP-AC score in both the function and benefits category means the wetland supports the natural ecosystem functions and provides services potentially important to society.

The WESP-AC Functional WSS Interpretation Tool is discussed in Section 2.4. A summary of the WESP-AC results is provided in Appendix B. The raw WESP-AC Excel files can be provided to the NSECC Wetland Specialist(s) upon request.

The WESP-AC functional evaluation technique recognizes that, in many cases, delineation of entire wetlands where they extend beyond a PA is not always feasible (e.g., property ownership) or necessary (Adamus 2018). Instead, WESP-AC permits the delimitation of an Assessment Area (AA), defined as the wetland or portion of wetland physically assessed in the field, while the Office Form considers the broader landscape characteristics and functions that extend beyond the AA and/or PA.

## 2.4 Wetlands of Special Significance

The Wetland Conservation Policy was developed by Nova Scotia Environment in 2011 and amended in 2019 (NSE, 2019). Its mandate is to provide a framework for the conservation of wetlands. Furthermore, it provides a framework for the identification of Wetlands of Special Significance. According to NSECC (2019, p.11-12), the following criteria define Wetlands of Special Significance:

- All salt marshes;

- Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (Crown and Provincial lands only), Provincial Park, Nature Reserve, Wilderness Areas or lands owned or legally protected by nongovernment charitable conservation land trusts;

- Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through the NS-EHJV;

- Wetlands known to support at-risk species as designated under the federal Species at Risk Act or the Nova Scotia Endangered Species Act; and,

- Wetlands in designated protected water areas as described within Section 106 of the Environment Act.

To date NSECC Wetland Specialists have provided guidance that the presence of a sessile or non-mobile (primarily flora) SAR within a delineated wetland triggers the determination of that wetland as a WSS. Mobile species have home ranges that may include wetlands within and beyond the PA, which may be used at various times of the year for specific biological requirements (i.e., breeding season, thermal regulation, foraging). As a result, a WSS designation assessment based on the observation a mobile species considers species-specific and site-specific conditions, including the following factors:

- whether the species was observed within the wetland;

- whether suitable habitat is present within the wetland;

- what is the wetland habitat used for (i.e., does the habitat provided within the wetland provide necessary life functions (i.e., nesting, or overwintering habitat)); and,

- the discreteness or specificity of habitat use by the mobile species (i.e., wood turtles have specific and discrete nest beach requirements, compared with the in-discrete and non-specific foraging habitat usage by mainland moose, for example).

A framework for determination of WSS designation based on functional benefit using WESP-AC has recently been developed and implemented by NSECC in August 2021 (see Section 3.2 and Appendix B for results). A Functional WSS Interpretation Tool automatically assesses the subject wetland based on the WESP-AC functional results. The grouped functions in Table 1 are used to calculate a “Functional Benefit Product” (FBP). The FBP is categorized into scores of “low”, “moderate” and “high”. The thresholds for these categories are calibrated by WESP-AC assessments across Nova Scotia. These categories are used to create WSS determination rules. The grouped functions are further combined into “supergroups” for habitat (Aquatic Habitat and Transition Habitat) and support (Hydrologic Support, Water Quality Support and Aquatic Support) functions. The wetland could be designated as a WSS if certain ‘high’ or combination of ‘moderate and ‘high’ scores are satisfied within these supergroups.

NSECC has also developed a WSS predictive GIS layer (September 2020, pers. comm., Ian Bryson, NSECC Wetland Specialist), which overlies mapped wetlands with protected areas layers, and rare species observations from ACCDC, among other attributes. According to NSECC, this WSS GIS layer is intended to be used as a planning tool, and its contents should be interpreted as potential WSS. The actual determination of WSS status is based on field verification of the parameters or considerations listed above.

This predictive layer or a previous version, was consulted during the desktop evaluation for wetlands prior to field delineations by MEL. Initial assessments in 2017 were reconfirmed with the 2020 WSS layer. This predictive layer incorporates all ACCDC rare species observations which fall within NSECC mapped wetlands, regardless of the species’ ranking or status, positional accuracy of the data points, observation date, and mobility of species. As such, it is used as a predictive tool only to support WSS determination.

Final WSS designation will be determined by NSECC with guidance from data collected through Project field surveys. The Project Team will continue to engage with NSECC and NSDNRR to discuss WSS designation on a site-specific basis.

# 3 RESULTS

## 3.1 PA Baseline Conditions

A total of 222 freshwater wetlands are present within the PA, as shown on Table 2. An additional 76 wetlands were delineated beyond the boundary of the current PA during a previous iteration of the Project design. As a result, the following wetlands are not present within the current PA: 36-39, 45, 62, 69, 75-82, 84-88, 90-93, 95-100, 102-112, 114, 116, 118-129, 132, 134-138, 140, 177, 178, 185, 189, 210, 211, 233, 241, 258, 260, 268, 270, 293, 295, 297, 298. A summary of Project wetlands, including type, area and dominant flow paths and vegetation type, are provided in Table 2.

**Table 2. Wetland Delineation Summary**

| Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type | Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type |
|---|---|---|---|---|---|---|---|
| **1*** | 72.470 | Contiguous Throughflow WC | Complex | **175** | 0.062 | Contiguous Throughflow WC | Swamp |
| **2*** | 7.510 | Inlet D | Complex | **176** | 0.596 | Isolated | Swamp |
| **3** | 0.026 | Isolated | Swamp | **179*** | 1.190 | Isolated | Swamp |
| **4** | 1.033 | Outlet D | Swamp | **180** | 0.031 | Isolated | Swamp |
| **5** | 1.346 | Outlet WC | Swamp | **181*** | 0.125 | Isolated | Bog |
| **6** | 0.084 | Isolated | Bog | **182** | 0.461 | Isolated | Complex |
| **7** | 1.944 | Isolated | Bog | **183*** | 0.076 | Discontinuous Throughflow D | Swamp |
| **8*** | 5.088 | Isolated | Bog | **184** | 0.083 | Isolated | Swamp |
| **9** | 0.051 | Isolated | Swamp | **186** | 0.159 | Isolated | Swamp |
| **10** | 0.144 | Isolated | Bog | **187** | 0.833 | Contiguous Throughflow WC | Swamp |
| **11** | 0.124 | Outlet D | Swamp | **188** | 0.314 | Isolated | Swamp |
| **12** | 5.805 | Contiguous Throughflow WC | Complex | **190** | 0.031 | Isolated | Swamp |
| **13** | 0.040 | Isolated | Bog | **191** | 0.302 | Isolated | Bog |
| **14** | 0.076 | Isolated | Bog | **192** | 0.145 | Contiguous Throughflow WC | Swamp |
| **15*** | 2.148 | Isolated | Bog | **193** | 2.138 | Outlet WC | Swamp |
| **16** | 0.450 | Contiguous Throughflow WC | Swamp | **194** | 0.436 | Outlet WC | Swamp |
| **17** | 11.930 | Outlet WC | Complex | **195** | 1.021 | Contiguous Throughflow WC | Swamp |
| **18** | 3.096 | Contiguous Throughflow WC | Fen | **196** | 0.293 | Contiguous Throughflow WC | Swamp |
| **19** | 0.103 | Isolated | Swamp | **197** | 0.076 | Contiguous Throughflow WC | Swamp |
| **20** | 1.674 | Contiguous Throughflow WC | Swamp | **198** | 0.403 | Isolated | Swamp |
| **21** | 2.359 | Outlet WC | Bog | **199** | 0.127 | Contiguous Throughflow WC | Swamp |
| **22** | 0.200 | Isolated | Swamp | **200** | 0.159 | Contiguous Throughflow WC | Swamp |
| **23** | 0.709 | Outlet WC | Swamp | **201** | 0.076 | Isolated | Swamp |

| Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type | Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type |
|---|---|---|---|---|---|---|---|
| **24** | 1.990 | Isolated | Swamp | **202** | 0.217 | Contiguous Throughflow WC | Swamp |
| **25** | 6.196 | Outlet WC | Complex | **203** | 0.655 | Isolated | Swamp |
| **26** | 0.183 | Isolated | Swamp | **204** | 0.196 | Contiguous Throughflow WC | Swamp |
| **27** | 7.613 | Contiguous Throughflow WC | Complex | **205** | 0.057 | Isolated | Swamp |
| **28** | 0.086 | Contiguous Throughflow WC | Fen | **206*** | 1.921 | Contiguous Throughflow WC | Complex |
| **29** | 0.180 | Isolated | Swamp | **207** | 0.414 | Isolated | Swamp |
| **30** | 0.113 | Isolated | Swamp | **208** | 0.031 | Isolated | Swamp |
| **31** | 0.254 | Isolated | Swamp | **209** | 0.586 | Isolated | Swamp |
| **32** | 0.033 | Isolated | Swamp | **212** | 0.016 | Contiguous Throughflow D | Swamp |
| **33** | 0.029 | Isolated | Swamp | **213** | 0.205 | Isolated | Swamp |
| **34** | 0.071 | Isolated | Swamp | **214** | 0.140 | Isolated | Swamp |
| **35*** | 2.168 | Contiguous Throughflow WC | Complex | **215** | 0.191 | Outlet WC | Swamp |
| **40** | 0.036 | Isolated | Swamp | **216** | 0.341 | Isolated | Bog |
| **41** | 0.815 | Outlet D | Swamp | **217** | 0.084 | Isolated | Swamp |
| **42*** | 48.520 | Contiguous Throughflow WC | Complex | **218** | 0.134 | Isolated | Swamp |
| **43*** | 0.113 | Outlet WC | Complex | **219** | 0.079 | Isolated | Swamp |
| **44*** | 24.750 | Contiguous Throughflow WC | Complex | **220** | 0.101 | Isolated | Swamp |
| **46** | 0.025 | Isolated | Swamp | **221** | 0.392 | Isolated | Swamp |
| **47** | 0.048 | Isolated | Swamp | **222** | 0.017 | Isolated | Swamp |
| **48** | 0.268 | Isolated | Swamp | **223** | 0.144 | Isolated | Swamp |
| **49** | 0.127 | Isolated | Swamp | **224** | 0.089 | Isolated | Swamp |
| **50** | 0.083 | Isolated | Swamp | **225** | 0.039 | Isolated | Swamp |
| **51** | 2.117 | Isolated | Swamp | **226** | 0.148 | Isolated | Swamp |
| **52** | 0.797 | Outlet WC | Swamp | **227** | 0.075 | Isolated | Swamp |
| **53** | 0.117 | Isolated | Swamp | **228** | 0.493 | Isolated | Swamp |

| Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type | Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type |
|---|---|---|---|---|---|---|---|
| **54** | 0.078 | Isolated | Swamp | **229*** | 7.237 | Contiguous Throughflow WC | Complex |
| **55** | 0.290 | Isolated | Swamp | **230** | 0.119 | Isolated | Swamp |
| **56** | 0.447 | Isolated | Swamp | **231** | 0.352 | Isolated | Swamp |
| **57** | 0.050 | Isolated | Swamp | **232** | 0.099 | Isolated | Swamp |
| **58** | 0.444 | Isolated | Swamp | **234** | 0.223 | Contiguous Throughflow WC | Swamp |
| **59** | 0.033 | Isolated | Swamp | **235** | 0.681 | Contiguous Throughflow WC | Swamp |
| **60** | 0.213 | Isolated | Swamp | **236** | 0.049 | Contiguous Throughflow WC | Swamp |
| **61** | 0.391 | Outlet WC | Swamp | **237** | 0.178 | Isolated | Complex |
| **63** | 0.896 | Contiguous Throughflow L | Fen | **238** | 0.030 | Isolated | Swamp |
| **64** | 0.120 | Isolated | Swamp | **239** | 0.095 | Isolated | Swamp |
| **65** | 0.045 | Contiguous Throughflow L | Fen | **240** | 0.083 | Isolated | Swamp |
| **66** | 0.041 | Contiguous Throughflow L | Fen | **242** | 0.041 | Isolated | Swamp |
| **67** | 0.180 | Isolated | Complex | **243*** | 1.017 | Isolated | Swamp |
| **68** | 0.540 | Contiguous Throughflow L | Fen | **244** | 0.149 | Isolated | Swamp |
| **70** | 0.116 | Contiguous Throughflow L | Fen | **245** | 0.384 | Isolated | Swamp |
| **71** | 0.126 | Contiguous Throughflow L | Fen | **246** | 0.071 | Isolated | Swamp |
| **72** | 0.083 | Isolated | Swamp | **247** | 0.796 | Isolated | Complex |
| **73** | 0.120 | Isolated | Swamp | **248** | 0.982 | Isolated | Swamp |
| **74** | 3.718 | Isolated | Swamp | **249** | 0.967 | Isolated | Bog |
| **83** | 1.079 | Contiguous Throughflow WC | Swamp | **250** | 2.772 | Isolated | Complex |
| **89** | 0.010 | Discontinuous Throughflow D | Swamp | **251** | 0.117 | Isolated | Swamp |
| **94** | 0.138 | Isolated | Swamp | **252** | 0.026 | Contiguous Throughflow WC | Swamp |
| **101*** | 1.218 | Isolated | Complex | **253** | 0.230 | Isolated | Swamp |
| **113** | 0.590 | Outlet WC | Swamp | **254*** | 1.159 | Contiguous Throughflow WC | Complex |
| **115*** | 0.069 | Isolated | Swamp | **255** | 1.193 | Isolated | Bog |

| Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type | Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type |
|---|---|---|---|---|---|---|---|
| **117*** | 7.034 | Outlet WC | Complex | **256** | 0.825 | Outlet WC | Bog |
| **130*** | 16.647 | Contiguous Throughflow WC | Complex | **257*** | 0.144 | Isolated | Swamp |
| **131** | 0.406 | Isolated | Swamp | **259*** | 0.335 | Isolated | Bog |
| **133*** | 1.593 | Contiguous Throughflow WC | Swamp | **261** | 0.208 | Isolated | Swamp |
| **139** | 1.816 | Contiguous Throughflow WC | Swamp | **262** | 0.234 | Isolated | Swamp |
| **141*** | 0.010 | Isolated | Swamp | **263** | 0.941 | Isolated | Bog |
| **142** | 0.029 | Isolated | Swamp | **264** | 0.957 | Contiguous Throughflow WC | Swamp |
| **143** | 0.118 | Isolated | Swamp | **265** | 0.089 | Isolated | Swamp |
| **144** | 0.529 | Contiguous Throughflow WC | Swamp | **266** | 0.163 | Isolated | Swamp |
| **145** | 0.357 | Isolated | Swamp | **267*** | 0.191 | Isolated | Swamp |
| **146** | 0.103 | Isolated | Swamp | **269** | 0.569 | Isolated | Swamp |
| **147** | 0.023 | Isolated | Swamp | **271** | 0.013 | Isolated | Swamp |
| **148** | 0.108 | Contiguous Throughflow WC | Swamp | **272*** | 0.491 | Isolated | Complex |
| **149** | 0.223 | Isolated | Bog | **273** | 0.162 | Isolated | Swamp |
| **150** | 0.376 | Isolated | Bog | **274*** | 0.423 | Isolated | Swamp |
| **151** | 0.394 | Inlet WC | Swamp | **275** | 0.046 | Isolated | Swamp |
| **152** | 0.028 | Contiguous Throughflow D | Swamp | **276*** | 0.369 | Isolated | Swamp |
| **153** | 0.807 | Isolated | Bog | **277** | 0.150 | Isolated | Swamp |
| **154** | 0.287 | Inlet D | Bog | **278*** | 0.310 | Isolated | Bog |
| **155** | 0.122 | Isolated | Swamp | **279** | 0.032 | Isolated | Swamp |
| **156** | 6.245 | Contiguous Throughflow WC | Complex | **280*** | 0.052 | Isolated | Bog |
| **157** | 0.037 | Isolated | Swamp | **281** | 0.110 | Isolated | Swamp |
| **158** | 0.505 | Outlet WC | Swamp | **282*** | 5.720 | Isolated | Bog |
| **159** | 0.904 | Outlet WC | Swamp | **283** | 0.194 | Contiguous Throughflow WC | Swamp |
| **160** | 1.773 | Isolated | Complex | **284** | 0.768 | Isolated | Swamp |

| Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type | Wetland ID | Size (ha) | Water Flow Path[1] | Wetland Type |
|---|---|---|---|---|---|---|---|
| **161** | 4.284 | Outlet WC | Complex | **285** | 0.028 | Discontinuous Throughflow D | Swamp |
| **162** | 0.182 | Isolated | Swamp | **286*** | 0.877 | Isolated | Swamp |
| **163** | 0.385 | Isolated | Bog | **287*** | 0.333 | Isolated | Swamp |
| **164** | 0.461 | Isolated | Swamp | **288*** | 0.041 | Isolated | Swamp |
| **165** | 0.032 | Isolated | Complex | **289*** | 0.023 | Isolated | Bog |
| **166** | 2.170 | Contiguous Throughflow WC | Complex | **290** | 0.362 | Isolated | Swamp |
| **167** | 0.273 | Isolated | Swamp | **291*** | 1.262 | Contiguous Throughflow WC | Swamp |
| **168** | 0.115 | Isolated | Bog | **292** | 0.317 | Outlet D | Swamp |
| **169** | 0.011 | Isolated | Swamp | **294** | 0.261 | Isolated | Swamp |
| **170** | 0.202 | Isolated | Swamp | **296** | 0.518 | Isolated | Complex |
| **171** | 0.064 | Isolated | Swamp | **299*** | 0.405 | Isolated | Bog |
| **172** | 0.215 | Contiguous Throughflow WC | Swamp | **300** | 0.142 | Isolated | Swamp |
| **173** | 0.470 | Contiguous Throughflow WC | Swamp | **Total Wetland Area in PA: 329.033 ha** | | | |
| **174** | 0.505 | Contiguous Throughflow WC | Swamp | | | | |

*Wetland continues beyond the PA boundary.

[1] WC indicates connectivity to a regulated watercourse, L indicates connectivity to Gold Brook Lake and D indicates that the flow path is driven by drainage which does not form a regulated watercourse. The distinction is made because the type and direction of flow into or out of a wetland may play a role in the determination of Project effects.

In total, the 222 wetlands account for approximately 329 hectares, representing a land cover of 27% of the PA (Figure 1). According to guidance from the US Corps of Engineers wetland delineation manual (Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987), at least 50% vegetation cover must be present to be classified as wetland, as such, habitats lacking vegetation cover in observed low flow periods were described as open water features. It is important to note that areas that meet this open water definition within delineated wetland boundaries have been removed from the calculation of wetland areas. Open water features are discussed specifically relating to watercourses and fish habitat (Fish and Fish Habitat Baseline Report). Data determination forms describing vegetation cover, soil characteristics and hydrology indicators were collected for each wetland, along with WESP-AC, and adjacent upland habitat. This data is available to support alteration applications in the permitting phase of the Project. A detailed assessment of sub-wetland habitat types (e.g., graminoid, coniferous forest, regenerating/cutover, etc.) are discussed and shown in the Vegetation Community Assessment Baseline Report.

Swamps represent the most abundant wetland class in the PA, accounting for 71% of all wetlands (Table 3). Swamps identified in the PA are predominantly coniferous dominant or mixedwood, with few deciduous dominant swamps. Seventy-five percent of swamps had a prominent shrub layer which primarily consisted of saplings including black spruce (*Picea marian*a), balsam fir (*Abies balsamea*), red maple (Acer rubrum), and tamarack (Larix laricina), as well as woody shrubs such as wild raisin (*Vibernum nudum*), mountain holly (*Ilex mucronatus*) and speckled alder (*Alnus incana*). The majority of swamps delineated within the PA (91%) are under one hectare in size, and collectively they account for only 17% of the total wetland area. However, this is likely slightly underrepresented, as all 29 wetland complexes contain a swamp component. Seventy percent of swamps delineated within the PA are isolated, 20% are in a throughflow position, 9% are in a headwater (outflow) position, and less than 1% receive surface water inflow but lack a defined outflow.

Bogs account for 12% of all wetlands within the PA, and 8% of the total wetland area (Table 3). This does not include the bog components found in 89% of the wetland complexes. Bogs in the PA range in size from <1-5.7 hectares (not including those found in complexes). Treed bogs are typically limited to coniferous trees, namely black spruce and tamarack, which was consistent with what was found in the PA. Mixed-wood bogs were rare and deciduous trees found in bogs within the PA were limited to red maple. Low shrub bogs, whose tree layers are sparse or absent, are characterized by ericaceous shrubs like leatherleaf (*Chamaedaphne calyculata*), sheep laurel (*Kalmia angustifolia*), and Labrador tea (*Rhododendron groenlandicum*), which are adapted to the acidic and nutrient poor soils indicative of bogs. Sixty-three percent of bog habitats in the PA have a prominent shrub layer. Herbaceous layer diversity within bogs is greatly lower than that of swamps.

Fens account for 4% of the wetlands within the PA (Table 3). They range in size from <1-3.1 hectares and only occupy 2% of the total PA wetland area. Additionally, 29% of wetland complexes contain a fen component. All fens are associated with a waterbody or watercourse, 75% are directly associated with

Gold Brook Lake, and the rest with throughflow watercourses. Most fens found within the PA are dominated by graminoid species and 25% have a prominent shrub layer. Trees are mainly limited to black spruce, red maple, and balsam fir.

While some wetland complexes may have marginal marsh components, no marshes were distinctly observed within the PA.

**Table 3. Summary of Wetland Classes**

| Wetland Type | Area | | | | Relative Abundance | | |
|---|---|---|---|---|---|---|---|
| | Average (ha) | Minimum (ha) | Maximum (ha) | Total (ha) | # of Wetlands | % of all Wetlands | % of all Wetland area |
| Swamp | 0.354 | 0.010 | 3.718 | 55.904 | 158 | 71.2 | 17.0 |
| Bog | 0.949 | 0.023 | 5.720 | 25.612 | 27 | 12.2 | 7.8 |
| Fen | 0.618 | 0.041 | 3.096 | 4.947 | 8 | 3.6 | 1.5 |
| Complex | 8.683 | 0.032 | 73.076 | 243.837 | 29 | 13.1 | 73.6 |

Of the 222 wetlands delineated within the PA, 29 are wetland complexes consisting of two or more wetland types. Within the PA, these complexes are comprised of swamp, fen, and bog components (Table 4). Despite only making up 13% of the number of wetlands delineated, these complexes equate to 74% of the total wetland area in the PA (Table 3). The largest wetland complex is Wetland 1, associated with Gold Brook, which is 73 hectares and consists of swamp, bog and fen components.

**Table 4. Wetland Complex Class Composition**

| Wetland ID | Swamp | Bog | Fen | Wetland ID | Swamp | Bog | Fen |
|---|---|---|---|---|---|---|---|
| **1** | ✓ | ✓ | ✓ | **156** | ✓ | ✓ | |
| **2** | ✓ | ✓ | | **160** | ✓ | ✓ | |
| **12** | ✓ | ✓ | | **161** | ✓ | ✓ | |
| **17** | ✓ | ✓ | | **165** | ✓ | ✓ | |
| **25** | ✓ | | ✓ | **166** | ✓ | ✓ | ✓ |
| **27** | ✓ | ✓ | ✓ | **182** | ✓ | ✓ | |
| **35** | ✓ | ✓ | ✓ | **206** | ✓ | ✓ | |
| **42** | ✓ | ✓ | | **229** | ✓ | ✓ | ✓ |
| **43** | ✓ | | ✓ | **237** | ✓ | ✓ | |
| **44** | ✓ | ✓ | | **247** | ✓ | ✓ | |
| **67** | ✓ | ✓ | | **250** | ✓ | ✓ | |
| **101** | ✓ | ✓ | | **254** | ✓ | | ✓ |
| **117** | ✓ | ✓ | | **272** | ✓ | ✓ | |
| **130** | ✓ | ✓ | | **296** | ✓ | ✓ | |

Various wetlands within the PA have been subject to anthropogenic disturbances, most notably historic mining activities (e.g., setting ponds, waste rock), timber harvesting, associated road networks and transmission lines. Historic setting ponds are found in Wetland 1, whereas wetlands in the northeast of the PA are primarily impacted by recent and historic timber harvesting. However, many wetlands within the PA are largely intact and were observed to retain natural functions.

## 3.2 Wetlands of Special Significance

As part of the qualitative wetland field assessments, along with a review of the current (June 2020) NSECC predictive WSS layer (pers. comm., Ian Bryson, NSECC Wetland Specialist), each wetland was reviewed to assess potential for WSS designation. MEL presents their WSS assessment below, in consideration of the desktop and field assessments, the Wetland Conservation Policy (NSE, 2019) and NSECC guidance received to date. However, the below only presents proposed WSS designations and ultimately WSS determination lies with NSECC.

The PA does not interact with any Ramsar sites, Provincial Wildlife Management Areas, Provincial Parks, Nature Reserves, Wilderness Areas, known lands owned or legally protected by non-governmental charitable conservation land trusts, intact or restored wetlands under the North American Waterfowl Management Plan, or protected water areas. Game Sanctuaries are excluded from WSS designation under the Wetland Conservation Policy (NSE, 2019). No wetlands within the PA are present within any of these above defined areas. The nearest protected area is the Loon Lake Nature Reserve, approximately 4 km to the northeast of the PA.

### 3.2.1 NSECC Predicted Wetlands of Special Significance

A review of the NSECC predictive WSS layer identified Wetland 1 as a potential WSS. The layer notes that Wetland 1 was identified based on species designation. Correspondences with NSECC and NSDRR were unable to confirm the species observation which triggered the wetland's inclusion in the predictive WSS layer. A review of the Project's ACCDC report (Appendix C) identified an observation of a short-eared owl (*Asio*, *flammeus*, SARA Special Concern, COSEWIC Special Concern, S1S2B) beyond the PA boundary, within the NSECC mapped extent of Wetland 1. The ACCDC dataset notes that a single adult was observed in July 2008, ~1 km south of the PA, in suitable nesting habitat and that the precision of the observation is within 2 km.

As the predictive WSS layer does not consider the positional accuracy of the ACCDC observations, it is possible that this observation was not observed within Wetland 1, or its extension beyond the PA (observed within 2 km of ACCDC data point). While short-eared owls occupy wetlands for certain life functions, they are a ground nesting species and their preferred nesting habitat is in raised, dry ground (Cornell University, 2019). This suggests that the ACCDC observation was not within Wetland 1 (a riparian floodplain complex to Gold Brook), as it was noted to be observed in suitable nesting habitat.

No other ACCDC SAR observations were observed within the NSECC mapped extent of Wetland 1, within or beyond the PA. As discussed in the following section, Wetland 1 contains observations of SAR lichen and will be carried forward as a potential WSS based on these occurrences. ACCDC data is provided in Appendix C and detailed in Project baseline reports for respective taxa. No other NSECC predicted WSS fall within the PA.

### 3.2.2 Wetlands with Observed SAR

Twenty-five wetlands within the PA had field observations of SAR, within or in close proximity to the wetland (Figure 2, Appendix A). Table 5 below presents the wetland-associated SAR observations and the presence of species-specific suitable breeding or discrete dwelling habitat. Observed wetland-associated SAR and their preferred habitats are described below, and further detailed in their respective Project baseline reports (i.e., Flora and Fauna Baseline Report, Avifauna Baseline Report).

**Table 5. Summary of Wetlands with Observed SAR**

| Wetland ID | Wetland & Habitat Available | Observed SAR[1] | Suitable Breeding or Dwelling Habitat Present[2] (Y/N) |
|---|---|---|---|
| 1 | Complex: Extensive treed swamp, bog and fen complex associated with Gold Brook, observations grouped in a swamp area along Watercourse 3 | Blue Felt Lichen | Y |
| 10 | Bog: Small isolated treed bog. Tracks observed on a trail adjacent to the wetland. | Mainland Moose (Evidence) | N |
| 12 | Complex: Mixedwood treed swamp and bog, adjacent to historical cutover, observations within eastern swamp component | Blue Felt Lichen | Y |
| 17 | Complex: Treed swamp and bog, species observed in swamp component | Blue Felt Lichen | Y |
| | | Olive-sided flycatcher | Y |
| 18 | Fen: Mixedwood treed fen | Blue Felt Lichen | Y |
| 20 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| | | Canada Warbler | Y |
| 25 | Complex: Softwood treed swamp and fen associated with watercourse | Canada Warbler | N |
| 42 | Complex: Softwood treed swamp and bog adjacent to cutover. Call heard during wetland delineation, south of wetland boundary near Watercourse 22. | Olive-sided flycatcher | Y |
| 44 | Complex: Softwood treed swamp and bog, observation from treed swamp component | Blue Felt Lichen* | Y |
| 48 | Swamp: Mixedwood treed swamp, species observed along wetland/upland edge | Evening Grosbeak | Y |
| | | Blue Felt Lichen | Y |
| 51 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 52 | Swamp: Treed swamp with red maple present | Blue Felt Lichen | Y |

| | | | |
|---|---|---|---|
| 57 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 58 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 83 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 101 | Complex: Treed swamp and bog | Blue Felt Lichen* | Y |
| 117 | Complex: Treed swamp and bog | Canada Warbler | Y |
| | | Blue Felt Lichen* | Y |
| 131 | Swamp: Softwood treed swamp | Blue Felt Lichen | Y |
| 158 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 161 | Complex: Treed swamp, open bog, observation from mixed-wood treed swamp component | Blue Felt Lichen | Y |
| 162 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 187 | Swamp: Treed swamp with red maple present | Blue Felt Lichen | Y |
| 194 | Swamp: Treed swamp with red maple present | Frosted Glass-whiskers Lichen | Y |
| 196 | Swamp: Mixedwood treed swamp | Blue Felt Lichen | Y |
| 201 | Swamp: Treed swamp with red maple present | Blue Felt Lichen | Y |

* Blue felt lichen occurrences in wetland area beyond PA

[1] Includes observations immediately adjacent to wetlands (+/- 10 m) to account for GPS accuracy

[2] Habitat that supports specific breeding or necessary biological requirements, such as dwellings (e.g., nests, dens, overwintering, hibernacula). This does not include broader supporting habitat used by the species for general life functions (e.g., foraging, movement).

Preferred blue felt lichen (*Pectenia plumbea*, SARA/COSEWIC Special Concern, NSESA Vulnerable, S3) habitat consists of cool and moist habitats with mature broad-leaved trees. Blue felt lichen is commonly found on the trunks of old hardwood trees in humid woodlands with mixed coniferous/hardwood or deciduous dominant swamps (NSDLF, 2010). Mixedwood or deciduous dominated treed swamps (or complexes) comprise ~30% of the wetlands within the PA. These wetland types are dispersed across the PA and may provide suitable blue felt lichen habitat. Within the PA, blue felt lichen was found within 21 wetlands (Table 5), typically in swamps or on the edges of wetland complexes growing on mature red maple trees, commonly associated with watercourses or drainage features. Lichen surveys extended beyond the PA to support earlier iterations of Project engineering and infrastructure placement. Based on this extended study area, multiple blue felt lichen occurrences were observed beyond the PA. Those associated with wetlands that extend beyond the PA are shown in Figure 2 (Appendix A).

Historically, frosted glass-whiskers (*Sclerophora peronella*, SARA/COSEWIC Special Concern, S1?) in Nova Scotia has been found on the exposed heartwood of mature hardwood trees in old-growth hardwood stands (COSEWIC, 2005). More recently, the species has also been found on the heartwood of red maples in forested wetlands (COSEWIC, 2014). Similarly to the habitat requirements of blue felt lichen, frosted glass-whiskers may be found in the mixedwood or deciduous dominated treed swamps across the

PA. Within the PA, frosted glass-whiskers was found within one hardwood swamp, Wetland 194 (Table 5).

Olive-sided flycatchers (*Contopus cooperi*, SARA Threatened, COSEWIC Special Concern, NSESA Threatened, S2B) are typically found in coniferous forests, and nest near open areas such as open bogs and other wetlands, waterbodies, and cut-blocks, with the presence of tall snags and/or trees that flycatcher use to forage, watch for predators, and advertise territory (NSDLF, 2021a). Wetland complexes consisting of riparian features with coniferous stands and adjacent open wetland or cutover areas (e.g., Wetland 1, 27, 42, 229) may provide suitable olive-sided flycatcher breeding habitat within the PA. These wetlands are commonly associated with surface water features and watercourses (e.g., Gold Brook Lake, Gold Brook). Within the PA, there were two olive-sided flycatcher observations associated with Wetlands 17 and 42, where individuals were heard calling near the upland-wetland edge of each treed swamp-bog complex.

The Canada warbler's (*Cardellina canadensis*, SARA/COSEWIC Threatened, NSESA Endangered, S3B) preferred breeding habitat is found in moist streamside forests and forested wetlands. Important habitat features for this species include complex understories with dense shrubs and ferns (e.g., cinnamon fern), and forest floors with extensive hummocks and downed wood (NSDLF, 2021b). Across the PA, 73% of wetlands were observed to have notable shrub cover (n=161), most of which were swamps or complexes containing understories with potential Canada warbler breeding habitat. Within the PA, there were three Canada warbler observations in Wetlands 20, 25 and 117 (Table 5). Wetland 20 is a treed swamp wetland with a well-developed shrub layer. Wetlands 25 and 117 are wetland complexes and the Canada warbler observations were in the treed swamp sections of the complexes that contain a dense shrub layer.

The preferred breeding habitat of the evening grosbeak (*Coccothraustes vespertinus*, COSEWIC Special Concern, NSESA Vulnerable, S3S4B) is open hardwood forests with fir and white spruce that support abundant spruce budworm (COSEWIC, 2016). Through the PA, mixedwood wetlands, predominantly small isolated treed swamps or swamp-bog complexes, that may support evening grosbeak breeding habitat are primarily found in the north-northeast and eastern portion near the Rocky Lakes. This includes Wetland 48, where there was one evening grosbeak observation along the upland edge (Table 5). Wetland 48 is a mixed-wood swamp with prevalent balsam fir in both the wetland and the adjacent upland.

Mainland moose (*Alces americanus*, NSESA Endangered, S1) have large home ranges and although generalist, they require select seasonal habitats. Moose are often found foraging in regenerative and/or mature mixedwood or softwood stands and, in summer months, areas with aquatic vegetation (e.g., shorelines, open water or riparian wetlands). In spring, islands, peninsulas and wetlands with open water features are often used for calving. In summer, moose use wetlands and mature upland forests for thermal regulation. Whereas in winter, mature stands with high, dense canopy cover provide refuge from deep snow (NSDNRR, 2021). The Recovery Plan for the Moose (*Alces alces americana*) in Mainland Nova Scotia (NSDNRR, 2021) presents a habitat suitability index (HSI) to model moose core habitat. Certain wetland areas meet the HSI criteria for predicted moose habitat within the PA, which includes cutover wetlands with regenerative stands for summer and winter foraging, wetlands with mature stands for summer and winter cover and riparian areas along large waterbodies (i.e., Gold Brook Lake) for calving. A Project specific HSI model is presented and discussed in the Project's EARD

All wetlands in Table 5 contain observations of sessile or non-mobile SAR (i.e., blue felt lichen or frosted-glass whiskers lichen), with the exception of Wetlands 10, 25 and 42, where mobile SAR were observed in or in proximity to the wetland. It is anticipated that the 22 wetlands listed in Table 5 with observations of SAR lichen will be classified as WSS (including wetlands with associated observations beyond the PA), and as a result are presented as potential WSS herein and in the EARD (Figure 2, Appendix A). Wetland 25 contained a confirmed observation of a mobile SAR (i.e., Canada warbler (*Cardellina canadensis*). All (23) wetlands with confirmed SAR (mobile or sessile) within the wetland area will be reviewed with NSECC. Final WSS designation will be made by NSECC.

A Canada warbler was observed in Wetland 25, incidentally during 2017/2018 surveys, along the upland-wetland edge. Wetland 25 is a softwood treed swamp-fen complex with a headwater watercourse, and is not characterized as shrub dominant. Coniferous saplings (e.g., balsam fir, black spruce) make up the shrub layer and the herbaceous layer is primarily comprised of three-seeded sedge and bunchberry. While Wetland 25 may be used by Canada warbler for other life functions, it is not anticipated to contain the species' preferred breeding habitat describe above (i.e., complex understory with dense shrubs and ferns). Seventy-three percent of the Project wetlands were observed to be shrub dominated and likely contain more suitable breeding habitat for Canada warbler.

An olive-sided flycatcher was heard calling incidentally during wetland surveys on July 7, 2021 from the eastern edge of Wetland 42, a large softwood treed swamp-bog complex with throughflow watercourse. The observation notes that the bird was ~50 m south of the observation point, which places it beyond the wetland, near Watercourse 22, adjacent to a cutover area. While Wetland 42 was observed to contain suitable olive-sided flycatcher habitat (i.e., coniferous forests near open wetlands, waterbodies, and cut-blocks), ~30% of the Project wetlands contain treed components with adjacent watercourse or waterbody features.

Moose tracks were observed once on a trial in the upland area adjacent to Wetland 10 (beyond the wetland) during a pellet group inventory (PGI) survey in 2017. Wetland 10 is a small (0.1 ha), hydrologically isolated, treed bog. While this wetland may provide non-discrete foraging habitat for mainland moose, it does not contain the required characteristics, as defined by the HIS, to support specific life functions (e.g., mature canopy cover for winter refuge, calving areas). It is likely that the adjacent trail was used as corridor for movement. Wetland 10 does not meet modeled HSI core habitat criteria, as described above and further discussed in the Project's EARD. In consideration of the habitat observed, HSI model and observation frequency, Wetland 10 does not appear to support necessary life functions for mainland moose.

### 3.3 Wetland Hydrology

In general, water flows north to south within the PA. The primary flow path is through Gold Brook Lake, largely originating in headwater wetland systems, and exits the PA at Gold Brook through Wetland 1 (Figure 1, Appendix A). Inflows are also received from the Rocky Lakes system to the east. In the northeast, water flow is eastward, exiting the PA towards Ocean Lake and other off-site waterbodies.

Hydrological flow from the northern portion of the PA into Gold Brook Lake is predominantly influenced by large wetland complexes consisting of swamp, bog, and fen components, such as Wetland 42. Wetland 42 is the largest of these complexes, associated with throughflow watercourses (e.g., Watercourse 20, 22,51 and 52), which lies along the northwestern boundary of Gold Brook Lake and extends northwest beyond the PA boundary. Gold Brook Lake is also hydrologically fed by district topographic gradients from the east and west via headwater and throughflow wetlands (e.g., Wetland 12, 20, 27 and 156).

The primary hydrological outlet of the PA is Gold Brook, which traverses Wetland 1, the largest wetland complex within the PA, consisting of fen, swamp, and bog components. Hydrological inputs are primarily received by Gold Brook Lake and associated tributaries, but there is also flow contributed by upgradient headwater wetlands (e.g., Wetland 17 and 44).

Hydrological flow paths east of Gold Brook Lake are also influenced by a topographic divide which generally runs north-south east of Watercourse 43 (Figure 2, Appendix A). Hydrological inputs east of this divide primarily exit the PA towards Ocean Lake and other off-site waterbodies through Watercourses 44, 81 and 88, and associated wetlands (e.g., Wetland 130 and 291). West of Watercourse 43, water flows into the east side of Gold Brook Lake through several watercourses and riparian wetland complexes, as well as an assemblage of small isolated treed swamps and bogs via groundwater inputs (Figure 1, Appendix A).

Wetland hydrology is highly dependent on wetland type and its position on the landscape. Within the PA, three classes of wetland were observed: bog, fen, and swamp (some including smalls shallow open water components). Bogs are ombrotrophic peatlands, meaning they are fed by precipitation , and typically do not receive surface water or groundwater inputs. As a result, they are commonly found in headwater positions and function as groundwater recharge systems. Bogs form through the accumulation of undecomposed organic soils (peat), which can be elevated above the surrounding landscape. As a result, the water table in bogs is often mounded, following the bog’s convex surface topography, and isolated from local groundwater regimes (Warner & Rubec, 1997).

Fens are a form of minerotrophic peatland, characterized by surface water and/or groundwater inputs. As a result, fens typically have shallower peat deposits and fluctuating water tables at or just above/below the ground surface (Warner & Rubec, 1997). Fens commonly function as flowthrough wetlands, shuttling surface water or groundwater horizontally across the landscape. Fens are often groundwater discharge areas that also receive surface water inflow from watercourses (Siegel & Glaser, 1987).

Swamps may be classified as peatlands (organic) or mineral wetlands depending on their substrate. Water table fluctuations in swamps are often greater than those of bogs and fens (commonly resulting in low to no peat acclamation). Swamps are on average drier than most other wetland types, with a water table below the surface for the majority of the year (Warner & Rubec, 1997). Most swamps in the PA are small, isolated headwater wetlands, or part of larger riparian complexes located along Gold Brook Lake and watercourses, and thus are subject to water level fluctuations and seasonal flooding.

## 3.4 Functional Assessment

The following sections summarize the results of the WESP-AC functional assessments for the 222 wetland within the PA, broken into the Grouped Functions described in Section 2.3. The results are further detailed in the summary tables provided in Appendix B. No functional WSS were identified through the WESP-AC WSS Interpretation Tool. The raw WESP-AC Excel files can be provided to the NSECC Wetland Specialist(s) upon request.

### 3.4.1 Hydrologic Group

The Hydrologic Group evaluates the effectiveness of a wetland to store or delay the downslope movement of surface water. However, the model does not account for wetland size, and in turn, the ability of larger wetlands to store more water than smaller wetlands. Wetlands that have the highest functions within this group include those that do not have surface water outlets, and instead, are isolated from flowing surface water.

On average, the function and benefit ranks for the Hydrological Group, for all Project wetlands, were Moderate. Wetlands which received Higher function ranks (see Appendix B) are isolated wetlands, typically located in headwater positions, such as Wetlands 8, 26, 55, 170, 221, 276 and 296. Lower function ranks were awarded to wetlands that actively convey water, with outflow and throughflow watercourses (see Appendix B), such as Wetlands 1, 18, 27, 66, 156, 196 and 285. Table 2 presents an overview of hydrological connectivity by wetland.

### 3.4.2 Water Quality Group

The Water Quality Group is compiled from four different functions: sediment retention and stabilization; phosphorus retention; nitrate removal; carbon sequestration. The main function of this group is to evaluate the wetland’s potential to intercept, retain, and filter sediments, particulates, and organic matter. Similar to the hydrologic group, the wetlands that have the highest functions in this regard include those that do not have a surface water outlet, and instead are isolated from flowing surface water. This model also does not account for wetland size and as such, larger wetlands do not necessarily score higher than small wetlands, although in reality size may factor into this function.

Project wetlands have a Higher function rank, on average, for the Water Quality Group (see Appendix B). The average benefit score is Moderate. Many wetlands which received Higher function ranks had Lower benefit ranks. The Higher function rank for Water Quality (76% of all wetlands) is likely a result of the numerous isolated wetlands within the PA which do not a have a defined outflow and therefore have greater ability to retain and filter particulate and organic matter. These wetland types are commonly hydrologically isolated and/or receiving (inflow) wetlands, such as swamps, which are the dominant wetland class in the PA.

#### 3.4.3 Aquatic Support Group

The Aquatic Support Group comprises four individual functions: stream flow support; aquatic invertebrate habitat; organic nutrient export; and water cooling. The main function of this group is to determine the wetland's ability to support ecological stream functions that promote habitat health. Wetlands lying adjacent to or containing flowing water score higher than those that do not (i.e. isolated wetlands). In addition, however, headwater wetlands are crucial for supporting stream flow during the dry season by contributing to water flow via groundwater input and storage capacity.

Many wetlands in the PA are associated with throughflow or outlet watercourses, as well as waterbodies (e.g., Gold Brook Lake), resulting in a Higher average Aquatic Support function rank. As a result, all wetlands in the PA were ranked Moderate and Higher in function, with the exception of Wetlands Wetlands 56 and 272 which ranked Lower (see Appendix B). Headwater wetlands, such as bogs, provide stream flow and cooling functions due to their typically limited exposed surface water, insulating properties, and groundwater water storage and retention time. Treed swamps can also provide Aquatic Support through groundwater discharge (e.g., seeps) and vegetation shading. Aquatic habitat and wetland support are further described in Fish and Fish Habitat Baseline Report.

#### 3.4.4 Aquatic Habitat Group

The Aquatic Habitat Group is compiled from five different functions: anadromous fish habitat, resident fish habitat, amphibian and turtle habitat, waterbird feeding habitat, and waterbird nesting habitat. Wetlands that have the highest functions within this group include those that are adjacent to or contain water features.

While, on average, wetlands in the PA ranked Lower and Moderate for Aquatic Support Habitat function and benefit, the Higher ranking wetlands are those associated with watercourse systems and open water features, such as Wetland 1, 18, 20 and 42 (see Appendix B). Aquatic habitat and wetland support are further described in Fish and Fish Habitat Baseline Report.

### 3.4.5 Transitional Habitat Group

The Transition Habitat Group comprises three different functions: songbird, raptor, and mammal habitat, native plant habitat and pollinator habitat. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants.

Due to the location of the PA, many wetlands provide relatively remote, undisturbed and unfragmented habitat, resulting in a Higher average function rank for Transitional Habitat. While the average benefit score is Lower. This is true of many wetlands within the PA as well as the border region and as a result 66% of wetlands ranked Higher in this function (see Appendix B). A detailed assessment of baseline habitat is provided in the Vegetation Community Assessment Baseline Report.

### 3.4.6 Wetland Condition

Wetland Condition refers to the integrity or health of a wetland as defined by its vegetative composition and richness of native species. Scores are derived from the similarity between the wetland being evaluated and reference wetlands of the same type and landscape setting (Adamus, 1996).

On average, wetlands within the PA had a Moderate Wetladn Condition rank. The wetlands with Moderate to Higher ranks contain a relatively good level vegetative community health and species diversity (see Appendix B). Lower ranked wetlands are typically smaller wetlands associated with historic disturbances such as roads, trails, historic mining, timber harvesting, etc., which may be more susceptible to changes in their surroundings.

### 3.4.7 Wetland Risk

Wetland Risk takes sensitivity and stressors into account by averaging the two. Sensitivity is the lack of intrinsic resistance and resilience of the wetland to human or naturally caused stress (Niemi et al., 1990). The functional assessment tool uses five metrics to measure sensitivity: abiotic resistance, biotic resistance, site fertility, availability of colonizers, and growth rate. Stress relates to the degree to which the wetland is or has recently been altered by humans in a way that degrades its ecological condition. The model applies four stress groups: hydrologic stress, water quality stress, fragmentation stress, and general disturbance stress. Wetlands that are highly resilient may have Lower risk scores despite their exposure to multiple stressors. Additionally, wetlands exposed to fewer threats, but with low resilience may have Higher risk scores. Wetland resilience is tied to multiple factors, such as size, proximity to natural land cover, and presence of invasive species.

Wetlands in the PA scored Moderate, on average, for Wetland Risk (see Appendix B), meaning most have a moderate resilience to stressors. Wetlands which scored Lower are assessed to have greater resilience. Many of which were found along Gold Brook Lake and removed from potential anthropogenic impacts (e.g., Wetlands 65, 66, 166).

### 3.5 Summary

Within the PA there were 222 wetlands delineated which consist of bogs, fens, and swamps, as well as complexes with combinations of these classes. The total wetland area in the PA is 329 ha. The majority of the wetlands are treed swamps (n=158), but large wetland complexes make up most of the wetland area within the PA (74%). Of the peatland wetland types, bogs were more prevalent, both in complexes (Table 3) and on their own (Table 2) then fens. No marsh wetlands were observed within the PA. Most individual wetlands area hydrological isolated swamps and bogs, in the sense that they do not have defined surface water connections (inlets/outlets/throughflow). Many large wetland complexes are hydrologically connected via throughflow watercourses and Gold Brook Lake.

It is anticipated that the 22 wetlands with observations of blue felt and frosted glass-whickers lichen will be classified as WSS. All (23) wetlands with confirmed SAR (mobile or sessile) within the wetland area will be reviewed with NSECC. Final WSS designation will be made by NSECC.

WESP-AC results present that the averaged Grouped function and benefit scores for wetlands in the PA range from Lower to Moderate, with the exception of the Water Quality, Aquatic Support and Transitional Habitat groups which rank Higher, on average, for function. As stated in Section 2.3. the highest functioning wetlands are those that have both Higher function and benefit ranks. Generally, lower average benefit scores were observed in comparison to functional scores. This is likely, in part, a result of the remoteness of the PA. No functional WSS were identified through the WESP-AC assessments.

## 4 LIMITATIONS

The following limitations regarding wetlands data collection and interpretation are acknowledge:

- Wetland delineation. classification and identification of soils, vegetation, wetland types, and general environmental characteristics have been completed by qualified professionals to accepted industry standards. However, a single assessment may not define the absolute status of wetlands conditions. While wetlands will be further assessed at the permitting stage, conditions and characteristics may change over the lifetime of this Project, either naturally or through non-Project related anthropogenic influences (e.g., climate change). External influencing factors are considered in the Project's EARD.
- GPS coordinates taken in the field using handheld Garmin GPS units have inherent accuracy limitation between 3 to 5 m. Wetland boundaries and observation points identified in this document are based upon these GPS readings and limited by this positional accuracy.
- There is inherent subjectivity in wetland assessments (e.g., % vegetation cover), which may cause discrepancies between assessors. However, all Project assessors are qualified personnel trained in wetland delineation and assessment and thus minor differences should not influence conclusions and analysis based upon the collected information.

- All reasonable assessment programs will involve an inherent risk that some site conditions or characteristics may not be detected during surveys. While multi-faceted and targeted surveys are completed to mitigate this risk, reports and analysis on such investigations will be based on reasonable interpretation from representative field sample points, supporting desktop interpretation and professional judgment.

## 5 CLOSING

This report has been prepared to support the Project's development and understand wetland presence and function across the PA. This report will support the necessary mitigation sequence to reduce and/or avoid impacts to wetlands or wetland functions where possible through the Project's EARD and future permitting processes.

This report has considered relevant factors and influences pertinent within the scope of the assessment and has completed and provided relevant information in accordance with the methodologies described herein.

Sarah Scarlett, M.Sc.
Project Coodinator
McCallum Environmental Ltd.
902-943-3144
sarah@mccallumenvironmental.com

Zacherye Simai
Junior Environmental Scientist
McCallum Environmental Ltd.
902-219-4888
zach@mccallumenvironmental.com

## 6 REFERENCES

Adamus, P. 1996. Bioindicators for Assessing Ecological Integrity of Prairie Wetlands. EPA/600/R-96/082, US EPA Environmental Research Laboratory, Corvallis. http://www.epa.gov/owow/wetlands/wqual/ppaindex.html

Barber, J.R., Fristrup, K.M., Brown, C.L., Hardy, A.R., Angeloni, L.M., and Crooks, K.R. 2009. Conserving the wild life therein- Protecting park fauna from anthropogenic noise. Parks Science. 26(3).

COSEWIC 2005. COSEWIC assessment and status report on the frosted glass-whiskers Sclerophora peronella in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 28 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC. 2010. COSEWIC assessment and status report on the Blue Felt Lichen Degelia plumbea in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 42 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC. 2014. COSEWIC status appraisal summary on the Frosted Glass-whiskers Sclerophora peronella in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xx pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

COSEWIC. 2016. COSEWIC assessment and status report on the Evening Grosbeak Coccothraustes vespertinus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 64 pp. (http://www.registrelep-sararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1).

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Munro, M.C., Newell, R.E., and Hill, N.M. 2014. Nova Scotia Plants. Retrieved from: https://ojs.library.dal.ca/NSM/pages/view/Plants.

Niemi, G. J., P. DeVore, N. Detenbeck, D. Taylor, A. Lima, J. Pastor, J. D. Yount, and R. J. Naiman. 1990. Overview of case studies on recovery of aquatic systems from disturbance. Environmental Management 14(5): 571-587.

Nova Scotia Environment (NSE). 2019. Nova Scotia Wetland Conservation Policy. 2019. Retrieved from: https://novascotia.ca/nse/wetland/docs/Nova.Scotia.Wetland.Conservation.Policy.pdf.

Nova Scotia Department of Lands and Forestry (NSDLF). 2021a. Recovery Plan for the Olive-sided Flycatcher (Contopus cooperi) in Nova Scotia [Final]. Nova Scotia Endangered Species Act Recovery Plan Series.

Nova Scotia Department of Lands and Forestry (NSDLF). 2021b. Recovery Plan for the Canada Warbler (Cardellina canadensis) in Nova Scotia [Final]. Nova Scotia Endangered Species Act Recovery Plan Series.

Nova Scotia Department of Natural Resources and Renewables (NSDNRR). 2018. *At-Risk Lichens – Special Management Practices.*

Nova Scotia Department of Natural Resources and Renewables (NSDNRR). 2021. Recovery Plan for the Moose (*Alces alces Americana*) in Mainland Nova Scotia. *Nova Scotia Endangered Species Act Recovery Plan Series*. 96pp.

Roland, A. E. 1998. Roland's Flora of Nova Scotia. Nimbus Publishing.

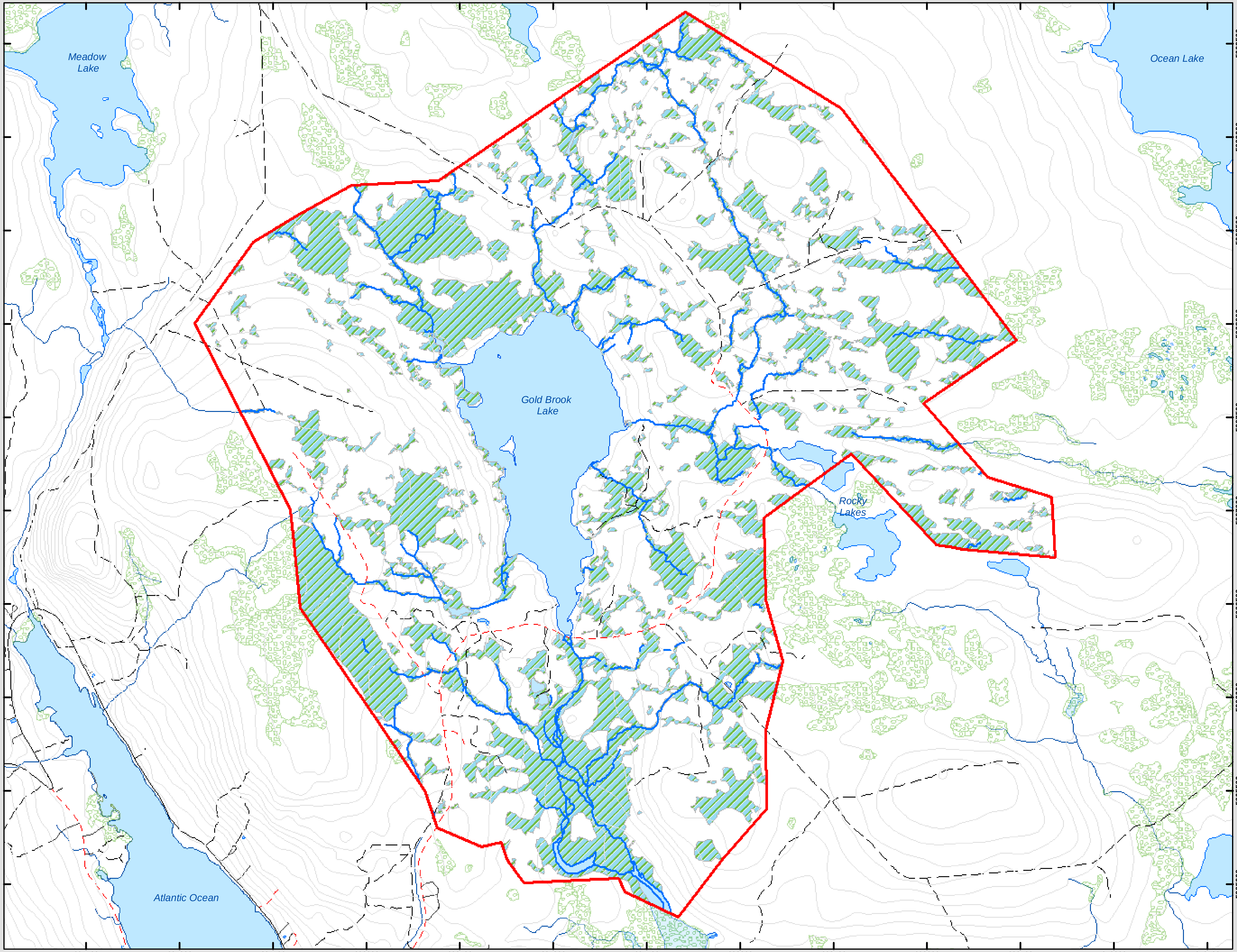
Siegel, D. I. and P. H. Glaser. 1987. Groundwater flow in a bog-fen complex, Lost River Peatland, northern Minnesota. The Journal of Ecology 75:743-754.

United States Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual:Northcentral and Northeast Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

United States Department of Agriculture and Natural Resources Conservation Service. 2003. Soil Survey Staff. Keys to SoilTaxonomy (9th Ed.). Retrieved from: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051544.pdf.

Warner B.G., and Rubec C.D.A. 1997. The Canadian Wetland Classification System. Second Edition. National Wetlands Working Group. 68pp.

# APPENDIX A. FIGURES




Prepared For:

Anaconda Mining

**FIGURE 1a**

**Goldboro Gold Project**

**Field Delineated Wetlands & Watercourses**

**Goldboro, NS**

Field Delineated Watercourses
NSTDB Watercourses Outside Project Area
Field Delineated Wetlands
NSECC Wetland Inventory
Open Water
EARD Proejct Area

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 250 500 1,000 m

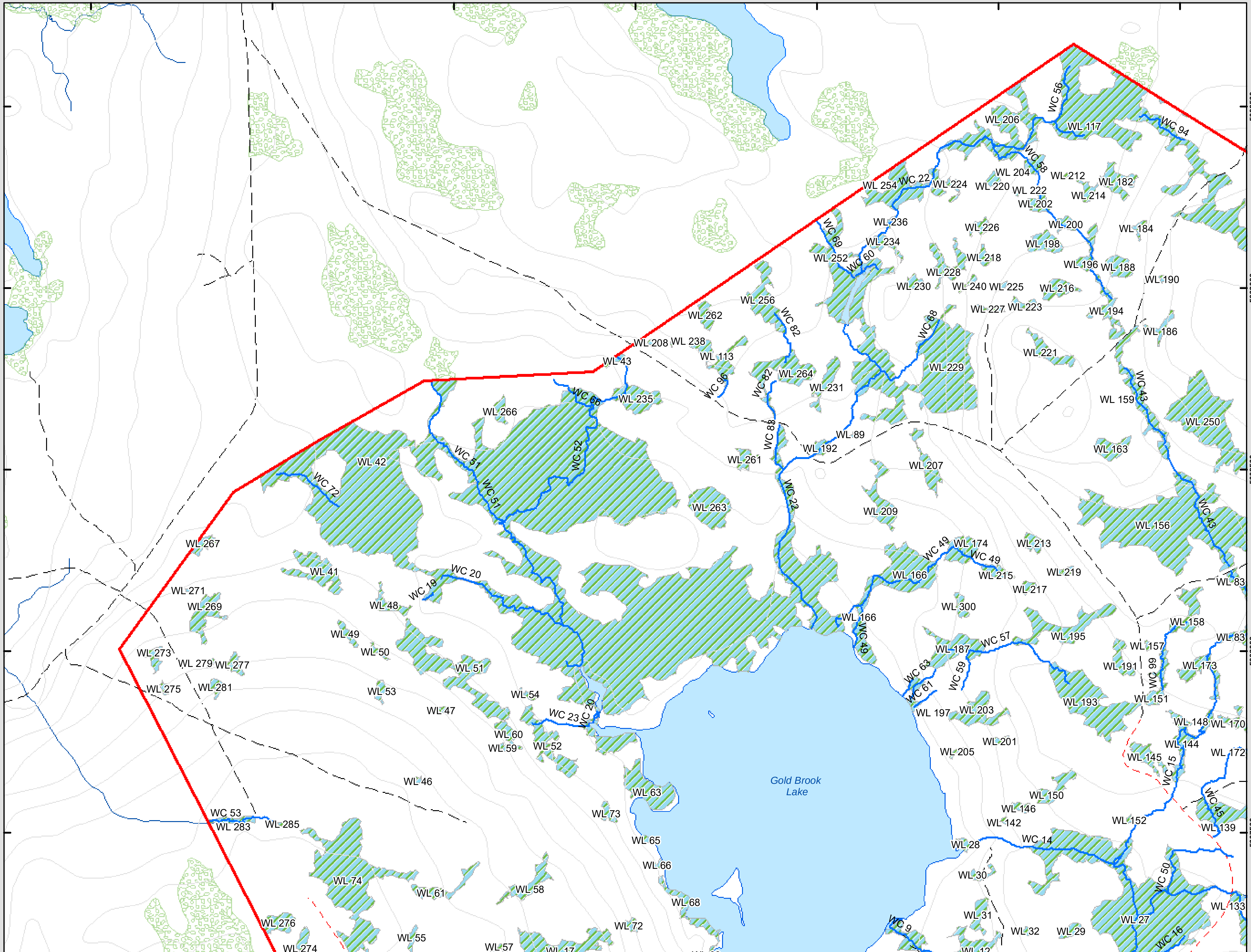
1:19,000 Scale when printed @ 11" x 17"

Drawn By: ZS
Reviewed By: SS

Date: 2022-03-02

McCallum Environmental Ltd.

Document Name: 220222_WLBaseline_WLOverview_Fig1overview




Prepared For:

Anaconda Mining

**FIGURE 1b**

**Goldboro Gold Project**

**Field Delineated Wetlands & Watercourses**

**Goldboro, NS**

- Field Delineated Watercourses
- NSTDB Watercourses Outside Project Area
- Field Delineated Wetlands
- NSECC Wetland Inventory
- Open Water
- EARD Proejct Area

Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 130 260 520 m

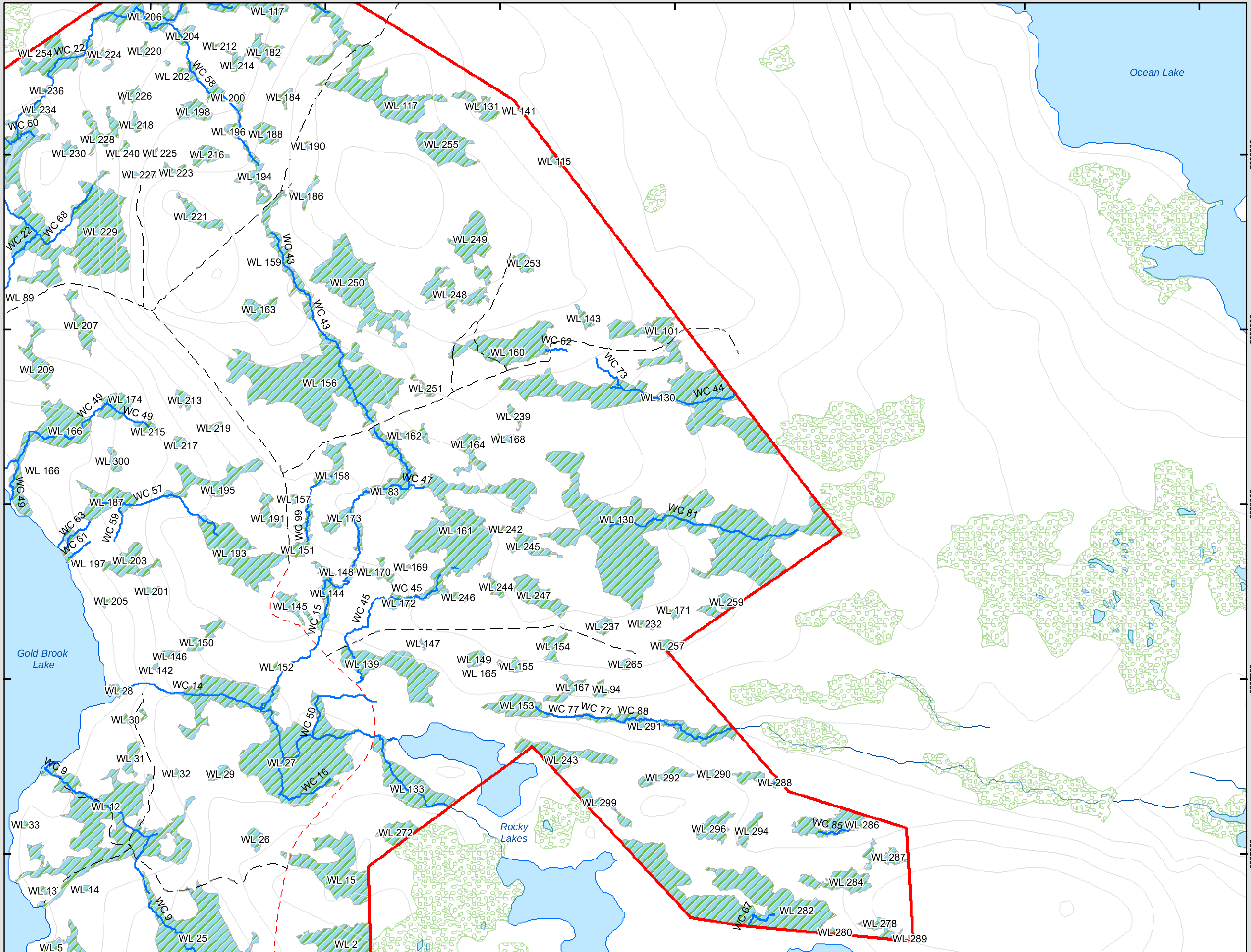
1:9,890 Scale when printed @ 11" x 17"

Drawn By: ZS
Reviewed By: SS

Date: 2022-03-02

McCallum Environmental Ltd.

Document Name: 220222_WLBaseline_WLOverview_Fig1




Prepared For:

Anaconda Mining

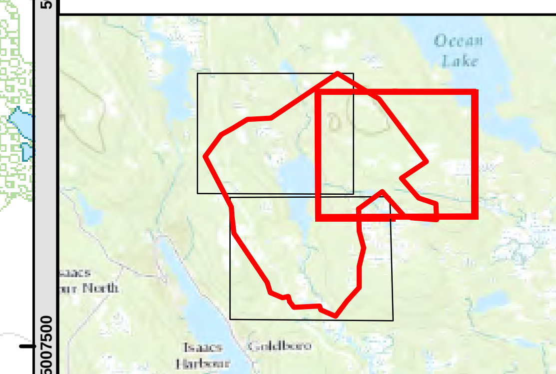
## FIGURE 1c

**Goldboro Gold Project**

**Field Delineated Wetlands & Watercourses**

**Goldboro, NS**

Field Delineated Watercourses
NSTDB Watercourses Outside Project Area
Field Delineated Wetlands
NSECC Wetland Inventory
Open Water
EARD Proejct Area




Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 137.5 275 550 m

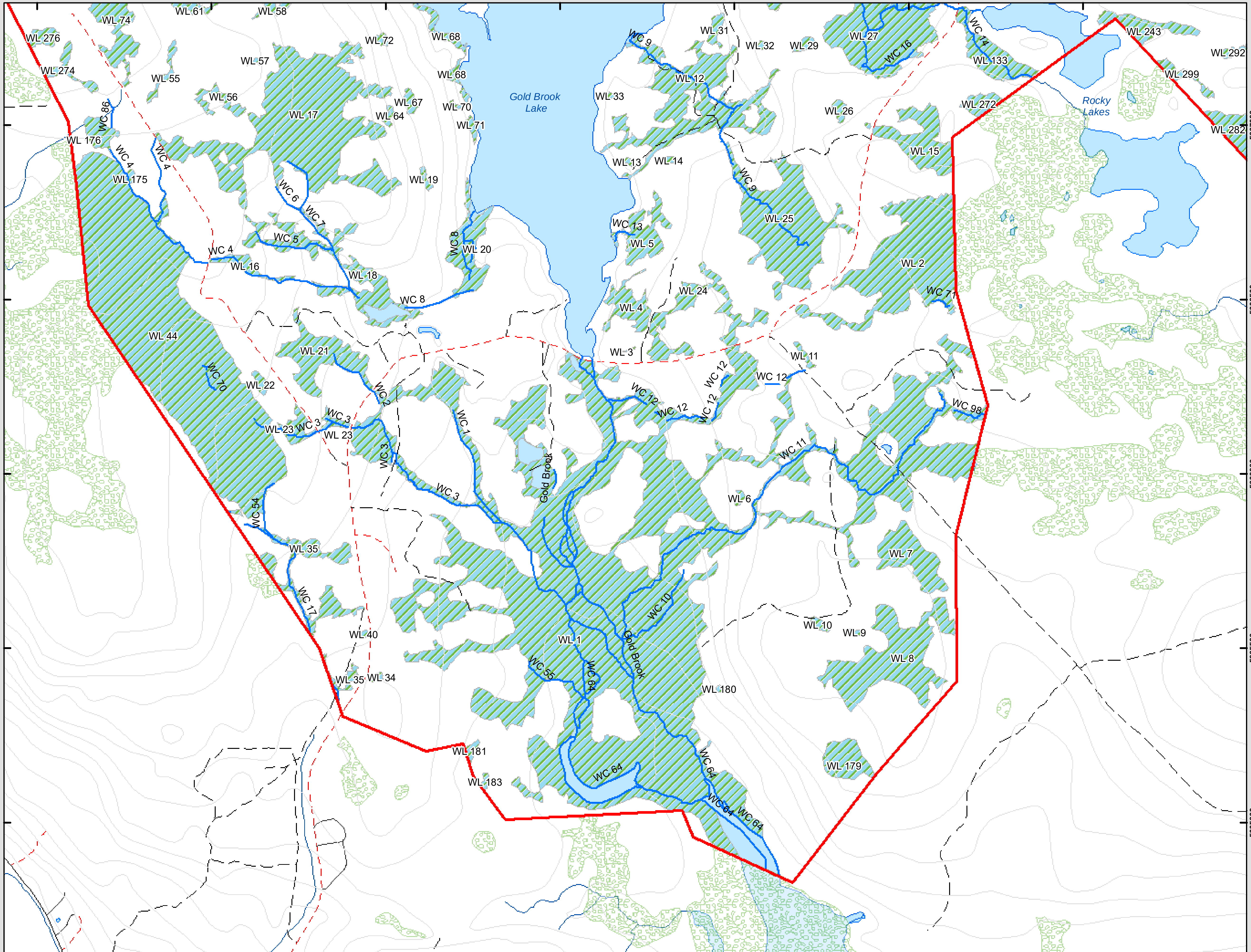
1:10,270 Scale when printed @ 11" x 17"

Drawn By: ZS
Reviewed By: SS

Date: 2022-03-02

McCallum Environmental Ltd.

Document Name: 220222_WLBaseline_WLOverview_Fig1




Prepared For:

Anaconda Mining

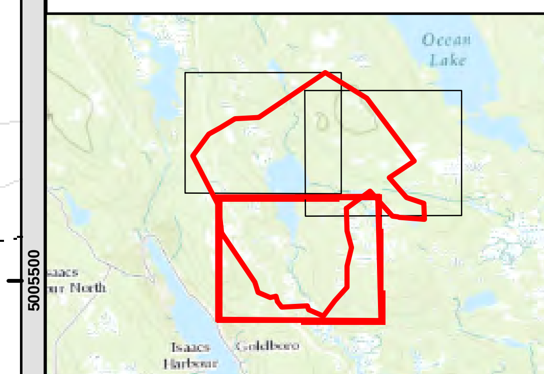
# FIGURE 1d

**Goldboro Gold Project**

**Field Delineated Wetlands & Watercourses**

**Goldboro, NS**

- Field Delineated Watercourses
- NSTDB Watercourses Outside Project Area
- Field Delineated Wetlands
- NSECC Wetland Inventory
- Open Water
- EARD Proejct Area




Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

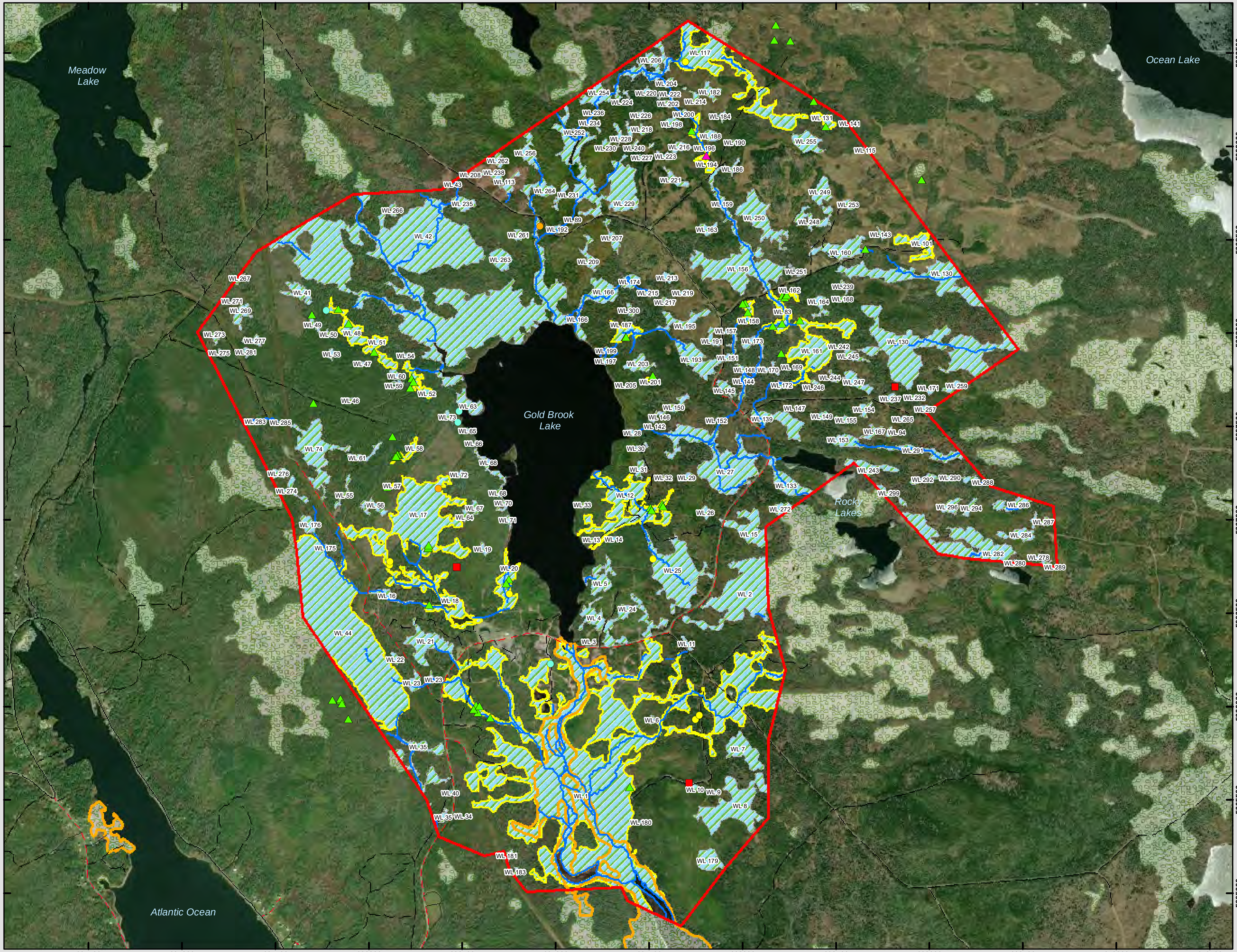
0 137.5 275 550 m

1:10,300 Scale when printed @ 11" x 17"

Drawn By: ZS
Reviewed By: SS
Date: 2022-03-02

McCallum Environmental Ltd.

Document Name: 220222_WLBaseline_WLOverview_Fig1




Prepared For:

Anaconda Mining

# FIGURE 2

## Goldboro Gold Project

## Potential Wetlands of Special Significance

## Goldboro, NS

**Observed SAR**

- Blue Felt Lichen
- Frosted Glass-whiskers Lichen
- Canada Warbler
- Evening Grosbeak
- Olive-sided Flycatcher
- Mainland Moose
- Field Delineated Watercourses
- Potential WSS - Blue Felt Lichen
- NSECC Predicted WSS
- Field Delineated Wetlands
- NSECC Wetland Inventory
- EARD Proejct Area


Coordinate System: NAD 1983 CSRS UTM Zone 20N
Projection: Transverse Mercator
Datum: North American 1983 CSRS
Units: Meter

0 250 500 1,000 m

1:19,000 Scale when printed @ 11" x 17"

Drawn By: ZS
Reviewed By: SS
Date: 2022-03-01

McCallum Environmental Ltd.

Document Name: 220222_WLBaseline_WLSAR_Fig2

# APPENDIX B. WESP-AC SUMMARY

**Table 1: WESP-AC Results - Grouped Function Scores for All Wetlands in the PA**

| WL ID | HYDROLOGIC Group | | WATER Quality Group | | AQUATIC SUPPORT Group | | AQUATIC Habitat Group | | TRANSITIONAL Habitat Group | | WETLAND CONDITION | | WETLAND RISK | | Average Function | Average Benefits | Functional WSS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | | | |
| 1 | 2.05 | 3.32 | 4.43 | 9.08 | 7.12 | 6.86 | 6.48 | 2.65 | 8.93 | 10.00 | N/A | 7.10 | N/A | 6.46 | 5.80 | 6.50 | No |
| 2 | 2.01 | 4.70 | 4.08 | 2.80 | 8.34 | 7.14 | 5.20 | 5.29 | 8.08 | 7.49 | N/A | 10.00 | N/A | 6.67 | 5.54 | 6.30 | No |
| 3 | 7.09 | 9.25 | 8.95 | 4.08 | 6.27 | 2.99 | 5.89 | 2.29 | 6.19 | 2.81 | N/A | 5.65 | N/A | 7.38 | 6.88 | 4.92 | No |
| 4 | 1.95 | 9.25 | 5.47 | 9.54 | 8.90 | 6.46 | 6.81 | 1.94 | 8.85 | 3.44 | N/A | 10.00 | N/A | 6.12 | 6.40 | 6.68 | No |
| 5 | 8.46 | 9.25 | 8.46 | 3.40 | 5.97 | 0.66 | 0.91 | 0.35 | 7.38 | 2.89 | N/A | 10.00 | N/A | 7.35 | 6.24 | 4.84 | No |
| 6 | 9.19 | 9.70 | 8.59 | 2.96 | 4.52 | 0.18 | 0.25 | 1.14 | 5.58 | 3.91 | N/A | 4.78 | N/A | 5.47 | 5.63 | 4.02 | No |
| 7 | 6.16 | 8.91 | 9.30 | 0.00 | 4.25 | 2.36 | 3.92 | 3.96 | 7.61 | 7.48 | N/A | 6.52 | N/A | 6.84 | 6.25 | 5.15 | No |
| 8 | 9.78 | 9.36 | 8.81 | 0.00 | 4.86 | 0.26 | 0.16 | 1.26 | 5.70 | 3.94 | N/A | 4.78 | N/A | 6.19 | 5.86 | 3.68 | No |
| 9 | 9.78 | 9.70 | 8.78 | 0.00 | 5.27 | 0.28 | 0.27 | 1.26 | 6.45 | 3.97 | N/A | 8.26 | N/A | 7.55 | 6.11 | 4.43 | No |
| 10 | 6.43 | 9.70 | 7.37 | 0.00 | 5.16 | 5.14 | 0.33 | 1.27 | 7.29 | 4.04 | N/A | 3.62 | N/A | 6.48 | 5.32 | 4.32 | No |
| 11 | 9.19 | 10.00 | 8.71 | 2.96 | 4.89 | 0.21 | 0.27 | 1.18 | 5.28 | 3.87 | N/A | 7.39 | N/A | 7.44 | 5.67 | 4.72 | No |
| 12 | 1.49 | 9.31 | 4.44 | 2.89 | 8.26 | 6.30 | 6.18 | 2.51 | 8.69 | 7.50 | N/A | 8.26 | N/A | 5.50 | 5.81 | 6.04 | No |
| 13 | 9.19 | 9.31 | 8.72 | 2.96 | 4.96 | 0.78 | 1.21 | 0.43 | 7.77 | 3.10 | N/A | 8.26 | N/A | 5.92 | 6.37 | 4.39 | No |
| 14 | 9.19 | 3.78 | 8.49 | 2.66 | 3.86 | 0.64 | 0.95 | 0.93 | 7.69 | 3.49 | N/A | 6.52 | N/A | 5.08 | 6.03 | 3.30 | No |
| 15 | 4.02 | 5.13 | 6.08 | 2.81 | 5.90 | 5.55 | 0.83 | 0.77 | 7.27 | 3.30 | N/A | 4.78 | N/A | 6.98 | 4.82 | 4.19 | No |
| 16 | 1.75 | 5.24 | 3.67 | 3.12 | 8.57 | 8.97 | 5.77 | 4.49 | 8.61 | 4.29 | N/A | 2.46 | N/A | 6.20 | 5.67 | 4.97 | No |
| 17 | 1.41 | 5.24 | 3.24 | 9.15 | 7.06 | 8.49 | 6.11 | 4.54 | 8.23 | 10.00 | N/A | 5.65 | N/A | 6.63 | 5.21 | 7.10 | No |
| 18 | 1.88 | 5.08 | 3.87 | 9.40 | 8.63 | 9.16 | 7.76 | 3.74 | 7.78 | 7.45 | N/A | 0.87 | N/A | 8.36 | 5.99 | 6.29 | No |
| 19 | 8.32 | 4.51 | 7.44 | 1.78 | 5.19 | 0.75 | 2.02 | 0.83 | 7.64 | 3.41 | N/A | 8.26 | N/A | 7.56 | 6.12 | 3.87 | No |
| 20 | 3.11 | 3.67 | 3.51 | 9.23 | 7.99 | 7.06 | 7.75 | 8.51 | 8.92 | 7.56 | N/A | 3.62 | N/A | 7.35 | 6.26 | 6.71 | No |
| 21 | 0.40 | 4.68 | 2.80 | 2.19 | 5.84 | 7.69 | 4.96 | 4.45 | 8.16 | 7.47 | N/A | 3.04 | N/A | 4.95 | 4.43 | 4.93 | No |
| 22 | 1.85 | 4.85 | 3.05 | 2.73 | 5.76 | 6.08 | 4.14 | 1.38 | 8.08 | 3.20 | N/A | 6.52 | N/A | 6.75 | 4.58 | 4.50 | No |
| 23 | 1.27 | 4.68 | 3.31 | 9.16 | 8.23 | 8.26 | 5.02 | 4.79 | 8.17 | 10.00 | N/A | 5.65 | N/A | 7.57 | 5.20 | 7.16 | No |
| 24 | 3.58 | 4.12 | 4.11 | 1.78 | 6.25 | 4.72 | 1.78 | 1.32 | 6.08 | 7.30 | N/A | 3.04 | N/A | 5.61 | 4.36 | 3.98 | No |
| 25 | 0.95 | 4.34 | 2.23 | 1.02 | 7.00 | 7.75 | 5.40 | 3.44 | 8.21 | 7.52 | N/A | 4.78 | N/A | 5.37 | 4.76 | 4.89 | No |
| 26 | 9.19 | 4.34 | 8.24 | 3.67 | 4.20 | 0.16 | 1.38 | 0.47 | 5.46 | 3.93 | N/A | 4.78 | N/A | 6.49 | 5.70 | 3.41 | No |
| 27 | 1.92 | 4.06 | 3.54 | 9.31 | 6.09 | 7.25 | 5.50 | 3.32 | 7.75 | 4.71 | N/A | 8.26 | N/A | 6.80 | 4.96 | 6.24 | No |
| 28 | 2.15 | 3.10 | 4.65 | 9.57 | 6.70 | 7.70 | 8.67 | 4.35 | 7.90 | 4.83 | N/A | 4.78 | N/A | 4.41 | 6.01 | 5.54 | No |
| 29 | 6.51 | 4.12 | 9.05 | 3.65 | 3.42 | 1.69 | 3.40 | 2.60 | 7.73 | 4.82 | N/A | 7.10 | N/A | 5.95 | 6.02 | 4.27 | No |
| 30 | 7.93 | 3.55 | 7.61 | 3.67 | 5.29 | 0.22 | 1.45 | 0.53 | 5.79 | 4.04 | N/A | 8.26 | N/A | 6.94 | 5.61 | 3.89 | No |
| 31 | 8.21 | 3.44 | 7.76 | 3.67 | 5.32 | 0.25 | 1.49 | 0.56 | 5.64 | 4.02 | N/A | 10.00 | N/A | 6.90 | 5.68 | 4.12 | No |
| 32 | 7.93 | 4.00 | 7.63 | 3.67 | 5.15 | 0.19 | 1.39 | 0.51 | 5.29 | 3.90 | N/A | 7.39 | N/A | 6.69 | 5.48 | 3.77 | No |
| 33 | 8.66 | 3.27 | 8.24 | 3.67 | 4.11 | 0.13 | 1.37 | 0.44 | 4.06 | 3.53 | N/A | 3.04 | N/A | 7.17 | 5.29 | 3.03 | No |
| 34 | 9.28 | 3.42 | 8.57 | 2.93 | 5.55 | 0.38 | 0.24 | 1.39 | 6.96 | 4.01 | N/A | 8.26 | N/A | 7.00 | 6.12 | 3.91 | No |
| 35 | 0.10 | 6.43 | 3.80 | 9.39 | 8.61 | 6.17 | 5.65 | 4.27 | 8.69 | 4.29 | N/A | 8.26 | N/A | 6.02 | 5.37 | 6.40 | No |
| 40 | 6.53 | 3.44 | 9.39 | 7.15 | 5.08 | 2.95 | 5.12 | 3.94 | 6.74 | 4.03 | N/A | 3.04 | N/A | 7.50 | 6.57 | 4.58 | No |
| 41 | 8.79 | 3.89 | 8.35 | 1.78 | 5.90 | 0.63 | 1.64 | 1.37 | 6.56 | 3.99 | N/A | 8.26 | N/A | 7.24 | 6.25 | 3.88 | No |
| 42 | 0.00 | 3.70 | 2.74 | 9.02 | 8.41 | 8.62 | 8.26 | 4.44 | 8.87 | 10.00 | N/A | 8.26 | N/A | 5.70 | 5.66 | 7.11 | No |
| 43 | 0.00 | 3.83 | 3.28 | 9.17 | 8.37 | 6.41 | 4.86 | 4.27 | 8.78 | 4.22 | N/A | 8.26 | N/A | 6.88 | 5.06 | 6.15 | No |
| 44 | 3.60 | 5.98 | 5.95 | 1.78 | 6.71 | 6.40 | 0.27 | 2.51 | 7.08 | 9.56 | N/A | 8.26 | N/A | 5.22 | 4.72 | 5.67 | No |
| 46 | 7.48 | 5.33 | 7.75 | 2.66 | 3.62 | 0.42 | 1.48 | 1.17 | 5.30 | 3.90 | N/A | 4.78 | N/A | 5.28 | 5.13 | 3.36 | No |
| 47 | 8.51 | 4.64 | 7.84 | 2.66 | 4.17 | 0.47 | 0.62 | 0.80 | 6.47 | 3.04 | N/A | 8.26 | N/A | 7.05 | 5.52 | 3.85 | No |
| 48 | 8.93 | 4.07 | 8.04 | 1.96 | 5.92 | 0.69 | 1.84 | 1.41 | 6.57 | 3.99 | N/A | 8.26 | N/A | 7.05 | 6.26 | 3.92 | No |
| 49 | 8.93 | 4.45 | 8.05 | 3.07 | 5.57 | 0.70 | 1.80 | 1.42 | 6.49 | 3.98 | N/A | 8.26 | N/A | 7.05 | 6.17 | 4.13 | No |
| 50 | 8.93 | 4.39 | 8.02 | 1.78 | 4.69 | 0.71 | 1.83 | 1.43 | 6.42 | 3.98 | N/A | 4.78 | N/A | 7.05 | 5.98 | 3.44 | No |
| 51 | 8.93 | 4.07 | 7.96 | 3.07 | 5.63 | 0.80 | 2.02 | 0.89 | 6.84 | 7.35 | N/A | 8.26 | N/A | 7.05 | 6.28 | 4.50 | No |
| 52 | 3.35 | 3.82 | 4.98 | 3.07 | 6.21 | 4.68 | 2.06 | 0.87 | 7.24 | 3.25 | N/A | 7.10 | N/A | 5.85 | 4.77 | 4.09 | No |
| 53 | 8.93 | 4.70 | 7.85 | 1.78 | 4.89 | 0.56 | 1.74 | 1.28 | 7.12 | 4.01 | N/A | 5.94 | N/A | 6.87 | 6.11 | 3.59 | No |
| 54 | 8.93 | 3.63 | 7.93 | 3.07 | 4.32 | 0.80 | 2.10 | 0.87 | 6.82 | 3.12 | N/A | 3.62 | N/A | 7.05 | 6.02 | 3.17 | No |
| 55 | 9.42 | 5.64 | 8.53 | 2.04 | 5.86 | 0.72 | 1.74 | 1.46 | 7.92 | 4.09 | N/A | 8.26 | N/A | 7.01 | 6.70 | 4.18 | No |
| 56 | 5.15 | 5.24 | 8.92 | 3.05 | 2.68 | 0.97 | 3.05 | 3.69 | 5.36 | 3.79 | N/A | 6.52 | N/A | 4.11 | 5.03 | 3.91 | No |
| 57 | 8.94 | 5.19 | 8.52 | 3.07 | 5.75 | 0.69 | 1.77 | 1.42 | 6.32 | 3.98 | N/A | 4.78 | N/A | 7.24 | 6.26 | 3.77 | No |
| 58 | 8.52 | 4.68 | 8.30 | 3.07 | 5.80 | 0.70 | 1.87 | 0.81 | 6.35 | 2.91 | N/A | 3.04 | N/A | 7.20 | 6.17 | 3.20 | No |
| 59 | 8.93 | 4.06 | 8.19 | 1.78 | 5.60 | 0.59 | 1.94 | 0.66 | 6.03 | 2.89 | N/A | 4.78 | N/A | 7.06 | 6.14 | 3.12 | No |
| 60 | 7.93 | 3.83 | 8.03 | 3.07 | 6.89 | 0.78 | 1.91 | 0.89 | 6.95 | 3.07 | N/A | 7.39 | N/A | 7.20 | 6.34 | 3.75 | No |
| 61 | 7.79 | 4.74 | 8.03 | 3.07 | 6.89 | 0.78 | 1.83 | 0.91 | 7.03 | 3.09 | N/A | 7.39 | N/A | 7.17 | 6.31 | 3.88 | No |
| 63 | 8.51 | 2.76 | 8.03 | 3.07 | 5.31 | 0.78 | 2.44 | 2.60 | 6.21 | 7.28 | N/A | 3.04 | N/A | 5.30 | 6.10 | 3.55 | No |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 8.46 | 4.23 | 8.48 | 3.07 | 5.39 | 0.88 | 2.06 | 0.98 | 7.04 | 7.38 | N/A | 6.52 | N/A | 7.18 | 6.29 | 4.32 | No |
| 65 | 3.49 | 2.99 | 6.00 | 3.07 | 8.28 | 4.09 | 2.32 | 1.19 | 8.41 | 3.64 | N/A | 10.00 | N/A | 3.16 | 5.70 | 4.02 | No |
| 66 | 8.51 | 2.76 | 8.07 | 1.96 | 3.86 | 0.76 | 1.57 | 2.76 | 6.95 | 7.34 | N/A | 3.04 | N/A | 4.16 | 5.79 | 3.26 | No |
| 67 | 9.02 | 3.89 | 8.32 | 3.18 | 8.21 | 0.76 | 1.94 | 0.87 | 7.02 | 3.21 | N/A | 8.26 | N/A | 6.86 | 6.90 | 3.86 | No |
| 68 | 8.04 | 2.93 | 8.22 | 3.07 | 5.16 | 0.74 | 1.68 | 2.72 | 7.10 | 7.37 | N/A | 4.78 | N/A | 4.14 | 6.04 | 3.68 | No |
| 70 | 8.93 | 2.82 | 8.36 | 3.07 | 5.74 | 0.78 | 1.80 | 2.73 | 6.85 | 7.32 | N/A | 4.78 | N/A | 4.47 | 6.34 | 3.71 | No |
| 71 | 8.63 | 2.76 | 8.23 | 3.07 | 5.65 | 0.80 | 1.68 | 2.79 | 7.64 | 7.41 | N/A | 8.26 | N/A | 5.03 | 6.37 | 4.30 | No |
| 72 | 7.45 | 4.06 | 7.86 | 3.07 | 5.93 | 0.94 | 2.07 | 1.05 | 7.74 | 3.61 | N/A | 6.52 | N/A | 7.18 | 6.21 | 3.78 | No |
| 73 | 6.00 | 3.44 | 7.45 | 1.78 | 5.50 | 0.68 | 1.82 | 0.79 | 6.70 | 3.15 | N/A | 3.04 | N/A | 7.21 | 5.49 | 2.87 | No |
| 74 | 9.77 | 10.00 | 8.64 | 0.00 | 5.78 | 0.39 | 1.41 | 1.14 | 5.05 | 3.85 | N/A | 4.78 | N/A | 7.18 | 6.13 | 3.90 | No |
| 83 | 0.79 | 4.74 | 4.66 | 9.14 | 7.75 | 6.96 | 4.80 | 8.00 | 8.36 | 7.49 | N/A | 8.26 | N/A | 3.80 | 5.27 | 6.91 | No |
| 89 | 8.51 | 2.74 | 7.98 | 4.49 | 5.97 | 0.71 | 2.10 | 1.38 | 6.25 | 3.95 | N/A | 4.78 | N/A | 6.49 | 6.16 | 3.51 | No |
| 94 | 8.38 | 6.20 | 8.04 | 2.66 | 5.66 | 0.67 | 2.11 | 0.72 | 6.97 | 3.19 | N/A | 4.78 | N/A | 4.77 | 6.23 | 3.29 | No |
| 101 | 7.76 | 3.92 | 7.98 | 2.66 | 5.93 | 0.29 | 0.53 | 2.42 | 6.87 | 7.33 | N/A | 8.26 | N/A | 5.47 | 5.82 | 4.34 | No |
| 113 | 5.55 | 5.16 | 8.18 | 2.63 | 4.26 | 2.05 | 3.48 | 3.86 | 8.37 | 4.16 | N/A | 5.94 | N/A | 4.51 | 5.97 | 4.04 | No |
| 115 | 5.99 | 4.13 | 9.26 | 2.63 | 3.98 | 2.19 | 3.36 | 7.65 | 8.74 | 7.55 | N/A | 10.00 | N/A | 5.24 | 6.26 | 5.63 | No |
| 117 | 9.24 | 4.40 | 8.43 | 1.78 | 5.19 | 0.38 | 0.31 | 1.37 | 6.98 | 10.00 | N/A | 8.26 | N/A | 6.97 | 6.03 | 4.74 | No |
| 130 | 0.51 | 4.74 | 3.31 | 2.43 | 7.64 | 6.77 | 5.06 | 4.08 | 8.73 | 4.26 | N/A | 4.78 | N/A | 4.55 | 5.05 | 4.52 | No |
| 131 | 8.52 | 2.99 | 8.33 | 1.78 | 5.27 | 0.39 | 0.40 | 2.57 | 6.44 | 10.00 | N/A | 6.52 | N/A | 5.98 | 5.79 | 4.32 | No |
| 133 | 0.71 | 4.51 | 2.89 | 2.49 | 6.29 | 7.81 | 5.15 | 3.45 | 8.24 | 3.35 | N/A | 6.52 | N/A | 3.44 | 4.65 | 4.51 | No |
| 139 | 0.59 | 6.49 | 3.07 | 4.08 | 5.10 | 5.40 | 3.59 | 2.91 | 8.04 | 3.80 | N/A | 8.26 | N/A | 3.74 | 4.08 | 4.95 | No |
| 141 | 8.80 | 2.88 | 8.46 | 1.96 | 5.18 | 0.59 | 0.95 | 0.87 | 6.87 | 3.20 | N/A | 4.78 | N/A | 5.78 | 6.05 | 2.86 | No |
| 142 | 8.65 | 1.92 | 8.23 | 1.96 | 6.59 | 0.47 | 1.63 | 0.58 | 6.86 | 3.01 | N/A | 6.52 | N/A | 6.51 | 6.39 | 2.99 | No |
| 143 | 8.91 | 10.00 | 8.47 | 3.62 | 4.50 | 0.14 | 0.00 | 2.37 | 5.68 | 7.25 | N/A | 3.04 | N/A | 6.66 | 5.51 | 4.73 | No |
| 144 | 0.06 | 4.33 | 4.46 | 9.14 | 8.79 | 6.88 | 5.41 | 3.29 | 9.12 | 3.88 | N/A | 8.26 | N/A | 5.26 | 5.57 | 5.86 | No |
| 145 | 9.74 | 3.89 | 8.29 | 1.81 | 5.59 | 0.84 | 2.32 | 0.88 | 6.81 | 3.19 | N/A | 4.78 | N/A | 5.94 | 6.55 | 3.05 | No |
| 146 | 9.07 | 3.33 | 8.29 | 1.78 | 5.55 | 0.83 | 2.33 | 0.85 | 6.81 | 3.20 | N/A | 8.26 | N/A | 5.82 | 6.41 | 3.44 | No |
| 147 | 8.63 | 4.83 | 8.35 | 2.66 | 4.56 | 0.59 | 1.09 | 0.84 | 6.19 | 2.97 | N/A | 3.04 | N/A | 4.15 | 5.76 | 2.73 | No |
| 148 | 0.48 | 4.46 | 4.85 | 9.14 | 9.24 | 7.28 | 5.74 | 3.30 | 8.90 | 3.85 | N/A | 8.26 | N/A | 5.78 | 5.84 | 6.01 | No |
| 149 | 8.91 | 4.83 | 8.34 | 2.66 | 5.01 | 0.63 | 1.07 | 0.89 | 7.42 | 3.35 | N/A | 8.26 | N/A | 4.95 | 6.15 | 3.65 | No |
| 150 | 8.77 | 4.23 | 8.14 | 1.96 | 3.68 | 0.65 | 2.00 | 0.72 | 6.65 | 3.09 | N/A | 3.04 | N/A | 4.52 | 5.85 | 2.60 | No |
| 151 | 0.71 | 7.39 | 4.51 | 1.98 | 7.60 | 6.46 | 5.76 | 3.95 | 7.47 | 4.08 | N/A | 8.26 | N/A | 5.07 | 5.21 | 5.31 | No |
| 152 | 8.04 | 3.55 | 8.22 | 1.96 | 4.57 | 0.82 | 2.29 | 0.85 | 6.68 | 3.15 | N/A | 6.52 | N/A | 5.78 | 5.96 | 3.23 | No |
| 153 | 3.74 | 3.67 | 5.40 | 1.96 | 5.58 | 4.40 | 0.68 | 0.89 | 7.67 | 3.39 | N/A | 8.26 | N/A | 5.08 | 4.61 | 3.95 | No |
| 154 | 8.38 | 5.14 | 8.04 | 2.66 | 5.11 | 0.53 | 1.04 | 0.78 | 6.02 | 7.28 | N/A | 3.04 | N/A | 6.63 | 5.72 | 3.72 | No |
| 155 | 8.91 | 5.30 | 8.22 | 2.66 | 5.29 | 0.64 | 1.14 | 0.89 | 7.42 | 3.32 | N/A | 8.26 | N/A | 5.98 | 6.19 | 3.87 | No |
| 156 | 0.61 | 5.02 | 4.71 | 9.02 | 8.91 | 7.03 | 4.72 | 3.99 | 9.01 | 4.39 | N/A | 10.00 | N/A | 5.93 | 5.59 | 6.48 | No |
| 157 | 8.07 | 4.68 | 7.84 | 1.78 | 6.14 | 0.81 | 1.98 | 1.51 | 6.85 | 4.04 | N/A | 4.78 | N/A | 6.71 | 6.17 | 3.47 | No |
| 158 | 1.88 | 4.74 | 4.29 | 1.80 | 6.88 | 6.07 | 4.59 | 3.97 | 8.40 | 4.29 | N/A | 8.26 | N/A | 5.09 | 5.21 | 4.89 | No |
| 159 | 0.44 | 5.13 | 2.89 | 1.94 | 7.21 | 6.61 | 3.94 | 3.94 | 8.58 | 4.32 | N/A | 8.26 | N/A | 4.41 | 4.61 | 4.94 | No |
| 160 | 9.19 | 3.21 | 8.37 | 2.07 | 3.72 | 0.38 | 0.51 | 2.54 | 6.15 | 7.28 | N/A | 4.78 | N/A | 5.98 | 5.59 | 3.75 | No |
| 161 | 0.75 | 4.51 | 4.84 | 3.60 | 8.68 | 6.45 | 4.39 | 7.72 | 9.11 | 7.59 | N/A | 8.26 | N/A | 5.17 | 5.55 | 6.19 | No |
| 162 | 9.32 | 4.68 | 8.64 | 1.96 | 5.83 | 0.78 | 1.85 | 2.72 | 8.34 | 7.46 | N/A | 8.26 | N/A | 5.78 | 6.80 | 4.52 | No |
| 163 | 9.07 | 5.13 | 8.53 | 0.89 | 5.27 | 0.39 | 0.40 | 1.36 | 6.47 | 3.98 | N/A | 6.52 | N/A | 7.21 | 5.95 | 3.64 | No |
| 164 | 9.19 | 4.85 | 8.66 | 1.96 | 5.35 | 0.53 | 0.60 | 2.69 | 7.68 | 7.41 | N/A | 8.26 | N/A | 5.78 | 6.30 | 4.50 | No |
| 165 | 9.33 | 4.00 | 8.54 | 1.96 | 5.27 | 0.63 | 0.99 | 0.90 | 7.72 | 3.41 | N/A | 8.26 | N/A | 5.98 | 6.37 | 3.59 | No |
| 166 | 0.98 | 9.98 | 3.35 | 9.62 | 8.52 | 5.95 | 5.41 | 3.03 | 8.40 | 3.75 | N/A | 8.26 | N/A | 4.15 | 5.33 | 6.39 | No |
| 167 | 9.41 | 4.82 | 8.55 | 1.96 | 6.21 | 0.92 | 2.52 | 0.92 | 6.91 | 3.08 | N/A | 6.52 | N/A | 5.52 | 6.72 | 3.39 | No |
| 168 | 8.80 | 4.68 | 8.33 | 1.78 | 5.11 | 0.49 | 0.88 | 1.37 | 6.08 | 3.95 | N/A | 3.04 | N/A | 5.98 | 5.84 | 3.04 | No |
| 169 | 9.32 | 4.06 | 8.50 | 1.78 | 5.65 | 0.47 | 1.50 | 0.01 | 6.68 | 2.58 | N/A | 8.26 | N/A | 7.17 | 6.33 | 3.47 | No |
| 170 | 9.18 | 3.95 | 8.64 | 1.96 | 6.12 | 0.72 | 1.83 | 1.44 | 6.92 | 4.02 | N/A | 8.26 | N/A | 7.17 | 6.54 | 3.93 | No |
| 171 | 8.66 | 5.36 | 8.36 | 1.78 | 5.13 | 0.44 | 0.42 | 1.41 | 6.17 | 3.94 | N/A | 3.04 | N/A | 7.11 | 5.75 | 3.30 | No |
| 172 | 0.56 | 3.95 | 4.53 | 9.14 | 8.82 | 6.32 | 5.29 | 3.30 | 9.34 | 4.07 | N/A | 8.26 | N/A | 6.38 | 5.71 | 5.92 | No |
| 173 | 0.25 | 4.12 | 4.60 | 9.14 | 9.12 | 6.64 | 5.26 | 4.69 | 8.82 | 4.33 | N/A | 8.26 | N/A | 5.24 | 5.61 | 6.06 | No |
| 174 | 1.32 | 6.03 | 4.70 | 9.42 | 8.63 | 5.75 | 5.71 | 3.08 | 9.09 | 3.89 | N/A | 6.52 | N/A | 6.63 | 5.89 | 5.90 | No |
| 175 | 3.33 | 7.95 | 4.78 | 9.39 | 6.19 | 5.63 | 1.16 | 2.36 | 6.25 | 7.25 | N/A | 6.52 | N/A | 4.73 | 4.34 | 6.26 | No |
| 176 | 9.22 | 5.13 | 8.27 | 1.81 | 3.57 | 0.18 | 0.13 | 2.38 | 5.77 | 7.24 | N/A | 3.04 | N/A | 7.20 | 5.39 | 3.86 | No |
| 179 | 8.46 | 0.00 | 7.96 | 1.04 | 5.81 | 0.62 | 1.71 | 1.35 | 7.09 | 4.03 | N/A | 3.04 | N/A | 7.07 | 6.21 | 2.45 | No |
| 180 | 8.66 | 2.93 | 8.28 | 1.78 | 5.08 | 0.35 | 0.42 | 1.31 | 5.86 | 3.94 | N/A | 3.04 | N/A | 6.83 | 5.66 | 2.88 | No |
| 181 | 6.71 | 2.71 | 9.47 | 1.02 | 3.94 | 2.42 | 4.00 | 3.97 | 7.73 | 4.16 | N/A | 6.52 | N/A | 6.42 | 6.37 | 3.89 | No |
| 182 | 7.25 | 4.57 | 9.36 | 3.55 | 4.37 | 2.64 | 4.32 | 3.99 | 8.07 | 4.15 | N/A | 4.78 | N/A | 7.35 | 6.68 | 4.43 | No |
| 183 | 6.51 | 2.43 | 9.29 | 1.94 | 5.09 | 2.86 | 4.69 | 2.61 | 7.93 | 3.68 | N/A | 8.26 | N/A | 7.24 | 6.70 | 4.15 | No |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 184 | 6.59 | 4.91 | 9.41 | 1.94 | 4.85 | 2.97 | 4.45 | 7.68 | 8.25 | 7.52 | N/A | 4.78 | N/A | 7.17 | 6.71 | 5.28 | No |
| 186 | 9.07 | 5.24 | 8.37 | 0.89 | 4.83 | 0.35 | 0.70 | 1.25 | 5.35 | 3.87 | N/A | 3.04 | N/A | 5.86 | 5.67 | 2.93 | No |
| 187 | 9.07 | 3.27 | 8.46 | 2.37 | 4.79 | 0.86 | 2.22 | 0.92 | 7.01 | 3.28 | N/A | 3.04 | N/A | 5.78 | 6.31 | 2.79 | No |
| 188 | 9.60 | 4.74 | 8.80 | 2.19 | 5.73 | 0.91 | 2.19 | 1.59 | 7.25 | 9.17 | N/A | 4.78 | N/A | 5.99 | 6.71 | 4.20 | No |
| 190 | 8.93 | 5.13 | 8.37 | 1.78 | 5.17 | 0.43 | 0.52 | 2.59 | 6.21 | 7.29 | N/A | 4.78 | N/A | 5.98 | 5.84 | 4.00 | No |
| 191 | 9.74 | 4.00 | 8.83 | 1.81 | 5.12 | 0.55 | 0.82 | 1.45 | 6.82 | 4.02 | N/A | 8.26 | N/A | 5.56 | 6.27 | 3.66 | No |
| 192 | 2.87 | 7.50 | 7.48 | 3.30 | 8.32 | 9.03 | 7.71 | 3.27 | 9.69 | 3.85 | N/A | 8.26 | N/A | 1.97 | 7.22 | 5.31 | No |
| 193 | 5.79 | 3.78 | 9.33 | 2.37 | 5.36 | 1.97 | 2.80 | 2.43 | 7.72 | 3.58 | N/A | 3.04 | N/A | 5.58 | 6.20 | 3.25 | No |
| 194 | 0.56 | 4.79 | 3.25 | 1.80 | 6.03 | 6.46 | 4.06 | 4.11 | 8.00 | 9.17 | N/A | 4.78 | N/A | 4.58 | 4.38 | 5.10 | No |
| 195 | 9.60 | 3.72 | 8.76 | 1.81 | 5.57 | 0.89 | 2.33 | 0.93 | 7.00 | 3.27 | N/A | 4.78 | N/A | 5.78 | 6.65 | 3.03 | No |
| 196 | 0.70 | 7.33 | 4.50 | 9.33 | 8.44 | 7.02 | 5.82 | 4.42 | 9.34 | 9.17 | N/A | 4.78 | N/A | 5.35 | 5.76 | 6.77 | No |
| 197 | 9.05 | 5.47 | 8.33 | 3.11 | 5.57 | 0.89 | 2.18 | 1.57 | 7.58 | 4.03 | N/A | 6.52 | N/A | 4.09 | 6.54 | 3.67 | No |
| 198 | 6.39 | 4.51 | 7.44 | 1.78 | 3.00 | 0.53 | 0.74 | 1.45 | 7.14 | 9.17 | N/A | 3.04 | N/A | 4.72 | 4.94 | 3.60 | No |
| 199 | 1.47 | 5.64 | 4.40 | 3.39 | 7.48 | 5.08 | 5.74 | 1.85 | 8.79 | 3.44 | N/A | 4.78 | N/A | 5.61 | 5.58 | 4.26 | No |
| 200 | 0.33 | 7.22 | 2.52 | 3.06 | 5.56 | 6.04 | 3.85 | 4.16 | 8.43 | 9.17 | N/A | 8.26 | N/A | 5.31 | 4.14 | 6.17 | No |
| 201 | 9.32 | 3.27 | 8.70 | 2.37 | 5.57 | 0.81 | 2.22 | 0.86 | 6.69 | 3.18 | N/A | 3.04 | N/A | 5.98 | 6.50 | 2.79 | No |
| 202 | 0.51 | 10.00 | 3.80 | 9.54 | 6.47 | 6.61 | 5.09 | 4.20 | 8.58 | 4.26 | N/A | 4.78 | N/A | 4.84 | 4.89 | 6.32 | No |
| 203 | 9.32 | 3.21 | 8.72 | 2.37 | 5.40 | 0.75 | 2.14 | 0.81 | 6.45 | 3.08 | N/A | 3.04 | N/A | 5.98 | 6.41 | 2.75 | No |
| 204 | 0.31 | 4.34 | 4.26 | 9.28 | 8.19 | 8.39 | 6.27 | 3.51 | 9.07 | 3.85 | N/A | 4.78 | N/A | 6.46 | 5.62 | 5.80 | No |
| 205 | 9.05 | 2.82 | 8.52 | 3.63 | 5.64 | 0.84 | 2.15 | 0.90 | 6.85 | 3.14 | N/A | 3.04 | N/A | 5.98 | 6.44 | 2.91 | No |
| 206 | 0.97 | 4.34 | 4.48 | 9.14 | 8.27 | 8.19 | 6.24 | 3.51 | 9.12 | 3.88 | N/A | 4.78 | N/A | 6.82 | 5.82 | 5.81 | No |
| 207 | 0.00 | 3.55 | 3.76 | 2.37 | 8.81 | 5.39 | 4.21 | 2.75 | 8.89 | 3.82 | N/A | 6.52 | N/A | 5.03 | 5.13 | 4.20 | No |
| 208 | 8.65 | 3.61 | 8.23 | 1.78 | 4.88 | 0.38 | 0.53 | 1.32 | 5.78 | 3.93 | N/A | 3.04 | N/A | 4.81 | 5.62 | 2.70 | No |
| 209 | 9.49 | 3.27 | 8.27 | 1.87 | 5.81 | 0.90 | 2.23 | 0.96 | 7.46 | 3.44 | N/A | 8.26 | N/A | 7.12 | 6.65 | 3.69 | No |
| 212 | 6.41 | 4.46 | 9.35 | 3.74 | 5.18 | 3.07 | 4.82 | 3.98 | 8.07 | 4.15 | N/A | 4.78 | N/A | 7.17 | 6.76 | 4.48 | No |
| 213 | 8.77 | 4.00 | 8.44 | 1.04 | 6.72 | 0.82 | 2.19 | 1.48 | 7.36 | 4.07 | N/A | 10.00 | N/A | 5.78 | 6.69 | 3.88 | No |
| 214 | 6.41 | 4.46 | 9.33 | 3.94 | 5.01 | 3.01 | 4.71 | 3.98 | 7.99 | 4.11 | N/A | 4.78 | N/A | 7.72 | 6.69 | 4.57 | No |
| 215 | 0.39 | 3.44 | 4.28 | 2.36 | 8.10 | 5.98 | 5.27 | 3.08 | 8.91 | 3.94 | N/A | 8.26 | N/A | 5.78 | 5.39 | 4.69 | No |
| 216 | 9.60 | 8.91 | 8.79 | 1.92 | 5.12 | 0.61 | 0.85 | 1.52 | 7.45 | 9.17 | N/A | 8.26 | N/A | 6.15 | 6.36 | 5.22 | No |
| 217 | 9.35 | 3.67 | 8.56 | 0.89 | 5.46 | 0.83 | 2.24 | 0.88 | 7.16 | 3.31 | N/A | 8.26 | N/A | 5.47 | 6.56 | 3.33 | No |
| 218 | 8.91 | 8.57 | 8.52 | 2.20 | 5.62 | 0.85 | 2.28 | 0.89 | 6.82 | 3.20 | N/A | 6.52 | N/A | 4.36 | 6.43 | 3.80 | No |
| 219 | 8.51 | 4.06 | 8.13 | 1.04 | 6.21 | 0.86 | 2.11 | 1.55 | 7.86 | 4.12 | N/A | 10.00 | N/A | 5.01 | 6.57 | 3.81 | No |
| 220 | 8.82 | 4.29 | 8.46 | 2.66 | 5.86 | 0.84 | 2.12 | 0.91 | 6.75 | 2.98 | N/A | 4.78 | N/A | 7.17 | 6.40 | 3.38 | No |
| 221 | 9.35 | 5.08 | 8.57 | 0.89 | 5.20 | 0.45 | 0.73 | 1.36 | 6.93 | 4.02 | N/A | 8.26 | N/A | 5.98 | 6.16 | 3.72 | No |
| 222 | 8.57 | 4.40 | 8.06 | 2.66 | 5.05 | 0.79 | 2.00 | 0.89 | 6.96 | 3.23 | N/A | 4.78 | N/A | 7.17 | 6.13 | 3.42 | No |
| 223 | 9.35 | 10.00 | 8.80 | 2.44 | 5.71 | 0.83 | 2.40 | 0.84 | 6.49 | 2.99 | N/A | 4.78 | N/A | 4.53 | 6.55 | 3.77 | No |
| 224 | 5.93 | 4.23 | 8.56 | 2.63 | 4.62 | 2.30 | 3.81 | 2.23 | 8.14 | 3.66 | N/A | 4.78 | N/A | 6.15 | 6.21 | 3.71 | No |
| 225 | 8.63 | 10.00 | 8.49 | 3.33 | 5.60 | 0.81 | 2.20 | 0.87 | 6.55 | 3.06 | N/A | 6.52 | N/A | 5.95 | 6.29 | 4.36 | No |
| 226 | 9.18 | 10.00 | 8.62 | 3.33 | 5.73 | 0.89 | 2.42 | 0.91 | 6.75 | 3.11 | N/A | 8.26 | N/A | 5.95 | 6.54 | 4.63 | No |
| 227 | 6.63 | 4.51 | 9.45 | 1.80 | 5.11 | 3.09 | 5.20 | 2.75 | 8.16 | 3.64 | N/A | 8.26 | N/A | 5.78 | 6.91 | 4.26 | No |
| 228 | 9.18 | 4.00 | 8.68 | 1.96 | 5.33 | 0.68 | 1.16 | 0.94 | 7.06 | 3.17 | N/A | 8.26 | N/A | 4.72 | 6.28 | 3.39 | No |
| 229 | 1.17 | 6.43 | 3.98 | 9.28 | 8.36 | 8.64 | 7.55 | 4.91 | 9.58 | 4.44 | N/A | 7.10 | N/A | 5.92 | 6.13 | 6.68 | No |
| 230 | 8.65 | 8.23 | 8.36 | 2.07 | 5.82 | 0.86 | 2.36 | 0.89 | 6.76 | 3.11 | N/A | 6.52 | N/A | 5.23 | 6.39 | 3.84 | No |
| 231 | 1.22 | 3.55 | 3.35 | 9.17 | 7.39 | 4.68 | 3.35 | 2.39 | 8.78 | 3.87 | N/A | 6.52 | N/A | 4.95 | 4.82 | 5.02 | No |
| 232 | 5.72 | 4.17 | 9.15 | 2.37 | 4.42 | 2.61 | 3.75 | 3.95 | 8.19 | 4.18 | N/A | 4.78 | N/A | 4.94 | 6.25 | 3.86 | No |
| 234 | 0.59 | 9.36 | 2.90 | 4.38 | 5.71 | 5.92 | 4.34 | 2.70 | 8.26 | 3.79 | N/A | 8.26 | N/A | 5.48 | 4.36 | 5.70 | No |
| 235 | 0.16 | 6.03 | 3.26 | 9.24 | 8.28 | 5.17 | 4.41 | 3.96 | 8.72 | 4.16 | N/A | 6.52 | N/A | 4.39 | 4.97 | 5.64 | No |
| 236 | 1.22 | 6.54 | 2.47 | 9.42 | 5.61 | 6.83 | 4.84 | 2.80 | 8.42 | 3.65 | N/A | 4.78 | N/A | 4.59 | 4.51 | 5.52 | No |
| 237 | 8.63 | 5.64 | 8.09 | 2.66 | 4.76 | 0.54 | 0.92 | 0.81 | 6.71 | 3.18 | N/A | 3.04 | N/A | 5.91 | 5.82 | 3.11 | No |
| 238 | 8.79 | 3.72 | 8.15 | 1.96 | 5.03 | 0.59 | 0.94 | 0.87 | 6.44 | 2.92 | N/A | 3.04 | N/A | 5.15 | 5.87 | 2.61 | No |
| 239 | 9.61 | 4.68 | 8.80 | 0.89 | 4.97 | 0.56 | 0.87 | 1.46 | 6.42 | 3.97 | N/A | 4.78 | N/A | 5.78 | 6.13 | 3.16 | No |
| 240 | 9.35 | 4.34 | 8.75 | 0.89 | 5.11 | 0.90 | 2.42 | 0.93 | 6.65 | 3.04 | N/A | 4.78 | N/A | 5.49 | 6.46 | 2.91 | No |
| 242 | 9.19 | 4.34 | 8.68 | 0.89 | 4.89 | 0.59 | 0.80 | 1.51 | 6.64 | 4.00 | N/A | 3.04 | N/A | 5.98 | 6.04 | 2.91 | No |
| 243 | 9.61 | 3.78 | 8.80 | 0.89 | 5.42 | 0.93 | 2.37 | 0.97 | 7.28 | 3.42 | N/A | 4.78 | N/A | 5.82 | 6.70 | 2.94 | No |
| 244 | 8.91 | 5.26 | 8.30 | 2.66 | 5.00 | 0.63 | 1.08 | 0.89 | 6.65 | 3.08 | N/A | 4.78 | N/A | 4.75 | 5.99 | 3.15 | No |
| 245 | 9.61 | 4.40 | 8.71 | 0.89 | 5.10 | 0.40 | 0.50 | 2.57 | 6.54 | 7.32 | N/A | 8.26 | N/A | 5.98 | 6.09 | 4.26 | No |
| 246 | 8.66 | 5.26 | 8.25 | 2.66 | 5.42 | 0.84 | 2.32 | 0.88 | 6.65 | 3.16 | N/A | 8.26 | N/A | 4.05 | 6.26 | 3.59 | No |
| 247 | 2.77 | 4.34 | 6.30 | 1.04 | 5.33 | 0.34 | 0.42 | 2.51 | 5.88 | 7.28 | N/A | 4.78 | N/A | 4.34 | 4.14 | 3.52 | No |
| 248 | 9.49 | 3.16 | 8.46 | 0.89 | 5.04 | 0.51 | 0.61 | 2.66 | 7.17 | 7.39 | N/A | 4.78 | N/A | 5.98 | 6.15 | 3.62 | No |
| 249 | 8.32 | 3.33 | 7.84 | 0.89 | 5.71 | 0.36 | 0.30 | 2.56 | 7.21 | 7.38 | N/A | 6.52 | N/A | 5.98 | 5.88 | 3.86 | No |
| 250 | 8.46 | 5.19 | 7.91 | 0.89 | 5.54 | 0.40 | 0.53 | 2.56 | 6.23 | 7.32 | N/A | 3.04 | N/A | 5.98 | 5.74 | 3.63 | No |
| 251 | 9.07 | 9.02 | 8.44 | 3.85 | 5.30 | 0.40 | 0.55 | 2.55 | 6.12 | 7.29 | N/A | 4.78 | N/A | 6.81 | 5.90 | 4.96 | No |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 252 | 0.00 | 0.00 | 0.48 | 0.88 | 3.96 | 2.24 | 3.17 | 2.35 | 8.09 | 3.76 | N/A | 6.52 | N/A | 4.23 | 3.14 | 2.85 | No |
| 253 | 9.33 | 8.80 | 8.30 | 3.29 | 5.43 | 0.61 | 1.67 | 2.56 | 6.80 | 7.34 | N/A | 6.52 | N/A | 7.51 | 6.31 | 5.23 | No |
| 254 | 0.49 | 6.71 | 2.75 | 9.34 | 7.97 | 7.80 | 5.81 | 3.53 | 8.92 | 3.97 | N/A | 6.52 | N/A | 6.63 | 5.19 | 6.36 | No |
| 255 | 9.18 | 3.21 | 8.63 | 0.89 | 5.44 | 0.55 | 1.54 | 2.51 | 6.58 | 7.32 | N/A | 6.52 | N/A | 5.23 | 6.27 | 3.75 | No |
| 256 | 0.30 | 6.75 | 4.77 | 3.11 | 7.91 | 7.49 | 4.78 | 3.23 | 8.27 | 3.89 | N/A | 8.26 | N/A | 5.94 | 5.21 | 5.52 | No |
| 257 | 9.08 | 5.13 | 8.52 | 1.96 | 5.82 | 0.82 | 2.16 | 0.88 | 7.09 | 3.22 | N/A | 8.26 | N/A | 7.17 | 6.53 | 3.92 | No |
| 259 | 8.91 | 5.20 | 8.30 | 2.66 | 5.46 | 0.79 | 2.09 | 0.87 | 7.19 | 3.33 | N/A | 4.78 | N/A | 5.24 | 6.39 | 3.27 | No |
| 261 | 8.65 | 3.32 | 8.15 | 2.66 | 5.54 | 0.94 | 2.45 | 0.35 | 7.53 | 3.05 | N/A | 7.39 | N/A | 4.30 | 6.46 | 3.15 | No |
| 262 | 8.38 | 3.93 | 8.03 | 2.66 | 5.35 | 0.84 | 2.39 | 0.86 | 6.24 | 2.99 | N/A | 3.04 | N/A | 3.56 | 6.08 | 2.56 | No |
| 263 | 8.91 | 3.02 | 8.30 | 2.03 | 4.99 | 0.58 | 1.07 | 0.83 | 6.54 | 3.10 | N/A | 4.78 | N/A | 4.28 | 5.96 | 2.66 | No |
| 264 | 2.79 | 6.45 | 6.61 | 4.00 | 5.95 | 4.21 | 1.87 | 0.76 | 6.01 | 2.83 | N/A | 3.04 | N/A | 5.67 | 4.65 | 3.85 | No |
| 265 | 7.65 | 5.07 | 7.64 | 2.66 | 6.58 | 0.63 | 1.88 | 0.71 | 7.52 | 3.31 | N/A | 8.26 | N/A | 7.36 | 6.26 | 4.00 | No |
| 266 | 1.92 | 3.12 | 5.61 | 3.77 | 5.13 | 0.73 | 2.08 | 1.40 | 5.99 | 3.96 | N/A | 3.04 | N/A | 2.20 | 4.15 | 2.60 | No |
| 267 | 8.12 | 2.10 | 7.59 | 3.75 | 4.57 | 0.61 | 1.92 | 2.51 | 6.17 | 7.30 | N/A | 3.62 | N/A | 6.99 | 5.67 | 3.84 | No |
| 269 | 6.19 | 2.34 | 9.04 | 3.29 | 3.19 | 2.40 | 4.23 | 7.63 | 8.27 | 7.47 | N/A | 4.49 | N/A | 6.40 | 6.18 | 4.86 | No |
| 271 | 7.62 | 2.24 | 7.92 | 2.66 | 3.65 | 0.59 | 1.75 | 2.52 | 6.69 | 7.34 | N/A | 3.62 | N/A | 4.80 | 5.53 | 3.40 | No |
| 272 | 0.00 | 3.88 | 1.98 | 1.96 | 2.81 | 1.53 | 2.71 | 2.13 | 6.84 | 3.34 | N/A | 3.04 | N/A | 2.15 | 2.87 | 2.58 | No |
| 273 | 6.66 | 2.51 | 9.26 | 2.63 | 3.46 | 3.14 | 5.85 | 7.65 | 7.81 | 7.50 | N/A | 2.75 | N/A | 4.52 | 6.61 | 4.39 | No |
| 274 | 8.49 | 5.82 | 8.10 | 2.66 | 4.20 | 0.33 | 0.77 | 1.21 | 5.48 | 3.91 | N/A | 3.04 | N/A | 5.94 | 5.41 | 3.27 | No |
| 275 | 9.60 | 2.31 | 8.85 | 1.81 | 6.09 | 0.61 | 1.81 | 1.32 | 6.13 | 3.96 | N/A | 5.65 | N/A | 6.91 | 6.50 | 3.22 | No |
| 276 | 9.91 | 10.00 | 9.06 | 3.33 | 5.54 | 0.20 | 0.00 | 2.46 | 6.56 | 7.30 | N/A | 8.26 | N/A | 7.20 | 6.21 | 5.54 | No |
| 277 | 9.21 | 2.26 | 8.69 | 1.81 | 6.19 | 0.56 | 1.64 | 1.30 | 6.34 | 3.96 | N/A | 8.26 | N/A | 7.20 | 6.41 | 3.62 | No |
| 278 | 9.25 | 5.39 | 8.70 | 1.78 | 5.09 | 0.62 | 1.09 | 0.88 | 6.48 | 2.94 | N/A | 4.78 | N/A | 5.47 | 6.12 | 3.12 | No |
| 279 | 8.93 | 2.26 | 8.56 | 1.81 | 6.00 | 0.51 | 1.54 | 1.26 | 5.92 | 3.93 | N/A | 6.52 | N/A | 7.20 | 6.19 | 3.36 | No |
| 280 | 8.94 | 3.89 | 8.53 | 1.78 | 5.27 | 0.64 | 1.04 | 0.90 | 6.74 | 3.07 | N/A | 8.26 | N/A | 5.82 | 6.10 | 3.48 | No |
| 281 | 9.21 | 2.37 | 8.71 | 3.48 | 6.13 | 0.55 | 1.56 | 1.30 | 6.50 | 3.98 | N/A | 5.65 | N/A | 6.93 | 6.42 | 3.46 | No |
| 282 | 9.42 | 4.75 | 8.81 | 0.89 | 5.53 | 0.66 | 1.18 | 0.91 | 6.82 | 3.13 | N/A | 8.26 | N/A | 5.98 | 6.35 | 3.51 | No |
| 283 | 0.52 | 8.52 | 4.19 | 5.12 | 6.85 | 5.95 | 4.94 | 4.34 | 7.63 | 4.14 | N/A | 5.65 | N/A | 7.50 | 4.83 | 5.89 | No |
| 284 | 8.91 | 5.37 | 8.47 | 2.66 | 5.79 | 1.03 | 2.56 | 1.04 | 8.45 | 3.70 | N/A | 8.26 | N/A | 5.94 | 6.84 | 4.00 | No |
| 285 | 1.12 | 2.93 | 4.18 | 3.65 | 7.26 | 6.49 | 5.76 | 4.32 | 7.70 | 4.10 | N/A | 3.04 | N/A | 4.81 | 5.20 | 4.19 | No |
| 286 | 8.94 | 7.56 | 8.45 | 2.22 | 4.86 | 0.43 | 0.86 | 0.70 | 5.58 | 2.63 | N/A | 3.04 | N/A | 5.70 | 5.74 | 3.18 | No |
| 287 | 6.53 | 4.88 | 9.37 | 3.05 | 4.23 | 3.01 | 5.08 | 2.70 | 8.12 | 3.80 | N/A | 6.52 | N/A | 4.46 | 6.67 | 4.06 | No |
| 288 | 6.45 | 4.56 | 9.35 | 3.05 | 5.36 | 2.95 | 4.85 | 3.97 | 8.31 | 4.16 | N/A | 6.52 | N/A | 5.74 | 6.86 | 4.42 | No |
| 289 | 9.08 | 4.29 | 8.45 | 1.78 | 5.96 | 0.95 | 2.43 | 0.98 | 7.05 | 3.13 | N/A | 8.26 | N/A | 5.82 | 6.59 | 3.60 | No |
| 290 | 9.55 | 4.63 | 8.78 | 0.89 | 5.71 | 0.83 | 2.27 | 1.48 | 6.55 | 3.99 | N/A | 8.26 | N/A | 5.60 | 6.57 | 3.67 | No |
| 291 | 0.15 | 4.50 | 3.82 | 9.31 | 7.15 | 6.08 | 3.75 | 2.53 | 8.75 | 3.80 | N/A | 4.78 | N/A | 5.52 | 4.72 | 5.22 | No |
| 292 | 4.63 | 4.82 | 5.72 | 3.63 | 7.06 | 5.61 | 2.35 | 0.90 | 7.39 | 3.29 | N/A | 8.26 | N/A | 4.07 | 5.43 | 4.37 | No |
| 294 | 9.39 | 4.56 | 8.70 | 5.29 | 6.50 | 0.94 | 2.58 | 0.93 | 7.05 | 3.10 | N/A | 8.26 | N/A | 5.78 | 6.85 | 4.12 | No |
| 296 | 9.67 | 4.94 | 8.97 | 1.81 | 5.54 | 0.72 | 1.21 | 0.97 | 7.31 | 3.30 | N/A | 8.26 | N/A | 5.78 | 6.54 | 3.68 | No |
| 299 | 8.66 | 4.89 | 8.32 | 2.70 | 5.29 | 0.66 | 1.21 | 0.90 | 6.77 | 3.13 | N/A | 8.26 | N/A | 5.79 | 6.05 | 3.76 | No |
| 300 | 9.18 | 3.27 | 8.62 | 1.78 | 5.72 | 0.99 | 2.39 | 1.04 | 8.15 | 3.68 | N/A | 8.26 | N/A | 5.78 | 6.81 | 3.54 | No |
| **Average Score** | 6.41 | 4.90 | 7.17 | 3.32 | 5.82 | 2.48 | 2.69 | 2.17 | 7.25 | 4.68 | - | 6.13 | - | 5.89 | 5.87 | 4.23 | |
| **Average Rating*** | Moderate | Moderate | Higher | Moderate | Higher | Lower | Lower | Moderate | Higher | Lower | - | Moderate | - | Moderate | | | |

*Average group rating calcaulted based on the Nova Scotia normalized reference values in the WESP-AC tool.

Higher
Moderate
Lower

**Table 2: WESP-AC Results - Specific Function Scores for All Wetlands within the PA**

| Wetland ID | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| Water Storage & Delay (WS) | 2.05 | 3.32 | 2.01 | 4.70 | 7.09 | 9.25 | 1.95 | 9.25 | 8.46 | 9.25 | 9.19 | 9.70 | 6.16 | 8.91 | 9.78 | 9.36 | 9.78 | 9.70 | 6.43 | 9.70 | 9.19 | 10.00 | 1.49 |
| Stream Flow Support (SFS) | 4.83 | 7.08 | 2.45 | 8.83 | 0.00 | 0.00 | 6.21 | 7.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.93 | 7.60 | 0.00 | 0.00 | 2.59 |
| Water Cooling (WC) | 5.42 | 6.18 | 7.20 | 2.21 | 2.67 | 0.00 | 8.40 | 4.26 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.40 |
| Sediment & Toxicant Retention & Stablization (SR) | 2.96 | 7.64 | 3.32 | 0.38 | 10.00 | 2.34 | 3.79 | 8.70 | 5.02 | 2.27 | 6.44 | 2.27 | 10.00 | 0.00 | 9.29 | 0.00 | 9.29 | 0.00 | 9.00 | 0.00 | 6.44 | 2.27 | 2.07 |
| Phosphorus Retention (PR) | 3.38 | 6.86 | 3.05 | 0.43 | 10.00 | 2.14 | 5.26 | 8.57 | 4.72 | 2.14 | 4.87 | 2.14 | 10.00 | 0.00 | 4.20 | 0.00 | 4.20 | 0.00 | 4.00 | 0.00 | 4.87 | 2.14 | 5.29 |
| Nitrate Removal & Retention (NR) | 3.26 | 10.00 | 2.75 | 4.00 | 10.00 | 5.00 | 3.00 | 10.00 | 10.00 | 4.00 | 10.00 | 3.33 | 10.00 | 0.00 | 10.00 | 0.00 | 10.00 | 0.00 | 3.62 | 0.00 | 10.00 | 3.33 | 1.71 |
| Carbon Sequestration (CS) | 5.17 | N/A | 4.71 | N/A | 1.58 | N/A | 6.34 | N/A | 7.92 | N/A | 7.44 | N/A | 4.41 | N/A | 7.00 | N/A | 6.78 | N/A | 6.31 | N/A | 8.35 | N/A | 5.25 |
| Organic Nutrient Export (OE) | 8.29 | N/A | 9.93 | N/A | 8.09 | N/A | 10.00 | N/A | 8.25 | N/A | 6.66 | N/A | 6.34 | N/A | 7.30 | N/A | 7.30 | N/A | 7.37 | N/A | 6.98 | N/A | 10.00 |
| Anadromous Fish Habitat (FA) | 4.87 | 2.62 | 3.41 | 5.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.27 |
| Resident & Other Fish Habitat (FR) | 3.32 | 2.50 | 2.81 | 5.37 | 0.00 | 0.00 | 5.17 | 1.99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.77 |
| Aquatic Invertebrate Habitat (INV) | 5.24 | 6.67 | 7.39 | 5.31 | 7.00 | 4.49 | 6.60 | 6.25 | 6.51 | 0.99 | 2.86 | 0.27 | 0.32 | 3.54 | 2.43 | 0.39 | 5.69 | 0.42 | 2.54 | 0.46 | 4.24 | 0.32 | 5.09 |
| Amphibian & Turtle Habitat (AM) | 3.95 | 3.43 | 3.14 | 4.90 | 7.54 | 2.98 | 5.76 | 2.91 | 1.52 | 0.59 | 0.42 | 1.91 | 2.93 | 4.61 | 0.26 | 2.10 | 0.44 | 2.10 | 0.55 | 2.12 | 0.45 | 1.96 | 3.57 |
| Waterbird Feeding Habitat (WBF) | 7.61 | 0.83 | 6.24 | 5.00 | 7.15 | 2.50 | 5.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.46 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.68 |
| Waterbird Nesting Habitat (WBN) | 7.01 | 0.00 | 5.12 | 5.00 | 6.53 | 2.50 | 8.61 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.54 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.14 |
| Songbird, Raptor, & Mammal Habitat (SBM) | 9.15 | 10.00 | 8.77 | 10.00 | 5.42 | 2.50 | 9.51 | 0.00 | 7.74 | 0.00 | 5.75 | 5.00 | 8.66 | 10.00 | 6.29 | 5.00 | 6.29 | 5.00 | 6.35 | 5.00 | 5.91 | 5.00 | 9.49 |
| Pollinator Habitat (POL) | 9.32 | 10.00 | 8.64 | 0.00 | 7.30 | 0.00 | 8.72 | 0.00 | 7.56 | 0.00 | 6.39 | 0.00 | 8.55 | 0.00 | 6.49 | 0.00 | 7.17 | 0.00 | 8.69 | 0.00 | 5.43 | 0.00 | 8.23 |
| Native Plant Habitat (PH) | 7.13 | 10.00 | 4.76 | 4.93 | 2.52 | 3.59 | 6.39 | 5.17 | 5.71 | 4.34 | 2.15 | 3.43 | 2.48 | 4.87 | 1.96 | 3.62 | 3.70 | 3.81 | 2.64 | 4.24 | 2.60 | 3.21 | 5.93 |
| Public Use & Recognition (PU) | N/A | 2.22 | N/A | 2.83 | N/A | 0.55 | N/A | 3.79 | N/A | 3.79 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A |
| Wetland Sensivity (Sens) | N/A | 7.85 | N/A | 8.59 | N/A | 9.90 | N/A | 7.30 | N/A | 9.75 | N/A | 6.05 | N/A | 8.80 | N/A | 7.49 | N/A | 9.80 | N/A | 7.87 | N/A | 10.00 | N/A |
| Wetland Ecological Condition (EC) | N/A | 7.10 | N/A | 10.00 | N/A | 5.65 | N/A | 10.00 | N/A | 10.00 | N/A | 4.78 | N/A | 6.52 | N/A | 4.78 | N/A | 8.26 | N/A | 3.62 | N/A | 7.39 | N/A |
| Wetland Stressors (STR) (higher score means more) | N/A | 5.07 | N/A | 4.75 | N/A | 4.86 | N/A | 4.94 | N/A | 4.94 | N/A | 4.88 | N/A | 4.88 | N/A | 4.88 | N/A | 5.31 | N/A | 5.09 | N/A | 4.88 | N/A |
| **Average Function/Benefit** | 5.47 | 5.76 | 5.04 | 4.88 | 5.46 | 3.07 | 5.95 | 4.75 | 4.32 | 2.74 | 3.66 | 2.41 | 4.76 | 3.38 | 3.82 | 2.09 | 4.16 | 2.45 | 3.50 | 2.51 | 3.79 | 2.77 | 5.23 |

| 2 | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | | 19 | | 20 | | 21 | | 22 | | 23 | | 24 | | 25 | | 26 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 9.31 | 9.19 | 9.31 | 9.19 | 3.78 | 4.02 | 5.13 | 1.75 | 5.24 | 1.41 | 5.24 | 1.88 | 5.08 | 8.32 | 4.51 | 3.11 | 3.67 | 0.40 | 4.68 | 1.85 | 4.85 | 1.27 | 4.68 | 3.58 | 4.12 | 0.95 | 4.34 | 9.19 | 4.34 |
| 7.19 | 0.00 | 0.00 | 0.00 | 0.00 | 2.38 | 8.14 | 5.93 | 10.00 | 5.52 | 9.46 | 10.00 | 9.96 | 0.00 | 0.00 | 3.28 | 8.02 | 5.52 | 8.44 | 1.59 | 7.77 | 3.52 | 8.98 | 3.10 | 6.84 | 3.45 | 8.31 | 0.00 | 0.00 |
| 2.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.80 | 7.41 | 5.13 | 6.65 | 6.71 | 7.13 | 0.00 | 0.00 | 6.96 | 2.40 | 2.40 | 7.15 | 3.15 | 1.87 | 8.30 | 8.26 | 0.00 | 0.00 | 5.13 | 7.50 | 0.00 | 0.00 |
| 1.89 | 6.44 | 2.27 | 5.73 | 1.36 | 5.73 | 0.45 | 2.56 | 1.21 | 1.76 | 8.02 | 3.41 | 7.92 | 4.30 | 0.91 | 3.59 | 7.76 | 0.52 | 0.85 | 1.37 | 1.05 | 2.16 | 7.92 | 3.59 | 0.91 | 1.24 | 0.38 | 6.44 | 1.04 |
| 2.14 | 4.87 | 2.14 | 3.49 | 1.29 | 2.67 | 0.43 | 0.91 | 0.86 | 0.66 | 6.86 | 1.82 | 8.48 | 0.58 | 0.86 | 2.48 | 7.59 | 1.65 | 0.98 | 1.77 | 1.34 | 1.47 | 7.05 | 0.58 | 0.86 | 1.58 | 0.43 | 3.54 | 0.98 |
| 3.33 | 10.00 | 3.33 | 10.00 | 3.33 | 3.47 | 4.00 | 2.81 | 4.17 | 2.01 | 10.00 | 4.17 | 10.00 | 10.00 | 2.22 | 3.12 | 10.00 | 1.94 | 2.83 | 2.60 | 3.50 | 3.33 | 10.00 | 2.78 | 2.22 | 2.45 | 1.33 | 10.00 | 5.00 |
| N/A | 8.45 | N/A | 8.67 | N/A | 7.36 | N/A | 4.61 | N/A | 4.29 | N/A | 4.31 | N/A | 4.65 | N/A | 3.78 | N/A | 3.65 | N/A | 3.73 | N/A | 3.90 | N/A | 5.19 | N/A | 2.51 | N/A | 5.96 | N/A |
| N/A | 6.98 | N/A | 5.16 | N/A | 8.12 | N/A | 10.00 | N/A | 8.54 | N/A | 9.54 | N/A | 7.01 | N/A | 9.22 | N/A | 7.55 | N/A | 7.41 | N/A | 9.47 | N/A | 8.44 | N/A | 8.69 | N/A | 6.17 | N/A |
| 1.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.17 | 2.67 | 4.61 | 2.79 | 5.48 | 3.39 | 0.00 | 0.00 | 4.40 | 3.58 | 4.21 | 2.71 | 0.00 | 0.00 | 4.52 | 4.07 | 0.00 | 0.00 | 5.01 | 2.85 | 0.00 | 0.00 |
| 1.87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.01 | 2.55 | 3.78 | 2.68 | 8.35 | 3.29 | 0.00 | 0.00 | 5.65 | 3.47 | 3.93 | 2.60 | 0.00 | 0.00 | 3.26 | 3.97 | 0.00 | 0.00 | 3.09 | 2.74 | 0.00 | 0.00 |
| 6.10 | 4.83 | 1.17 | 5.08 | 0.96 | 4.23 | 0.73 | 4.81 | 6.43 | 3.18 | 6.43 | 2.77 | 7.98 | 6.44 | 1.12 | 7.58 | 7.84 | 1.00 | 5.23 | 4.25 | 3.50 | 6.69 | 5.37 | 4.74 | 0.91 | 3.98 | 5.77 | 2.74 | 0.24 |
| 3.57 | 2.02 | 0.72 | 1.59 | 1.54 | 1.39 | 1.29 | 5.10 | 4.65 | 6.95 | 4.97 | 6.83 | 4.28 | 3.36 | 1.38 | 5.76 | 8.01 | 4.01 | 4.16 | 4.66 | 2.15 | 4.76 | 4.84 | 2.96 | 2.21 | 6.16 | 3.97 | 2.31 | 0.79 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.21 | 5.00 | 5.72 | 5.00 | 8.21 | 2.50 | 0.00 | 0.00 | 8.99 | 10.00 | 5.39 | 5.00 | 5.53 | 0.83 | 5.77 | 5.00 | 0.00 | 0.00 | 5.97 | 2.50 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.38 | 5.00 | 5.32 | 5.00 | 6.98 | 2.50 | 0.00 | 0.00 | 7.75 | 10.00 | 5.06 | 5.00 | 3.60 | 0.00 | 3.05 | 5.00 | 0.00 | 0.00 | 3.01 | 2.50 | 0.00 | 0.00 |
| 10.00 | 8.12 | 0.00 | 7.58 | 2.50 | 6.86 | 2.50 | 8.98 | 5.00 | 9.43 | 10.00 | 8.16 | 10.00 | 7.11 | 2.50 | 9.46 | 10.00 | 7.43 | 10.00 | 7.35 | 0.00 | 9.03 | 10.00 | 6.60 | 10.00 | 9.25 | 10.00 | 4.49 | 3.33 |
| 0.00 | 8.32 | 0.00 | 8.73 | 0.00 | 8.43 | 0.00 | 9.36 | 0.00 | 9.32 | 10.00 | 8.55 | 0.00 | 8.77 | 0.00 | 9.53 | 0.00 | 9.65 | 0.00 | 9.64 | 0.00 | 9.45 | 10.00 | 6.74 | 0.00 | 8.82 | 0.00 | 6.59 | 3.33 |
| 5.03 | 5.21 | 4.65 | 3.62 | 4.61 | 3.06 | 4.32 | 5.23 | 5.19 | 2.33 | 10.00 | 4.34 | 4.73 | 3.64 | 4.49 | 5.92 | 5.38 | 2.92 | 4.82 | 2.56 | 4.80 | 2.21 | 10.00 | 2.90 | 3.78 | 3.43 | 5.12 | 1.91 | 4.23 |
| 3.70 | N/A | 2.08 | N/A | 2.05 | N/A | 2.65 | N/A | 2.13 | N/A | 2.13 | N/A | 2.48 | N/A | 2.13 | N/A | 4.10 | N/A | 2.48 | N/A | 2.25 | N/A | 2.31 | N/A | 2.13 | N/A | 2.48 | N/A | 0.91 |
| 6.12 | N/A | 9.23 | N/A | 5.75 | N/A | 9.21 | N/A | 7.91 | N/A | 8.59 | N/A | 10.00 | N/A | 9.77 | N/A | 8.97 | N/A | 3.84 | N/A | 7.61 | N/A | 8.38 | N/A | 5.97 | N/A | 5.91 | N/A | 7.25 |
| 8.26 | N/A | 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 2.46 | N/A | 5.65 | N/A | 0.87 | N/A | 8.26 | N/A | 3.62 | N/A | 3.04 | N/A | 6.52 | N/A | 5.65 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 |
| 4.88 | N/A | 2.61 | N/A | 4.42 | N/A | 4.75 | N/A | 4.48 | N/A | 4.66 | N/A | 6.72 | N/A | 5.36 | N/A | 5.74 | N/A | 6.06 | N/A | 5.90 | N/A | 6.76 | N/A | 5.25 | N/A | 4.82 | N/A | 5.72 |
| 4.11 | 4.38 | 2.41 | 4.05 | 2.01 | 3.40 | 2.55 | 5.39 | 4.34 | 4.70 | 6.53 | 5.97 | 5.65 | 3.78 | 2.29 | 5.92 | 6.32 | 3.95 | 4.20 | 3.59 | 2.84 | 4.83 | 6.75 | 3.01 | 2.54 | 4.40 | 3.99 | 3.49 | 2.21 |

| 27 | | 28 | | 29 | | 30 | | 31 | | 32 | | 33 | | 34 | | 35 | | 40 | | 41 | | 42 | | 43 | | 44 | | 46 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 1.92 | 4.06 | 2.15 | 3.10 | 6.51 | 4.12 | 7.93 | 3.55 | 8.21 | 3.44 | 7.93 | 4.00 | 8.66 | 3.27 | 9.28 | 3.42 | 0.10 | 6.43 | 6.53 | 3.44 | 8.79 | 3.89 | 0.00 | 3.70 | 0.00 | 3.83 | 3.60 | 5.98 | 7.48 | 5.33 |
| 5.52 | 8.28 | 6.90 | 7.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.24 | 7.41 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 8.79 | 5.59 | 7.50 | 6.21 | 9.48 | 0.00 | 0.00 |
| 5.67 | 5.85 | 3.46 | 5.20 | 2.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.10 | 1.49 | 2.54 | 0.00 | 0.00 | 0.00 | 7.55 | 8.12 | 8.90 | 3.39 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.10 | 8.17 | 4.34 | 10.00 | 10.00 | 0.89 | 4.30 | 1.04 | 5.02 | 1.04 | 4.30 | 1.04 | 5.73 | 1.04 | 7.86 | 1.13 | 2.10 | 8.39 | 10.00 | 1.54 | 6.44 | 0.91 | 1.50 | 7.26 | 1.86 | 7.71 | 6.44 | 0.91 | 4.30 | 1.36 |
| 2.42 | 7.68 | 4.21 | 7.41 | 10.00 | 0.98 | 3.36 | 0.98 | 3.66 | 0.98 | 3.36 | 0.98 | 3.51 | 0.98 | 4.81 | 0.43 | 3.01 | 7.93 | 10.00 | 1.34 | 2.94 | 0.86 | 1.12 | 6.86 | 1.05 | 7.29 | 2.21 | 0.86 | 0.00 | 1.29 |
| 2.26 | 10.00 | 3.10 | 10.00 | 10.00 | 5.00 | 10.00 | 5.00 | 10.00 | 5.00 | 10.00 | 5.00 | 10.00 | 5.00 | 10.00 | 4.00 | 3.59 | 10.00 | 10.00 | 10.00 | 10.00 | 2.22 | 3.32 | 10.00 | 3.74 | 10.00 | 3.32 | 2.22 | 10.00 | 3.33 |
| 4.31 | N/A | 5.11 | N/A | 2.40 | N/A | 3.25 | N/A | 3.38 | N/A | 3.38 | N/A | 6.66 | N/A | 5.90 | N/A | 4.35 | N/A | 5.14 | N/A | 7.38 | N/A | 2.71 | N/A | 3.92 | N/A | 7.12 | N/A | 7.69 | N/A |
| 7.15 | N/A | 7.83 | N/A | 4.74 | N/A | 7.51 | N/A | 7.51 | N/A | 7.51 | N/A | 6.23 | N/A | 7.77 | N/A | 9.10 | N/A | 6.98 | N/A | 7.91 | N/A | 9.17 | N/A | 8.76 | N/A | 8.25 | N/A | 4.41 | N/A |
| 5.45 | 3.42 | 4.88 | 4.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.91 | 5.74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.76 | 3.32 | 7.43 | 4.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.86 | 2.74 | 0.00 | 0.00 | 0.00 | 0.00 | 6.16 | 5.67 | 5.03 | 3.06 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.82 | 4.49 | 4.09 | 8.44 | 1.27 | 2.53 | 4.78 | 0.33 | 4.99 | 0.38 | 3.62 | 0.29 | 1.72 | 0.19 | 5.58 | 0.58 | 9.07 | 5.88 | 3.20 | 4.43 | 7.64 | 0.94 | 8.34 | 8.46 | 8.10 | 5.09 | 6.24 | 0.47 | 4.91 | 0.63 |
| 3.15 | 2.71 | 6.80 | 4.79 | 4.65 | 2.63 | 2.41 | 0.89 | 2.48 | 0.94 | 2.31 | 0.85 | 2.29 | 0.73 | 0.40 | 2.31 | 5.29 | 4.99 | 6.52 | 4.42 | 2.74 | 2.29 | 4.77 | 3.47 | 3.98 | 4.64 | 0.46 | 4.18 | 2.47 | 1.94 |
| 3.97 | 3.33 | 9.38 | 3.33 | 3.88 | 3.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.99 | 5.00 | 6.52 | 5.00 | 0.00 | 0.00 | 7.50 | 0.83 | 4.68 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.82 | 3.33 | 9.70 | 3.33 | 2.24 | 3.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.56 | 5.00 | 5.57 | 5.00 | 0.00 | 0.00 | 9.37 | 0.00 | 5.81 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.46 | 3.33 | 7.64 | 3.33 | 6.33 | 3.33 | 4.77 | 3.33 | 4.90 | 3.33 | 4.67 | 3.33 | 4.31 | 3.33 | 6.89 | 5.00 | 9.27 | 5.00 | 7.16 | 5.00 | 6.83 | 5.00 | 9.37 | 10.00 | 9.42 | 5.00 | 6.47 | 10.00 | 5.85 | 5.00 |
| 8.74 | 3.33 | 8.17 | 3.33 | 9.50 | 3.33 | 6.86 | 3.33 | 6.64 | 3.33 | 6.23 | 3.33 | 4.58 | 3.33 | 7.42 | 0.00 | 9.03 | 0.00 | 7.59 | 0.00 | 7.12 | 0.00 | 7.97 | 10.00 | 8.51 | 0.00 | 7.77 | 10.00 | 6.13 | 0.00 |
| 5.07 | 5.40 | 7.09 | 5.58 | 2.04 | 5.57 | 2.51 | 4.39 | 2.38 | 4.37 | 2.13 | 4.19 | 1.70 | 3.63 | 5.16 | 4.05 | 6.04 | 5.18 | 2.90 | 4.17 | 4.04 | 3.95 | 7.79 | 10.00 | 6.45 | 5.08 | 4.96 | 7.35 | 1.42 | 3.39 |
| N/A | 0.83 | N/A | 1.95 | N/A | 0.83 | N/A | 0.74 | N/A | 0.74 | N/A | 0.83 | N/A | 0.74 | N/A | 2.83 | N/A | 0.51 | N/A | 5.14 | N/A | 2.31 | N/A | 2.43 | N/A | 2.69 | N/A | 4.04 | N/A | 0.34 |
| N/A | 6.35 | N/A | 3.17 | N/A | 6.07 | N/A | 8.22 | N/A | 8.14 | N/A | 7.65 | N/A | 8.68 | N/A | 8.99 | N/A | 7.64 | N/A | 7.84 | N/A | 10.00 | N/A | 6.97 | N/A | 9.12 | N/A | 6.12 | N/A | 6.49 |
| N/A | 8.26 | N/A | 4.78 | N/A | 7.10 | N/A | 8.26 | N/A | 10.00 | N/A | 7.39 | N/A | 3.04 | N/A | 8.26 | N/A | 8.26 | N/A | 3.04 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 |
| N/A | 7.24 | N/A | 5.65 | N/A | 5.83 | N/A | 5.65 | N/A | 5.65 | N/A | 5.72 | N/A | 5.65 | N/A | 5.01 | N/A | 4.40 | N/A | 7.16 | N/A | 4.48 | N/A | 4.42 | N/A | 4.65 | N/A | 4.32 | N/A | 4.08 |
| 4.39 | 5.23 | 6.02 | 5.20 | 4.47 | 2.89 | 3.39 | 2.41 | 3.48 | 2.49 | 3.26 | 2.35 | 3.26 | 2.09 | 4.18 | 2.42 | 5.51 | 5.07 | 5.33 | 3.55 | 4.23 | 2.37 | 5.89 | 6.37 | 5.05 | 5.12 | 3.71 | 3.90 | 3.22 | 2.00 |

| 47 | | 48 | | 49 | | 50 | | 51 | | 52 | | 53 | | 54 | | 55 | | 56 | | 57 | | 58 | | 59 | | 60 | | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 8.51 | 4.64 | 8.93 | 4.07 | 8.93 | 4.45 | 8.93 | 4.39 | 8.93 | 4.07 | 3.35 | 3.82 | 8.93 | 4.70 | 8.93 | 3.63 | 9.42 | 5.64 | 5.15 | 5.24 | 8.94 | 5.19 | 8.52 | 4.68 | 8.93 | 4.06 | 7.93 | 3.83 | 7.79 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.83 | 6.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.02 | 1.36 | 6.44 | 0.91 | 6.44 | 0.91 | 6.44 | 0.91 | 6.44 | 0.91 | 6.16 | 0.91 | 5.59 | 0.91 | 6.16 | 0.91 | 7.86 | 1.13 | 10.00 | 0.76 | 6.44 | 0.91 | 5.73 | 0.91 | 6.44 | 0.91 | 4.30 | 0.91 | 4.30 |
| 0.00 | 1.29 | 0.00 | 0.86 | 0.01 | 0.86 | 0.00 | 0.86 | 0.01 | 0.86 | 0.70 | 0.86 | 0.00 | 0.86 | 0.00 | 0.86 | 2.68 | 0.43 | 10.00 | 0.86 | 3.81 | 0.86 | 3.51 | 0.86 | 1.61 | 0.86 | 3.30 | 0.86 | 3.30 |
| 10.00 | 3.33 | 10.00 | 2.50 | 10.00 | 4.17 | 10.00 | 2.22 | 10.00 | 4.17 | 2.88 | 4.17 | 10.00 | 2.22 | 10.00 | 4.17 | 10.00 | 2.67 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 2.22 | 10.00 | 4.17 | 10.00 |
| 7.72 | N/A | 7.91 | N/A | 7.91 | N/A | 7.69 | N/A | 7.25 | N/A | 5.50 | N/A | 7.21 | N/A | 7.25 | N/A | 7.72 | N/A | 1.40 | N/A | 7.89 | N/A | 7.19 | N/A | 7.47 | N/A | 6.62 | N/A | 6.62 |
| 4.73 | N/A | 5.58 | N/A | 5.36 | N/A | 5.36 | N/A | 5.36 | N/A | 5.65 | N/A | 4.23 | N/A | 5.01 | N/A | 8.19 | N/A | 3.78 | N/A | 7.93 | N/A | 8.15 | N/A | 7.91 | N/A | 9.40 | N/A | 9.40 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.73 | 0.71 | 8.35 | 1.04 | 7.84 | 1.04 | 6.43 | 1.07 | 7.94 | 1.20 | 7.45 | 1.18 | 6.98 | 0.84 | 5.91 | 1.20 | 5.91 | 1.08 | 0.50 | 1.45 | 6.31 | 1.04 | 5.64 | 1.05 | 5.23 | 0.88 | 8.08 | 1.17 | 8.08 |
| 1.04 | 1.34 | 3.07 | 2.35 | 3.01 | 2.37 | 3.05 | 2.39 | 3.37 | 1.48 | 3.43 | 1.45 | 2.90 | 2.13 | 3.51 | 1.45 | 2.90 | 2.44 | 1.72 | 1.91 | 2.95 | 2.37 | 3.11 | 1.35 | 3.23 | 1.10 | 3.18 | 1.49 | 3.05 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.07 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.28 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7.00 | 2.50 | 7.00 | 5.00 | 7.05 | 5.00 | 7.10 | 5.00 | 7.41 | 10.00 | 7.32 | 2.50 | 6.37 | 5.00 | 7.33 | 2.50 | 7.25 | 5.00 | 3.08 | 5.00 | 7.05 | 5.00 | 7.03 | 2.50 | 6.32 | 2.50 | 7.42 | 2.50 | 7.52 |
| 6.87 | 0.00 | 6.96 | 0.00 | 6.67 | 0.00 | 6.52 | 0.00 | 7.07 | 0.00 | 7.71 | 0.00 | 8.04 | 0.00 | 7.01 | 0.00 | 8.82 | 0.00 | 6.74 | 0.00 | 6.54 | 0.00 | 6.14 | 0.00 | 6.79 | 0.00 | 6.61 | 0.00 | 6.61 |
| 3.95 | 3.93 | 4.45 | 3.95 | 4.07 | 3.89 | 3.59 | 3.86 | 4.33 | 4.10 | 5.29 | 4.25 | 4.17 | 4.07 | 4.61 | 4.06 | 5.00 | 4.54 | 2.10 | 2.76 | 3.19 | 3.85 | 3.82 | 3.74 | 2.71 | 3.71 | 5.38 | 3.98 | 5.48 |
| N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 2.48 | N/A | 2.13 | N/A | 2.13 | N/A | 0.69 | N/A | 2.13 | N/A | 0.51 | N/A |
| N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 7.61 | N/A | 9.64 | N/A | 10.00 | N/A | 9.22 | N/A | 3.74 | N/A | 10.00 | N/A | 10.00 | N/A | 9.63 | N/A | 10.00 | N/A |
| N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 8.26 | N/A | 7.10 | N/A | 5.94 | N/A | 3.62 | N/A | 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 3.04 | N/A | 4.78 | N/A | 7.39 | N/A |
| N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.81 | N/A | 4.48 | N/A | 4.48 | N/A | 4.40 | N/A | 4.48 | N/A | 4.40 | N/A |
| 3.56 | 2.28 | 4.04 | 2.36 | 3.96 | 2.47 | 3.83 | 2.18 | 4.01 | 2.68 | 3.66 | 2.45 | 3.79 | 2.23 | 3.87 | 2.02 | 4.46 | 2.51 | 3.75 | 2.58 | 4.18 | 2.36 | 4.05 | 1.97 | 3.92 | 1.96 | 4.25 | 2.17 | 4.24 |

| 1 | 63 | | 64 | | 65 | | 66 | | 67 | | 68 | | 70 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 4.74 | 8.51 | 2.76 | 8.46 | 4.23 | 3.49 | 2.99 | 8.51 | 2.76 | 9.02 | 3.89 | 8.04 | 2.93 | 8.93 | 2.82 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.86 | 5.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.91 | 5.73 | 0.91 | 7.15 | 0.91 | 7.15 | 0.91 | 5.73 | 0.91 | 6.44 | 0.91 | 6.44 | 0.91 | 6.44 | 0.91 |
| 0.86 | 3.45 | 0.86 | 3.04 | 0.86 | 4.04 | 0.86 | 1.67 | 0.86 | 3.81 | 1.50 | 2.68 | 0.86 | 3.74 | 0.86 |
| 4.17 | 10.00 | 4.17 | 10.00 | 4.17 | 3.28 | 4.17 | 10.00 | 2.50 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 4.17 |
| N/A | 5.04 | N/A | 7.63 | N/A | 4.93 | N/A | 7.15 | N/A | 6.31 | N/A | 6.68 | N/A | 6.68 | N/A |
| N/A | 7.70 | N/A | 6.98 | N/A | 10.00 | N/A | 5.58 | N/A | 8.22 | N/A | 7.17 | N/A | 7.91 | N/A |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.18 | 4.01 | 1.17 | 7.23 | 1.32 | 8.37 | 1.66 | 3.00 | 1.14 | 7.44 | 1.15 | 5.42 | 1.12 | 6.31 | 1.17 |
| 1.52 | 4.07 | 4.33 | 3.44 | 1.63 | 3.86 | 1.98 | 2.62 | 4.60 | 3.24 | 1.44 | 2.80 | 4.53 | 3.00 | 4.55 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 6.87 | 10.00 | 7.83 | 10.00 | 8.84 | 2.50 | 7.65 | 10.00 | 7.30 | 2.50 | 7.45 | 10.00 | 7.51 | 10.00 |
| 0.00 | 6.19 | 0.00 | 7.17 | 0.00 | 8.22 | 0.00 | 6.59 | 0.00 | 7.53 | 0.00 | 7.55 | 0.00 | 6.34 | 0.00 |
| 4.01 | 3.61 | 3.70 | 3.74 | 4.25 | 6.91 | 4.83 | 4.52 | 4.04 | 4.74 | 4.20 | 4.94 | 4.25 | 4.72 | 3.93 |
| 0.64 | N/A | 3.79 | N/A | 1.91 | N/A | 3.79 | N/A | 4.51 | N/A | 1.91 | N/A | 4.51 | N/A | 4.51 |
| 10.00 | N/A | 6.17 | N/A | 10.00 | N/A | 4.35 | N/A | 6.27 | N/A | 9.36 | N/A | 6.25 | N/A | 6.89 |
| 7.39 | N/A | 3.04 | N/A | 6.52 | N/A | 10.00 | N/A | 3.04 | N/A | 8.26 | N/A | 4.78 | N/A | 4.78 |
| 4.34 | N/A | 4.42 | N/A | 4.35 | N/A | 1.96 | N/A | 2.04 | N/A | 4.35 | N/A | 2.04 | N/A | 2.04 |
| 2.22 | 3.83 | 2.38 | 4.28 | 2.64 | 4.53 | 2.41 | 3.71 | 2.25 | 4.94 | 2.30 | 4.07 | 2.44 | 4.21 | 2.45 |

| 71 | | 72 | | 73 | | 74 | | 83 | | 89 | | 94 | | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 8.63 | 2.76 | 7.45 | 4.06 | 6.00 | 3.44 | 9.77 | 10.00 | 0.79 | 4.74 | 8.51 | 2.74 | 8.38 | 6.20 | 7.76 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 8.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.79 | 3.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.44 | 0.91 | 5.02 | 0.91 | 1.46 | 0.91 | 9.29 | 0.00 | 1.59 | 7.56 | 5.02 | 2.55 | 5.02 | 1.36 | 2.88 |
| 4.87 | 0.86 | 2.53 | 0.86 | 1.67 | 0.86 | 2.01 | 0.00 | 3.25 | 7.29 | 1.42 | 2.41 | 3.60 | 1.29 | 4.22 |
| 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 2.22 | 10.00 | 0.00 | 2.66 | 10.00 | 10.00 | 5.50 | 10.00 | 3.33 | 10.00 |
| 4.55 | N/A | 5.36 | N/A | 6.48 | N/A | 7.86 | N/A | 5.95 | N/A | 7.38 | N/A | 5.74 | N/A | 6.75 |
| 7.69 | N/A | 8.23 | N/A | 7.91 | N/A | 7.91 | N/A | 8.97 | N/A | 8.13 | N/A | 7.93 | N/A | 8.25 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.28 | 3.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.78 | 1.20 | 6.27 | 1.42 | 4.43 | 1.02 | 6.66 | 0.58 | 4.79 | 5.06 | 7.08 | 1.07 | 5.59 | 1.01 | 6.21 |
| 2.80 | 4.64 | 3.44 | 1.75 | 3.04 | 1.32 | 2.36 | 1.90 | 5.61 | 6.78 | 3.50 | 2.29 | 3.51 | 1.21 | 0.89 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.45 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.66 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7.77 | 10.00 | 8.18 | 2.50 | 6.94 | 2.50 | 5.71 | 5.00 | 9.08 | 10.00 | 6.84 | 5.00 | 6.63 | 2.50 | 6.05 |
| 7.93 | 0.00 | 8.75 | 0.00 | 7.55 | 0.00 | 5.23 | 0.00 | 8.27 | 0.00 | 6.17 | 0.00 | 8.08 | 0.00 | 7.95 |
| 6.37 | 4.44 | 3.24 | 4.79 | 3.06 | 4.10 | 2.21 | 3.10 | 5.56 | 4.92 | 3.96 | 3.69 | 2.86 | 4.16 | 3.39 |
| N/A | 4.51 | N/A | 1.91 | N/A | 2.17 | N/A | 1.82 | N/A | 2.23 | N/A | 2.43 | N/A | 1.09 | N/A |
| N/A | 8.01 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 5.32 | N/A | 9.60 | N/A | 7.59 | N/A |
| N/A | 8.26 | N/A | 6.52 | N/A | 3.04 | N/A | 4.78 | N/A | 8.26 | N/A | 4.78 | N/A | 4.78 | N/A |
| N/A | 2.04 | N/A | 4.35 | N/A | 4.42 | N/A | 4.35 | N/A | 2.29 | N/A | 3.37 | N/A | 1.96 | N/A |
| 4.34 | 2.73 | 4.03 | 2.28 | 3.44 | 1.89 | 4.06 | 2.19 | 4.90 | 5.77 | 4.00 | 2.39 | 3.96 | 1.92 | 3.79 |

| 1.1 | 113 | | 115 | | 117 | | 130 | | 131 | | 133 | | 139 | | 141 | | 142 | | 143 | | 144 | | 145 | | 146 | | 147 | | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 3.92 | 5.55 | 5.16 | 5.99 | 4.13 | 9.24 | 4.40 | 0.51 | 4.74 | 8.52 | 2.99 | 0.71 | 4.51 | 0.59 | 6.49 | 8.80 | 2.88 | 8.65 | 1.92 | 8.91 | 10.00 | 0.06 | 4.33 | 9.74 | 3.89 | 9.07 | 3.33 | 8.63 | 4.83 | 0.48 |
| 0.00 | 0.74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.90 | 8.26 | 0.00 | 0.00 | 5.52 | 8.41 | 4.48 | 6.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.28 | 8.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 |
| 0.00 | 2.40 | 0.00 | 3.88 | 0.00 | 0.00 | 0.00 | 8.40 | 2.32 | 0.00 | 0.00 | 2.63 | 7.19 | 3.25 | 4.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.90 | 2.63 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.90 |
| 1.36 | 10.00 | 1.13 | 10.00 | 1.13 | 6.44 | 0.91 | 3.14 | 0.83 | 5.73 | 0.91 | 1.00 | 0.76 | 0.68 | 1.32 | 6.44 | 0.91 | 5.73 | 0.91 | 5.73 | 2.27 | 2.10 | 7.56 | 7.86 | 0.45 | 6.44 | 0.91 | 4.30 | 1.36 | 2.63 |
| 1.29 | 3.78 | 1.29 | 10.00 | 1.29 | 2.86 | 0.86 | 1.85 | 0.43 | 3.50 | 0.86 | 2.67 | 0.86 | 2.16 | 1.50 | 3.80 | 0.86 | 3.45 | 0.86 | 4.57 | 2.14 | 2.01 | 7.29 | 2.34 | 0.43 | 3.74 | 0.86 | 4.32 | 1.29 | 3.68 |
| 3.33 | 10.00 | 3.33 | 10.00 | 3.33 | 10.00 | 2.22 | 2.27 | 3.33 | 10.00 | 2.22 | 1.71 | 3.33 | 1.97 | 5.42 | 10.00 | 2.50 | 10.00 | 2.50 | 10.00 | 4.33 | 2.33 | 10.00 | 10.00 | 2.50 | 10.00 | 2.22 | 10.00 | 3.33 | 2.74 |
| N/A | 1.63 | N/A | 4.06 | N/A | 8.16 | N/A | 3.84 | N/A | 7.44 | N/A | 3.54 | N/A | 3.95 | N/A | 7.44 | N/A | 6.68 | N/A | 7.43 | N/A | 5.86 | N/A | 6.11 | N/A | 6.15 | N/A | 8.20 | N/A | 5.95 |
| N/A | 5.94 | N/A | 5.31 | N/A | 7.19 | N/A | 7.77 | N/A | 7.29 | N/A | 7.80 | N/A | 6.39 | N/A | 7.51 | N/A | 9.40 | N/A | 6.98 | N/A | 9.30 | N/A | 7.81 | N/A | 7.49 | N/A | 6.96 | N/A | 10.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.43 | 4.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.55 | 1.11 | 0.00 | 0.00 | 3.51 | 4.54 | 2.10 | 3.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.02 | 2.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.38 |
| 0.43 | 1.25 | 3.07 | 1.39 | 3.28 | 5.63 | 0.58 | 4.43 | 5.28 | 5.67 | 0.58 | 3.16 | 6.00 | 1.12 | 3.61 | 3.90 | 0.88 | 5.72 | 0.70 | 1.14 | 0.21 | 8.63 | 5.86 | 5.65 | 1.26 | 6.98 | 1.24 | 1.67 | 0.88 | 9.41 |
| 4.04 | 3.32 | 3.61 | 2.42 | 6.53 | 0.52 | 2.29 | 5.03 | 4.70 | 0.66 | 4.28 | 5.40 | 2.81 | 2.86 | 3.51 | 1.59 | 1.45 | 2.72 | 0.97 | 0.00 | 3.96 | 6.03 | 4.19 | 3.86 | 1.46 | 3.89 | 1.42 | 1.82 | 1.40 | 6.24 |
| 0.00 | 4.09 | 5.00 | 4.67 | 10.00 | 0.00 | 0.00 | 4.56 | 5.00 | 0.00 | 0.00 | 5.47 | 0.00 | 4.72 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.19 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.63 |
| 0.00 | 4.56 | 5.00 | 3.09 | 10.00 | 0.00 | 0.00 | 6.07 | 5.00 | 0.00 | 0.00 | 5.32 | 0.00 | 2.63 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.87 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.99 |
| 10.00 | 7.02 | 5.00 | 9.04 | 10.00 | 6.82 | 10.00 | 9.68 | 5.00 | 6.75 | 10.00 | 9.28 | 0.00 | 9.05 | 2.50 | 7.31 | 2.50 | 5.95 | 2.50 | 5.82 | 10.00 | 9.69 | 2.50 | 7.35 | 2.50 | 7.24 | 2.50 | 7.17 | 2.50 | 9.61 |
| 0.00 | 10.00 | 0.00 | 9.75 | 0.00 | 8.02 | 10.00 | 8.42 | 0.00 | 7.02 | 10.00 | 8.47 | 0.00 | 8.87 | 0.00 | 7.45 | 0.00 | 7.82 | 0.00 | 6.59 | 0.00 | 8.62 | 0.00 | 7.35 | 0.00 | 7.51 | 0.00 | 6.34 | 0.00 | 8.56 |
| 3.95 | 3.21 | 4.98 | 4.41 | 5.32 | 3.02 | 10.00 | 5.20 | 5.14 | 3.81 | 10.00 | 3.87 | 5.03 | 3.19 | 5.08 | 4.12 | 4.18 | 3.96 | 3.88 | 1.89 | 3.51 | 7.34 | 5.19 | 4.09 | 4.16 | 3.54 | 4.18 | 2.13 | 3.83 | 6.44 |
| 2.17 | N/A | 2.25 | N/A | 2.17 | N/A | 0.60 | N/A | 2.08 | N/A | 2.17 | N/A | 2.69 | N/A | 2.34 | N/A | 0.55 | N/A | 1.18 | N/A | 2.43 | N/A | 0.64 | N/A | 0.72 | N/A | 2.17 | N/A | 2.34 | N/A |
| 8.99 | N/A | 4.60 | N/A | 8.51 | N/A | 9.60 | N/A | 7.47 | N/A | 10.00 | N/A | 3.61 | N/A | 5.19 | N/A | 10.00 | N/A | 8.59 | N/A | 8.36 | N/A | 8.97 | N/A | 10.00 | N/A | 9.69 | N/A | 6.01 | N/A |
| 8.26 | N/A | 5.94 | N/A | 10.00 | N/A | 8.26 | N/A | 4.78 | N/A | 6.52 | N/A | 6.52 | N/A | 8.26 | N/A | 4.78 | N/A | 6.52 | N/A | 3.04 | N/A | 8.26 | N/A | 4.78 | N/A | 8.26 | N/A | 3.04 | N/A |
| 1.96 | N/A | 4.42 | N/A | 1.96 | N/A | 4.34 | N/A | 1.63 | N/A | 1.96 | N/A | 3.27 | N/A | 2.29 | N/A | 1.55 | N/A | 4.42 | N/A | 4.96 | N/A | 1.55 | N/A | 1.88 | N/A | 1.96 | N/A | 2.29 | N/A |
| 2.62 | 4.32 | 2.88 | 4.94 | 4.09 | 3.99 | 3.37 | 4.86 | 3.53 | 3.91 | 3.29 | 4.38 | 3.37 | 3.41 | 3.47 | 4.02 | 1.74 | 4.12 | 1.84 | 3.47 | 2.91 | 5.54 | 4.47 | 4.24 | 1.79 | | | 3.62 | 1.74 | 5.78 |

| 48 | 149 | | 150 | | 151 | | 152 | | 153 | | 154 | | 155 | | 156 | | 157 | | 158 | | 159 | | 160 | | 161 | | 162 | | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 4.46 | 8.91 | 4.83 | 8.77 | 4.23 | 0.71 | 7.39 | 8.04 | 3.55 | 3.74 | 3.67 | 8.38 | 5.14 | 8.91 | 5.30 | 0.61 | 5.02 | 8.07 | 4.68 | 1.88 | 4.74 | 0.44 | 5.13 | 9.19 | 3.21 | 0.75 | 4.51 | 9.32 | 4.68 | 9.07 |
| 8.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 7.42 | 0.00 | 0.00 | 5.17 | 6.39 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 8.43 | 0.00 | 0.00 | 2.62 | 7.55 | 5.93 | 8.03 | 0.00 | 0.00 | 4.83 | 7.54 | 0.00 | 0.00 | 0.00 |
| 3.59 | 0.00 | 0.00 | 0.00 | 0.00 | 3.92 | 4.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.90 | 3.77 | 0.00 | 0.00 | 6.38 | 1.84 | 2.75 | 3.61 | 0.00 | 0.00 | 8.90 | 4.51 | 0.00 | 0.00 | 0.00 |
| 7.56 | 5.02 | 1.36 | 5.73 | 0.91 | 1.60 | 0.57 | 5.73 | 0.91 | 6.44 | 0.91 | 4.30 | 1.36 | 5.02 | 1.36 | 3.52 | 7.26 | 4.30 | 0.91 | 1.70 | 0.38 | 0.77 | 0.76 | 6.44 | 0.91 | 3.34 | 0.76 | 6.44 | 0.91 | 7.15 |
| 7.29 | 4.66 | 1.29 | 2.74 | 0.86 | 2.69 | 0.64 | 2.38 | 0.86 | 2.05 | 0.86 | 3.30 | 1.29 | 4.66 | 1.29 | 4.48 | 6.86 | 3.30 | 0.86 | 3.13 | 0.43 | 1.90 | 0.86 | 3.09 | 0.86 | 4.79 | 0.86 | 4.81 | 0.86 | 3.65 |
| 10.00 | 10.00 | 3.33 | 10.00 | 2.50 | 3.59 | 2.67 | 10.00 | 2.50 | 2.93 | 2.50 | 10.00 | 3.33 | 10.00 | 3.33 | 4.72 | 10.00 | 10.00 | 2.22 | 3.16 | 2.50 | 2.08 | 2.50 | 10.00 | 2.67 | 2.94 | 5.00 | 10.00 | 2.50 | 10.00 |
| N/A | 7.05 | N/A | 6.68 | N/A | 5.64 | N/A | 7.69 | N/A | 6.05 | N/A | 6.74 | N/A | 6.08 | N/A | 5.00 | N/A | 5.09 | N/A | 5.26 | N/A | 3.68 | N/A | 7.44 | N/A | 5.54 | N/A | 7.91 | N/A | 7.45 |
| N/A | 7.19 | N/A | 5.26 | N/A | 9.35 | N/A | 6.15 | N/A | 6.64 | N/A | 7.29 | N/A | 7.19 | N/A | 9.64 | N/A | 8.76 | N/A | 8.51 | N/A | 9.18 | N/A | 4.64 | N/A | 9.85 | N/A | 7.81 | N/A | 7.28 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.07 | 4.14 | 0.94 | 3.14 | 0.98 | 4.53 | 4.53 | 5.79 | 1.22 | 6.22 | 0.84 | 4.44 | 0.79 | 6.35 | 0.97 | 8.54 | 4.65 | 5.32 | 1.21 | 3.53 | 4.36 | 3.09 | 3.95 | 5.02 | 0.57 | 6.42 | 4.05 | 7.56 | 1.16 | 5.78 |
| 4.30 | 1.78 | 1.48 | 3.33 | 1.20 | 7.72 | 4.48 | 3.82 | 1.42 | 1.14 | 1.48 | 1.73 | 1.30 | 1.89 | 1.49 | 4.80 | 4.88 | 3.30 | 2.52 | 6.02 | 4.67 | 5.13 | 4.45 | 0.86 | 4.23 | 3.17 | 7.20 | 3.08 | 4.53 | 0.67 |
| 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 6.27 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.24 | 5.00 | 0.00 | 0.00 | 5.03 | 5.00 | 4.29 | 5.00 | 0.00 | 0.00 | 6.16 | 10.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 4.94 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.20 | 5.00 | 0.00 | 0.00 | 4.76 | 5.00 | 4.33 | 5.00 | 0.00 | 0.00 | 3.71 | 10.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 7.41 | 2.50 | 6.62 | 2.50 | 7.56 | 5.00 | 7.23 | 2.50 | 7.41 | 2.50 | 6.88 | 10.00 | 7.43 | 2.50 | 9.60 | 5.00 | 7.50 | 5.00 | 9.20 | 5.00 | 9.20 | 5.00 | 6.59 | 10.00 | 9.64 | 10.00 | 7.45 | 10.00 | 6.77 |
| 0.00 | 8.13 | 0.00 | 7.55 | 0.00 | 8.22 | 0.00 | 7.22 | 0.00 | 8.38 | 0.00 | 5.99 | 0.00 | 7.98 | 0.00 | 9.25 | 0.00 | 7.53 | 0.00 | 9.13 | 0.00 | 9.28 | 0.00 | 6.42 | 0.00 | 9.83 | 0.00 | 9.34 | 0.00 | 7.02 |
| 5.15 | 4.58 | 4.40 | 3.11 | 4.00 | 4.35 | 4.46 | 3.95 | 4.09 | 5.09 | 4.46 | 2.59 | 3.65 | 5.16 | 4.36 | 6.40 | 5.34 | 3.48 | 4.25 | 4.49 | 5.19 | 5.17 | 5.23 | 4.13 | 3.68 | 5.70 | 5.51 | 5.23 | 4.74 | 3.96 |
| 0.55 | N/A | 2.25 | N/A | 1.09 | N/A | 0.81 | N/A | 0.55 | N/A | 2.17 | N/A | 2.69 | N/A | 2.25 | N/A | 0.72 | N/A | 1.75 | N/A | 0.72 | N/A | 0.72 | N/A | 2.43 | N/A | 0.55 | N/A | 0.64 | N/A |
| 10.00 | N/A | 7.93 | N/A | 7.08 | N/A | 6.70 | N/A | 10.00 | N/A | 5.74 | N/A | 10.00 | N/A | 10.00 | N/A | 8.55 | N/A | 10.00 | N/A | 8.29 | N/A | 6.93 | N/A | 9.02 | N/A | 8.78 | N/A | 10.00 | N/A |
| 8.26 | N/A | 8.26 | N/A | 3.04 | N/A | 8.26 | N/A | 6.52 | N/A | 8.26 | N/A | 3.04 | N/A | 8.26 | N/A | 10.00 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A |
| 1.55 | N/A | 1.96 | N/A | 1.96 | N/A | 3.45 | N/A | 1.55 | N/A | 4.42 | N/A | 3.27 | N/A | 1.96 | N/A | 3.31 | N/A | 3.43 | N/A | 1.88 | N/A | 1.88 | N/A | 2.94 | N/A | 1.55 | N/A | 1.55 | N/A |
| 4.58 | 4.05 | 2.13 | 3.70 | 1.60 | 4.51 | 3.73 | 4.00 | 1.88 | 3.60 | 2.33 | 3.63 | 2.41 | 4.16 | 2.27 | 5.44 | 4.94 | | | 4.40 | 3.46 | 3.95 | 3.54 | 3.75 | 2.38 | 5.03 | 4.69 | 4.64 | 2.62 | 4.05 |

| 63 | 164 | | 165 | | 166 | | 167 | | 168 | | 169 | | 170 | | 171 | | 172 | | 173 | | 174 | | 175 | | 176 | | 179 | | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 5.13 | 9.19 | 4.85 | 9.33 | 4.00 | 0.98 | 9.98 | 9.41 | 4.82 | 8.80 | 4.68 | 9.32 | 4.06 | 9.18 | 3.95 | 8.66 | 5.36 | 0.56 | 3.95 | 0.25 | 4.12 | 1.32 | 6.03 | 3.33 | 7.95 | 9.22 | 5.13 | 8.46 | 0.00 | 8.66 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.76 | 6.42 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.24 | 7.66 | 6.28 | 7.94 | 6.90 | 6.61 | 7.24 | 8.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.90 | 4.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.65 | 1.58 | 8.15 | 2.56 | 9.40 | 2.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.45 | 6.44 | 0.91 | 6.44 | 0.91 | 2.45 | 9.15 | 7.15 | 0.91 | 5.73 | 0.91 | 6.44 | 0.91 | 6.44 | 0.91 | 5.73 | 0.91 | 3.20 | 7.56 | 2.45 | 7.56 | 3.48 | 8.58 | 5.73 | 8.39 | 7.15 | 0.45 | 5.02 | 0.45 | 5.73 |
| 0.43 | 4.86 | 0.86 | 4.86 | 0.86 | 1.70 | 8.57 | 4.75 | 0.86 | 3.50 | 0.86 | 4.81 | 0.86 | 4.81 | 0.86 | 3.50 | 0.86 | 3.93 | 7.29 | 2.85 | 7.29 | 2.00 | 7.93 | 0.43 | 7.93 | 1.93 | 0.43 | 4.33 | 0.43 | 3.51 |
| 1.11 | 10.00 | 2.50 | 10.00 | 2.50 | 2.55 | 10.00 | 10.00 | 2.50 | 10.00 | 2.22 | 10.00 | 2.22 | 10.00 | 2.50 | 10.00 | 2.22 | 2.99 | 10.00 | 2.21 | 10.00 | 2.52 | 10.00 | 3.09 | 10.00 | 10.00 | 2.50 | 10.00 | 1.33 | 10.00 |
| N/A | 7.97 | N/A | 7.05 | N/A | 4.01 | N/A | 6.52 | N/A | 7.44 | N/A | 6.77 | N/A | 7.91 | N/A | 7.66 | N/A | 5.22 | N/A | 5.86 | N/A | 5.92 | N/A | 5.80 | N/A | 7.04 | N/A | 4.34 | N/A | 7.00 |
| N/A | 7.19 | N/A | 7.19 | N/A | 9.23 | N/A | 8.35 | N/A | 7.29 | N/A | 7.60 | N/A | 7.81 | N/A | 7.29 | N/A | 10.00 | N/A | 10.00 | N/A | 8.31 | N/A | 7.28 | N/A | 4.96 | N/A | 8.47 | N/A | 7.30 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.77 | 2.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.51 | 3.41 | 5.15 | 5.33 | 5.52 | 2.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.59 | 6.88 | 0.79 | 6.21 | 0.94 | 8.36 | 5.68 | 7.87 | 1.38 | 4.38 | 0.74 | 7.25 | 0.71 | 8.24 | 1.08 | 4.60 | 0.65 | 7.64 | 5.71 | 8.55 | 5.57 | 6.82 | 5.81 | 5.91 | 0.52 | 3.78 | 0.27 | 4.17 | 0.93 | 4.15 |
| 2.27 | 1.00 | 4.49 | 1.65 | 1.51 | 5.04 | 3.88 | 4.21 | 1.54 | 1.47 | 2.29 | 2.49 | 0.01 | 3.05 | 2.40 | 0.69 | 2.35 | 5.05 | 4.10 | 5.05 | 4.96 | 4.92 | 3.97 | 1.94 | 3.93 | 0.22 | 3.97 | 2.86 | 2.25 | 0.70 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.70 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.09 | 2.50 | 6.07 | 5.00 | 5.64 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.27 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.84 | 2.50 | 5.98 | 5.00 | 6.83 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.00 | 7.33 | 10.00 | 7.48 | 2.50 | 9.24 | 2.50 | 7.56 | 2.50 | 6.83 | 5.00 | 6.11 | 0.00 | 7.14 | 5.00 | 6.99 | 5.00 | 9.53 | 2.50 | 9.12 | 5.00 | 9.53 | 2.50 | 5.74 | 10.00 | 5.87 | 10.00 | 6.73 | 5.00 | 6.53 |
| 0.00 | 8.43 | 0.00 | 8.38 | 0.00 | 8.41 | 0.00 | 6.49 | 0.00 | 6.24 | 0.00 | 7.58 | 0.00 | 7.32 | 0.00 | 5.94 | 0.00 | 9.83 | 0.00 | 9.43 | 0.00 | 8.87 | 0.00 | 6.62 | 0.00 | 6.39 | 0.00 | 8.13 | 0.00 | 6.34 |
| 3.90 | 5.05 | 4.45 | 5.30 | 4.49 | 5.03 | 5.00 | 4.69 | 3.99 | 2.91 | 3.71 | 3.70 | 3.86 | 5.11 | 4.10 | 3.10 | 3.67 | 7.22 | 5.48 | 6.10 | 5.25 | 7.57 | 5.22 | 5.27 | 3.49 | 3.21 | 3.47 | 3.29 | 4.20 | 2.71 |
| 2.17 | N/A | 0.55 | N/A | 2.25 | N/A | 2.98 | N/A | 2.17 | N/A | 2.17 | N/A | 0.66 | N/A | 0.55 | N/A | 2.17 | N/A | 0.72 | N/A | 1.24 | N/A | 0.55 | N/A | 0.69 | N/A | 0.69 | N/A | 2.13 | N/A |
| 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 3.62 | N/A | 9.07 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 9.79 | N/A | 8.36 | N/A | 5.81 | N/A | 8.92 | N/A | 5.05 | N/A | 10.00 | N/A | 9.66 | N/A |
| 6.52 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 6.52 | N/A | 3.04 | N/A | 8.26 | N/A | 8.26 | N/A | 3.04 | N/A | 8.26 | N/A | 8.26 | N/A | 6.52 | N/A | 6.52 | N/A | 3.04 | N/A | 3.04 | N/A |
| 4.42 | N/A | 1.55 | N/A | 1.96 | N/A | 4.69 | N/A | 1.96 | N/A | 1.96 | N/A | 4.34 | N/A | 4.34 | N/A | 4.42 | N/A | 4.40 | N/A | 4.66 | N/A | 4.34 | N/A | 4.40 | N/A | 4.40 | N/A | 4.48 | N/A |
| 2.21 | 4.37 | 2.59 | 4.35 | 2.11 | 5.20 | 4.85 | 4.53 | 2.01 | 3.80 | 1.98 | 4.24 | 1.89 | 4.53 | 2.31 | 3.77 | 2.13 | 5.62 | 4.53 | 5.50 | 5.03 | 5.62 | 4.54 | 3.43 | 4.06 | 3.52 | 2.33 | 3.87 | 1.78 | 3.68 |

| 30 | 181 | | 182 | | 183 | | 184 | | 186 | | 187 | | 188 | | 190 | | 191 | | 192 | | 193 | | 194 | | 195 | | 196 | | 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 2.93 | 6.71 | 2.71 | 7.25 | 4.57 | 6.51 | 2.43 | 6.59 | 4.91 | 9.07 | 5.24 | 9.07 | 3.27 | 9.60 | 4.74 | 8.93 | 5.13 | 9.74 | 4.00 | 2.87 | 7.50 | 5.79 | 3.78 | 0.56 | 4.79 | 9.60 | 3.72 | 0.70 | 7.33 | 9.05 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.93 | 7.58 | 0.00 | 0.00 | 6.62 | 7.98 | 0.00 | 0.00 | 7.24 | 8.51 | 0.00 |
| 0.00 | 3.25 | 0.00 | 2.42 | 0.00 | 4.50 | 0.00 | 4.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.38 | 10.00 | 6.65 | 0.00 | 3.88 | 2.32 | 0.00 | 0.00 | 8.90 | 1.76 | 0.00 |
| 0.91 | 10.00 | 0.38 | 10.00 | 1.60 | 10.00 | 0.76 | 10.00 | 0.76 | 6.91 | 0.45 | 7.15 | 0.45 | 7.86 | 0.85 | 6.44 | 0.91 | 7.86 | 0.45 | 4.19 | 1.40 | 10.00 | 0.45 | 0.92 | 0.38 | 7.86 | 0.45 | 3.64 | 8.02 | 5.73 |
| 0.86 | 10.00 | 0.43 | 10.00 | 1.34 | 10.00 | 0.86 | 10.00 | 0.86 | 3.65 | 0.43 | 2.76 | 0.43 | 5.01 | 0.98 | 3.74 | 0.86 | 5.01 | 0.43 | 10.00 | 1.07 | 10.00 | 0.43 | 1.86 | 0.43 | 5.01 | 0.43 | 4.03 | 7.95 | 3.33 |
| 2.22 | 10.00 | 1.33 | 10.00 | 4.58 | 10.00 | 2.50 | 10.00 | 2.50 | 10.00 | 1.11 | 10.00 | 3.33 | 10.00 | 2.83 | 10.00 | 2.22 | 10.00 | 2.50 | 5.62 | 4.33 | 10.00 | 3.33 | 2.39 | 2.50 | 10.00 | 2.50 | 2.98 | 10.00 | 10.00 |
| N/A | 5.79 | N/A | 4.92 | N/A | 4.29 | N/A | 5.32 | N/A | 6.40 | N/A | 7.73 | N/A | 7.51 | N/A | 6.80 | N/A | 7.76 | N/A | 0.00 | N/A | 4.62 | N/A | 4.17 | N/A | 7.21 | N/A | 5.07 | N/A | 7.60 |
| N/A | 5.46 | N/A | 6.08 | N/A | 6.52 | N/A | 6.07 | N/A | 7.28 | N/A | 7.03 | N/A | 7.81 | N/A | 7.28 | N/A | 7.17 | N/A | 10.00 | N/A | 5.85 | N/A | 7.13 | N/A | 7.81 | N/A | 8.72 | N/A | 6.35 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 3.96 | 0.00 | 0.00 | 3.71 | 1.68 | 0.00 | 0.00 | 6.63 | 1.61 | 0.00 |
| 0.53 | 0.96 | 3.63 | 2.15 | 3.96 | 3.65 | 4.29 | 3.53 | 4.46 | 2.28 | 0.53 | 3.16 | 1.29 | 6.83 | 1.37 | 4.96 | 0.65 | 5.13 | 0.82 | 7.26 | 6.61 | 3.82 | 2.95 | 2.08 | 4.52 | 5.52 | 1.34 | 7.03 | 6.32 | 7.65 |
| 2.18 | 3.56 | 4.67 | 3.69 | 4.95 | 6.18 | 3.52 | 5.70 | 6.83 | 1.17 | 2.08 | 3.70 | 1.53 | 3.65 | 2.66 | 0.87 | 4.32 | 1.37 | 2.42 | 6.82 | 3.90 | 2.45 | 3.22 | 4.70 | 4.43 | 3.88 | 1.55 | 5.64 | 5.43 | 3.63 |
| 0.00 | 5.53 | 5.00 | 5.97 | 5.00 | 4.99 | 2.50 | 5.37 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.72 | 2.50 | 3.84 | 2.50 | 4.27 | 5.00 | 0.00 | 0.00 | 6.58 | 5.00 | 0.00 |
| 0.00 | 3.28 | 5.00 | 3.71 | 5.00 | 4.79 | 2.50 | 4.93 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.60 | 2.50 | 2.55 | 2.50 | 4.47 | 5.00 | 0.00 | 0.00 | 6.20 | 5.00 | 0.00 |
| 5.00 | 8.76 | 5.00 | 9.15 | 5.00 | 8.83 | 2.50 | 9.29 | 10.00 | 6.25 | 5.00 | 7.54 | 2.50 | 7.87 | 5.00 | 6.86 | 10.00 | 7.20 | 5.00 | 9.26 | 2.50 | 8.98 | 2.50 | 9.17 | 5.00 | 7.61 | 2.50 | 10.00 | 5.00 | 7.77 |
| 0.00 | 8.74 | 0.00 | 8.04 | 0.00 | 8.46 | 0.00 | 8.70 | 0.00 | 5.18 | 0.00 | 7.63 | 0.00 | 7.85 | 10.00 | 6.42 | 0.00 | 7.32 | 0.00 | 8.91 | 0.00 | 7.77 | 0.00 | 8.19 | 10.00 | 7.50 | 0.00 | 8.97 | 10.00 | 6.87 |
| 3.65 | 2.61 | 4.96 | 3.77 | 4.88 | 3.82 | 4.90 | 3.67 | 5.10 | 1.95 | 3.24 | 3.99 | 4.29 | 4.17 | 10.00 | 3.41 | 3.76 | 4.41 | 4.11 | 10.00 | 5.15 | 2.66 | 4.75 | 3.14 | 10.00 | 4.09 | 4.28 | 7.08 | 10.00 | 7.54 |
| 0.51 | N/A | 2.13 | N/A | 2.22 | N/A | 2.13 | N/A | 0.43 | N/A | 2.08 | N/A | 0.55 | N/A | 0.64 | N/A | 2.17 | N/A | 0.64 | N/A | 2.43 | N/A | 1.09 | N/A | 2.17 | N/A | 0.55 | N/A | 0.46 | N/A |
| 9.27 | N/A | 8.36 | N/A | 8.98 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 9.57 | N/A | 0.00 | N/A | 9.21 | N/A | 7.20 | N/A | 10.00 | N/A | 9.04 | N/A |
| 3.04 | N/A | 6.52 | N/A | 4.78 | N/A | 8.26 | N/A | 4.78 | N/A | 3.04 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 | N/A | 4.78 | N/A |
| 4.40 | N/A | 4.48 | N/A | 5.73 | N/A | 4.48 | N/A | 4.34 | N/A | 1.72 | N/A | 1.55 | N/A | 1.99 | N/A | 1.96 | N/A | 1.55 | N/A | 3.94 | N/A | 1.96 | N/A | 1.96 | N/A | 1.55 | N/A | 1.66 | N/A |
| 1.87 | 4.98 | 2.87 | 5.13 | 3.29 | 5.44 | 2.72 | 5.53 | 3.95 | 3.54 | 1.84 | 4.10 | 1.70 | 4.60 | 2.94 | 3.87 | 2.46 | 4.29 | 2.09 | 6.15 | 3.87 | 5.00 | 2.20 | 3.96 | 4.22 | 4.48 | 1.77 | 5.85 | 5.68 | 4.44 |

| 97 | 198 | | 199 | | 200 | | 201 | | 202 | | 203 | | 204 | | 205 | | 206 | | 207 | | 208 | | 209 | | 212 | | 213 | | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 5.47 | 6.39 | 4.51 | 1.47 | 5.64 | 0.33 | 7.22 | 9.32 | 3.27 | 0.51 | 10.00 | 9.32 | 3.21 | 0.31 | 4.34 | 9.05 | 2.82 | 0.97 | 4.34 | 0.00 | 3.55 | 8.65 | 3.61 | 9.49 | 3.27 | 6.41 | 4.46 | 8.77 | 4.00 | 6.41 |
| 0.00 | 0.00 | 0.00 | 2.62 | 5.79 | 5.52 | 7.44 | 0.00 | 0.00 | 6.28 | 7.62 | 0.00 | 0.00 | 6.28 | 9.06 | 0.00 | 0.00 | 6.55 | 8.97 | 5.93 | 6.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 8.40 | 1.53 | 2.63 | 2.16 | 0.00 | 0.00 | 6.79 | 3.86 | 0.00 | 0.00 | 8.90 | 6.83 | 0.00 | 0.00 | 7.70 | 6.08 | 8.40 | 2.97 | 0.00 | 0.00 | 0.00 | 0.00 | 4.92 | 0.00 | 0.00 | 0.00 | 3.67 |
| 1.59 | 1.46 | 0.91 | 3.50 | 0.95 | 0.65 | 1.32 | 7.15 | 0.45 | 0.91 | 8.70 | 7.15 | 0.45 | 2.45 | 7.94 | 5.73 | 0.91 | 3.70 | 7.56 | 1.78 | 0.45 | 5.73 | 0.91 | 7.86 | 0.79 | 10.00 | 1.13 | 6.44 | 0.45 | 10.00 |
| 1.50 | 0.96 | 0.86 | 3.05 | 1.07 | 1.87 | 1.50 | 4.71 | 0.43 | 2.24 | 8.57 | 4.71 | 0.43 | 3.27 | 7.71 | 4.51 | 0.86 | 3.06 | 7.29 | 2.01 | 0.43 | 3.45 | 0.86 | 1.81 | 0.43 | 10.00 | 1.29 | 3.79 | 0.43 | 10.00 |
| 3.89 | 10.00 | 2.22 | 3.02 | 4.58 | 1.85 | 3.89 | 10.00 | 3.33 | 2.61 | 10.00 | 10.00 | 3.33 | 2.97 | 10.00 | 10.00 | 5.00 | 3.25 | 10.00 | 3.29 | 3.33 | 10.00 | 2.22 | 10.00 | 2.50 | 10.00 | 5.00 | 10.00 | 1.33 | 10.00 |
| N/A | 7.08 | N/A | 5.12 | N/A | 3.15 | N/A | 7.73 | N/A | 4.93 | N/A | 7.91 | N/A | 5.07 | N/A | 7.91 | N/A | 5.17 | N/A | 4.61 | N/A | 6.66 | N/A | 6.46 | N/A | 4.76 | N/A | 7.28 | N/A | 4.67 |
| N/A | 4.41 | N/A | 8.60 | N/A | 6.81 | N/A | 7.81 | N/A | 7.05 | N/A | 7.81 | N/A | 8.72 | N/A | 8.02 | N/A | 9.05 | N/A | 10.00 | N/A | 7.28 | N/A | 8.13 | N/A | 6.61 | N/A | 9.19 | N/A | 6.61 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.54 | 2.33 | 0.00 | 0.00 | 5.29 | 2.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 4.13 | 1.24 | 3.51 | 2.29 | 0.00 | 0.00 | 4.48 | 2.03 | 0.00 | 0.00 | 5.20 | 2.21 | 0.00 | 0.00 | 5.61 | 2.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.34 | 1.98 | 0.80 | 5.82 | 5.80 | 2.24 | 4.32 | 5.54 | 1.21 | 3.39 | 5.33 | 4.18 | 1.12 | 6.03 | 7.28 | 4.98 | 1.25 | 6.66 | 7.15 | 6.16 | 4.41 | 2.62 | 0.57 | 5.86 | 1.35 | 3.44 | 4.61 | 7.83 | 1.23 | 3.36 |
| 2.62 | 1.24 | 2.42 | 6.50 | 2.87 | 4.46 | 4.35 | 3.70 | 1.43 | 5.99 | 4.96 | 3.56 | 1.34 | 5.52 | 4.25 | 3.58 | 1.51 | 5.98 | 4.26 | 5.02 | 3.74 | 0.89 | 2.20 | 3.72 | 1.61 | 6.25 | 4.83 | 3.64 | 2.47 | 6.13 |
| 0.00 | 0.00 | 0.00 | 5.09 | 0.00 | 4.12 | 5.00 | 0.00 | 0.00 | 5.69 | 5.00 | 0.00 | 0.00 | 6.42 | 2.50 | 0.00 | 0.00 | 6.55 | 2.50 | 4.55 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.57 | 5.00 | 0.00 | 0.00 | 5.44 |
| 0.00 | 0.00 | 0.00 | 6.95 | 0.00 | 4.17 | 5.00 | 0.00 | 0.00 | 4.79 | 5.00 | 0.00 | 0.00 | 6.29 | 2.50 | 0.00 | 0.00 | 6.18 | 2.50 | 5.41 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.15 | 5.00 | 0.00 | 0.00 | 4.89 |
| 5.00 | 7.19 | 5.00 | 9.77 | 0.00 | 9.08 | 5.00 | 7.27 | 2.50 | 9.42 | 5.00 | 7.01 | 2.50 | 9.67 | 2.50 | 7.48 | 2.50 | 9.56 | 2.50 | 9.84 | 2.50 | 6.56 | 5.00 | 7.76 | 2.50 | 9.17 | 5.00 | 7.35 | 5.00 | 9.22 |
| 0.00 | 8.28 | 10.00 | 8.40 | 0.00 | 9.35 | 10.00 | 7.35 | 0.00 | 8.70 | 0.00 | 7.09 | 0.00 | 8.49 | 0.00 | 6.94 | 0.00 | 8.77 | 0.00 | 8.12 | 0.00 | 6.17 | 0.00 | 8.27 | 0.00 | 8.14 | 0.00 | 8.27 | 0.00 | 7.24 |
| 4.15 | 2.54 | 10.00 | 5.24 | 5.15 | 4.11 | 10.00 | 3.47 | 4.14 | 5.08 | 5.14 | 3.28 | 3.99 | 7.26 | 5.15 | 4.22 | 4.09 | 7.72 | 5.20 | 5.86 | 5.10 | 2.29 | 3.61 | 3.92 | 4.54 | 3.63 | 4.91 | 3.74 | 4.42 | 3.84 |
| 2.89 | N/A | 2.17 | N/A | 0.46 | N/A | 2.25 | N/A | 1.09 | N/A | 0.55 | N/A | 1.09 | N/A | 0.60 | N/A | 1.09 | N/A | 2.22 | N/A | 0.55 | N/A | 1.18 | N/A | 0.55 | N/A | 0.60 | N/A | 0.64 | N/A |
| 6.96 | N/A | 7.49 | N/A | 10.00 | N/A | 8.66 | N/A | 10.00 | N/A | 7.77 | N/A | 10.00 | N/A | 8.59 | N/A | 10.00 | N/A | 9.22 | N/A | 8.51 | N/A | 7.66 | N/A | 8.69 | N/A | 10.00 | N/A | 10.00 | N/A |
| 6.52 | N/A | 3.04 | N/A | 4.78 | N/A | 8.26 | N/A | 3.04 | N/A | 4.78 | N/A | 3.04 | N/A | 4.78 | N/A | 3.04 | N/A | 4.78 | N/A | 6.52 | N/A | 3.04 | N/A | 8.26 | N/A | 4.78 | N/A | 10.00 | N/A |
| 1.22 | N/A | 1.96 | N/A | 1.22 | N/A | 1.96 | N/A | 1.96 | N/A | 1.90 | N/A | 1.96 | N/A | 4.34 | N/A | 1.96 | N/A | 4.42 | N/A | 1.55 | N/A | 1.96 | N/A | 5.56 | N/A | 4.34 | N/A | 1.55 | N/A |
| 2.27 | 3.03 | 2.70 | 5.16 | 2.69 | 3.76 | 4.77 | 4.36 | 1.73 | 4.64 | 5.06 | 4.24 | 1.71 | 5.85 | 4.89 | 4.26 | 1.84 | 5.99 | 4.93 | 4.76 | 2.89 | 3.55 | 1.73 | 4.31 | 2.11 | 5.53 | 3.21 | 4.49 | 2.19 | 5.38 |

| 14 | 215 | | 216 | | 217 | | 218 | | 219 | | 220 | | 221 | | 222 | | 223 | | 224 | | 225 | | 226 | | 227 | | 228 | | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 4.46 | 0.39 | 3.44 | 9.60 | 8.91 | 9.35 | 3.67 | 8.91 | 8.57 | 8.51 | 4.06 | 8.82 | 4.29 | 9.35 | 5.08 | 8.57 | 4.40 | 9.35 | 10.00 | 5.93 | 4.23 | 8.63 | 10.00 | 9.18 | 10.00 | 6.63 | 4.51 | 9.18 | 4.00 | 1.17 |
| 0.00 | 6.21 | 6.83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 |
| 0.00 | 8.40 | 2.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.50 | 0.00 | 0.00 | 0.00 | 7.40 |
| 1.38 | 3.38 | 0.38 | 7.86 | 1.13 | 7.86 | 0.45 | 5.73 | 1.70 | 6.44 | 0.45 | 5.02 | 1.36 | 7.86 | 0.45 | 5.02 | 1.36 | 7.86 | 1.81 | 10.00 | 1.13 | 5.73 | 2.27 | 6.44 | 2.27 | 10.00 | 0.38 | 6.44 | 0.91 | 2.83 |
| 1.70 | 3.58 | 0.43 | 5.01 | 1.07 | 3.94 | 0.43 | 4.51 | 1.50 | 1.66 | 0.43 | 5.32 | 1.29 | 3.94 | 0.43 | 3.07 | 1.29 | 3.94 | 1.71 | 4.82 | 1.29 | 4.51 | 2.14 | 4.81 | 2.14 | 10.00 | 0.43 | 4.81 | 0.86 | 2.50 |
| 5.14 | 2.63 | 3.33 | 10.00 | 2.33 | 10.00 | 1.11 | 10.00 | 2.50 | 10.00 | 1.33 | 10.00 | 3.33 | 10.00 | 1.11 | 10.00 | 3.33 | 10.00 | 2.78 | 10.00 | 3.33 | 10.00 | 3.89 | 10.00 | 3.89 | 10.00 | 2.50 | 10.00 | 2.50 | 2.31 |
| N/A | 4.93 | N/A | 7.45 | N/A | 6.68 | N/A | 7.91 | N/A | 6.97 | N/A | 7.36 | N/A | 6.75 | N/A | 6.39 | N/A | 8.61 | N/A | 3.63 | N/A | 7.69 | N/A | 7.69 | N/A | 5.61 | N/A | 8.20 | N/A | 4.84 |
| N/A | 8.57 | N/A | 6.96 | N/A | 6.89 | N/A | 7.81 | N/A | 7.79 | N/A | 8.04 | N/A | 7.28 | N/A | 6.90 | N/A | 7.91 | N/A | 6.43 | N/A | 7.60 | N/A | 7.60 | N/A | 6.50 | N/A | 7.17 | N/A | 8.72 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.39 |
| 0.00 | 4.54 | 1.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.38 |
| 4.51 | 7.35 | 5.67 | 6.18 | 0.92 | 7.36 | 1.25 | 5.92 | 1.27 | 8.38 | 1.29 | 6.73 | 1.26 | 5.18 | 0.68 | 5.90 | 1.19 | 6.13 | 1.24 | 1.37 | 3.44 | 6.83 | 1.22 | 7.65 | 1.33 | 3.90 | 4.63 | 6.76 | 1.03 | 9.03 |
| 4.81 | 6.06 | 3.97 | 1.41 | 2.54 | 3.74 | 1.47 | 3.80 | 1.48 | 3.51 | 2.58 | 3.54 | 1.52 | 1.22 | 2.27 | 3.34 | 1.48 | 4.00 | 1.40 | 3.59 | 2.88 | 3.66 | 1.44 | 4.03 | 1.51 | 6.94 | 3.75 | 1.93 | 1.56 | 5.37 |
| 5.00 | 5.33 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.17 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.36 | 2.50 | 0.00 | 0.00 | 6.63 |
| 5.00 | 6.12 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.06 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 4.98 | 2.50 | 0.00 | 0.00 | 6.77 |
| 5.00 | 9.81 | 2.50 | 7.54 | 5.00 | 7.38 | 2.50 | 7.41 | 2.50 | 7.66 | 5.00 | 7.53 | 2.50 | 6.78 | 5.00 | 7.39 | 2.50 | 7.18 | 2.50 | 7.74 | 2.50 | 7.30 | 2.50 | 7.49 | 2.50 | 9.18 | 2.50 | 7.64 | 2.50 | 9.93 |
| 0.00 | 8.84 | 0.00 | 8.23 | 10.00 | 7.97 | 0.00 | 7.32 | 0.00 | 9.02 | 0.00 | 5.99 | 0.00 | 7.87 | 0.00 | 7.50 | 0.00 | 6.42 | 0.00 | 9.48 | 0.00 | 6.66 | 0.00 | 6.76 | 0.00 | 7.86 | 0.00 | 6.92 | 0.00 | 9.18 |
| 4.67 | 5.38 | 5.29 | 4.25 | 10.00 | 3.71 | 4.34 | 3.98 | 4.17 | 3.42 | 4.71 | 4.40 | 3.84 | 3.36 | 4.14 | 4.40 | 4.22 | 3.83 | 3.86 | 3.21 | 4.87 | 3.44 | 3.96 | 3.73 | 4.04 | 4.40 | 4.83 | 4.88 | 4.13 | 8.56 |
| 0.60 | N/A | 0.55 | N/A | 2.17 | N/A | 0.55 | N/A | 0.55 | N/A | 0.64 | N/A | 0.60 | N/A | 2.17 | N/A | 0.60 | N/A | 0.55 | N/A | 0.60 | N/A | 0.55 | N/A | 0.55 | N/A | 0.55 | N/A | 0.55 | N/A |
| 9.79 | N/A | 10.00 | N/A | 10.00 | N/A | 9.39 | N/A | 6.78 | N/A | 8.47 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 7.15 | N/A | 7.96 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 7.90 | N/A |
| 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 6.52 | N/A | 10.00 | N/A | 4.78 | N/A | 8.26 | N/A | 4.78 | N/A | 4.78 | N/A | 4.78 | N/A | 6.52 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A |
| 5.64 | N/A | 1.55 | N/A | 2.31 | N/A | 1.55 | N/A | 1.94 | N/A | 1.55 | N/A | 4.34 | N/A | 1.96 | N/A | 4.34 | N/A | 1.90 | N/A | 4.34 | N/A | 1.90 | N/A | 1.90 | N/A | 1.55 | N/A | 1.55 | N/A |
| 3.29 | 5.38 | 3.27 | 4.38 | 3.40 | 4.41 | 1.84 | 4.31 | 2.08 | 4.32 | 2.13 | 4.28 | 2.06 | 4.09 | 2.19 | 4.03 | 2.08 | 4.43 | 2.09 | 4.64 | 2.44 | 4.24 | 2.44 | 4.43 | 2.55 | 5.64 | 2.57 | 4.35 | 1.88 | 6.21 |

| 29 | 230 | | 231 | | 232 | | 234 | | 235 | | 236 | | 237 | | 238 | | 239 | | 240 | | 242 | | 243 | | 244 | | 245 | | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 6.43 | 8.65 | 8.23 | 1.22 | 3.55 | 5.72 | 4.17 | 0.59 | 9.36 | 0.16 | 6.03 | 1.22 | 6.54 | 8.63 | 5.64 | 8.79 | 3.72 | 9.61 | 4.68 | 9.35 | 4.34 | 9.19 | 4.34 | 9.61 | 3.78 | 8.91 | 5.26 | 9.61 | 4.40 | 8.66 |
| 8.85 | 0.00 | 0.00 | 2.97 | 5.87 | 0.00 | 0.00 | 5.52 | 6.69 | 5.24 | 5.88 | 5.24 | 7.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8.38 | 0.00 | 0.00 | 4.50 | 0.95 | 4.50 | 0.00 | 2.63 | 4.19 | 8.40 | 3.18 | 2.75 | 6.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8.20 | 5.73 | 1.59 | 1.31 | 7.71 | 10.00 | 0.45 | 0.68 | 1.89 | 2.07 | 7.94 | 1.10 | 8.58 | 4.30 | 1.36 | 5.73 | 0.91 | 7.86 | 0.45 | 7.86 | 0.45 | 7.15 | 0.45 | 7.86 | 0.45 | 5.02 | 1.36 | 7.86 | 0.45 | 5.02 |
| 7.50 | 3.45 | 1.50 | 3.24 | 7.29 | 10.00 | 0.43 | 2.16 | 2.14 | 2.77 | 7.50 | 1.09 | 7.93 | 4.37 | 1.29 | 3.45 | 0.86 | 5.06 | 0.43 | 3.94 | 0.43 | 4.76 | 0.43 | 5.06 | 0.43 | 4.66 | 1.29 | 5.06 | 0.43 | 3.60 |
| 10.00 | 10.00 | 2.33 | 2.84 | 10.00 | 10.00 | 3.33 | 2.38 | 5.56 | 2.63 | 10.00 | 2.88 | 10.00 | 10.00 | 3.33 | 10.00 | 2.50 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 3.33 | 10.00 | 1.11 | 10.00 |
| N/A | 7.69 | N/A | 3.88 | N/A | 3.20 | N/A | 3.59 | N/A | 3.73 | N/A | 2.95 | N/A | 6.04 | N/A | 6.01 | N/A | 7.44 | N/A | 8.22 | N/A | 7.53 | N/A | 7.46 | N/A | 6.74 | N/A | 6.74 | N/A | 7.37 |
| N/A | 7.91 | N/A | 9.82 | N/A | 5.88 | N/A | 6.81 | N/A | 9.10 | N/A | 6.97 | N/A | 6.98 | N/A | 7.49 | N/A | 6.98 | N/A | 6.89 | N/A | 6.98 | N/A | 7.61 | N/A | 6.98 | N/A | 6.98 | N/A | 6.91 |
| 3.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.52 | 1.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.71 | 1.64 | 0.00 | 0.00 | 3.84 | 1.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 8.06 | 6.95 | 1.29 | 2.59 | 3.61 | 1.47 | 3.91 | 3.45 | 4.55 | 7.05 | 4.33 | 2.02 | 5.67 | 3.21 | 0.80 | 2.79 | 0.88 | 4.85 | 0.84 | 6.43 | 1.35 | 4.26 | 0.88 | 5.32 | 1.40 | 5.12 | 0.94 | 5.94 | 0.61 | 7.30 |
| 5.42 | 3.93 | 1.48 | 4.35 | 3.15 | 4.05 | 4.46 | 5.20 | 3.39 | 4.57 | 4.62 | 5.13 | 3.48 | 1.54 | 1.35 | 1.57 | 1.44 | 1.44 | 2.43 | 4.03 | 1.54 | 1.33 | 2.51 | 3.96 | 1.61 | 1.80 | 1.48 | 0.83 | 4.28 | 3.86 |
| 5.00 | 0.00 | 0.00 | 3.07 | 2.50 | 4.07 | 5.00 | 4.10 | 2.50 | 4.55 | 5.00 | 4.42 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.00 | 0.00 | 0.00 | 4.34 | 2.50 | 4.90 | 5.00 | 4.33 | 2.50 | 5.83 | 5.00 | 4.88 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.00 | 7.41 | 2.50 | 9.47 | 2.50 | 9.44 | 5.00 | 9.24 | 2.50 | 9.47 | 5.00 | 9.23 | 2.50 | 7.04 | 2.50 | 7.30 | 2.50 | 7.23 | 5.00 | 7.59 | 2.50 | 7.45 | 5.00 | 7.78 | 2.50 | 7.39 | 2.50 | 6.74 | 10.00 | 7.36 |
| 0.00 | 6.82 | 0.00 | 8.80 | 0.00 | 8.27 | 0.00 | 8.64 | 0.00 | 8.01 | 0.00 | 7.87 | 0.00 | 7.60 | 0.00 | 5.92 | 0.00 | 6.17 | 0.00 | 6.27 | 0.00 | 6.57 | 0.00 | 8.15 | 0.00 | 6.67 | 0.00 | 7.17 | 0.00 | 7.16 |
| 5.42 | 4.12 | 4.03 | 6.04 | 5.18 | 3.12 | 5.02 | 3.95 | 5.07 | 6.44 | 4.96 | 5.71 | 4.85 | 2.82 | 4.14 | 3.51 | 3.75 | 3.47 | 3.80 | 3.30 | 3.93 | 3.47 | 3.98 | 3.29 | 4.51 | 3.64 | 3.99 | 3.79 | 3.94 | 3.26 |
| 1.23 | N/A | 0.55 | N/A | 1.09 | N/A | 2.08 | N/A | 2.17 | N/A | 0.55 | N/A | 2.08 | N/A | 2.43 | N/A | 2.25 | N/A | 0.55 | N/A | 0.55 | N/A | 2.17 | N/A | 2.08 | N/A | 2.25 | N/A | 2.17 | N/A |
| 9.55 | N/A | 8.57 | N/A | 7.94 | N/A | 8.24 | N/A | 8.99 | N/A | 7.23 | N/A | 7.55 | N/A | 8.88 | N/A | 8.35 | N/A | 10.00 | N/A | 9.43 | N/A | 10.00 | N/A | 10.00 | N/A | 7.53 | N/A | 10.00 | N/A |
| 7.10 | N/A | 6.52 | N/A | 6.52 | N/A | 4.78 | N/A | 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 3.04 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 | N/A | 8.26 | N/A |
| 2.29 | N/A | 1.90 | N/A | 1.96 | N/A | 1.63 | N/A | 1.96 | N/A | 1.55 | N/A | 1.63 | N/A | 2.94 | N/A | 1.96 | N/A | 1.55 | N/A | 1.55 | N/A | 1.96 | N/A | 1.63 | N/A | 1.96 | N/A | 1.96 | N/A |
| 5.79 | 4.27 | 2.13 | 4.03 | 3.81 | 4.98 | 2.82 | 3.94 | 3.86 | 4.71 | 4.49 | 4.22 | 4.53 | 3.68 | 1.98 | 3.68 | 1.69 | 4.12 | 1.87 | 4.35 | 1.68 | 4.04 | 1.89 | 4.48 | 1.80 | 3.94 | 1.93 | 4.16 | 2.51 | 4.15 |

| 46 | 247 | | 248 | | 249 | | 250 | | 251 | | 252 | | 253 | | 254 | | 255 | | 256 | | 257 | | 259 | | 261 | | 262 | | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 5.26 | 2.77 | 4.34 | 9.49 | 3.16 | 8.32 | 3.33 | 8.46 | 5.19 | 9.07 | 9.02 | 0.00 | 0.00 | 9.33 | 8.80 | 0.49 | 6.71 | 9.18 | 3.21 | 0.30 | 6.75 | 9.08 | 5.13 | 8.91 | 5.20 | 8.65 | 3.32 | 8.38 | 3.93 | 8.91 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.17 | 8.39 | 0.00 | 0.00 | 4.55 | 8.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 6.15 | 7.82 | 0.00 | 0.00 | 8.15 | 7.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.36 | 7.15 | 0.45 | 7.86 | 0.45 | 5.02 | 0.45 | 5.02 | 0.45 | 6.44 | 1.59 | 0.00 | 0.38 | 7.15 | 2.04 | 2.25 | 8.13 | 7.15 | 0.45 | 2.45 | 1.59 | 6.44 | 0.91 | 5.02 | 1.36 | 5.02 | 1.36 | 4.30 | 1.36 | 5.02 |
| 1.29 | 4.76 | 0.43 | 1.81 | 0.43 | 1.65 | 0.43 | 1.60 | 0.43 | 3.74 | 1.50 | 0.00 | 0.43 | 2.10 | 1.71 | 2.97 | 7.93 | 4.71 | 0.43 | 2.18 | 1.50 | 3.80 | 0.86 | 4.66 | 1.29 | 3.55 | 1.29 | 1.12 | 1.29 | 4.61 |
| 3.33 | 2.72 | 1.33 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 5.00 | 0.00 | 1.11 | 10.00 | 4.00 | 2.73 | 10.00 | 10.00 | 1.11 | 3.49 | 3.89 | 10.00 | 2.50 | 10.00 | 3.33 | 10.00 | 3.33 | 10.00 | 3.33 | 10.00 |
| N/A | 7.15 | N/A | 7.98 | N/A | 6.07 | N/A | 6.68 | N/A | 7.33 | N/A | 0.76 | N/A | 7.15 | N/A | 2.22 | N/A | 7.16 | N/A | 6.01 | N/A | 7.90 | N/A | 6.75 | N/A | 6.65 | N/A | 8.79 | N/A | 6.80 |
| N/A | 7.61 | N/A | 7.28 | N/A | 8.25 | N/A | 8.23 | N/A | 7.49 | N/A | 5.59 | N/A | 7.61 | N/A | 9.52 | N/A | 7.60 | N/A | 8.69 | N/A | 7.12 | N/A | 7.61 | N/A | 6.89 | N/A | 7.91 | N/A | 7.17 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.30 | 3.84 | 0.00 | 0.00 | 5.03 | 1.97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.21 | 3.90 | 0.00 | 0.00 | 3.10 | 2.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.27 | 4.58 | 0.52 | 3.96 | 0.76 | 4.44 | 0.54 | 3.17 | 0.61 | 4.94 | 0.60 | 1.77 | 3.37 | 5.35 | 0.92 | 6.84 | 5.42 | 5.52 | 0.82 | 7.18 | 5.27 | 7.89 | 1.22 | 5.59 | 1.19 | 7.48 | 1.41 | 3.23 | 1.26 | 4.07 |
| 1.47 | 0.71 | 4.19 | 1.01 | 4.44 | 0.50 | 4.27 | 0.88 | 4.27 | 0.92 | 4.25 | 3.39 | 3.08 | 2.79 | 4.27 | 5.43 | 3.09 | 2.57 | 4.19 | 2.24 | 3.89 | 3.60 | 1.46 | 3.48 | 1.44 | 4.09 | 0.59 | 3.99 | 1.44 | 1.78 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.11 | 2.50 | 0.00 | 0.00 | 2.85 | 2.50 | 0.00 | 0.00 | 5.60 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.20 | 2.50 | 0.00 | 0.00 | 2.84 | 2.50 | 0.00 | 0.00 | 3.89 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 6.48 | 10.00 | 7.19 | 10.00 | 6.70 | 10.00 | 6.70 | 10.00 | 6.65 | 10.00 | 9.22 | 2.50 | 6.72 | 10.00 | 9.47 | 2.50 | 6.48 | 10.00 | 9.35 | 2.50 | 7.36 | 2.50 | 7.30 | 2.50 | 7.75 | 0.00 | 7.28 | 2.50 | 7.12 |
| 0.00 | 6.59 | 0.00 | 8.20 | 0.00 | 8.37 | 0.00 | 7.09 | 0.00 | 6.59 | 0.00 | 8.47 | 0.00 | 7.58 | 0.00 | 9.35 | 0.00 | 7.46 | 0.00 | 9.04 | 0.00 | 7.47 | 0.00 | 8.15 | 0.00 | 8.45 | 0.00 | 6.34 | 0.00 | 7.07 |
| 4.12 | 2.47 | 3.70 | 3.00 | 4.35 | 3.11 | 4.26 | 2.33 | 3.90 | 3.50 | 3.75 | 3.19 | 5.01 | 3.78 | 4.04 | 6.30 | 5.33 | 3.15 | 3.94 | 3.22 | 5.21 | 5.26 | 4.20 | 3.24 | 4.37 | 3.62 | 4.58 | 1.97 | 3.86 | 3.66 |
| 0.64 | N/A | 2.25 | N/A | 2.17 | N/A | 2.17 | N/A | 2.17 | N/A | 2.69 | N/A | 0.55 | N/A | 2.17 | N/A | 1.56 | N/A | 2.08 | N/A | 0.66 | N/A | 0.55 | N/A | 2.17 | N/A | 2.28 | N/A | 0.66 | N/A |
| 6.56 | N/A | 6.72 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 6.91 | N/A | 10.00 | N/A | 10.00 | N/A | 8.82 | N/A | 6.88 | N/A | 10.00 | N/A | 6.06 | N/A | 6.64 | N/A | 5.58 | N/A |
| 8.26 | N/A | 4.78 | N/A | 4.78 | N/A | 6.52 | N/A | 3.04 | N/A | 4.78 | N/A | 6.52 | N/A | 6.52 | N/A | 6.52 | N/A | 6.52 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 7.39 | N/A | 3.04 | N/A |
| 1.55 | N/A | 1.96 | N/A | 1.96 | N/A | 1.96 | N/A | 1.96 | N/A | 3.61 | N/A | 1.55 | N/A | 5.03 | N/A | 3.27 | N/A | 1.63 | N/A | 4.99 | N/A | 4.34 | N/A | 4.42 | N/A | 1.96 | N/A | 1.55 | N/A |
| 1.98 | 3.12 | 2.14 | 3.99 | 2.30 | 3.67 | 2.37 | 3.54 | 2.27 | 3.92 | 2.99 | 2.45 | 1.92 | 4.09 | 3.13 | 4.89 | 5.23 | 4.18 | 2.27 | 4.97 | 3.99 | 4.47 | 2.21 | 4.16 | 2.01 | 4.24 | 1.80 | 3.72 | 1.57 | 3.89 |

| 63 | 264 | | 265 | | 266 | | 267 | | 269 | | 271 | | 272 | | 273 | | 274 | | 275 | | 276 | | 277 | | 278 | | 279 | | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 3.02 | 2.79 | 6.45 | 7.65 | 5.07 | 1.92 | 3.12 | 8.12 | 2.10 | 6.19 | 2.34 | 7.62 | 2.24 | 0.00 | 3.88 | 6.66 | 2.51 | 8.49 | 5.82 | 9.60 | 2.31 | 9.91 | 10.00 | 9.21 | 2.26 | 9.25 | 5.39 | 8.93 | 2.26 | 8.94 |
| 0.00 | 5.79 | 6.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.13 | 4.30 | 2.04 | 2.88 | 1.36 | 4.30 | 1.36 | 4.73 | 1.89 | 10.00 | 1.38 | 4.73 | 1.36 | 0.00 | 0.91 | 10.00 | 1.13 | 4.30 | 1.36 | 7.86 | 0.45 | 9.29 | 0.00 | 7.86 | 0.45 | 6.44 | 0.91 | 7.15 | 0.45 | 6.44 |
| 1.07 | 0.41 | 1.93 | 3.15 | 1.29 | 4.32 | 1.29 | 0.33 | 1.96 | 10.00 | 1.70 | 1.40 | 1.29 | 0.00 | 0.86 | 10.00 | 1.29 | 3.43 | 1.29 | 5.01 | 0.43 | 4.14 | 0.00 | 3.94 | 0.43 | 5.68 | 0.86 | 3.65 | 0.43 | 3.83 |
| 2.50 | 3.62 | 5.00 | 10.00 | 3.33 | 1.36 | 5.00 | 10.00 | 4.67 | 10.00 | 4.17 | 10.00 | 3.33 | 0.36 | 2.50 | 10.00 | 3.33 | 10.00 | 3.33 | 10.00 | 2.50 | 10.00 | 5.00 | 10.00 | 2.50 | 10.00 | 2.22 | 10.00 | 2.50 | 10.00 |
| N/A | 8.91 | N/A | 5.11 | N/A | 6.98 | N/A | 5.68 | N/A | 2.32 | N/A | 7.26 | N/A | 3.10 | N/A | 4.10 | N/A | 7.06 | N/A | 7.91 | N/A | 9.08 | N/A | 7.69 | N/A | 7.48 | N/A | 7.69 | N/A | 7.96 |
| N/A | 7.67 | N/A | 9.21 | N/A | 7.60 | N/A | 4.39 | N/A | 3.94 | N/A | 5.09 | N/A | 4.46 | N/A | 4.15 | N/A | 5.87 | N/A | 7.81 | N/A | 7.70 | N/A | 8.13 | N/A | 7.23 | N/A | 8.13 | N/A | 7.30 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.86 | 3.49 | 1.00 | 6.61 | 0.94 | 3.06 | 1.09 | 6.43 | 0.92 | 3.44 | 3.60 | 3.74 | 0.89 | 0.18 | 2.30 | 3.65 | 4.71 | 4.30 | 0.50 | 8.18 | 0.92 | 5.79 | 0.30 | 8.28 | 0.84 | 4.56 | 0.93 | 7.37 | 0.77 | 5.61 |
| 1.38 | 3.12 | 1.27 | 3.14 | 1.19 | 3.47 | 2.33 | 3.20 | 4.18 | 5.11 | 6.27 | 2.92 | 4.20 | 0.00 | 2.72 | 8.02 | 6.52 | 1.28 | 2.02 | 3.02 | 2.20 | 0.00 | 4.09 | 2.73 | 2.16 | 1.81 | 1.46 | 2.57 | 2.10 | 1.74 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.62 | 10.00 | 0.00 | 0.00 | 3.99 | 2.50 | 4.92 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.49 | 10.00 | 0.00 | 0.00 | 3.16 | 2.50 | 5.46 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 6.82 | 2.50 | 6.58 | 2.50 | 6.95 | 5.00 | 6.46 | 10.00 | 7.46 | 10.00 | 6.52 | 10.00 | 7.43 | 2.50 | 8.79 | 10.00 | 6.06 | 5.00 | 6.57 | 5.00 | 6.21 | 10.00 | 6.46 | 5.00 | 7.35 | 2.50 | 6.28 | 5.00 | 7.47 |
| 0.00 | 5.94 | 0.00 | 8.82 | 0.00 | 6.34 | 0.00 | 6.93 | 0.00 | 9.68 | 0.00 | 7.84 | 0.00 | 8.09 | 0.00 | 8.93 | 0.00 | 6.14 | 0.00 | 6.63 | 0.00 | 7.21 | 0.00 | 6.86 | 0.00 | 5.97 | 0.00 | 6.36 | 0.00 | 6.57 |
| 4.02 | 2.83 | 3.62 | 3.24 | 4.35 | 1.81 | 3.77 | 2.84 | 3.79 | 3.42 | 4.84 | 2.24 | 4.06 | 1.26 | 4.39 | 2.36 | 5.02 | 2.25 | 3.46 | 3.69 | 3.74 | 4.28 | 3.79 | 4.12 | 3.77 | 3.53 | 3.78 | 3.83 | 3.58 | 3.98 |
| 2.28 | N/A | 2.28 | N/A | 1.28 | N/A | 0.66 | N/A | 2.31 | N/A | 0.69 | N/A | 0.69 | N/A | 0.66 | N/A | 0.69 | N/A | 0.51 | N/A | 0.69 | N/A | 0.51 | N/A | 0.69 | N/A | 2.17 | N/A | 0.69 | N/A |
| 6.60 | N/A | 6.26 | N/A | 10.00 | N/A | 2.85 | N/A | 10.00 | N/A | 10.00 | N/A | 7.72 | N/A | 2.75 | N/A | 6.87 | N/A | 10.00 | N/A | 9.41 | N/A | 10.00 | N/A | 10.00 | N/A | 8.97 | N/A | 10.00 | N/A |
| 4.78 | N/A | 3.04 | N/A | 8.26 | N/A | 3.04 | N/A | 3.62 | N/A | 4.49 | N/A | 3.62 | N/A | 3.04 | N/A | 2.75 | N/A | 3.04 | N/A | 5.65 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 6.52 | N/A |
| 1.96 | N/A | 5.07 | N/A | 4.73 | N/A | 1.55 | N/A | 3.98 | N/A | 2.81 | N/A | 1.88 | N/A | 1.55 | N/A | 2.17 | N/A | 1.88 | N/A | 4.40 | N/A | 4.40 | N/A | 4.40 | N/A | 1.96 | N/A | 4.40 | N/A |
| 1.69 | 3.28 | 2.45 | 3.91 | 2.33 | 2.83 | 1.64 | 3.48 | 2.60 | 4.89 | 3.80 | 3.49 | 2.17 | 1.88 | 1.74 | 5.31 | 3.53 | 3.48 | 2.01 | 4.49 | 1.98 | 4.33 | 2.97 | 4.43 | 2.15 | 4.08 | 1.89 | 4.23 | 2.04 | 4.11 |

| 30 | 281 | | 282 | | 283 | | 284 | | 285 | | 286 | | 287 | | 288 | | 289 | | 290 | | 291 | | 292 | | 294 | | 296 | | 29 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 3.89 | 9.21 | 2.37 | 9.42 | 4.75 | 0.52 | 8.52 | 8.91 | 5.37 | 1.12 | 2.93 | 8.94 | 7.56 | 6.53 | 4.88 | 6.45 | 4.56 | 9.08 | 4.29 | 9.55 | 4.63 | 0.15 | 4.50 | 4.63 | 4.82 | 9.39 | 4.56 | 9.67 | 4.94 | 8.66 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.24 | 6.41 | 0.00 | 0.00 | 6.62 | 6.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.86 | 7.18 | 4.14 | 8.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.75 | 4.35 | 0.00 | 0.00 | 3.25 | 5.35 | 0.00 | 0.00 | 2.63 | 0.00 | 5.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.29 | 3.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.91 | 7.86 | 0.45 | 7.86 | 0.45 | 1.34 | 1.89 | 5.02 | 1.36 | 1.94 | 0.89 | 7.15 | 1.13 | 10.00 | 0.76 | 10.00 | 0.76 | 6.44 | 0.91 | 7.86 | 0.45 | 1.56 | 8.17 | 6.44 | 0.91 | 6.44 | 0.91 | 7.86 | 0.45 | 5.02 |
| 0.86 | 3.94 | 0.43 | 4.81 | 0.43 | 2.23 | 2.14 | 4.66 | 1.29 | 2.87 | 0.98 | 3.73 | 1.07 | 10.00 | 0.86 | 10.00 | 0.86 | 3.83 | 0.86 | 4.66 | 0.43 | 4.53 | 7.71 | 4.19 | 0.86 | 5.68 | 0.86 | 5.87 | 0.43 | 3.60 |
| 2.22 | 10.00 | 5.00 | 10.00 | 1.11 | 2.70 | 6.67 | 10.00 | 3.33 | 1.78 | 5.00 | 10.00 | 2.78 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 2.22 | 10.00 | 1.11 | 3.28 | 10.00 | 3.10 | 5.00 | 10.00 | 7.50 | 10.00 | 2.50 | 10.00 |
| N/A | 7.91 | N/A | 7.79 | N/A | 5.46 | N/A | 8.12 | N/A | 5.37 | N/A | 6.73 | N/A | 4.93 | N/A | 4.77 | N/A | 7.36 | N/A | 7.75 | N/A | 3.07 | N/A | 6.24 | N/A | 7.50 | N/A | 8.01 | N/A | 7.97 |
| N/A | 8.34 | N/A | 7.55 | N/A | 7.98 | N/A | 7.06 | N/A | 9.01 | N/A | 7.30 | N/A | 5.75 | N/A | 6.65 | N/A | 7.94 | N/A | 7.72 | N/A | 8.80 | N/A | 8.89 | N/A | 7.74 | N/A | 7.45 | N/A | 7.29 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.65 | 1.97 | 0.00 | 0.00 | 6.26 | 1.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.99 | 1.84 | 0.00 | 0.00 | 5.22 | 1.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.95 | 7.34 | 0.82 | 6.50 | 0.99 | 3.89 | 5.73 | 7.85 | 1.54 | 3.16 | 6.20 | 2.38 | 0.65 | 2.46 | 4.51 | 3.90 | 4.43 | 7.94 | 1.43 | 7.08 | 1.25 | 3.06 | 3.93 | 7.87 | 1.31 | 8.85 | 1.41 | 7.11 | 1.08 | 5.85 |
| 1.51 | 2.61 | 2.16 | 1.96 | 1.51 | 5.19 | 4.55 | 4.27 | 1.74 | 5.44 | 4.45 | 1.43 | 1.17 | 6.78 | 3.67 | 6.46 | 4.69 | 4.05 | 1.64 | 3.79 | 2.47 | 4.50 | 3.39 | 3.92 | 1.50 | 4.30 | 1.56 | 2.02 | 1.61 | 2.02 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.92 | 5.00 | 0.00 | 0.00 | 4.76 | 5.00 | 0.00 | 0.00 | 5.26 | 2.50 | 5.02 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.78 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.67 | 5.00 | 0.00 | 0.00 | 4.55 | 5.00 | 0.00 | 0.00 | 4.86 | 2.50 | 4.68 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.87 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.50 | 6.46 | 5.00 | 7.49 | 2.50 | 8.95 | 5.00 | 8.14 | 2.50 | 8.80 | 5.00 | 6.52 | 2.50 | 9.01 | 2.50 | 9.26 | 5.00 | 7.84 | 2.50 | 7.33 | 5.00 | 9.51 | 2.50 | 7.47 | 2.50 | 7.62 | 2.50 | 7.78 | 2.50 | 7.47 |
| 0.00 | 7.20 | 0.00 | 6.87 | 0.00 | 8.14 | 0.00 | 9.28 | 0.00 | 7.39 | 0.00 | 5.18 | 0.00 | 8.91 | 0.00 | 8.17 | 0.00 | 6.47 | 0.00 | 6.51 | 0.00 | 8.37 | 0.00 | 7.78 | 0.00 | 6.57 | 0.00 | 7.47 | 0.00 | 6.87 |
| 3.98 | 3.76 | 3.86 | 4.11 | 4.07 | 1.80 | 4.85 | 5.45 | 4.93 | 3.61 | 4.60 | 2.24 | 3.32 | 3.74 | 5.08 | 4.64 | 4.94 | 4.46 | 4.06 | 3.43 | 3.93 | 6.10 | 5.07 | 5.75 | 4.32 | 5.26 | 4.03 | 5.26 | 4.32 | 3.86 |
| 1.97 | N/A | 0.69 | N/A | 2.17 | N/A | 0.60 | N/A | 0.61 | N/A | 3.66 | N/A | 1.97 | N/A | 0.72 | N/A | 0.55 | N/A | 1.97 | N/A | 2.17 | N/A | 1.00 | N/A | 0.55 | N/A | 0.55 | N/A | 0.55 | N/A |
| 10.00 | N/A | 9.45 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 3.82 | N/A | 9.76 | N/A | 7.03 | N/A | 9.93 | N/A | 10.00 | N/A | 9.25 | N/A | 9.41 | N/A | 6.59 | N/A | 10.00 | N/A | 10.00 | N/A |
| 8.26 | N/A | 5.65 | N/A | 8.26 | N/A | 5.65 | N/A | 8.26 | N/A | 3.04 | N/A | 3.04 | N/A | 6.52 | N/A | 6.52 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A |
| 1.63 | N/A | 4.40 | N/A | 1.96 | N/A | 4.99 | N/A | 1.88 | N/A | 5.81 | N/A | 1.63 | N/A | 1.88 | N/A | 1.55 | N/A | 1.63 | N/A | 1.96 | N/A | 1.63 | N/A | 1.55 | N/A | 1.55 | N/A | 1.55 | N/A |
| 2.04 | 4.39 | 2.12 | 4.37 | 2.01 | 4.56 | 4.48 | 4.63 | 2.25 | 4.77 | 3.81 | 3.62 | 1.93 | 5.35 | 2.50 | 5.63 | 3.05 | 4.44 | 2.09 | 4.45 | 2.15 | 4.22 | 4.11 | 4.14 | 2.43 | 4.67 | 2.30 | 4.62 | 2.01 | 4.04 |

| 99 | 300 | |
| --- | --- | --- |
| Benefits Score | Function Score | Benefits Score |
| 4.89 | 9.18 | 3.27 |
| 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 |
| 1.59 | 6.44 | 0.91 |
| 1.29 | 4.81 | 0.86 |
| 3.33 | 10.00 | 2.22 |
| N/A | 7.73 | N/A |
| N/A | 7.60 | N/A |
| 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 |
| 1.00 | 7.63 | 1.49 |
| 1.51 | 3.98 | 1.73 |
| 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 |
| 2.50 | 8.11 | 2.50 |
| 0.00 | 9.22 | 0.00 |
| 4.07 | 3.90 | 4.90 |
| 2.08 | N/A | 0.55 |
| 9.63 | N/A | 10.00 |
| 8.26 | N/A | 8.26 |
| 1.94 | N/A | 1.55 |
| 2.21 | 4.62 | 2.01 |

# APPENDIX C. ACCDC REPORT

Atlantic Canada Conservation Data Centre
Centre de données sur la conservation du Canada atlantique

# DATA REPORT 6802: Goldboro, NS

Prepared 23 February 2021
by C. Robicheau, Data Manager

**CONTENTS OF REPORT**




**Map 1**. A 100 km buffer around the study area

## 1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; www.accdc.com) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The AC CDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the AC CDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees.

Upon request and for a fee, the AC CDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the AC CDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

### 1.1 DATA LIST

Included datasets:

| Filename | Contents |
|---|---|
| GoldboroNS_6802ob.xls | Rare or legally-protected Flora and Fauna in your study area |
| GoldboroNS_6802ob100km.xls | A list of Rare and legally protected Flora and Fauna within 100 km of your study area |
| GoldboroNS_6802ff_py.xls | Rare Freshwater Fish in your study area (DFO database) |

### 1.2 RESTRICTIONS
The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The AC CDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) AC CDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) AC CDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an AC CDC data response.

### 1.3 ADDITIONAL INFORMATION
The accompanying Data Dictionary provides metadata for the data provided.

Please direct any additional questions about AC CDC data to the following individuals:

**Plants, Lichens, Ranking Methods, All other Inquiries**
Sean Blaney, Senior Scientist, Executive Director
Tel: (506) 364-2658
sean.blaney@accdc.ca

**Animals (Fauna)**
John Klymko, Zoologist
Tel: (506) 364-2660
john.klymko@accdc.ca

**Plant Communities**
Sarah Robinson, Community Ecologist
Tel: (506) 364-2664
sarah.robinson@accdc.ca

**Data Management, GIS**
James Churchill, Data Manager
Tel: (902) 679-6146
james.churchill@accdc.ca

**Billing**
Jean Breau
Tel: (506) 364-2657
jean.breau@accdc.ca

Questions on the biology of Federal Species at Risk can be directed to AC CDC: (506) 364-2658, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Donna Hurlburt, NS DLF: (902) 679-6886. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NS DLF Regional Biologist:

**Western**: Emma Vost
(902) 670-8187
Emma.Vost@novascotia.ca

**Western**: Sarah Spencer
(902) 541-0081
Sarah.Spencer@novascotia.ca

**Central**: Shavonne Meyer
(902) 893-0816
Shavonne.Meyer@novascotia.ca

**Central**: Kimberly George
(902) 890-1046
Kimberly.George@novascotia.ca

**Eastern**: Harrison Moore
(902) 497-4119
Harrison.Moore@novascotia.ca

**Eastern**: Maureen Cameron-MacMillan
(902) 295-2554
Maureen.Cameron-MacMillan@novascotia.ca

**Eastern**: Elizabeth Walsh
(902) 563-3370
Elizabeth.Walsh@novascotia.ca

For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Garry Gregory, PEI Dept. of Communities, Land and Environment: (902) 569-7595.

# 2.0 RARE AND ENDANGERED SPECIES

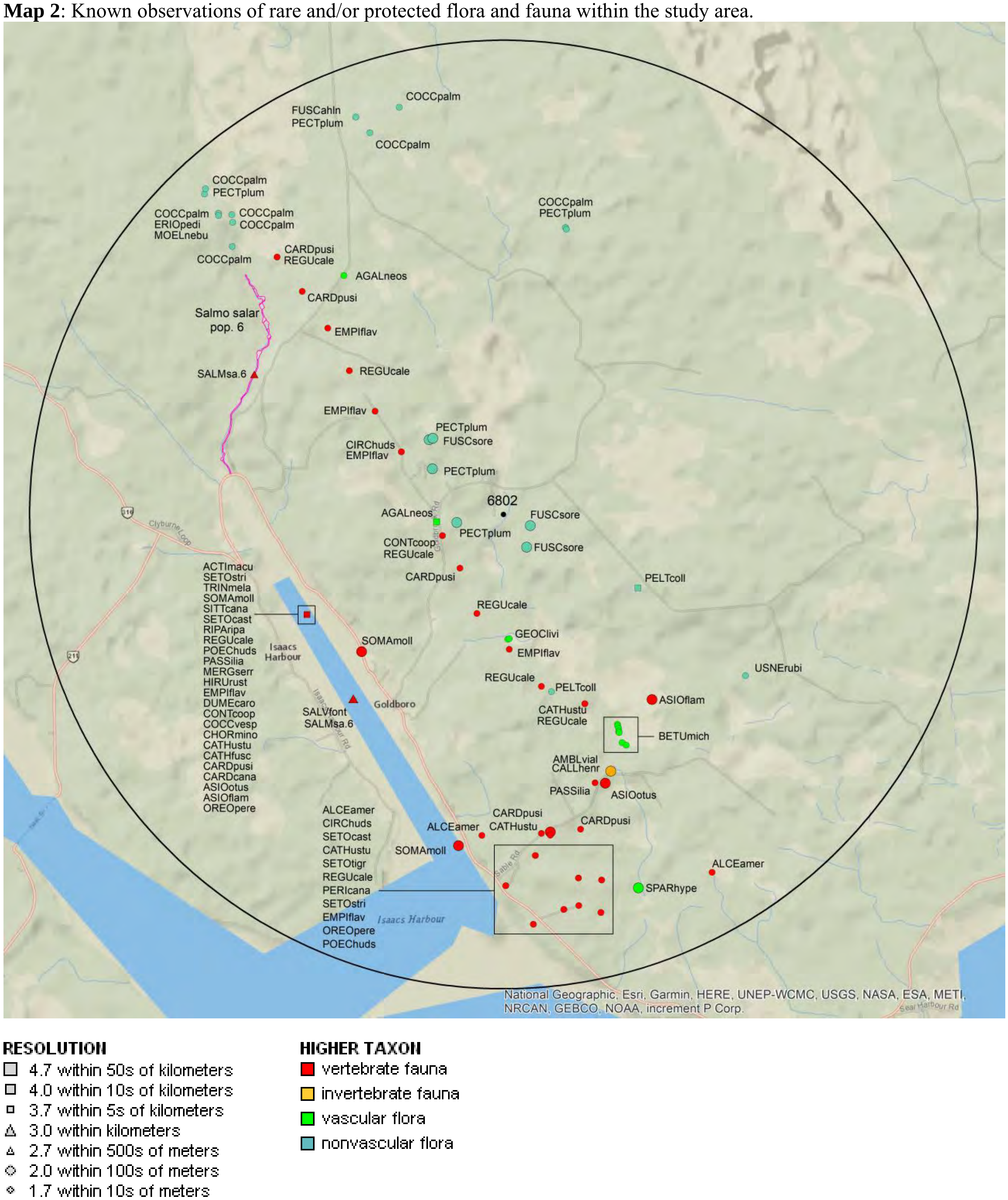
## 2.1 FLORA

The study area contains 13 records of 4 vascular and 25 records of 8 nonvascular flora (Map 2 and attached: *ob.xls).

## 2.2 FAUNA

The study area contains 81 records of 30 vertebrate and 2 records of 2 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if “location-sensitive” species occur near your study site.

**Map 2**: Known observations of rare and/or protected flora and fauna within the study area.

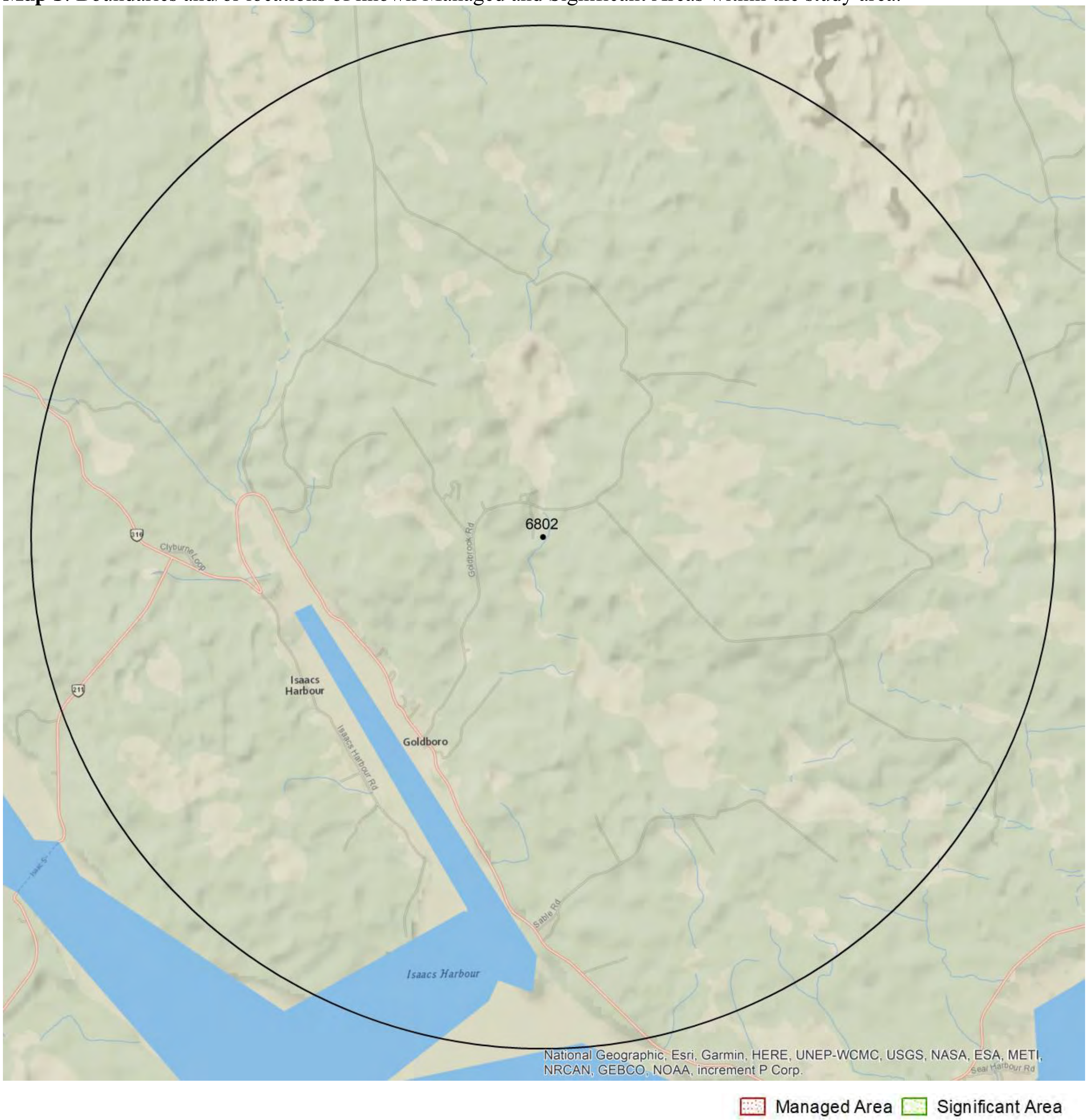


# 3.0 SPECIAL AREAS

### 3.1 MANAGED AREAS
The GIS scan identified no managed areas in the vicinity of the study area (Map 3 and attached file: *msa.xls).

### 3.2 SIGNIFICANT AREAS
The GIS scan identified no biologically significant sites in the vicinity of the study area (Map 3 and attached file: *msa.xls).

**Map 3**: Boundaries and/or locations of known Managed and Significant Areas within the study area.



# 4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding "location-sensitive" species, section 4.3) within the study area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

## 4.1 FLORA

| | Scientific *Name* | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) |
|---|---|---|---|---|---|---|---|---|
| N | *Erioderma pedicellatum (Atlantic pop.)* | Boreal Felt Lichen - Atlantic pop. | Endangered | Endangered | Endangered | S1 | 3 | 4.4 ± 0.0 |
| N | *Pectenia plumbea* | Blue Felt Lichen | Special Concern | Special Concern | Vulnerable | S3 | 6 | 0.5 ± 0.0 |
| N | *Peltigera collina* | Tree Pelt Lichen | | | | S2? | 2 | 1.6 ± 4.0 |
| N | *Usnea rubicunda* | Red Beard Lichen | | | | S2S3 | 1 | 3.1 ± 0.0 |
| N | *Fuscopannaria ahlneri* | Corrugated Shingles Lichen | | | | S3 | 1 | 4.5 ± 0.0 |
| N | *Moelleropsis nebulosa* | Blue-gray Moss Shingle Lichen | | | | S3 | 1 | 4.4 ± 0.0 |
| N | *Fuscopannaria sorediata* | a Lichen | | | | S3 | 3 | 0.3 ± 0.0 |
| N | *Coccocarpia palmicola* | Salted Shell Lichen | | | | S3S4 | 8 | 3.1 ± 0.0 |
| P | *Sparganium hyperboreum* | Northern Burreed | | | | S1S2 | 1 | 4.2 ± 0.0 |
| P | *Betula michauxii* | Michaux's Dwarf Birch | | | | S2S3 | 8 | 2.5 ± 0.0 |
| P | *Geocaulon lividum* | Northern Comandra | | | | S3 | 2 | 1.3 ± 0.0 |
| P | *Agalinis neoscotica* | Nova Scotia Agalinis | | | | S3S4 | 2 | 0.7 ± 4.0 |

## 4.2 FAUNA

| | Scientific *Name* | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) |
|---|---|---|---|---|---|---|---|---|
| A | *Salmo salar pop. 6* | Altantic Salmon - Nova Scotia Southern Upland pop. | Endangered | | | S1 | 2 | 2.5 ± 1.0 |
| A | *Riparia riparia* | Bank Swallow | Threatened | Threatened | Endangered | S2S3B | 1 | 2.3 ± 7.0 |
| A | *Hirundo rustica* | Barn Swallow | Threatened | Threatened | Endangered | S2S3B | 1 | 2.3 ± 7.0 |
| A | *Cardellina canadensis* | Canada Warbler | Threatened | Threatened | Endangered | S3B | 1 | 2.3 ± 7.0 |
| A | *Asio flammeus* | Short-eared Owl | Special Concern | Special Concern | | S1S2B | 2 | 2.3 ± 7.0 |
| A | *Chordeiles minor* | Common Nighthawk | Special Concern | Threatened | Threatened | S2B | 1 | 2.3 ± 7.0 |
| A | *Contopus cooperi* | Olive-sided Flycatcher | Special Concern | Threatened | Threatened | S2B | 2 | 0.7 ± 0.0 |
| A | *Coccothraustes vespertinus* | Evening Grosbeak | Special Concern | Special Concern | Vulnerable | S3S4B,S3N | 1 | 2.3 ± 7.0 |
| A | *Circus hudsonius* | Northern Harrier | Not At Risk | | | S3S4B | 2 | 1.3 ± 0.0 |
| A | *Alces americanus* | Moose | | | Endangered | S1 | 3 | 3.4 ± 0.0 |
| A | *Setophaga tigrina* | Cape May Warbler | | | | S2B | 1 | 3.9 ± 0.0 |
| A | *Asio otus* | Long-eared Owl | | | | S2S3 | 2 | 2.3 ± 7.0 |
| A | *Perisoreus canadensis* | Canada Jay | | | | S3 | 2 | 3.9 ± 0.0 |
| A | *Poecile hudsonicus* | Boreal Chickadee | | | | S3 | 3 | 2.3 ± 7.0 |
| A | *Sitta canadensis* | Red-breasted Nuthatch | | | | S3 | 1 | 2.3 ± 7.0 |
| A | *Salvelinus fontinalis* | Brook Trout | | | | S3 | 1 | 2.5 ± 1.0 |
| A | *Dumetella carolinensis* | Gray Catbird | | | | S3B | 1 | 2.3 ± 7.0 |
| A | *Cardellina pusilla* | Wilson's Warbler | | | | S3B | 6 | 0.7 ± 0.0 |
| A | *Tringa melanoleuca* | Greater Yellowlegs | | | | S3B,S3S4M | 1 | 2.3 ± 7.0 |
| A | *Somateria mollissima* | Common Eider | | | | S3S4 | 4 | 2.1 ± 0.0 |
| A | *Actitis macularius* | Spotted Sandpiper | | | | S3S4B | 2 | 2.3 ± 7.0 |
| A | *Empidonax flaviventris* | Yellow-bellied Flycatcher | | | | S3S4B | 7 | 1.3 ± 0.0 |
| A | *Regulus calendula* | Ruby-crowned Kinglet | | | | S3S4B | 13 | 0.7 ± 0.0 |
| A | *Catharus fuscescens* | Veery | | | | S3S4B | 1 | 2.3 ± 7.0 |
| A | *Catharus ustulatus* | Swainson's Thrush | | | | S3S4B | 10 | 2.2 ± 0.0 |
| A | *Oreothlypis peregrina* | Tennessee Warbler | | | | S3S4B | 2 | 2.3 ± 7.0 |
| A | *Setophaga castanea* | Bay-breasted Warbler | | | | S3S4B | 3 | 2.3 ± 7.0 |
| A | *Setophaga striata* | Blackpoll Warbler | | | | S3S4B | 2 | 2.3 ± 7.0 |
| A | *Passerella iliaca* | Fox Sparrow | | | | S3S4B | 2 | 2.3 ± 7.0 |

| | Scientific *Name* | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) |
|---|---|---|---|---|---|---|---|---|
| A | *Mergus serrator* | Red-breasted Merganser | | | | S3S4B,S5N | 1 | 2.3 ± 7.0 |
| I | *Callophrys henrici* | Henry's Elfin | | | | S3 | 1 | 2.9 ± 0.0 |
| I | *Amblyscirtes vialis* | Common Roadside-Skipper | | | | S3S4 | 1 | 2.9 ± 0.0 |

## 4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below with "YES".

### Nova Scotia

| Scientific *Name* | Common Name | SARA | Prov Legal Prot | Known within the Study Site? |
|---|---|---|---|---|
| *Fraxinus nigra* | Black Ash | | Threatened | No |
| *Emydoidea blandingii* | *Blanding's Turtle - Nova Scotia pop.* | Endangered | Vulnerable | No |
| *Glyptemys insculpta* | Wood Turtle | Threatened | Threatened | No |
| *Falco peregrinus pop. 1* | Peregrine Falcon - anatum/tundrius pop. | Special Concern | Vulnerable | No |
| ***Bat hibernaculum or bat species occurrence*** | | **[Endangered][1]** | **[Endangered][1]** | **YES** |

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NS Endangered Species Act.

## 4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.


| # recs | CITATION |
|---|---|
| 43 | Bell, G. 2018. Moose, bat and bird records from Goldboro LNG Project, NS, Environmental Assessment. Amec Foster Wheeler. |
| 34 | Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs. |
| 13 | Cameron, R.P. 2011. Lichen observations, 2011. Nova Scotia Environment & Labour, 731 recs. |
| 11 | LaPaix, R.W.; Crowell, M.J.; MacDonald, M.; Neily, T.D.; Quinn, G. 2017. Stantec Nova Scotia rare plant records, 2012-2016. Stantec Consulting. |
| 8 | iNaturalist. 2020. iNaturalist Data Export 2020. iNaturalist.org and iNaturalist.ca, Web site: 128728 recs. |
| 4 | Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs. |
| 2 | Klymko, J. 2018. Maritimes Butterfly Atlas database. Atlantic Canada Conservation Data Centre. |
| 1 | Cameron, R.P. 2009. Erioderma pedicellatum database, 1979-2008. Dept Environment & Labour, 103 recs. |
| 1 | Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014. |
| 1 | Munro, Marian K. Tracked lichen specimens, Nova Scotia Provincial Museum of Natural History Herbarium. Atlantic Canada Conservation Data Centre. 2019. |
| 1 | Neily, T.H. & Pepper, C.; Toms, B. 2013. Nova Scotia lichen location database. Mersey Tobeatic Research Institute, 1301 records. |
| 1 | Neily, T.H. & Pepper, C.; Toms, B. 2020. Nova Scotia lichen database [as of 2020-03-18]. Mersey Tobeatic Research Institute. |
| 1 | Neily, T.H. 2010. Erioderma Pedicellatum records 2005-09. Mersey Tobiatic Research Institute, 67 recs. |
| 1 | Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs. |


# 5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 20,364 records of 143 vertebrate and 435 records of 47 invertebrate fauna; 3536 records of 227 vascular and 1819 records of 91 nonvascular flora (attached: *ob100km.xls).

Taxa within 100 km of the study site that are rare and/or endangered in the province in which the study site occurs (including "location-sensitive" species). All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (± the precision, in km, of the record).

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| A | *Myotis lucifugus* | Little Brown Myotis | Endangered | Endangered | Endangered | S1 | 42 | 27.7 ± 0.0 | NS |
| A | *Salmo salar pop. 1* | Atlantic Salmon - Inner Bay of Fundy pop. | Endangered | Endangered | | S1 | 1 | 95.9 ± 0.0 | NS |
| A | *Salmo salar pop. 4* | Atlantic Salmon - Eastern Cape Breton pop. | Endangered | | | S1 | 10 | 55.7 ± 0.0 | NS |
| A | *Salmo salar pop. 6* | Altantic Salmon - Nova Scotia Southern Upland pop. | Endangered | | | S1 | 35 | 2.5 ± 1.0 | NS |
| A | *Charadrius melodus melodus* | Piping Plover melodus ssp | Endangered | Endangered | Endangered | S1B | 728 | 18.0 ± 7.0 | NS |
| A | *Sterna dougallii* | Roseate Tern | Endangered | Endangered | Endangered | S1B | 76 | 10.5 ± 0.0 | NS |
| A | *Dermochelys coriacea (Atlantic pop.)* | Leatherback Sea Turtle - Atlantic pop. | Endangered | Endangered | | S1S2N | 2 | 51.9 ± 0.0 | NS |
| A | *Calidris canutus rufa* | Red Knot rufa ssp | Endangered | Endangered | Endangered | S2M | 17 | 13.1 ± 0.0 | NS |
| A | *Pagophila eburnea* | Ivory Gull | Endangered | Endangered | | SNA | 1 | 82.4 ± 0.0 | NS |
| A | *Antrostomus vociferus* | Eastern Whip-Poor-Will | Threatened | Threatened | Threatened | S1?B | 2 | 58.5 ± 7.0 | NS |
| A | *Catharus bicknelli* | Bicknell's Thrush | Threatened | Threatened | Endangered | S1S2B | 1 | 75.8 ± 7.0 | NS |
| A | *Limosa haemastica* | Hudsonian Godwit | Threatened | | | S1S2M | 5 | 54.6 ± 0.0 | NS |
| A | *Glyptemys insculpta* | Wood Turtle | Threatened | Threatened | Threatened | S2 | 3865 | 22.1 ± 10.0 | NS |
| A | *Anguilla rostrata* | American Eel | Threatened | | | S2 | 3 | 81.9 ± 0.0 | NS |
| A | *Chaetura pelagica* | Chimney Swift | Threatened | Threatened | Endangered | S2B,S1M | 155 | 20.5 ± 7.0 | NS |
| A | *Riparia riparia* | Bank Swallow | Threatened | Threatened | Endangered | S2S3B | 566 | 2.3 ± 7.0 | NS |
| A | *Hirundo rustica* | Barn Swallow | Threatened | Threatened | Endangered | S2S3B | 448 | 2.3 ± 7.0 | NS |
| A | *Cardellina canadensis* | Canada Warbler | Threatened | Threatened | Endangered | S3B | 400 | 2.3 ± 7.0 | NS |
| A | *Dolichonyx oryzivorus* | Bobolink | Threatened | Threatened | Vulnerable | S3S4B | 197 | 16.4 ± 7.0 | NS |
| A | *Sturnella magna* | Eastern Meadowlark | Threatened | Threatened | | SHB | 2 | 24.3 ± 0.0 | NS |
| A | *Hylocichla mustelina* | Wood Thrush | Threatened | Threatened | | SUB | 8 | 12.0 ± 7.0 | NS |
| A | *Salmo salar pop. 12* | Atlantic Salmon - Gaspe - Southern Gulf of St Lawrence pop. | Special Concern | | | S1 | 23 | 43.5 ± 50.0 | NS |
| A | *Passerculus sandwichensis princeps* | Savannah Sparrow princeps ssp | Special Concern | Special Concern | | S1B | 3 | 16.4 ± 7.0 | NS |
| A | *Bucephala islandica (Eastern pop.)* | Barrow's Goldeneye - Eastern pop. | Special Concern | Special Concern | | S1N | 2 | 90.7 ± 0.0 | NS |
| A | *Asio flammeus* | Short-eared Owl | Special Concern | Special Concern | | S1S2B | 4 | 2.3 ± 7.0 | NS |
| A | *Euphagus carolinus* | Rusty Blackbird | Special Concern | Special Concern | Endangered | S2B | 174 | 17.2 ± 0.0 | NS |
| A | *Chordeiles minor* | Common Nighthawk | Special Concern | Threatened | Threatened | S2B | 199 | 2.3 ± 7.0 | NS |
| A | *Contopus cooperi* | Olive-sided Flycatcher | Special Concern | Threatened | Threatened | S2B | 619 | 0.7 ± 0.0 | NS |
| A | *Histrionicus histrionicus pop. 1* | Harlequin Duck - Eastern pop. | Special Concern | Special Concern | Endangered | S2N | 37 | 13.1 ± 0.0 | NS |
| A | *Balaenoptera physalus* | Fin Whale | Special Concern | Special Concern | | S2S3 | 2 | 100.0 ± 0.0 | NS |
| A | *Morone saxatilis pop. 1* | Striped Bass- Southern Gulf of St Lawrence pop. | Special Concern | | | S2S3N | 1 | 53.1 ± 1.0 | NS |
| A | *Chelydra serpentina* | Snapping Turtle | Special Concern | Special Concern | Vulnerable | S3 | 31 | 28.8 ± 0.0 | NS |
| A | *Contopus virens* | Eastern Wood-Pewee | Special Concern | Special Concern | Vulnerable | S3S4B | 229 | 12.0 ± 7.0 | NS |
| A | *Coccothraustes vespertinus* | Evening Grosbeak | Special Concern | Special Concern | Vulnerable | S3S4B,S3N | 246 | 2.3 ± 7.0 | NS |
| A | *Phocoena phocoena pop. 1* | Harbour Porpoise - Northwest Atlantic pop. | Special Concern | | | S4 | 1 | 52.2 ± 0.0 | NS |
| A | *Podiceps auritus* | Horned Grebe | Special Concern | Special Concern | | S4N | 6 | 51.4 ± 0.0 | NS |
| A | *Chrysemys picta picta* | Eastern Painted Turtle | Special Concern | | | S4S5 | 2 | 45.3 ± 1.0 | NS |
| A | *Calidris subruficollis* | Buff-breasted Sandpiper | Special Concern | Special Concern | | SNA | 1 | 85.2 ± 0.0 | NS |
| A | *Lynx canadensis* | Canadian Lynx | Not At Risk | | Endangered | S1 | 6 | 68.2 ± 1.0 | NS |
| A | *Accipiter cooperii* | Cooper's Hawk | Not At Risk | | | S1?B | 2 | 98.2 ± 0.0 | NS |
| A | *Chlidonias niger* | Black Tern | Not At Risk | | | S1B | 3 | 13.1 ± 0.0 | NS |
| A | *Falco peregrinus pop. 1* | Peregrine Falcon - anatum/tundrius | Not At Risk | Special Concern | Vulnerable | S1B,SNAM | 3 | 52.1 ± 7.0 | NS |
| A | *Aegolius funereus* | Boreal Owl | Not At Risk | | | S2?B | 5 | 31.4 ± 7.0 | NS |
| A | *Hemidactylium scutatum* | Four-toed Salamander | Not At Risk | | | S3 | 11 | 14.5 ± 0.0 | NS |
| A | *Megaptera novaeangliae* | Humpback Whale (NW | Not At Risk | | | S3 | 2 | 52.2 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| | | Atlantic pop.) | | | | | | | |
| A | *Sterna hirundo* | Common Tern | Not At Risk | | | S3B | 387 | 8.0 ± 7.0 | NS |
| A | *Sialia sialis* | Eastern Bluebird | Not At Risk | | | S3B | 14 | 12.1 ± 7.0 | NS |
| A | *Buteo lagopus* | Rough-legged Hawk | Not At Risk | | | S3N | 5 | 25.9 ± 6.0 | NS |
| A | *Accipiter gentilis* | Northern Goshawk | Not At Risk | | | S3S4 | 55 | 18.0 ± 7.0 | NS |
| A | *Lagenorhynchus acutus* | Atlantic White-sided Dolphin | Not At Risk | | | S3S4 | 4 | 52.3 ± 0.0 | NS |
| A | *Circus hudsonius* | Northern Harrier | Not At Risk | | | S3S4B | 195 | 1.3 ± 0.0 | NS |
| A | *Ammospiza nelsoni* | Nelson's Sparrow | Not At Risk | | | S3S4B | 79 | 8.0 ± 7.0 | NS |
| A | *Morone saxatilis* | Striped Bass | E,SC | | | S2S3 | 1 | 57.7 ± 0.0 | NS |
| A | *Alces americanus* | Moose | | | Endangered | S1 | 61 | 3.4 ± 0.0 | NS |
| A | *Picoides dorsalis* | American Three-toed Woodpecker | | | | S1? | 4 | 22.5 ± 7.0 | NS |
| A | *Passerina cyanea* | Indigo Bunting | | | | S1?B | 4 | 38.4 ± 7.0 | NS |
| A | *Uria aalge* | Common Murre | | | | S1?B,S5N | 1 | 78.3 ± 0.0 | NS |
| A | *Nycticorax nycticorax* | Black-crowned Night-heron | | | | S1B | 1 | 62.9 ± 7.0 | NS |
| A | *Anas acuta* | Northern Pintail | | | | S1B | 3 | 38.4 ± 7.0 | NS |
| A | *Oxyura jamaicensis* | Ruddy Duck | | | | S1B | 2 | 50.5 ± 7.0 | NS |
| A | *Haematopus palliatus* | American Oystercatcher | | | | S1B | 7 | 51.5 ± 7.0 | NS |
| A | *Myiarchus crinitus* | Great Crested Flycatcher | | | | S1B | 1 | 100.0 ± 7.0 | NS |
| A | *Mimus polyglottos* | Northern Mockingbird | | | | S1B | 16 | 13.2 ± 0.0 | NS |
| A | *Toxostoma rufum* | Brown Thrasher | | | | S1B | 4 | 48.2 ± 0.0 | NS |
| A | *Vireo gilvus* | Warbling Vireo | | | | S1B | 5 | 53.7 ± 7.0 | NS |
| A | *Setophaga pinus* | Pine Warbler | | | | S1B | 4 | 51.4 ± 0.0 | NS |
| A | *Calidris minutilla* | Least Sandpiper | | | | S1B,S3M | 147 | 13.2 ± 0.0 | NS |
| A | *Charadrius semipalmatus* | Semipalmated Plover | | | | S1B,S3S4M | 246 | 12.5 ± 0.0 | NS |
| A | *Vespertilionidae sp.* | bat species | | | | S1S2 | 64 | 3.2 ± 0.0 | NS |
| A | *Pluvialis dominica* | American Golden-Plover | | | | S1S2M | 22 | 54.6 ± 0.0 | NS |
| A | *Vireo philadelphicus* | Philadelphia Vireo | | | | S2?B | 16 | 13.1 ± 0.0 | NS |
| A | *Spatula clypeata* | Northern Shoveler | | | | S2B | 1 | 93.9 ± 0.0 | NS |
| A | *Mareca strepera* | Gadwall | | | | S2B | 2 | 49.4 ± 0.0 | NS |
| A | *Empidonax traillii* | Willow Flycatcher | | | | S2B | 4 | 38.4 ± 7.0 | NS |
| A | *Setophaga tigrina* | Cape May Warbler | | | | S2B | 73 | 3.9 ± 0.0 | NS |
| A | *Piranga olivacea* | Scarlet Tanager | | | | S2B | 5 | 51.1 ± 7.0 | NS |
| A | *Pooecetes gramineus* | Vesper Sparrow | | | | S2B | 6 | 22.5 ± 7.0 | NS |
| A | *Molothrus ater* | Brown-headed Cowbird | | | | S2B | 31 | 20.5 ± 7.0 | NS |
| A | *Bucephala clangula* | Common Goldeneye | | | | S2B,S5N | 111 | 7.1 ± 12.0 | NS |
| A | *Branta bernicla* | Brant | | | | S2M | 1 | 36.1 ± 16.0 | NS |
| A | *Phalacrocorax carbo* | Great Cormorant | | | | S2S3 | 94 | 13.1 ± 0.0 | NS |
| A | *Asio otus* | Long-eared Owl | | | | S2S3 | 23 | 2.3 ± 7.0 | NS |
| A | *Spinus pinus* | Pine Siskin | | | | S2S3 | 220 | 8.0 ± 7.0 | NS |
| A | *Cathartes aura* | Turkey Vulture | | | | S2S3B | 2 | 85.8 ± 0.0 | NS |
| A | *Rallus limicola* | Virginia Rail | | | | S2S3B | 7 | 39.0 ± 7.0 | NS |
| A | *Tringa semipalmata* | Willet | | | | S2S3B | 537 | 8.0 ± 7.0 | NS |
| A | *Petrochelidon pyrrhonota* | Cliff Swallow | | | | S2S3B | 101 | 16.4 ± 7.0 | NS |
| A | *Pheucticus ludovicianus* | Rose-breasted Grosbeak | | | | S2S3B | 161 | 8.0 ± 7.0 | NS |
| A | *Icterus galbula* | Baltimore Oriole | | | | S2S3B | 22 | 37.3 ± 7.0 | NS |
| A | *Pinicola enucleator* | Pine Grosbeak | | | | S2S3B,S5N | 78 | 12.0 ± 7.0 | NS |
| A | *Numenius phaeopus hudsonicus* | Hudsonian Whimbrel | | | | S2S3M | 57 | 13.1 ± 0.0 | NS |
| A | *Calidris melanotos* | Pectoral Sandpiper | | | | S2S3M | 27 | 13.2 ± 0.0 | NS |
| A | *Perisoreus canadensis* | Canada Jay | | | | S3 | 365 | 3.9 ± 0.0 | NS |
| A | *Poecile hudsonicus* | Boreal Chickadee | | | | S3 | 667 | 2.3 ± 7.0 | NS |
| A | *Sitta canadensis* | Red-breasted Nuthatch | | | | S3 | 486 | 2.3 ± 7.0 | NS |
| A | *Alosa pseudoharengus* | Alewife | | | | S3 | 19 | 19.1 ± 1.0 | NS |
| A | *Salvelinus fontinalis* | Brook Trout | | | | S3 | 43 | 2.5 ± 1.0 | NS |
| A | *Salvelinus namaycush* | Lake Trout | | | | S3 | 1 | 81.0 ± 0.0 | NS |
| A | *Menidia menidia* | Atlantic Silverside | | | | S3 | 2 | 78.6 ± 0.0 | NS |
| A | *Pekania pennanti* | Fisher | | | | S3 | 5 | 40.1 ± 7.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| A | *Calidris maritima* | Purple Sandpiper | | | | S3?N | 31 | 13.1 ± 0.0 | NS |
| A | *Calcarius lapponicus* | Lapland Longspur | | | | S3?N | 2 | 59.7 ± 0.0 | NS |
| A | *Falco sparverius* | American Kestrel | | | | S3B | 227 | 12.1 ± 7.0 | NS |
| A | *Charadrius vociferus* | Killdeer | | | | S3B | 159 | 16.4 ± 7.0 | NS |
| A | *Gallinago delicata* | Wilson's Snipe | | | | S3B | 239 | 8.0 ± 7.0 | NS |
| A | *Sterna paradisaea* | Arctic Tern | | | | S3B | 109 | 8.0 ± 7.0 | NS |
| A | *Coccyzus erythropthalmus* | Black-billed Cuckoo | | | | S3B | 44 | 22.5 ± 7.0 | NS |
| A | *Tyrannus tyrannus* | Eastern Kingbird | | | | S3B | 73 | 13.1 ± 0.0 | NS |
| A | *Dumetella carolinensis* | Gray Catbird | | | | S3B | 165 | 2.3 ± 7.0 | NS |
| A | *Cardellina pusilla* | Wilson's Warbler | | | | S3B | 68 | 0.7 ± 0.0 | NS |
| A | *Tringa melanoleuca* | Greater Yellowlegs | | | | S3B,S3S4M | 304 | 2.3 ± 7.0 | NS |
| A | *Oceanodroma leucorhoa* | Leach's Storm-Petrel | | | | S3B,S5M | 67 | 13.1 ± 0.0 | NS |
| A | *Rissa tridactyla* | Black-legged Kittiwake | | | | S3B,S5N | 2 | 13.4 ± 0.0 | NS |
| A | *Fratercula arctica* | Atlantic Puffin | | | | S3B,S5N | 4 | 13.1 ± 0.0 | NS |
| A | *Pluvialis squatarola* | Black-bellied Plover | | | | S3M | 190 | 13.0 ± 0.0 | NS |
| A | *Tringa flavipes* | Lesser Yellowlegs | | | | S3M | 229 | 13.1 ± 0.0 | NS |
| A | *Arenaria interpres* | Ruddy Turnstone | | | | S3M | 85 | 13.1 ± 0.0 | NS |
| A | *Calidris pusilla* | Semipalmated Sandpiper | | | | S3M | 194 | 13.1 ± 0.0 | NS |
| A | *Calidris fuscicollis* | White-rumped Sandpiper | | | | S3M | 58 | 59.2 ± 0.0 | NS |
| A | *Limnodromus griseus* | Short-billed Dowitcher | | | | S3M | 122 | 13.1 ± 0.0 | NS |
| A | *Calidris alba* | Sanderling | | | | S3M,S2N | 108 | 13.1 ± 0.0 | NS |
| A | *Chroicocephalus ridibundus* | Black-headed Gull | | | | S3N | 18 | 54.2 ± 0.0 | NS |
| A | *Somateria mollissima* | Common Eider | | | | S3S4 | 553 | 2.1 ± 0.0 | NS |
| A | *Picoides arcticus* | Black-backed Woodpecker | | | | S3S4 | 91 | 8.0 ± 7.0 | NS |
| A | *Loxia curvirostra* | Red Crossbill | | | | S3S4 | 56 | 18.0 ± 7.0 | NS |
| A | *Botaurus lentiginosus* | American Bittern | | | | S3S4B | 141 | 20.6 ± 0.0 | NS |
| A | *Spatula discors* | Blue-winged Teal | | | | S3S4B | 71 | 19.1 ± 7.0 | NS |
| A | *Actitis macularius* | Spotted Sandpiper | | | | S3S4B | 511 | 2.3 ± 7.0 | NS |
| A | *Empidonax flaviventris* | Yellow-bellied Flycatcher | | | | S3S4B | 539 | 1.3 ± 0.0 | NS |
| A | *Regulus calendula* | Ruby-crowned Kinglet | | | | S3S4B | 1221 | 0.7 ± 0.0 | NS |
| A | *Catharus fuscescens* | Veery | | | | S3S4B | 211 | 2.3 ± 7.0 | NS |
| A | *Catharus ustulatus* | Swainson's Thrush | | | | S3S4B | 954 | 2.2 ± 0.0 | NS |
| A | *Oreothlypis peregrina* | Tennessee Warbler | | | | S3S4B | 159 | 2.3 ± 7.0 | NS |
| A | *Setophaga castanea* | Bay-breasted Warbler | | | | S3S4B | 311 | 2.3 ± 7.0 | NS |
| A | *Setophaga striata* | Blackpoll Warbler | | | | S3S4B | 89 | 2.3 ± 7.0 | NS |
| A | *Passerella iliaca* | Fox Sparrow | | | | S3S4B | 87 | 2.3 ± 7.0 | NS |
| A | *Mergus serrator* | Red-breasted Merganser | | | | S3S4B,S5N | 116 | 2.3 ± 7.0 | NS |
| A | *Bucephala albeola* | Bufflehead | | | | S3S4N | 38 | 7.1 ± 12.0 | NS |
| A | *Lanius borealis* | Northern Shrike | | | | S3S4N | 1 | 78.7 ± 1.0 | NS |
| A | *Leucophaeus atricilla* | Laughing Gull | | | | SHB | 3 | 13.1 ± 0.0 | NS |
| A | *Progne subis* | Purple Martin | | | | SHB | 4 | 13.1 ± 0.0 | NS |
| A | *Eremophila alpestris* | Horned Lark | | | | SHB,S4S5N | 1 | 82.9 ± 7.0 | NS |
| A | *Morus bassanus* | Northern Gannet | | | | SHB,S5M | 34 | 13.2 ± 0.0 | NS |
| I | *Danaus plexippus* | Monarch | Endangered | Special Concern | Endangered | S2B | 35 | 13.0 ± 0.0 | NS |
| I | *Alasmidonta varicosa* | Brook Floater | Special Concern | Special Concern | Threatened | S1S2 | 8 | 21.0 ± 0.0 | NS |
| I | *Bombus terricola* | Yellow-banded Bumblebee | Special Concern | Special Concern | Vulnerable | S3 | 2 | 20.4 ± 0.0 | NS |
| I | *Neurocordulia michaeli* | Broadtailed Shadowdragon | | | | S1 | 26 | 27.1 ± 0.0 | NS |
| I | *Lycaena dorcas* | Dorcas Copper | | | | S1? | 19 | 82.5 ± 0.0 | NS |
| I | *Strymon melinus* | Grey Hairstreak | | | | S1S2 | 2 | 71.3 ± 1.0 | NS |
| I | *Nymphalis l-album* | Compton Tortoiseshell | | | | S1S2 | 1 | 90.3 ± 2.0 | NS |
| I | *Haematopota rara* | Shy Cleg | | | | S1S3 | 1 | 85.3 ± 0.0 | NS |
| I | *Lycaena hyllus* | Bronze Copper | | | | S2 | 2 | 36.1 ± 0.0 | NS |
| I | *Lycaena dospassosi* | Salt Marsh Copper | | | | S2 | 1 | 97.2 ± 0.0 | NS |
| I | *Satyrium calanus* | Banded Hairstreak | | | | S2 | 1 | 89.9 ± 2.0 | NS |
| I | *Aglais milberti* | Milbert's Tortoiseshell | | | | S2 | 1 | 90.3 ± 2.0 | NS |
| I | *Margaritifera margaritifera* | Eastern Pearlshell | | | | S2 | 67 | 20.2 ± 0.0 | NS |
| I | *Pantala hymenaea* | Spot-Winged Glider | | | | S2?B | 1 | 36.1 ± 1.0 | NS |
| I | *Thorybes pylades* | Northern Cloudywing | | | | S2S3 | 19 | 36.2 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| I | *Amblyscirtes hegon* | Pepper and Salt Skipper | | | | S2S3 | 5 | 32.1 ± 0.0 | NS |
| I | *Satyrium liparops* | Striped Hairstreak | | | | S2S3 | 4 | 89.2 ± 1.0 | NS |
| I | *Euphydryas phaeton* | Baltimore Checkerspot | | | | S2S3 | 24 | 24.0 ± 0.0 | NS |
| I | *Gomphus descriptus* | Harpoon Clubtail | | | | S2S3 | 16 | 69.0 ± 0.0 | NS |
| I | *Ophiogomphus aspersus* | Brook Snaketail | | | | S2S3 | 5 | 69.0 ± 0.0 | NS |
| I | *Ophiogomphus mainensis* | Maine Snaketail | | | | S2S3 | 14 | 54.0 ± 0.0 | NS |
| I | *Ophiogomphus rupinsulensis* | Rusty Snaketail | | | | S2S3 | 36 | 27.1 ± 0.0 | NS |
| I | *Alasmidonta undulata* | Triangle Floater | | | | S2S3 | 7 | 33.9 ± 0.0 | NS |
| I | *Naemia seriata* | a Ladybird beetle | | | | S3 | 1 | 54.8 ± 0.0 | NS |
| I | *Iphthiminus opacus* | a Darkling Beetle | | | | S3 | 1 | 85.8 ± 0.0 | NS |
| I | *Monochamus marmorator* | a Longhorned Beetle | | | | S3 | 2 | 20.3 ± 0.0 | NS |
| I | *Callophrys henrici* | Henry's Elfin | | | | S3 | 2 | 2.9 ± 0.0 | NS |
| I | *Callophrys lanoraieensis* | Bog Elfin | | | | S3 | 1 | 72.3 ± 1.0 | NS |
| I | *Speyeria aphrodite* | Aphrodite Fritillary | | | | S3 | 4 | 44.7 ± 100.0 | NS |
| I | *Polygonia faunus* | Green Comma | | | | S3 | 7 | 36.1 ± 0.0 | NS |
| I | *Megisto cymela* | Little Wood-satyr | | | | S3 | 1 | 79.5 ± 1.0 | NS |
| I | *Oeneis jutta* | Jutta Arctic | | | | S3 | 4 | 39.7 ± 0.0 | NS |
| I | *Aeshna clepsydra* | Mottled Darner | | | | S3 | 3 | 46.1 ± 1.0 | NS |
| I | *Aeshna constricta* | Lance-Tipped Darner | | | | S3 | 1 | 99.5 ± 1.0 | NS |
| I | *Boyeria grafiana* | Ocellated Darner | | | | S3 | 7 | 27.2 ± 0.0 | NS |
| I | *Gomphaeschna furcillata* | Harlequin Darner | | | | S3 | 3 | 56.6 ± 0.0 | NS |
| I | *Nannothemis bella* | Elfin Skimmer | | | | S3 | 3 | 56.6 ± 0.0 | NS |
| I | *Sympetrum danae* | Black Meadowhawk | | | | S3 | 8 | 7.6 ± 0.0 | NS |
| I | *Enallagma vernale* | Vernal Bluet | | | | S3 | 4 | 64.1 ± 0.0 | NS |
| I | *Amphiagrion saucium* | Eastern Red Damsel | | | | S3 | 4 | 85.3 ± 0.0 | NS |
| I | *Cupido comyntas* | Eastern Tailed Blue | | | | S3? | 1 | 71.5 ± 0.0 | NS |
| I | *Polygonia interrogationis* | Question Mark | | | | S3B | 18 | 17.6 ± 0.0 | NS |
| I | *Erynnis juvenalis* | Juvenal's Duskywing | | | | S3S4 | 1 | 51.0 ± 1.0 | NS |
| I | *Amblyscirtes vialis* | Common Roadside-Skipper | | | | S3S4 | 16 | 2.9 ± 0.0 | NS |
| I | *Polygonia progne* | Grey Comma | | | | S3S4 | 20 | 34.0 ± 0.0 | NS |
| I | *Lanthus parvulus* | Northern Pygmy Clubtail | | | | S3S4 | 10 | 28.6 ± 0.0 | NS |
| I | *Lampsilis radiata* | Eastern Lampmussel | | | | S3S4 | 16 | 28.4 ± 0.0 | NS |
| N | *Erioderma pedicellatum (Atlantic pop.)* | Boreal Felt Lichen - Atlantic pop. | Endangered | Endangered | Endangered | S1 | 488 | 4.4 ± 0.0 | NS |
| N | *Erioderma mollissimum* | Graceful Felt Lichen | Endangered | Endangered | Endangered | S1S2 | 14 | 45.1 ± 0.0 | NS |
| N | *Peltigera hydrothyria* | Eastern Waterfan | Threatened | Threatened | Threatened | S1 | 6 | 49.6 ± 0.0 | NS |
| N | *Pannaria lurida* | Wrinkled Shingle Lichen | Threatened | Threatened | Threatened | S1S2 | 1 | 97.7 ± 0.0 | NS |
| N | *Fuscopannaria leucosticta* | White-rimmed Shingle Lichen | Threatened | | | S2S3 | 5 | 67.6 ± 0.0 | NS |
| N | *Anzia colpodes* | Black-foam Lichen | Threatened | Threatened | Threatened | S3 | 8 | 50.7 ± 0.0 | NS |
| N | *Sclerophora peronella (Atlantic pop.)* | Frosted Glass-whiskers (Atlantic population) | Special Concern | Special Concern | | S1? | 21 | 11.2 ± 0.0 | NS |
| N | *Pectenia plumbea* | Blue Felt Lichen | Special Concern | Special Concern | Vulnerable | S3 | 146 | 0.5 ± 0.0 | NS |
| N | *Fissidens exilis* | Pygmy Pocket Moss | Not At Risk | | | S1S2 | 5 | 42.2 ± 0.0 | NS |
| N | *Pseudevernia cladonia* | Ghost Antler Lichen | Not At Risk | | | S2S3 | 4 | 10.5 ± 0.0 | NS |
| N | *Cinclidium stygium* | Sooty Cupola Moss | | | | S1 | 2 | 88.0 ± 0.0 | NS |
| N | *Cladonia brevis* | Short Peg Lichen | | | | S1 | 1 | 85.6 ± 0.0 | NS |
| N | *Conardia compacta* | Coast Creeping Moss | | | | S1? | 1 | 99.8 ± 2.0 | NS |
| N | *Oligotrichum hercynicum* | Hercynian Hair Moss | | | | S1? | 1 | 98.0 ± 0.0 | NS |
| N | *Lichina confinis* | Marine Seaweed Lichen | | | | S1? | 2 | 89.1 ± 2.0 | NS |
| N | *Polychidium muscicola* | Eyed Mossthorns Woollybear Lichen | | | | S1? | 2 | 43.9 ± 0.0 | NS |
| N | *Parmeliella parvula* | Poor-man's Shingles Lichen | | | | S1? | 6 | 9.8 ± 0.0 | NS |
| N | *Sphagnum platyphyllum* | Flat-leaved Peat Moss | | | | S1S2 | 4 | 82.0 ± 0.0 | NS |
| N | *Cyrto-hypnum minutulum* | Tiny Cedar Moss | | | | S1S2 | 1 | 77.0 ± 0.0 | NS |
| N | *Hamatocaulis vernicosus* | a Moss | | | | S1S2 | 1 | 91.2 ± 0.0 | NS |
| N | *Barbilophozia lycopodioides* | Greater Pawwort | | | | S1S3 | 1 | 98.9 ± 0.0 | NS |
| N | *Peltigera neckeri* | Black-saddle Pelt Lichen | | | | S1S3 | 1 | 52.9 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| N | *Riccardia multifida* | Delicate Germanderwort | | | | S2? | 1 | 20.3 ± 0.0 | NS |
| N | *Anacamptodon splachnoides* | a Moss | | | | S2? | 1 | 44.6 ± 0.0 | NS |
| N | *Anomodon viticulosus* | a Moss | | | | S2? | 1 | 99.4 ± 0.0 | NS |
| N | *Atrichum angustatum* | Lesser Smoothcap Moss | | | | S2? | 1 | 54.9 ± 3.0 | NS |
| N | *Campylium polygamum* | a Moss | | | | S2? | 2 | 52.9 ± 0.0 | NS |
| N | *Campylium radicale* | Long-stalked Fine Wet Moss | | | | S2? | 1 | 83.5 ± 0.0 | NS |
| N | *Fissidens taxifolius* | Yew-leaved Pocket Moss | | | | S2? | 2 | 99.4 ± 0.0 | NS |
| N | *Platydictya jungermannioides* | False Willow Moss | | | | S2? | 3 | 59.1 ± 0.0 | NS |
| N | *Pohlia sphagnicola* | a moss | | | | S2? | 1 | 36.4 ± 0.0 | NS |
| N | *Scorpidium scorpioides* | Hooked Scorpion Moss | | | | S2? | 2 | 83.4 ± 0.0 | NS |
| N | *Sphagnum subnitens* | Lustrous Peat Moss | | | | S2? | 2 | 94.3 ± 0.0 | NS |
| N | *Tetraplodon angustatus* | Toothed-leaved Nitrogen Moss | | | | S2? | 3 | 41.9 ± 0.0 | NS |
| N | *Tortella fragilis* | Fragile Twisted Moss | | | | S2? | 1 | 98.8 ± 0.0 | NS |
| N | *Leptogium teretiusculum* | Beaded Jellyskin Lichen | | | | S2? | 4 | 59.1 ± 0.0 | NS |
| N | *Cladonia labradorica* | Labrador Lichen | | | | S2? | 1 | 11.0 ± 0.0 | NS |
| N | *Peltigera collina* | Tree Pelt Lichen | | | | S2? | 29 | 1.6 ± 4.0 | NS |
| N | *Tetraplodon mnioides* | Entire-leaved Nitrogen Moss | | | | S2S3 | 1 | 51.6 ± 0.0 | NS |
| N | *Limprichtia revolvens* | a Moss | | | | S2S3 | 5 | 81.6 ± 0.0 | NS |
| N | *Collema leptaleum* | Crumpled Bat's Wing Lichen | | | | S2S3 | 1 | 55.4 ± 0.0 | NS |
| N | *Solorina saccata* | Woodland Owl Lichen | | | | S2S3 | 5 | 53.5 ± 0.0 | NS |
| N | *Ahtiana aurescens* | Eastern Candlewax Lichen | | | | S2S3 | 4 | 68.2 ± 0.0 | NS |
| N | *Cetraria muricata* | Spiny Heath Lichen | | | | S2S3 | 2 | 5.4 ± 1.0 | NS |
| N | *Cladonia incrassata* | Powder-foot British Soldiers Lichen | | | | S2S3 | 1 | 50.5 ± 0.0 | NS |
| N | *Leptogium tenuissimum* | Birdnest Jellyskin Lichen | | | | S2S3 | 12 | 5.2 ± 0.0 | NS |
| N | *Parmelia fertilis* | Fertile Shield Lichen | | | | S2S3 | 1 | 91.3 ± 0.0 | NS |
| N | *Usnea mutabilis* | Bloody Beard Lichen | | | | S2S3 | 1 | 82.8 ± 0.0 | NS |
| N | *Usnea rubicunda* | Red Beard Lichen | | | | S2S3 | 2 | 3.1 ± 0.0 | NS |
| N | *Stereocaulon condensatum* | Granular Soil Foam Lichen | | | | S2S3 | 4 | 61.8 ± 0.0 | NS |
| N | *Cladonia coccifera* | Eastern Boreal Pixie-cup Lichen | | | | S2S3 | 3 | 22.2 ± 0.0 | NS |
| N | *Collema tenax* | Soil Tarpaper Lichen | | | | S3 | 1 | 56.4 ± 0.0 | NS |
| N | *Collema nigrescens* | Blistered Tarpaper Lichen | | | | S3 | 4 | 59.6 ± 0.0 | NS |
| N | *Sticta fuliginosa* | Peppered Moon Lichen | | | | S3 | 14 | 11.1 ± 0.0 | NS |
| N | *Leptogium subtile* | Appressed Jellyskin Lichen | | | | S3 | 5 | 56.4 ± 0.0 | NS |
| N | *Fuscopannaria ahlneri* | Corrugated Shingles Lichen | | | | S3 | 38 | 4.5 ± 0.0 | NS |
| N | *Heterodermia speciosa* | Powdered Fringe Lichen | | | | S3 | 7 | 29.0 ± 0.0 | NS |
| N | *Heterodermia squamulosa* | Scaly Fringe Lichen | | | | S3 | 1 | 46.5 ± 0.0 | NS |
| N | *Leptogium corticola* | Blistered Jellyskin Lichen | | | | S3 | 22 | 45.8 ± 0.0 | NS |
| N | *Leptogium lichenoides* | Tattered Jellyskin Lichen | | | | S3 | 10 | 50.4 ± 0.0 | NS |
| N | *Nephroma bellum* | Naked Kidney Lichen | | | | S3 | 4 | 60.4 ± 0.0 | NS |
| N | *Placynthium nigrum* | Common Ink Lichen | | | | S3 | 1 | 60.7 ± 10.0 | NS |
| N | *Platismatia norvegica* | Oldgrowth Rag Lichen | | | | S3 | 2 | 14.3 ± 0.0 | NS |
| N | *Moelleropsis nebulosa* | Blue-gray Moss Shingle Lichen | | | | S3 | 31 | 4.4 ± 0.0 | NS |
| N | *Fuscopannaria sorediata* | a Lichen | | | | S3 | 7 | 0.3 ± 0.0 | NS |
| N | *Ephebe lanata* | Waterside Rockshag Lichen | | | | S3 | 2 | 37.4 ± 0.0 | NS |
| N | *Anomodon tristis* | a Moss | | | | S3? | 1 | 55.6 ± 0.0 | NS |
| N | *Sphagnum riparium* | Streamside Peat Moss | | | | S3? | 2 | 90.8 ± 0.0 | NS |
| N | *Phaeophyscia pusilloides* | Pompom-tipped Shadow Lichen | | | | S3? | 4 | 60.1 ± 0.0 | NS |
| N | *Cladonia stygia* | Black-footed Reindeer Lichen | | | | S3? | 2 | 45.1 ± 0.0 | NS |
| N | *Dicranella varia* | a Moss | | | | S3S4 | 3 | 82.9 ± 0.0 | NS |
| N | *Dicranum leioneuron* | a Dicranum Moss | | | | S3S4 | 1 | 57.2 ± 0.0 | NS |
| N | *Encalypta procera* | Slender Extinguisher Moss | | | | S3S4 | 5 | 56.3 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| N | *Sphagnum lindbergii* | Lindberg's Peat Moss | | | | S3S4 | 5 | 36.4 ± 0.0 | NS |
| N | *Splachnum ampullaceum* | Cruet Dung Moss | | | | S3S4 | 2 | 66.5 ± 0.0 | NS |
| N | *Schistidium agassizii* | Elf Bloom Moss | | | | S3S4 | 1 | 27.3 ± 3.0 | NS |
| N | *Arctoparmelia incurva* | Finger Ring Lichen | | | | S3S4 | 4 | 52.1 ± 0.0 | NS |
| N | *Hypogymnia vittata* | Slender Monk's Hood Lichen | | | | S3S4 | 123 | 11.0 ± 0.0 | NS |
| N | *Leptogium acadiense* | Acadian Jellyskin Lichen | | | | S3S4 | 11 | 12.0 ± 0.0 | NS |
| N | *Cladonia floerkeana* | Gritty British Soldiers Lichen | | | | S3S4 | 1 | 86.0 ± 0.0 | NS |
| N | *Vahliella leucophaea* | Shelter Shingle Lichen | | | | S3S4 | 1 | 60.5 ± 0.0 | NS |
| N | *Melanohalea olivacea* | Spotted Camouflage Lichen | | | | S3S4 | 1 | 74.8 ± 0.0 | NS |
| N | *Parmotrema chinense* | Powdered Ruffle Lichen | | | | S3S4 | 1 | 46.3 ± 0.0 | NS |
| N | *Physconia detersa* | Bottlebrush Frost Lichen | | | | S3S4 | 1 | 50.7 ± 0.0 | NS |
| N | *Sphaerophorus fragilis* | Fragile Coral Lichen | | | | S3S4 | 1 | 52.6 ± 0.0 | NS |
| N | *Coccocarpia palmicola* | Salted Shell Lichen | | | | S3S4 | 627 | 3.1 ± 0.0 | NS |
| N | *Physcia tenella* | Fringed Rosette Lichen | | | | S3S4 | 1 | 45.9 ± 3.0 | NS |
| N | *Anaptychia palmulata* | Shaggy Fringed Lichen | | | | S3S4 | 23 | 10.5 ± 0.0 | NS |
| N | *Evernia prunastri* | Valley Oakmoss Lichen | | | | S3S4 | 2 | 58.8 ± 0.0 | NS |
| N | *Dermatocarpon luridum* | Brookside Stippleback Lichen | | | | S3S4 | 7 | 14.6 ± 8.0 | NS |
| N | *Heterodermia neglecta* | Fringe Lichen | | | | S3S4 | 22 | 14.6 ± 0.0 | NS |
| P | *Fraxinus nigra* | Black Ash | Threatened | | Threatened | S1S2 | 90 | 35.0 ± 0.0 | NS |
| P | *Bartonia paniculata ssp. paniculata* | Branched Bartonia | Threatened | Threatened | | SNA | 1 | 92.1 ± 10.0 | NS |
| P | *Juncus caesariensis* | New Jersey Rush | Special Concern | Special Concern | Vulnerable | S2 | 71 | 83.4 ± 0.0 | NS |
| P | *Floerkea proserpinacoides* | False Mermaidweed | Not At Risk | | | S2 | 9 | 44.1 ± 1.0 | NS |
| P | *Thuja occidentalis* | Eastern White Cedar | | | Vulnerable | S1 | 1 | 50.2 ± 0.0 | NS |
| P | *Sanicula odorata* | Clustered Sanicle | | | | S1 | 3 | 74.6 ± 0.0 | NS |
| P | *Zizia aurea* | Golden Alexanders | | | | S1 | 19 | 32.3 ± 0.0 | NS |
| P | *Arnica lonchophylla* | Northern Arnica | | | | S1 | 1 | 68.5 ± 7.0 | NS |
| P | *Bidens hyperborea* | Estuary Beggarticks | | | | S1 | 1 | 54.6 ± 1.0 | NS |
| P | *Ageratina altissima* | White Snakeroot | | | | S1 | 2 | 53.7 ± 7.0 | NS |
| P | *Cardamine dentata* | Toothed Bittercress | | | | S1 | 1 | 80.8 ± 0.0 | NS |
| P | *Cochlearia tridactylites* | Limestone Scurvy-grass | | | | S1 | 12 | 28.4 ± 0.0 | NS |
| P | *Stellaria crassifolia* | Fleshy Stitchwort | | | | S1 | 1 | 88.7 ± 2.0 | NS |
| P | *Hudsonia tomentosa* | Woolly Beach-heath | | | | S1 | 6 | 51.5 ± 1.0 | NS |
| P | *Desmodium canadense* | Canada Tick-trefoil | | | | S1 | 10 | 88.2 ± 0.0 | NS |
| P | *Fraxinus pennsylvanica* | Red Ash | | | | S1 | 1 | 51.6 ± 0.0 | NS |
| P | *Bistorta vivipara* | Alpine Bistort | | | | S1 | 1 | 77.2 ± 1.0 | NS |
| P | *Montia fontana* | Water Blinks | | | | S1 | 2 | 51.0 ± 3.0 | NS |
| P | *Agalinis purpurea var. parviflora* | Small-flowered Purple False Foxglove | | | | S1 | 2 | 83.3 ± 0.0 | NS |
| P | *Scrophularia lanceolata* | Lance-leaved Figwort | | | | S1 | 1 | 27.8 ± 1.0 | NS |
| P | *Pilea pumila* | Dwarf Clearweed | | | | S1 | 1 | 74.7 ± 6.0 | NS |
| P | *Carex alopecoidea* | Foxtail Sedge | | | | S1 | 2 | 49.9 ± 0.0 | NS |
| P | *Carex granularis* | Limestone Meadow Sedge | | | | S1 | 11 | 83.7 ± 0.0 | NS |
| P | *Carex gynocrates* | Northern Bog Sedge | | | | S1 | 11 | 84.2 ± 0.0 | NS |
| P | *Carex haydenii* | Hayden's Sedge | | | | S1 | 2 | 62.1 ± 5.0 | NS |
| P | *Carex pellita* | Woolly Sedge | | | | S1 | 7 | 88.3 ± 0.0 | NS |
| P | *Carex plantaginea* | Plantain-Leaved Sedge | | | | S1 | 2 | 96.8 ± 0.0 | NS |
| P | *Carex tenuiflora* | Sparse-Flowered Sedge | | | | S1 | 3 | 20.8 ± 1.0 | NS |
| P | *Carex tincta* | Tinged Sedge | | | | S1 | 1 | 49.9 ± 1.0 | NS |
| P | *Carex viridula var. saxilittoralis* | Greenish Sedge | | | | S1 | 4 | 90.9 ± 0.0 | NS |
| P | *Carex viridula var. elatior* | Greenish Sedge | | | | S1 | 20 | 85.3 ± 0.0 | NS |
| P | *Carex grisea* | Inflated Narrow-leaved Sedge | | | | S1 | 6 | 49.4 ± 0.0 | NS |
| P | *Cyperus lupulinus* | Hop Flatsedge | | | | S1 | 5 | 51.0 ± 0.0 | NS |
| P | *Cyperus lupulinus ssp. macilentus* | Hop Flatsedge | | | | S1 | 10 | 51.5 ± 1.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Eleocharis erythropoda* | Red-stemmed Spikerush | | | | S1 | 1 | 92.4 ± 0.0 | NS |
| P | *Iris prismatica* | Slender Blue Flag | | | | S1 | 2 | 33.3 ± 7.0 | NS |
| P | *Luzula spicata* | Spiked Woodrush | | | | S1 | 1 | 49.8 ± 0.0 | NS |
| P | *Malaxis monophyllos var. brachypoda* | North American White Adder's-mouth | | | | S1 | 1 | 39.7 ± 7.0 | NS |
| P | *Bromus latiglumis* | Broad-Glumed Brome | | | | S1 | 15 | 61.2 ± 0.0 | NS |
| P | *Elymus wiegandii* | Wiegand's Wild Rye | | | | S1 | 6 | 64.2 ± 0.0 | NS |
| P | *Elymus hystrix* | Spreading Wild Rye | | | | S1 | 1 | 78.7 ± 1.0 | NS |
| P | *Potamogeton nodosus* | Long-leaved Pondweed | | | | S1 | 1 | 36.1 ± 5.0 | NS |
| P | *Sparganium androcladum* | Branching Bur-Reed | | | | S1 | 1 | 51.9 ± 1.0 | NS |
| P | *Equisetum palustre* | Marsh Horsetail | | | | S1 | 8 | 94.7 ± 0.0 | NS |
| P | *Solidago hispida* | Hairy Goldenrod | | | | S1? | 1 | 72.1 ± 7.0 | NS |
| P | *Dichanthelium lindheimeri* | Lindheimer's Panicgrass | | | | S1? | 1 | 86.6 ± 0.0 | NS |
| P | *Rudbeckia laciniata* | Cut-Leaved Coneflower | | | | S1S2 | 2 | 37.0 ± 0.0 | NS |
| P | *Cornus suecica* | Swedish Bunchberry | | | | S1S2 | 2 | 53.2 ± 0.0 | NS |
| P | *Anemone virginiana var. alba* | Virginia Anemone | | | | S1S2 | 6 | 95.7 ± 0.0 | NS |
| P | *Parnassia parviflora* | Small-flowered Grass-of-Parnassus | | | | S1S2 | 10 | 74.8 ± 1.0 | NS |
| P | *Carex livida* | Livid Sedge | | | | S1S2 | 23 | 47.8 ± 0.0 | NS |
| P | *Juncus greenei* | Greene's Rush | | | | S1S2 | 1 | 51.6 ± 1.0 | NS |
| P | *Juncus alpinoarticulatus ssp. americanus* | Northern Green Rush | | | | S1S2 | 8 | 51.6 ± 5.0 | NS |
| P | *Platanthera huronensis* | Fragrant Green Orchid | | | | S1S2 | 2 | 57.3 ± 10.0 | NS |
| P | *Cinna arundinacea* | Sweet Wood Reed Grass | | | | S1S2 | 24 | 61.2 ± 0.0 | NS |
| P | *Sparganium hyperboreum* | Northern Burreed | | | | S1S2 | 3 | 4.2 ± 0.0 | NS |
| P | *Cryptogramma stelleri* | Steller's Rockbrake | | | | S1S2 | 17 | 97.1 ± 0.0 | NS |
| P | *Selaginella selaginoides* | Low Spikemoss | | | | S1S2 | 2 | 81.5 ± 0.0 | NS |
| P | *Carex vacillans* | Estuarine Sedge | | | | S1S3 | 3 | 49.9 ± 0.0 | NS |
| P | *Osmorhiza longistylis* | Smooth Sweet Cicely | | | | S2 | 16 | 41.0 ± 0.0 | NS |
| P | *Erigeron philadelphicus* | Philadelphia Fleabane | | | | S2 | 4 | 58.5 ± 7.0 | NS |
| P | *Symphyotrichum ciliolatum* | Fringed Blue Aster | | | | S2 | 3 | 22.4 ± 0.0 | NS |
| P | *Impatiens pallida* | Pale Jewelweed | | | | S2 | 7 | 29.1 ± 7.0 | NS |
| P | *Caulophyllum thalictroides* | Blue Cohosh | | | | S2 | 35 | 40.9 ± 0.0 | NS |
| P | *Cardamine parviflora* | Small-flowered Bittercress | | | | S2 | 2 | 94.9 ± 0.0 | NS |
| P | *Draba arabisans* | Rock Whitlow-Grass | | | | S2 | 3 | 97.8 ± 1.0 | NS |
| P | *Lobelia kalmii* | Brook Lobelia | | | | S2 | 72 | 77.1 ± 0.0 | NS |
| P | *Stellaria humifusa* | Saltmarsh Starwort | | | | S2 | 4 | 36.0 ± 0.0 | NS |
| P | *Stellaria longifolia* | Long-leaved Starwort | | | | S2 | 1 | 64.6 ± 0.0 | NS |
| P | *Oxybasis rubra* | Red Goosefoot | | | | S2 | 5 | 62.9 ± 7.0 | NS |
| P | *Crassula aquatica* | Water Pygmyweed | | | | S2 | 2 | 75.8 ± 7.0 | NS |
| P | *Myriophyllum farwellii* | Farwell's Water Milfoil | | | | S2 | 4 | 23.6 ± 0.0 | NS |
| P | *Utricularia resupinata* | Inverted Bladderwort | | | | S2 | 1 | 99.4 ± 0.0 | NS |
| P | *Persicaria arifolia* | Halberd-leaved Tearthumb | | | | S2 | 7 | 20.9 ± 0.0 | NS |
| P | *Rumex triangulivalvis* | Triangular-valve Dock | | | | S2 | 4 | 60.9 ± 6.0 | NS |
| P | *Anemonastrum canadense* | Canada Anemone | | | | S2 | 2 | 53.8 ± 3.0 | NS |
| P | *Anemone quinquefolia* | Wood Anemone | | | | S2 | 5 | 27.4 ± 0.0 | NS |
| P | *Anemone virginiana* | Virginia Anemone | | | | S2 | 31 | 50.4 ± 0.0 | NS |
| P | *Caltha palustris* | Yellow Marsh Marigold | | | | S2 | 3 | 54.0 ± 0.0 | NS |
| P | *Galium labradoricum* | Labrador Bedstraw | | | | S2 | 32 | 81.0 ± 0.0 | NS |
| P | *Salix pedicellaris* | Bog Willow | | | | S2 | 6 | 82.3 ± 0.0 | NS |
| P | *Comandra umbellata* | Bastard's Toadflax | | | | S2 | 30 | 50.7 ± 0.0 | NS |
| P | *Saxifraga paniculata ssp. laestadii* | Laestadius' Saxifrage | | | | S2 | 1 | 93.2 ± 7.0 | NS |
| P | *Tiarella cordifolia* | Heart-leaved Foamflower | | | | S2 | 2 | 54.2 ± 3.0 | NS |
| P | *Viola nephrophylla* | Northern Bog Violet | | | | S2 | 6 | 65.9 ± 0.0 | NS |
| P | *Carex bebbii* | Bebb's Sedge | | | | S2 | 10 | 44.8 ± 7.0 | NS |
| P | *Carex castanea* | Chestnut Sedge | | | | S2 | 15 | 80.9 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Carex hystericina* | Porcupine Sedge | | | | S2 | 29 | 50.3 ± 0.0 | NS |
| P | *Carex tenera* | Tender Sedge | | | | S2 | 3 | 50.4 ± 1.0 | NS |
| P | *Carex atratiformis* | Scabrous Black Sedge | | | | S2 | 2 | 96.7 ± 7.0 | NS |
| P | *Eleocharis quinqueflora* | Few-flowered Spikerush | | | | S2 | 10 | 84.8 ± 0.0 | NS |
| P | *Juncus stygius ssp. americanus* | Moor Rush | | | | S2 | 27 | 81.4 ± 1.0 | NS |
| P | *Allium schoenoprasum var. sibiricum* | Wild Chives | | | | S2 | 1 | 61.8 ± 7.0 | NS |
| P | *Lilium canadense* | Canada Lily | | | | S2 | 48 | 27.2 ± 1.0 | NS |
| P | *Cypripedium parviflorum var. pubescens* | Yellow Lady's-slipper | | | | S2 | 28 | 50.5 ± 0.0 | NS |
| P | *Cypripedium parviflorum var. makasin* | Small Yellow Lady's-Slipper | | | | S2 | 1 | 99.4 ± 0.0 | NS |
| P | *Cypripedium reginae* | Showy Lady's-Slipper | | | | S2 | 127 | 53.3 ± 0.0 | NS |
| P | *Platanthera flava var. herbiola* | Pale Green Orchid | | | | S2 | 1 | 29.7 ± 1.0 | NS |
| P | *Spiranthes lucida* | Shining Ladies'-Tresses | | | | S2 | 31 | 78.4 ± 1.0 | NS |
| P | *Dichanthelium linearifolium* | Narrow-leaved Panic Grass | | | | S2 | 1 | 90.8 ± 7.0 | NS |
| P | *Potamogeton friesii* | Fries' Pondweed | | | | S2 | 5 | 65.2 ± 0.0 | NS |
| P | *Potamogeton richardsonii* | Richardson's Pondweed | | | | S2 | 6 | 33.7 ± 0.0 | NS |
| P | *Cystopteris laurentiana* | Laurentian Bladder Fern | | | | S2 | 5 | 96.7 ± 10.0 | NS |
| P | *Dryopteris fragrans* | Fragrant Wood Fern | | | | S2 | 3 | 27.7 ± 0.0 | NS |
| P | *Polystichum lonchitis* | Northern Holly Fern | | | | S2 | 5 | 78.8 ± 5.0 | NS |
| P | *Woodsia glabella* | Smooth Cliff Fern | | | | S2 | 2 | 96.7 ± 7.0 | NS |
| P | *Symphyotrichum boreale* | Boreal Aster | | | | S2? | 52 | 82.8 ± 0.0 | NS |
| P | *Cuscuta cephalanthi* | Buttonbush Dodder | | | | S2? | 6 | 49.7 ± 0.0 | NS |
| P | *Epilobium coloratum* | Purple-veined Willowherb | | | | S2? | 3 | 56.4 ± 0.0 | NS |
| P | *Crataegus submollis* | Quebec Hawthorn | | | | S2? | 2 | 64.5 ± 7.0 | NS |
| P | *Eleocharis ovata* | Ovate Spikerush | | | | S2? | 1 | 17.2 ± 0.0 | NS |
| P | *Scirpus pedicellatus* | Stalked Bulrush | | | | S2? | 3 | 61.7 ± 0.0 | NS |
| P | *Senecio pseudoarnica* | Seabeach Ragwort | | | | S2S3 | 18 | 13.4 ± 0.0 | NS |
| P | *Betula michauxii* | Michaux's Dwarf Birch | | | | S2S3 | 19 | 2.5 ± 0.0 | NS |
| P | *Sagina nodosa* | Knotted Pearlwort | | | | S2S3 | 6 | 36.3 ± 1.0 | NS |
| P | *Sagina nodosa ssp. borealis* | Knotted Pearlwort | | | | S2S3 | 2 | 89.5 ± 0.0 | NS |
| P | *Hypericum x dissimulatum* | Disguised St. John's-wort | | | | S2S3 | 1 | 20.3 ± 1.0 | NS |
| P | *Triosteum aurantiacum* | Orange-fruited Tinker's Weed | | | | S2S3 | 151 | 40.9 ± 0.0 | NS |
| P | *Shepherdia canadensis* | Soapberry | | | | S2S3 | 8 | 94.3 ± 0.0 | NS |
| P | *Empetrum atropurpureum* | Purple Crowberry | | | | S2S3 | 1 | 52.5 ± 3.0 | NS |
| P | *Euphorbia polygonifolia* | Seaside Spurge | | | | S2S3 | 11 | 51.1 ± 0.0 | NS |
| P | *Halenia deflexa* | Spurred Gentian | | | | S2S3 | 23 | 29.1 ± 1.0 | NS |
| P | *Hedeoma pulegioides* | American False Pennyroyal | | | | S2S3 | 2 | 73.6 ± 5.0 | NS |
| P | *Polygonum aviculare ssp. buxiforme* | Box Knotweed | | | | S2S3 | 1 | 90.6 ± 0.0 | NS |
| P | *Polygonum oxyspermum ssp. raii* | Ray's Knotweed | | | | S2S3 | 4 | 22.2 ± 1.0 | NS |
| P | *Amelanchier fernaldii* | Fernald's Serviceberry | | | | S2S3 | 1 | 21.4 ± 1.0 | NS |
| P | *Potentilla canadensis* | Canada Cinquefoil | | | | S2S3 | 1 | 52.2 ± 2.0 | NS |
| P | *Galium aparine* | Common Bedstraw | | | | S2S3 | 15 | 50.1 ± 0.0 | NS |
| P | *Salix pellita* | Satiny Willow | | | | S2S3 | 1 | 47.2 ± 1.0 | NS |
| P | *Carex adusta* | Lesser Brown Sedge | | | | S2S3 | 1 | 41.5 ± 5.0 | NS |
| P | *Carex hirtifolia* | Pubescent Sedge | | | | S2S3 | 22 | 41.0 ± 0.0 | NS |
| P | *Eleocharis flavescens var. olivacea* | Bright-green Spikerush | | | | S2S3 | 3 | 45.0 ± 0.0 | NS |
| P | *Eriophorum gracile* | Slender Cottongrass | | | | S2S3 | 8 | 6.7 ± 1.0 | NS |
| P | *Cypripedium parviflorum* | Yellow Lady's-slipper | | | | S2S3 | 54 | 50.4 ± 0.0 | NS |
| P | *Poa glauca* | Glaucous Blue Grass | | | | S2S3 | 8 | 97.1 ± 0.0 | NS |
| P | *Stuckenia filiformis* | Thread-leaved Pondweed | | | | S2S3 | 10 | 60.9 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Botrychium lanceolatum ssp. angustisegmentum* | Narrow Triangle Moonwort | | | | S2S3 | 5 | 79.8 ± 0.0 | NS |
| P | *Botrychium simplex* | Least Moonwort | | | | S2S3 | 3 | 75.7 ± 1.0 | NS |
| P | *Angelica atropurpurea* | Purple-stemmed Angelica | | | | S3 | 11 | 60.3 ± 0.0 | NS |
| P | *Erigeron hyssopifolius* | Hyssop-leaved Fleabane | | | | S3 | 18 | 50.3 ± 0.0 | NS |
| P | *Bidens beckii* | Water Beggarticks | | | | S3 | 6 | 44.2 ± 0.0 | NS |
| P | *Packera paupercula* | Balsam Groundsel | | | | S3 | 59 | 50.4 ± 0.0 | NS |
| P | *Betula pumila* | Bog Birch | | | | S3 | 1 | 83.0 ± 0.0 | NS |
| P | *Campanula aparinoides* | Marsh Bellflower | | | | S3 | 9 | 35.1 ± 0.0 | NS |
| P | *Vaccinium boreale* | Northern Blueberry | | | | S3 | 5 | 21.4 ± 1.0 | NS |
| P | *Vaccinium cespitosum* | dwarf bilberry | | | | S3 | 46 | 27.0 ± 0.0 | NS |
| P | *Bartonia virginica* | Yellow Bartonia | | | | S3 | 1 | 78.7 ± 0.0 | NS |
| P | *Proserpinaca palustris* | Marsh Mermaidweed | | | | S3 | 27 | 52.8 ± 0.0 | NS |
| P | *Proserpinaca pectinata* | Comb-leaved Mermaidweed | | | | S3 | 2 | 87.8 ± 1.0 | NS |
| P | *Teucrium canadense* | Canada Germander | | | | S3 | 41 | 47.2 ± 0.0 | NS |
| P | *Decodon verticillatus* | Swamp Loosestrife | | | | S3 | 1 | 82.8 ± 7.0 | NS |
| P | *Epilobium strictum* | Downy Willowherb | | | | S3 | 6 | 36.8 ± 0.0 | NS |
| P | *Polygala sanguinea* | Blood Milkwort | | | | S3 | 3 | 7.2 ± 0.0 | NS |
| P | *Persicaria pensylvanica* | Pennsylvania Smartweed | | | | S3 | 15 | 49.6 ± 0.0 | NS |
| P | *Fallopia scandens* | Climbing False Buckwheat | | | | S3 | 26 | 29.2 ± 0.0 | NS |
| P | *Plantago rugelii* | Rugel's Plantain | | | | S3 | 2 | 93.8 ± 0.0 | NS |
| P | *Samolus parviflorus* | Seaside Brookweed | | | | S3 | 12 | 49.7 ± 0.0 | NS |
| P | *Pyrola asarifolia* | Pink Pyrola | | | | S3 | 3 | 84.1 ± 0.0 | NS |
| P | *Pyrola minor* | Lesser Pyrola | | | | S3 | 1 | 97.3 ± 2.0 | NS |
| P | *Ranunculus gmelinii* | Gmelin's Water Buttercup | | | | S3 | 46 | 33.1 ± 2.0 | NS |
| P | *Endotropis alnifolia* | alder-leaved buckthorn | | | | S3 | 335 | 52.2 ± 0.0 | NS |
| P | *Agrimonia gryposepala* | Hooked Agrimony | | | | S3 | 197 | 35.1 ± 0.0 | NS |
| P | *Amelanchier spicata* | Running Serviceberry | | | | S3 | 5 | 14.6 ± 0.0 | NS |
| P | *Galium kamtschaticum* | Northern Wild Licorice | | | | S3 | 5 | 92.1 ± 0.0 | NS |
| P | *Geocaulon lividum* | Northern Comandra | | | | S3 | 65 | 1.3 ± 0.0 | NS |
| P | *Limosella australis* | Southern Mudwort | | | | S3 | 3 | 82.0 ± 5.0 | NS |
| P | *Lindernia dubia* | Yellow-seeded False Pimperel | | | | S3 | 11 | 50.1 ± 0.0 | NS |
| P | *Laportea canadensis* | Canada Wood Nettle | | | | S3 | 16 | 40.8 ± 3.0 | NS |
| P | *Verbena hastata* | Blue Vervain | | | | S3 | 48 | 40.9 ± 0.0 | NS |
| P | *Carex cryptolepis* | Hidden-scaled Sedge | | | | S3 | 7 | 45.9 ± 1.0 | NS |
| P | *Carex eburnea* | Bristle-leaved Sedge | | | | S3 | 23 | 54.7 ± 5.0 | NS |
| P | *Carex lupulina* | Hop Sedge | | | | S3 | 11 | 49.8 ± 6.0 | NS |
| P | *Carex rosea* | Rosy Sedge | | | | S3 | 5 | 35.1 ± 4.0 | NS |
| P | *Carex tribuloides* | Blunt Broom Sedge | | | | S3 | 11 | 17.5 ± 0.0 | NS |
| P | *Carex wiegandii* | Wiegand's Sedge | | | | S3 | 2 | 47.6 ± 0.0 | NS |
| P | *Carex foenea* | Fernald's Hay Sedge | | | | S3 | 1 | 69.5 ± 0.0 | NS |
| P | *Schoenoplectus americanus* | Olney's Bulrush | | | | S3 | 1 | 49.8 ± 0.0 | NS |
| P | *Juncus subcaudatus* | Woods-Rush | | | | S3 | 6 | 13.1 ± 0.0 | NS |
| P | *Juncus dudleyi* | Dudley's Rush | | | | S3 | 84 | 31.3 ± 0.0 | NS |
| P | *Goodyera repens* | Lesser Rattlesnake-plantain | | | | S3 | 8 | 65.8 ± 0.0 | NS |
| P | *Neottia bifolia* | Southern Twayblade | | | | S3 | 47 | 11.2 ± 0.0 | NS |
| P | *Platanthera grandiflora* | Large Purple Fringed Orchid | | | | S3 | 50 | 19.1 ± 10.0 | NS |
| P | *Platanthera hookeri* | Hooker's Orchid | | | | S3 | 3 | 46.7 ± 0.0 | NS |
| P | *Platanthera orbiculata* | Small Round-leaved Orchid | | | | S3 | 2 | 37.5 ± 0.0 | NS |
| P | *Spiranthes ochroleuca* | Yellow Ladies'-tresses | | | | S3 | 3 | 82.8 ± 0.0 | NS |
| P | *Alopecurus aequalis* | Short-awned Foxtail | | | | S3 | 5 | 56.2 ± 1.0 | NS |
| P | *Dichanthelium clandestinum* | Deer-tongue Panic Grass | | | | S3 | 81 | 27.3 ± 0.0 | NS |
| P | *Potamogeton obtusifolius* | Blunt-leaved Pondweed | | | | S3 | 11 | 45.1 ± 1.0 | NS |
| P | *Potamogeton praelongus* | White-stemmed Pondweed | | | | S3 | 10 | 29.1 ± 10.0 | NS |
| P | *Potamogeton zosteriformis* | Flat-stemmed Pondweed | | | | S3 | 1 | 97.2 ± 7.0 | NS |
| P | *Sparganium natans* | Small Burreed | | | | S3 | 8 | 26.0 ± 0.0 | NS |
| P | *Asplenium trichomanes* | Maidenhair Spleenwort | | | | S3 | 4 | 46.7 ± 0.0 | NS |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Asplenium viride* | Green Spleenwort | | | | S3 | 20 | 62.3 ± 0.0 | NS |
| P | *Equisetum pratense* | Meadow Horsetail | | | | S3 | 14 | 79.3 ± 0.0 | NS |
| P | *Equisetum variegatum* | Variegated Horsetail | | | | S3 | 39 | 43.2 ± 0.0 | NS |
| P | *Isoetes tuckermanii ssp. acadiensis* | Acadian Quillwort | | | | S3 | 3 | 17.3 ± 0.0 | NS |
| P | *Diphasiastrum sitchense* | Sitka Ground-cedar | | | | S3 | 19 | 35.2 ± 1.0 | NS |
| P | *Huperzia appressa* | Mountain Firmoss | | | | S3 | 1 | 92.9 ± 1.0 | NS |
| P | *Sceptridium dissectum* | Dissected Moonwort | | | | S3 | 3 | 49.2 ± 1.0 | NS |
| P | *Polypodium appalachianum* | Appalachian Polypody | | | | S3 | 1 | 91.2 ± 0.0 | NS |
| P | *Bidens vulgata* | Tall Beggarticks | | | | S3? | 1 | 80.1 ± 0.0 | NS |
| P | *Persicaria amphibia var. emersa* | Long-root Smartweed | | | | S3? | 1 | 50.0 ± 0.0 | NS |
| P | *Diphasiastrum x sabinifolium* | Savin-leaved Ground-cedar | | | | S3? | 3 | 58.0 ± 5.0 | NS |
| P | *Atriplex glabriuscula var. franktonii* | Frankton's Saltbush | | | | S3S4 | 1 | 46.1 ± 0.0 | NS |
| P | *Suaeda calceoliformis* | Horned Sea-blite | | | | S3S4 | 5 | 28.8 ± 0.0 | NS |
| P | *Myriophyllum sibiricum* | Siberian Water Milfoil | | | | S3S4 | 2 | 54.0 ± 0.0 | NS |
| P | *Nuphar microphylla* | Small Yellow Pond-lily | | | | S3S4 | 1 | 95.9 ± 2.0 | NS |
| P | *Sanguinaria canadensis* | Bloodroot | | | | S3S4 | 141 | 40.0 ± 5.0 | NS |
| P | *Polygonum fowleri* | Fowler's Knotweed | | | | S3S4 | 4 | 54.2 ± 0.0 | NS |
| P | *Rumex fueginus* | Tierra del Fuego Dock | | | | S3S4 | 9 | 88.3 ± 0.0 | NS |
| P | *Fragaria vesca ssp. americana* | Woodland Strawberry | | | | S3S4 | 18 | 56.2 ± 0.0 | NS |
| P | *Salix petiolaris* | Meadow Willow | | | | S3S4 | 4 | 82.3 ± 0.0 | NS |
| P | *Agalinis neoscotica* | Nova Scotia Agalinis | | | | S3S4 | 3 | 0.7 ± 4.0 | NS |
| P | *Eriophorum russeolum* | Russet Cottongrass | | | | S3S4 | 7 | 46.7 ± 5.0 | NS |
| P | *Triglochin gaspensis* | Gasp├⌐ Arrowgrass | | | | S3S4 | 23 | 53.8 ± 0.0 | NS |
| P | *Juncus acuminatus* | Sharp-Fruit Rush | | | | S3S4 | 3 | 52.0 ± 0.0 | NS |
| P | *Luzula parviflora* | Small-flowered Woodrush | | | | S3S4 | 3 | 46.1 ± 0.0 | NS |
| P | *Liparis loeselii* | Loesel's Twayblade | | | | S3S4 | 9 | 40.3 ± 0.0 | NS |
| P | *Panicum philadelphicum* | Philadelphia Panicgrass | | | | S3S4 | 1 | 77.2 ± 0.0 | NS |
| P | *Trisetum spicatum* | Narrow False Oats | | | | S3S4 | 1 | 88.3 ± 0.0 | NS |
| P | *Cystopteris bulbifera* | Bulblet Bladder Fern | | | | S3S4 | 117 | 46.8 ± 1.0 | NS |
| P | *Equisetum hyemale* | Common Scouring-rush | | | | S3S4 | 1 | 82.6 ± 0.0 | NS |
| P | *Equisetum hyemale ssp. affine* | Common Scouring-rush | | | | S3S4 | 36 | 44.3 ± 0.0 | NS |
| P | *Equisetum scirpoides* | Dwarf Scouring-Rush | | | | S3S4 | 64 | 79.8 ± 0.0 | NS |
| P | *Diphasiastrum complanatum* | Northern Ground-cedar | | | | S3S4 | 2 | 82.8 ± 5.0 | NS |
| P | *Schizaea pusilla* | Little Curlygrass Fern | | | | S3S4 | 9 | 8.3 ± 0.0 | NS |
| P | *Viola canadensis* | Canada Violet | | | | SH | 1 | 97.7 ± 0.0 | NS |

## 5.1 SOURCE BIBLIOGRAPHY (100 km)

The recipient of these data shall acknowledge the AC CDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.


| # recs | CITATION |
|---|---|
| 8648 | Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs. |
| 3734 | Eaton, S. 2014. Nova Scotia Wood Turtle Database. Environment and Climate Change Canada, 4843 recs. |
| 1653 | Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs. |
| 1274 | Paquet, Julie. 2018. Atlantic Canada Shorebird Survey (ACSS) database 2012-2018. Environment Canada, Canadian Wildlife Service. |
| 822 | Morrison, Guy. 2011. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 15939 surveys. 86171 recs. |
| 668 | Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2014. Atlantic Canada Conservation Data Centre Fieldwork 2014. Atlantic Canada Conservation Data Centre, # recs. |
| 604 | iNaturalist. 2020. iNaturalist Data Export 2020. iNaturalist.org and iNaturalist.ca, Web site: 128728 recs. |
| 531 | Neily, T.H. & Pepper, C.; Toms, B. 2018. Nova Scotia lichen database [as of 2018-03]. Mersey Tobeatic Research Institute. |
| 507 | eBird. 2020. eBird Basic Dataset. Version: EBD_relFeb-2020. Ithaca, New York. Feb 2020, Cape Breton Bras d'Or Lakes Watershed subset. Cornell Lab of Ornithology, 5063 recs. |

| # recs | CITATION |
|---|---|
| 437 | Blaney, C.S.; Mazerolle, D.M. 2009. Fieldwork 2009. Atlantic Canada Conservation Data Centre. Sackville NB, 13395 recs. |
| 392 | eBird. 2020. eBird Basic Dataset. Version: EBD_relNov-2019. Ithaca, New York. Nov 2019, Cape Breton Bras d'Or Lakes Watershed subset. Cornell Lab of Ornithology. |
| 383 | Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2015. Atlantic Canada Conservation Data Centre Fieldwork 2015. Atlantic Canada Conservation Data Centre, # recs. |
| 342 | Benjamin, L.K. (compiler). 2012. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 4965 recs. |
| 338 | Neily, T.H. & Pepper, C.; Toms, B. 2013. Nova Scotia lichen location database. Mersey Tobeatic Research Institute, 1301 records. |
| 310 | Wilhelm, S.I. et al. 2011. Colonial Waterbird Database. Canadian Wildlife Service, Sackville, 2698 sites, 9718 recs (8192 obs). |
| 309 | Hicks, Andrew. 2009. Coastal Waterfowl Surveys Database, 2000-08. Canadian Wildlife Service, Sackville, 46488 recs (11149 non-zero). |
| 267 | Amirault, D.L. & Stewart, J. 2007. Piping Plover Database 1894-2006. Canadian Wildlife Service, Sackville, 3344 recs, 1228 new. |
| 266 | Churchill, J.L. 2020. Atlantic Canada Conservation Data Centre Fieldwork 2020. Atlantic Canada Conservation Data Centre, 1083 recs. |
| 263 | Neily, T.H. 2017. Nova Scotia lichen records. Mersey Tobeatic Research Institute. |
| 215 | Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs. |
| 193 | Blaney, C.S.; Mazerolle, D.M.; Hill, N.M. 2011. Nova Scotia Crown Share Land Legacy Trust Fieldwork. Atlantic Canada Conservation Data Centre, 5022 recs. |
| 181 | Belliveau, A.G. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2016. Atlantic Canada Conservation Data Centre, 10695 recs. |
| 181 | Belliveau, A.G. 2018. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre. |
| 159 | Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs. |
| 147 | Blaney, C.S.; Mazerolle, D.M. 2012. Fieldwork 2012. Atlantic Canada Conservation Data Centre, 13,278 recs. |
| 144 | Blaney, C.S & Spicer, C.D.; Popma, T.M.; Basquill, S.P. 2003. Vascular Plant Surveys of Northumberland Strait Rivers & Amherst Area Peatlands. Nova Scotia Museum Research Grant, 501 recs. |
| 124 | LaPaix, R.W.; Crowell, M.J.; MacDonald, M.; Neily, T.D.; Quinn, G. 2017. Stantec Nova Scotia rare plant records, 2012-2016. Stantec Consulting. |
| 116 | Klymko, J. 2018. Maritimes Butterfly Atlas database. Atlantic Canada Conservation Data Centre. |
| 116 | Newell, R.E. 2005. E.C. Smith Digital Herbarium. E.C. Smith Herbarium, Irving Biodiversity Collection, Acadia University, Web site: http://luxor.acadiau.ca/library/Herbarium/project/. 582 recs. |
| 106 | Blaney, C.S.; Mazerolle, D.M. 2010. Fieldwork 2010. Atlantic Canada Conservation Data Centre. Sackville NB, 15508 recs. |
| 101 | Blaney, C.S. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2016. Atlantic Canada Conservation Data Centre, 6719 recs. |
| 96 | Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2011. Atlantic Canada Conservation Data Centre. Sackville NB, 760 recs. |
| 96 | Neily, T.H. & Pepper, C.; Toms, B. 2020. Nova Scotia lichen database [as of 2020-03-18]. Mersey Tobeatic Research Institute. |
| 93 | Mazerolle, D.M. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre. |
| 92 | Bryson, I.C. 2020. Nova Scotia flora and lichen observations 2020. Nova Scotia Environment, 139 recs. |
| 89 | Pronych, G. & Wilson, A. 1993. Atlas of Rare Vascular Plants in Nova Scotia. Nova Scotia Museum, Halifax NS, I:1-168, II:169-331. 1446 recs. |
| 82 | Toms, B. 2018. Bat Species data from www.batconservation.ca for Nova Scotia. Mersey Tobeatic Research Institute, 547 Records. |
| 81 | Cameron, R.P. 2011. Lichen observations, 2011. Nova Scotia Environment & Labour, 731 recs. |
| 77 | Staicer, C. & Bliss, S.; Achenbach, L. 2017. Occurrences of tracked breeding birds in forested wetlands. , 303 records. |
| 67 | MacDonald, E.C. 2018. Piping Plover nest records from 2010-2017. Canadian Wildlife Service. |
| 67 | Manthorne, A. 2014. MaritimesSwiftwatch Project database 2013-2014. Bird Studies Canada, Sackville NB, 326 recs. |
| 65 | Belliveau, A.G. 2018. E.C. Smith Herbarium and Atlantic Canada Conservation Data Centre Fieldwork 2018. E.C. Smith Herbarium, 6226 recs. |
| 63 | Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs. |
| 56 | Pulsifer, M.D. 2002. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 369 recs. |
| 55 | Scott, F.W. 2002. Nova Scotia Herpetofauna Atlas Database. Acadia University, Wolfville NS, 8856 recs. |
| 53 | MacDonald, E.C. 2018. CWS Piping Plover Census, 2010-2017. Canadian Wildlife Service, 672 recs. |
| 48 | Neily, T.H. & Pepper, C.; Toms, B. 2015. Nova Scotia lichen location database [as of 2015-02-15]. Mersey Tobeatic Research Institute, 1691 records. |
| 45 | Bell, G. 2018. Moose, bat and bird records from Goldboro LNG Project, NS, Environmental Assessment. Amec Foster Wheeler. |
| 44 | Amirault, D.L. & McKnight, J. 2003. Piping Plover Database 1991-2003. Canadian Wildlife Service, Sackville, unpublished data. 7 recs. |
| 44 | Benjamin, L.K. 2012. NSDNR fieldwork & consultant reports 2008-2012. Nova Scotia Dept Natural Resources, 196 recs. |
| 43 | Mazerolle, D.M. 2018. Atlantic Canada Conservation Data Centre botanical fieldwork 2018. Atlantic Canada Conservation Data Centre, 13515 recs. |
| 42 | Pepper, C. 2013. 2013 rare bird and plant observations in Nova Scotia. , 181 records. |
| 41 | Cameron, R.P. 2009. Erioderma pedicellatum database, 1979-2008. Dept Environment & Labour, 103 recs. |
| 39 | Wilhelm, S.I. et al. 2019. Colonial Waterbird Database. Canadian Wildlife Service. |
| 35 | Benjamin, L.K. 2009. D. Anderson Odonata Records for Cape Breton, 1997-2004. Nova Scotia Dept Natural Resources, 1316 recs. |
| 35 | Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2013. |
| 35 | Munro, Marian K. Tracked lichen specimens, Nova Scotia Provincial Museum of Natural History Herbarium. Atlantic Canada Conservation Data Centre. 2019. |
| 34 | Canadian Wildlife Service, Dartmouth. 2010. Piping Plover censuses 2007-09, 304 recs. |
| 33 | iNaturalist. 2018. iNaturalist Data Export 2018. iNaturalist.org and iNaturalist.ca, Web site: 11700 recs. |
| 33 | Nova Scotia Nature Trust. 2013. Nova Scotia Nature Trust 2013 Species records. Nova Scotia Nature Trust, 95 recs. |
| 32 | Quigley, E.J. & Neily, P.D,. 2012. Botanical Discoveries in Inverness County, NS. Nova Scotia Dept Natural Resources. Pers. comm. to C.S. Blaney, Nov. 29, 141 rec. |
| 29 | Benjamin, L.K. (compiler). 2001. Significant Habitat & Species Database. Nova Scotia Dept of Natural Resources, 15 spp, 224 recs. |
| 25 | Benjamin, L.K. 2011. NSDNR fieldwork & consultant reports 1997, 2009-10. Nova Scotia Dept Natural Resources, 85 recs. |
| 25 | Neily, T.H. 2017. Maritmes Lichen and Bryophyte records. Atlantic Canada Conservation Data Centre, 1015 recs. |
| 24 | Neily, T.H. 2013. Email communication to Sean Blaney regarding Listera australis observations made from 2007 to 2011 in Nova Scotia. , 50. |
| 24 | Porter, C.J.M. 2014. Field work data 2007-2014. Nova Scotia Nature Trust, 96 recs. |
| 23 | Roland, A.E. & Smith, E.C. 1969. The Flora of Nova Scotia, 1st Ed. Nova Scotia Museum, Halifax, 743pp. |
| 23 | Zinck, M. & Roland, A.E. 1998. Roland's Flora of Nova Scotia. Nova Scotia Museum, 3rd ed., rev. M. Zinck; 2 Vol., 1297 pp. |

| # recs | CITATION |
|---|---|
| 22 | Chapman, C.J. 2018. Atlantic Canada Conservation Data Centre botanical fieldwork 2018. Atlantic Canada Conservation Data Centre, 11171 recs. |
| 22 | Churchill, J.L. 2019. Atlantic Canada Conservation Data Centre Fieldwork 2019. Atlantic Canada Conservation Data Centre. |
| 21 | Neily, T.H. 2010. Erioderma Pedicellatum records 2005-09. Mersey Tobiatic Research Institute, 67 recs. |
| 20 | Brunelle, P.-M. (compiler). 2009. ADIP/MDDS Odonata Database: data to 2006 inclusive. Atlantic Dragonfly Inventory Program (ADIP), 24200 recs. |
| 20 | Neily, T.H. 2012. 2012 Erioderma pedicellatum records in Nova Scotia. |
| 19 | Neily, T.H. 2019. Tom Neily NS Bryophyte records (2009-2013). T.H. Neily, Atlantic Canada Conservation Data Centre, 1029 specimen records. |
| 17 | Adams, J. & Herman, T.B. 1998. Thesis, Unpublished map of C. insculpta sightings. Acadia University, Wolfville NS, 88 recs. |
| 17 | Blaney, C.S.; Spicer, C.D. 2001. Fieldwork 2001. Atlantic Canada Conservation Data Centre. Sackville NB, 981 recs. |
| 16 | Chapman, C.N. (Cody). 2020. Nova Scotia Black Ash (Fraxinus nigra) field observations by Confederacy of Mainland Mi'kmaq. Forestry Program, Confederacy of Mainland Mi'kmaq. |
| 16 | Mazerolle, D.M. 2017. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre. |
| 15 | Clayden, S. Digitization of Wolfgang Maass Nova Scotia forest lichen collections, 1964-2004. New Brunswick Museum. 2018. |
| 14 | Cameron, R.P. 2009. Cyanolichen database. Nova Scotia Environment & Labour, 1724 recs. |
| 14 | e-Butterfly. 2016. Export of Maritimes records and photos. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org. |
| 14 | Patrick, A.; Horne, D.; Noseworthy, J. et. al. 2017. Field data for Nova Scotia and New Brunswick, 2015 and 2017. Nature Conservancy of Canada. |
| 14 | Robinson, S.L. 2011. 2011 ND dune survey field data. Atlantic Canada Conservation Data Centre, 2715 recs. |
| 13 | Cameron, R.P. 2012. Rob Cameron 2012 vascular plant data. NS Department of Environment, 30 recs. |
| 13 | Hill, N.M. 1994. Status report on the Long's bulrush Scirpus longii in Canada. Committee on the Status of Endangered Wildlife in Canada, 7 recs. |
| 13 | White, S. 2018. Notable species sightings, 2016-2017. East Coast Aquatics. |
| 13 | WIlliams, M. Cape Breton University Digital Herbarium. Cape Breton University Digital Herbarium. 2013. |
| 12 | anon. 2001. S.. H.. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 76 recs. |
| 12 | Archibald, D.R. 2003. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 213 recs. |
| 11 | Cameron, R.P. 2017. 2017 rare species field data. Nova Scotia Environment, 64 recs. |
| 11 | Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs. |
| 11 | Neily, T.H. Tom Neily NS Sphagnum records (2009-2014). T.H. Neily, Atlantic Canada Conservation Data Centre. 2019. |
| 11 | Robinson, S.L. 2015. 2014 field data. |
| 10 | Basquill, S.P., Porter, C. 2019. Bryophyte and lichen specimens submitted to the E.C. Smith Herbarium. NS Department of Lands and Forestry. |
| 10 | Holder, M.L.; Kingsley, A.L. 2000. Kinglsey and Holder observations from 2000 field work. |
| 10 | Knapton, R. & Power, T.; Williams, M. 2001. SAR Inventory: Fortress Louisbourg NP. Parks Canada, Atlantic, SARINV01-13. 157 recs. |
| 10 | Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates. |
| 9 | Bryson, I. 2020. Nova Scotia and Newfoundland rare species observations, 2018-2020. Nova Scotia Environment. |
| 9 | Gilhen, J. 1984. Amphibians & Reptiles of Nova Scotia, 1st Ed. Nova Scotia Museum, 164pp. |
| 9 | Newell, R.E. 2004. Assessment and update status report on the New Jersey Rush<br>(Juncus caesariensis) in Canada. Committee on the Status of Endangered Wildlife in Canada, 15 recs. |
| 9 | Power, T.; Gilhen, J. 2018. Status, distribution, and nesting ecology of Snapping Turtle (Chelydra serpentina) on Cape Breton Island, Nova Scotia, Canada. The Canadian Field Naturalist, 132(1): 8-17. |
| 9 | Whittam, R.M. 1999. Status Report on the Roseate Tern (update) in Canada. Committee on the Status of Endangered Wildlife in Canada, 36 recs. |
| 8 | Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs. |
| 8 | Oldham, M.J. 2000. Oldham database records from Maritime provinces. Oldham, M.J; ONHIC, 487 recs. |
| 7 | Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2013. Atlantic Canada Conservation Data Centre Fieldwork 2013. Atlantic Canada Conservation Data Centre, 9000+ recs. |
| 7 | Blaney, C.S.; Mazerolle, D.M.; Oberndorfer, E. 2007. Fieldwork 2007. Atlantic Canada Conservation Data Centre. Sackville NB, 13770 recs. |
| 7 | Cameron, R.P. 2013. 2013 rare species field data. Nova Scotia Department of Environment, 71 recs. |
| 7 | Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014. |
| 7 | NatureServe Canada. 2019. iNaturalist Maritimes Butterfly Records. iNaturalist.org and iNaturalist.ca. |
| 7 | Neily, T.H. & Pepper, C.; Toms, B. 2020. Nova Scotia lichen database [as of 2020-05-25]. Mersey Tobeatic Research Institute, 668 recs. |
| 7 | Nussey, Pat & NCC staff. 2019. AEI tracked species records, 2016-2019. Chapman, C.J. (ed.) Atlantic Canada Conservation Data Centre, 333. |
| 7 | Robinson, S.L. 2014. 2013 Field Data. Atlantic Canada Conservation Data Centre. |
| 7 | Taylor, B.R., and Tam, J.C. 2012. Local distribution of the rare plant Triosteum aurantiacum in northeastern Nova Scotia, Canada. Rhodora, 114(960): 366-382. |
| 6 | Benjamin, L.K. 2009. Boreal Felt Lichen, Mountain Avens, Orchid and other recent records. Nova Scotia Dept Natural Resources, 105 recs. |
| 6 | Cameron, R.P. 2005. Erioderma pedicellatum unpublished data. NS Dept of Environment, 9 recs. |
| 6 | NS DNR. 2017. Black Ash records from NS DNR Permanent Sample Plots (PSPs), 1965-2016. NS Dept of Natural Resources. |
| 6 | Phinney, Lori; Toms, Brad; et. al. 2016. Bank Swallows (Riparia riparia) in Nova Scotia: inventory and assessment of colonies. Merset Tobeiatc Research Institute, 25 recs. |
| 6 | Popma, T.M. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 113 recs. |
| 6 | Powell, B.C. 1967. Female sexual cycles of Chrysemy spicta & Clemmys insculpta in Nova Scotia. Can. Field-Nat., 81:134-139. 26 recs. |
| 5 | Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs. |
| 5 | Cameron, R.P. 2014. 2013-14 rare species field data. Nova Scotia Department of Environment, 35 recs. |
| 5 | Cameron, R.P. 2018. Degelia plumbea records. Nova Scotia Environment. |
| 5 | Power, T. 2019. Cape Breton Wood Turtle records. NS Lands and Forestry. |
| 5 | Richardson, D., Anderson, F., Cameron, R, McMullin, T., Clayden, S. 2014. Field Work Report on Black Foam Lichen (Anzia colpodes). COSEWIC. |
| 5 | Whittam, R.M. 1997. Status Report on the Roseate Tern (Sterna dougallii) in Canada. Committee on the Status of Endangered Wildlife in Canada, 5 recs. |
| 4 | Basquill, S.P. 2012. 2012 rare vascular plant field data. Nova Scotia Department of Natural Resources, 37 recs. |

| # recs | CITATION |
|---|---|
| 4 | Belland, R.J. Maritimes moss records from various herbarium databases. 2014. |
| 4 | Blaney, C.S.; Mazerolle, D.M. 2008. Fieldwork 2008. Atlantic Canada Conservation Data Centre. Sackville NB, 13343 recs. |
| 4 | Blaney, C.S.; Mazerolle, D.M. 2011. Fieldwork 2011. Atlantic Canada Conservation Data Centre. Sackville NB. |
| 4 | Blaney, C.S.; Spicer, C.D.; Mazerolle, D.M. 2005. Fieldwork 2005. Atlantic Canada Conservation Data Centre. Sackville NB, 2333 recs. |
| 4 | Ferguson, D.C. 1954. The Lepidoptera of Nova Scotia. Part I, macrolepidoptera. Proceedings of the Nova Scotian Institute of Science, 23(3), 161-375. |
| 4 | Neily, T.H. & Pepper, C.; Toms, B. 2018. Nova Scotia lichen database Update. Mersey Tobeatic Research Institute, 14 recs. |
| 4 | O'Neil, S. 1998. Atlantic Salmon: Northumberland Strait Nova Scotia part of SFA 18. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-08. 9 recs. |
| 4 | Plissner, J.H. & Haig, S.M. 1997. 1996 International piping plover census. US Geological Survey, Corvallis OR, 231 pp. |
| 4 | Rousseau, J. 1938. Notes Floristiques sur l'est de la Nouvelle-Ecosse in Contributions de l'Institut Botanique de l'Universite de Montreal. Universite de Montreal, 32, 13-62. 11 recs. |
| 3 | Blaney, C.S. 2000. Fieldwork 2000. Atlantic Canada Conservation Data Centre. Sackville NB, 1265 recs. |
| 3 | e-Butterfly. 2018. Selected Maritimes butterfly records from 2016 and 2017. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org. |
| 3 | Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs. |
| 3 | Manthorne, A. 2019. Incidental aerial insectivore observations. Birds Canada. |
| 3 | Neily, T.H. 2016. Email communication (May 6, 2016) to Sean Blaney regarding Fissidens exilis observations made in 2016 in Nova Scotia. Pers. Comm., 3 recs. |
| 3 | O'Neil, S. 1998. Atlantic Salmon: Eastern Shore Nova Scotia SFA 20. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-10. 4 recs. |
| 3 | Ogden, J. NS DNR Butterfly Collection Dataset. Nova Scotia Department of Natural Resources. 2014. |
| 2 | Basquill, S.P. 2012. 2012 Bryophyte specimen data. Nova Scotia Department of Natural Resources, 37 recs. |
| 2 | Blaney, C.S. Miscellaneous specimens received by ACCDC (botany). Various persons. 2001-08. |
| 2 | Cameron, B. 2005. C. palmicola, E. pedicellatum records from Sixth Lake. Pers. comm. to C.S. Blaney. 3 recs, 3 recs. |
| 2 | Cameron, R.P. 2006. Erioderma pedicellatum 2006 field data. NS Dept of Environment, 9 recs. |
| 2 | COSEWIC (Committee on the Status of Wildlife in Canada). 2013. COSEWIC Assessment and Status Report on the Eastern Waterfan Peltigera hydrothyria in Canada. COSEWIC, 46 pp. |
| 2 | Frittaion, C. 2012. NSNT 2012 Field Observations. Nova Scotia Nature Trust, Pers comm. to S. Blaney Feb. 7, 34 recs. |
| 2 | Gillis, J. 2007. Botanical observations from bog on Skye Mountain, NS. Pers. comm., 8 recs. |
| 2 | Gillis, J. 2015. Rare plant records from Cape Breton gypsum sites. Pers. comm., 25 rare plant records. |
| 2 | Hill, N. 2003. Floerkea proserpinacoides at Heatherdale, Antigonish Co. 2002. , Pers. comm. to C.S. Blaney. 2 recs. |
| 2 | Klymko, J.J.D. 2018. 2017 field data. Atlantic Canada Conservation Data Centre. |
| 2 | LaPaix, R.W.; Crowell, M.J.; MacDonald, M. 2011. Stantec rare plant records, 2010-11. Stantec Consulting, 334 recs. |
| 2 | Ogden, K. Nova Scotia Museum butterfly specimen database. Nova Scotia Museum. 2017. |
| 2 | Sollows, M.C,. 2008. NBM Science Collections databases: mammals. New Brunswick Museum, Saint John NB, download Jan. 2008, 4983 recs. |
| 2 | Whittam, R.M. et al. 1998. Country Island Tern Restoration Project. Canadian Wildlife Service, Sackville, 2 recs. |
| 1 | Baechler, Lynn. 2016. Plant observations & photos, 2016. Pers. comm. to S. Blaney, May 2016, 2 recs. |
| 1 | Bateman, M.C. 2001. Coastal Waterfowl Surveys Database, 1965-2001. Canadian Wildlife Service, Sackville, 667 recs. |
| 1 | Benjamin, L.K. 2009. NSDNR Fieldwork & Consultants Reports. Nova Scotia Dept Natural Resources, 143 recs. |
| 1 | Blaney, C.S. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 1042 recs. |
| 1 | Blaney, C.S.; Spicer, C.D.; Rothfels, C. 2004. Fieldwork 2004. Atlantic Canada Conservation Data Centre. Sackville NB, 1343 recs. |
| 1 | Boyne, A.W. & Grecian, V.D. 1999. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 23 recs. |
| 1 | Christie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs. |
| 1 | Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs. |
| 1 | Crowell, M. 2013. email to Sean Blaney regarding Listera australis at Bear Head and Mill Cove Canadian Forces Station. Jacques Whitford Environmental Ltd., 2. |
| 1 | Daury, R.W. & Bateman, M.C. 1996. The Barrow's Goldeneye (Bucephala islandica) in the Atlantic Provinces and Maine. Canadian Wildlife Service, Sackville, 47pp. |
| 1 | Doucet, D.A. 2009. Census of Globally Rare, Endemic Butterflies of Nova Scotia Gulf of St Lawrence Salt Marshes. Nova Scotia Dept of Natural Resources, Species at Risk, 155 recs. |
| 1 | Gregory, G. 2018. Bat species observation. Pers. comm. to J.L. Churchill. |
| 1 | Haughian, S.R. 2018. Description of Fuscopannaria leucosticta field work in 2017. New Brunswick Museum, 314 recs. |
| 1 | Klymko, J. 2019. Atlantic Canada Conservation Data Centre zoological fieldwork 2018. Atlantic Canada Conservation Data Centre. |
| 1 | Klymko, J. Henry Hensel's Butterfly Collection Database. Atlantic Canada Conservation Data Centre. 2016. |
| 1 | Klymko, J.J.D. 2016. 2015 field data. Atlantic Canada Conservation Data Centre. |
| 1 | Marshall, L. 1998. Atlantic Salmon: Cape Breton SFA 18 (part) & SFA 19. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-09. 5 recs. |
| 1 | McNeil, J.A. 2016. Blandings Turtle (Emydoidea blandingii), Eastern Ribbonsnake (Thamnophis sauritus), Wood Turtle (Glyptemys insculpta), and Snapping Turtle (Chelydra serpentina) sightings, 2016. Mersey Tobeatic Research Institute, 774 records. |
| 1 | McNeil, J.A. 2019. Snapping Turtle records, 2019. Mersey Tobeatic Research Institute. |
| 1 | Neily, P.D. Plant Specimens. Nova Scotia Dept Natural Resources, Truro. 2006. |
| 1 | Neily, T.H. & Pepper, C.; Toms, B. 2019. Boreal Felt Lichen Observation, April 2019. Mersey Tobeatic Research Institute. |
| 1 | Neily, T.H. & Pepper, C.; Toms, B. 2019. Boreal Felt Lichen Observation, January 2019. Mersey Tobeatic Research Institute, 1 rec. |
| 1 | Neily, T.H. 2013. Email communication to Sean Blaney regarding Agalinis paupercula observations made in 2013 in Nova Scotia. , 1 rec. |
| 1 | Newell, R.B.; Sam, D. 2014. 2014 Bloodroot personal communication report, Antigonish, NS. NS Department of Natural Resources. |
| 1 | Newell, R.E. 2001. Fortress Louisbourg Species at Risk Survey 2001. Parks Canada, 4 recs. |
| 1 | Olsen, R. Herbarium Specimens. Nova Scotia Agricultural College, Truro. 2003. |
| 1 | Parker, G.R., Maxwell, J.W., Morton, L.D. & Smith,G.E.J. 1983. The ecology of Lynx , Lynx canadensis, on Cape Breton Island. Canadian Journal of Zoology, 61:770-786. 51 recs. |
| 1 | Pepper, Chris. 2012. Observations of breeding Canada Warbler's along the Eastern Shore, NS. Pers. comm. to S. Blaney, Jan. 20, 28 recs. |

| # recs | CITATION |
| --- | --- |
| 1 | Porter, K. 2013. 2013 rare and non-rare vascular plant field data. St. Mary's University, 57 recs. |
| 1 | Quigley, E.J. 2006. Plant records, Mabou & Port Hood. Pers. comm. to S.P. Basquill, Jun. 12. 4 recs, 4 recs. |
| 1 | Robinson, C.B. 1907. Early intervale flora of eastern Nova Scotia. Transactions of the Nova Scotia Institute of Science, 10:502-506. 1 rec. |
| 1 | Standley, L.A. 2002. Carex haydenii in Nova Scotia. , Pers. comm. to C.S. Blaney. 4 recs. |
| 1 | Webster, R.P. Atlantic Forestry Centre Insect Collection, Maritimes butterfly records. Natural Resources Canada. 2014. |
| 1 | White, S. 2019. Notable species sightings, 2018. East Coast Aquatics. |
| 1 | Whittam, R.M. 2000. Senecio pseudoarnica on Country Island. , Pers. comm. to S. Gerriets. 1 rec. |

# Appendix G.2

## WESP Results

**Table 1: WESP-AC Results - Grouped Function Scores for Directly Impacted Wetlands**

| WL ID | HYDROLOGIC Group | | WATER Quality Group | | AQUATIC SUPPORT Group | | AQUATIC Habitat Group | | TRANSITIONAL Habitat Group | | WETLAND CONDITION | | WETLAND RISK | | Average Function | Average Benefits | Functional WSS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | Function | Benefits | | | |
| 1 | 2.05 | 3.32 | 4.43 | 9.08 | 7.12 | 6.86 | 6.48 | 2.65 | 8.93 | 10.00 | N/A | 7.10 | N/A | 6.46 | 5.80 | 6.50 | No |
| 2 | 2.01 | 4.70 | 4.08 | 2.80 | 8.34 | 7.14 | 5.20 | 5.29 | 8.08 | 7.49 | N/A | 10.00 | N/A | 6.67 | 5.54 | 6.30 | No |
| 3 | 7.09 | 9.25 | 8.95 | 4.08 | 6.27 | 2.99 | 5.89 | 2.29 | 6.19 | 2.81 | N/A | 5.65 | N/A | 7.38 | 6.88 | 4.92 | No |
| 4 | 1.95 | 9.25 | 5.47 | 9.54 | 8.90 | 6.46 | 6.81 | 1.94 | 8.85 | 3.44 | N/A | 10.00 | N/A | 6.12 | 6.40 | 6.68 | No |
| 5 | 8.46 | 9.25 | 8.46 | 3.40 | 5.97 | 0.66 | 0.91 | 0.35 | 7.38 | 2.89 | N/A | 10.00 | N/A | 7.35 | 6.24 | 4.84 | No |
| 6 | 9.19 | 9.70 | 8.59 | 2.96 | 4.52 | 0.18 | 0.25 | 1.14 | 5.58 | 3.91 | N/A | 4.78 | N/A | 5.47 | 5.63 | 4.02 | No |
| 7 | 6.16 | 8.91 | 9.30 | 0.00 | 4.25 | 2.36 | 3.92 | 3.96 | 7.61 | 7.48 | N/A | 6.52 | N/A | 6.84 | 6.25 | 5.15 | No |
| 8 | 9.78 | 9.36 | 8.81 | 0.00 | 4.86 | 0.26 | 0.16 | 1.26 | 5.70 | 3.94 | N/A | 4.78 | N/A | 6.19 | 5.86 | 3.68 | No |
| 9 | 9.78 | 9.70 | 8.78 | 0.00 | 5.27 | 0.28 | 0.27 | 1.26 | 6.45 | 3.97 | N/A | 8.26 | N/A | 7.55 | 6.11 | 4.43 | No |
| 10 | 6.43 | 9.70 | 7.37 | 0.00 | 5.16 | 5.14 | 0.33 | 1.27 | 7.29 | 4.04 | N/A | 3.62 | N/A | 6.48 | 5.32 | 4.32 | No |
| 11 | 9.19 | 10.00 | 8.71 | 2.96 | 4.89 | 0.21 | 0.27 | 1.18 | 5.28 | 3.87 | N/A | 7.39 | N/A | 7.44 | 5.67 | 4.72 | No |
| 12 | 1.49 | 9.31 | 4.44 | 2.89 | 8.26 | 6.30 | 6.18 | 2.51 | 8.69 | 7.50 | N/A | 8.26 | N/A | 5.50 | 5.81 | 6.04 | No |
| 14 | 9.19 | 3.78 | 8.49 | 2.66 | 3.86 | 0.64 | 0.95 | 0.93 | 7.69 | 3.49 | N/A | 6.52 | N/A | 5.08 | 6.03 | 3.30 | No |
| 15 | 4.02 | 5.13 | 6.08 | 2.81 | 5.90 | 5.55 | 0.83 | 0.77 | 7.27 | 3.30 | N/A | 4.78 | N/A | 6.98 | 4.82 | 4.19 | No |
| 16 | 1.75 | 5.24 | 3.67 | 3.12 | 8.57 | 8.97 | 5.77 | 4.49 | 8.61 | 4.29 | N/A | 2.46 | N/A | 6.20 | 5.67 | 4.97 | No |
| 17 | 1.41 | 5.24 | 3.24 | 9.15 | 7.06 | 8.49 | 6.11 | 4.54 | 8.23 | 10.00 | N/A | 5.65 | N/A | 6.63 | 5.21 | 7.10 | No |
| 18 | 1.88 | 5.08 | 3.87 | 9.40 | 8.63 | 9.16 | 7.76 | 3.74 | 7.78 | 7.45 | N/A | 0.87 | N/A | 8.36 | 5.99 | 6.29 | No |
| 20 | 3.11 | 3.67 | 3.51 | 9.23 | 7.99 | 7.06 | 7.75 | 8.51 | 8.92 | 7.56 | N/A | 3.62 | N/A | 7.35 | 6.26 | 6.71 | No |
| 21 | 0.40 | 4.68 | 2.80 | 2.19 | 5.84 | 7.69 | 4.96 | 4.45 | 8.16 | 7.47 | N/A | 3.04 | N/A | 4.95 | 4.43 | 4.93 | No |
| 22 | 1.85 | 4.85 | 3.05 | 2.73 | 5.76 | 6.08 | 4.14 | 1.38 | 8.08 | 3.20 | N/A | 6.52 | N/A | 6.75 | 4.58 | 4.50 | No |
| 23 | 1.27 | 4.68 | 3.31 | 9.16 | 8.23 | 8.26 | 5.02 | 4.79 | 8.17 | 10.00 | N/A | 5.65 | N/A | 7.57 | 5.20 | 7.16 | No |
| 24 | 3.58 | 4.12 | 4.11 | 1.78 | 6.25 | 4.72 | 1.78 | 1.32 | 6.08 | 7.30 | N/A | 3.04 | N/A | 5.61 | 4.36 | 3.98 | No |
| 25 | 0.95 | 4.34 | 2.23 | 1.02 | 7.00 | 7.75 | 5.40 | 3.44 | 8.21 | 7.52 | N/A | 4.78 | N/A | 5.37 | 4.76 | 4.89 | No |
| 26 | 9.19 | 4.34 | 8.24 | 3.67 | 4.20 | 0.16 | 1.38 | 0.47 | 5.46 | 3.93 | N/A | 4.78 | N/A | 6.49 | 5.70 | 3.41 | No |
| 29 | 6.51 | 4.12 | 9.05 | 3.65 | 3.42 | 1.69 | 3.40 | 2.60 | 7.73 | 4.82 | N/A | 7.10 | N/A | 5.95 | 6.02 | 4.27 | No |
| 32 | 7.93 | 4.00 | 7.63 | 3.67 | 5.15 | 0.19 | 1.39 | 0.51 | 5.29 | 3.90 | N/A | 7.39 | N/A | 6.69 | 5.48 | 3.77 | No |
| 34 | 9.28 | 3.42 | 8.57 | 2.93 | 5.55 | 0.38 | 0.24 | 1.39 | 6.96 | 4.01 | N/A | 8.26 | N/A | 7.00 | 6.12 | 3.91 | No |
| 42 | 0.00 | 3.70 | 2.74 | 9.02 | 8.41 | 8.62 | 8.26 | 4.44 | 8.87 | 10.00 | N/A | 8.26 | N/A | 5.70 | 5.66 | 7.11 | No |
| 46 | 7.48 | 5.33 | 7.75 | 2.66 | 3.62 | 0.42 | 1.48 | 1.17 | 5.30 | 3.90 | N/A | 4.78 | N/A | 5.28 | 5.13 | 3.36 | No |
| 47 | 8.51 | 4.64 | 7.84 | 2.66 | 4.17 | 0.47 | 0.62 | 0.80 | 6.47 | 3.04 | N/A | 8.26 | N/A | 7.05 | 5.52 | 3.85 | No |
| 51 | 8.93 | 4.07 | 7.96 | 3.07 | 5.63 | 0.80 | 2.02 | 0.89 | 6.84 | 7.35 | N/A | 8.26 | N/A | 7.05 | 6.28 | 4.50 | No |
| 52 | 3.35 | 3.82 | 4.98 | 3.07 | 6.21 | 4.68 | 2.06 | 0.87 | 7.24 | 3.25 | N/A | 7.10 | N/A | 5.85 | 4.77 | 4.09 | No |
| 53 | 8.93 | 4.70 | 7.85 | 1.78 | 4.89 | 0.56 | 1.74 | 1.28 | 7.12 | 4.01 | N/A | 5.94 | N/A | 6.87 | 6.11 | 3.59 | No |
| 54 | 8.93 | 3.63 | 7.93 | 3.07 | 4.32 | 0.80 | 2.10 | 0.87 | 6.82 | 3.12 | N/A | 3.62 | N/A | 7.05 | 6.02 | 3.17 | No |
| 55 | 9.42 | 5.64 | 8.53 | 2.04 | 5.86 | 0.72 | 1.74 | 1.46 | 7.92 | 4.09 | N/A | 8.26 | N/A | 7.01 | 6.70 | 4.18 | No |
| 56 | 5.15 | 5.24 | 8.92 | 3.05 | 2.68 | 0.97 | 3.05 | 3.69 | 5.36 | 3.79 | N/A | 6.52 | N/A | 4.11 | 5.03 | 3.91 | No |
| 57 | 8.94 | 5.19 | 8.52 | 3.07 | 5.75 | 0.69 | 1.77 | 1.42 | 6.32 | 3.98 | N/A | 4.78 | N/A | 7.24 | 6.26 | 3.77 | No |
| 58 | 8.52 | 4.68 | 8.30 | 3.07 | 5.80 | 0.70 | 1.87 | 0.81 | 6.35 | 2.91 | N/A | 3.04 | N/A | 7.20 | 6.17 | 3.20 | No |
| 61 | 7.79 | 4.74 | 8.03 | 3.07 | 6.89 | 0.78 | 1.83 | 0.91 | 7.03 | 3.09 | N/A | 7.39 | N/A | 7.17 | 6.31 | 3.88 | No |
| 64 | 8.46 | 4.23 | 8.48 | 3.07 | 5.39 | 0.88 | 2.06 | 0.98 | 7.04 | 7.38 | N/A | 6.52 | N/A | 7.18 | 6.29 | 4.32 | No |
| 67 | 9.02 | 3.89 | 8.32 | 3.18 | 8.21 | 0.76 | 1.94 | 0.87 | 7.02 | 3.21 | N/A | 8.26 | N/A | 6.86 | 6.90 | 3.86 | No |
| 72 | 7.45 | 4.06 | 7.86 | 3.07 | 5.93 | 0.94 | 2.07 | 1.05 | 7.74 | 3.61 | N/A | 6.52 | N/A | 7.18 | 6.21 | 3.78 | No |
| 74 | 9.77 | 10.00 | 8.64 | 0.00 | 5.78 | 0.39 | 1.41 | 1.14 | 5.05 | 3.85 | N/A | 4.78 | N/A | 7.18 | 6.13 | 3.90 | No |
| 83 | 0.79 | 4.74 | 4.66 | 9.14 | 7.75 | 6.96 | 4.80 | 8.00 | 8.36 | 7.49 | N/A | 8.26 | N/A | 3.80 | 5.27 | 6.91 | No |
| 117 | 9.24 | 4.40 | 8.43 | 1.78 | 5.19 | 0.38 | 0.31 | 1.37 | 6.98 | 10.00 | N/A | 8.26 | N/A | 6.97 | 6.03 | 4.74 | No |
| 130 | 0.51 | 4.74 | 3.31 | 2.43 | 7.64 | 6.77 | 5.06 | 4.08 | 8.73 | 4.26 | N/A | 4.78 | N/A | 4.55 | 5.05 | 4.52 | No |
| 133 | 0.71 | 4.51 | 2.89 | 2.49 | 6.29 | 7.81 | 5.15 | 3.45 | 8.24 | 3.35 | N/A | 6.52 | N/A | 3.44 | 4.65 | 4.51 | No |
| 144 | 0.06 | 4.33 | 4.46 | 9.14 | 8.79 | 6.88 | 5.41 | 3.29 | 9.12 | 3.88 | N/A | 8.26 | N/A | 5.26 | 5.57 | 5.86 | No |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 145 | 9.74 | 3.89 | 8.29 | 1.81 | 5.59 | 0.84 | 2.32 | 0.88 | 6.81 | 3.19 | N/A | 4.78 | N/A | 5.94 | 6.55 | 3.05 | No |
| 147 | 8.63 | 4.83 | 8.35 | 2.66 | 4.56 | 0.59 | 1.09 | 0.84 | 6.19 | 2.97 | N/A | 3.04 | N/A | 4.15 | 5.76 | 2.73 | No |
| 148 | 0.48 | 4.46 | 4.85 | 9.14 | 9.24 | 7.28 | 5.74 | 3.30 | 8.90 | 3.85 | N/A | 8.26 | N/A | 5.78 | 5.84 | 6.01 | No |
| 149 | 8.91 | 4.83 | 8.34 | 2.66 | 5.01 | 0.63 | 1.07 | 0.89 | 7.42 | 3.35 | N/A | 8.26 | N/A | 4.95 | 6.15 | 3.65 | No |
| 150 | 8.77 | 4.23 | 8.14 | 1.96 | 3.68 | 0.65 | 2.00 | 0.72 | 6.65 | 3.09 | N/A | 3.04 | N/A | 4.52 | 5.85 | 2.60 | No |
| 151 | 0.71 | 7.39 | 4.51 | 1.98 | 7.60 | 6.46 | 5.76 | 3.95 | 7.47 | 4.08 | N/A | 8.26 | N/A | 5.07 | 5.21 | 5.31 | No |
| 154 | 8.38 | 5.14 | 8.04 | 2.66 | 5.11 | 0.53 | 1.04 | 0.78 | 6.02 | 7.28 | N/A | 3.04 | N/A | 6.63 | 5.72 | 3.72 | No |
| 155 | 8.91 | 5.30 | 8.22 | 2.66 | 5.29 | 0.64 | 1.14 | 0.89 | 7.42 | 3.32 | N/A | 8.26 | N/A | 5.98 | 6.19 | 3.87 | No |
| 156 | 0.61 | 5.02 | 4.71 | 9.02 | 8.91 | 7.03 | 4.72 | 3.99 | 9.01 | 4.39 | N/A | 10.00 | N/A | 5.93 | 5.59 | 6.48 | No |
| 157 | 8.07 | 4.68 | 7.84 | 1.78 | 6.14 | 0.81 | 1.98 | 1.51 | 6.85 | 4.04 | N/A | 4.78 | N/A | 6.71 | 6.17 | 3.47 | No |
| 158 | 1.88 | 4.74 | 4.29 | 1.80 | 6.88 | 6.07 | 4.59 | 3.97 | 8.40 | 4.29 | N/A | 8.26 | N/A | 5.09 | 5.21 | 4.89 | No |
| 159 | 0.44 | 5.13 | 2.89 | 1.94 | 7.21 | 6.61 | 3.94 | 3.94 | 8.58 | 4.32 | N/A | 8.26 | N/A | 4.41 | 4.61 | 4.94 | No |
| 160 | 9.19 | 3.21 | 8.37 | 2.07 | 3.72 | 0.38 | 0.51 | 2.54 | 6.15 | 7.28 | N/A | 4.78 | N/A | 5.98 | 5.59 | 3.75 | No |
| 161 | 0.75 | 4.51 | 4.84 | 3.60 | 8.68 | 6.45 | 4.39 | 7.72 | 9.11 | 7.59 | N/A | 8.26 | N/A | 5.17 | 5.55 | 6.19 | No |
| 162 | 9.32 | 4.68 | 8.64 | 1.96 | 5.83 | 0.78 | 1.85 | 2.72 | 8.34 | 7.46 | N/A | 8.26 | N/A | 5.78 | 6.80 | 4.52 | No |
| 163 | 9.07 | 5.13 | 8.53 | 0.89 | 5.27 | 0.39 | 0.40 | 1.36 | 6.47 | 3.98 | N/A | 6.52 | N/A | 7.21 | 5.95 | 3.64 | No |
| 164 | 9.19 | 4.85 | 8.66 | 1.96 | 5.35 | 0.53 | 0.60 | 2.69 | 7.68 | 7.41 | N/A | 8.26 | N/A | 5.78 | 6.30 | 4.50 | No |
| 168 | 8.80 | 4.68 | 8.33 | 1.78 | 5.11 | 0.49 | 0.88 | 1.37 | 6.08 | 3.95 | N/A | 3.04 | N/A | 5.98 | 5.84 | 3.04 | No |
| 169 | 9.32 | 4.06 | 8.50 | 1.78 | 5.65 | 0.47 | 1.50 | 0.01 | 6.68 | 2.58 | N/A | 8.26 | N/A | 7.17 | 6.33 | 3.47 | No |
| 170 | 9.18 | 3.95 | 8.64 | 1.96 | 6.12 | 0.72 | 1.83 | 1.44 | 6.92 | 4.02 | N/A | 8.26 | N/A | 7.17 | 6.54 | 3.93 | No |
| 172 | 0.56 | 3.95 | 4.53 | 9.14 | 8.82 | 6.32 | 5.29 | 3.30 | 9.34 | 4.07 | N/A | 8.26 | N/A | 6.38 | 5.71 | 5.92 | No |
| 173 | 0.25 | 4.12 | 4.60 | 9.14 | 9.12 | 6.64 | 5.26 | 4.69 | 8.82 | 4.33 | N/A | 8.26 | N/A | 5.24 | 5.61 | 6.06 | No |
| 174 | 1.32 | 6.03 | 4.70 | 9.42 | 8.63 | 5.75 | 5.71 | 3.08 | 9.09 | 3.89 | N/A | 6.52 | N/A | 6.63 | 5.89 | 5.90 | No |
| 176 | 9.22 | 5.13 | 8.27 | 1.81 | 3.57 | 0.18 | 0.13 | 2.38 | 5.77 | 7.24 | N/A | 3.04 | N/A | 7.20 | 5.39 | 3.86 | No |
| 180 | 8.66 | 2.93 | 8.28 | 1.78 | 5.08 | 0.35 | 0.42 | 1.31 | 5.86 | 3.94 | N/A | 3.04 | N/A | 6.83 | 5.66 | 2.88 | No |
| 184 | 6.59 | 4.91 | 9.41 | 1.94 | 4.85 | 2.97 | 4.45 | 7.68 | 8.25 | 7.52 | N/A | 4.78 | N/A | 7.17 | 6.71 | 5.28 | No |
| 186 | 9.07 | 5.24 | 8.37 | 0.89 | 4.83 | 0.35 | 0.70 | 1.25 | 5.35 | 3.87 | N/A | 3.04 | N/A | 5.86 | 5.67 | 2.93 | No |
| 187 | 9.07 | 3.27 | 8.46 | 2.37 | 4.79 | 0.86 | 2.22 | 0.92 | 7.01 | 3.28 | N/A | 3.04 | N/A | 5.78 | 6.31 | 2.79 | No |
| 191 | 9.74 | 4.00 | 8.83 | 1.81 | 5.12 | 0.55 | 0.82 | 1.45 | 6.82 | 4.02 | N/A | 8.26 | N/A | 5.56 | 6.27 | 3.66 | No |
| 193 | 5.79 | 3.78 | 9.33 | 2.37 | 5.36 | 1.97 | 2.80 | 2.43 | 7.72 | 3.58 | N/A | 3.04 | N/A | 5.58 | 6.20 | 3.25 | No |
| 194 | 0.56 | 4.79 | 3.25 | 1.80 | 6.03 | 6.46 | 4.06 | 4.11 | 8.00 | 9.17 | N/A | 4.78 | N/A | 4.58 | 4.38 | 5.10 | No |
| 195 | 9.60 | 3.72 | 8.76 | 1.81 | 5.57 | 0.89 | 2.33 | 0.93 | 7.00 | 3.27 | N/A | 4.78 | N/A | 5.78 | 6.65 | 3.03 | No |
| 196 | 0.70 | 7.33 | 4.50 | 9.33 | 8.44 | 7.02 | 5.82 | 4.42 | 9.34 | 9.17 | N/A | 4.78 | N/A | 5.35 | 5.76 | 6.77 | No |
| 199 | 1.47 | 5.64 | 4.40 | 3.39 | 7.48 | 5.08 | 5.74 | 1.85 | 8.79 | 3.44 | N/A | 4.78 | N/A | 5.61 | 5.58 | 4.26 | No |
| 201 | 9.32 | 3.27 | 8.70 | 2.37 | 5.57 | 0.81 | 2.22 | 0.86 | 6.69 | 3.18 | N/A | 3.04 | N/A | 5.98 | 6.50 | 2.79 | No |
| 203 | 9.32 | 3.21 | 8.72 | 2.37 | 5.40 | 0.75 | 2.14 | 0.81 | 6.45 | 3.08 | N/A | 3.04 | N/A | 5.98 | 6.41 | 2.75 | No |
| 207 | 0.00 | 3.55 | 3.76 | 2.37 | 8.81 | 5.39 | 4.21 | 2.75 | 8.89 | 3.82 | N/A | 6.52 | N/A | 5.03 | 5.13 | 4.20 | No |
| 209 | 9.49 | 3.27 | 8.27 | 1.87 | 5.81 | 0.90 | 2.23 | 0.96 | 7.46 | 3.44 | N/A | 8.26 | N/A | 7.12 | 6.65 | 3.69 | No |
| 213 | 8.77 | 4.00 | 8.44 | 1.04 | 6.72 | 0.82 | 2.19 | 1.48 | 7.36 | 4.07 | N/A | 10.00 | N/A | 5.78 | 6.69 | 3.88 | No |
| 215 | 0.39 | 3.44 | 4.28 | 2.36 | 8.10 | 5.98 | 5.27 | 3.08 | 8.91 | 3.94 | N/A | 8.26 | N/A | 5.78 | 5.39 | 4.69 | No |
| 217 | 9.35 | 3.67 | 8.56 | 0.89 | 5.46 | 0.83 | 2.24 | 0.88 | 7.16 | 3.31 | N/A | 8.26 | N/A | 5.47 | 6.56 | 3.33 | No |
| 219 | 8.51 | 4.06 | 8.13 | 1.04 | 6.21 | 0.86 | 2.11 | 1.55 | 7.86 | 4.12 | N/A | 10.00 | N/A | 5.01 | 6.57 | 3.81 | No |
| 221 | 9.35 | 5.08 | 8.57 | 0.89 | 5.20 | 0.45 | 0.73 | 1.36 | 6.93 | 4.02 | N/A | 8.26 | N/A | 5.98 | 6.16 | 3.72 | No |
| 227 | 6.63 | 4.51 | 9.45 | 1.80 | 5.11 | 3.09 | 5.20 | 2.75 | 8.16 | 3.64 | N/A | 8.26 | N/A | 5.78 | 6.91 | 4.26 | No |
| 229 | 1.17 | 6.43 | 3.98 | 9.28 | 8.36 | 8.64 | 7.55 | 4.91 | 9.58 | 4.44 | N/A | 7.10 | N/A | 5.92 | 6.13 | 6.68 | No |
| 237 | 8.63 | 5.64 | 8.09 | 2.66 | 4.76 | 0.54 | 0.92 | 0.81 | 6.71 | 3.18 | N/A | 3.04 | N/A | 5.91 | 5.82 | 3.11 | No |
| 239 | 9.61 | 4.68 | 8.80 | 0.89 | 4.97 | 0.56 | 0.87 | 1.46 | 6.42 | 3.97 | N/A | 4.78 | N/A | 5.78 | 6.13 | 3.16 | No |
| 242 | 9.19 | 4.34 | 8.68 | 0.89 | 4.89 | 0.59 | 0.80 | 1.51 | 6.64 | 4.00 | N/A | 3.04 | N/A | 5.98 | 6.04 | 2.91 | No |
| 244 | 8.91 | 5.26 | 8.30 | 2.66 | 5.00 | 0.63 | 1.08 | 0.89 | 6.65 | 3.08 | N/A | 4.78 | N/A | 4.75 | 5.99 | 3.15 | No |
| 245 | 9.61 | 4.40 | 8.71 | 0.89 | 5.10 | 0.40 | 0.50 | 2.57 | 6.54 | 7.32 | N/A | 8.26 | N/A | 5.98 | 6.09 | 4.26 | No |
| 246 | 8.66 | 5.26 | 8.25 | 2.66 | 5.42 | 0.84 | 2.32 | 0.88 | 6.65 | 3.16 | N/A | 8.26 | N/A | 4.05 | 6.26 | 3.59 | No |
| 247 | 2.77 | 4.34 | 6.30 | 1.04 | 5.33 | 0.34 | 0.42 | 2.51 | 5.88 | 7.28 | N/A | 4.78 | N/A | 4.34 | 4.14 | 3.52 | No |
| 248 | 9.49 | 3.16 | 8.46 | 0.89 | 5.04 | 0.51 | 0.61 | 2.66 | 7.17 | 7.39 | N/A | 4.78 | N/A | 5.98 | 6.15 | 3.62 | No |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 249 | 8.32 | 3.33 | 7.84 | 0.89 | 5.71 | 0.36 | 0.30 | 2.56 | 7.21 | 7.38 | N/A | 6.52 | N/A | 5.98 | 5.88 | 3.86 | No |
| 250 | 8.46 | 5.19 | 7.91 | 0.89 | 5.54 | 0.40 | 0.53 | 2.56 | 6.23 | 7.32 | N/A | 3.04 | N/A | 5.98 | 5.74 | 3.63 | No |
| 251 | 9.07 | 9.02 | 8.44 | 3.85 | 5.30 | 0.40 | 0.55 | 2.55 | 6.12 | 7.29 | N/A | 4.78 | N/A | 6.81 | 5.90 | 4.96 | No |
| 255 | 9.18 | 3.21 | 8.63 | 0.89 | 5.44 | 0.55 | 1.54 | 2.51 | 6.58 | 7.32 | N/A | 6.52 | N/A | 5.23 | 6.27 | 3.75 | No |
| 284 | 8.91 | 5.37 | 8.47 | 2.66 | 5.79 | 1.03 | 2.56 | 1.04 | 8.45 | 3.70 | N/A | 8.26 | N/A | 5.94 | 6.84 | 4.00 | No |
| 287 | 6.53 | 4.88 | 9.37 | 3.05 | 4.23 | 3.01 | 5.08 | 2.70 | 8.12 | 3.80 | N/A | 6.52 | N/A | 4.46 | 6.67 | 4.06 | No |
| 291 | 0.15 | 4.50 | 3.82 | 9.31 | 7.15 | 6.08 | 3.75 | 2.53 | 8.75 | 3.80 | N/A | 4.78 | N/A | 5.52 | 4.72 | 5.22 | No |
| 292 | 4.63 | 4.82 | 5.72 | 3.63 | 7.06 | 5.61 | 2.35 | 0.90 | 7.39 | 3.29 | N/A | 8.26 | N/A | 4.07 | 5.43 | 4.37 | No |
| 294 | 9.39 | 4.56 | 8.70 | 5.29 | 6.50 | 0.94 | 2.58 | 0.93 | 7.05 | 3.10 | N/A | 8.26 | N/A | 5.78 | 6.85 | 4.12 | No |
| 296 | 9.67 | 4.94 | 8.97 | 1.81 | 5.54 | 0.72 | 1.21 | 0.97 | 7.31 | 3.30 | N/A | 8.26 | N/A | 5.78 | 6.54 | 3.68 | No |
| 300 | 9.18 | 3.27 | 8.62 | 1.78 | 5.72 | 0.99 | 2.39 | 1.04 | 8.15 | 3.68 | N/A | 8.26 | N/A | 5.78 | 6.81 | 3.54 | No |
| **Average Score** | 6.19 | 5.03 | 6.99 | 3.26 | 6.04 | 2.81 | 2.77 | 2.25 | 7.34 | 4.88 | - | 6.25 | - | 6.01 | 5.87 | 4.36 | |
| **Average Rating*** | Moderate | Moderate | Higher | Moderate | Higher | Lower | Lower | Moderate | Higher | Lower | - | Moderate | - | Moderate | | | |

*Average group rating calcaulted based on the Nova Scotia normalized reference values in the WESP-AC tool.

**Table 2: WESP-AC Results - Specific Function Scores for Directly Impacted Wetlands**

| Wetland ID | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| Water Storage & Delay (WS) | 2.05 | 3.32 | 2.01 | 4.70 | 7.09 | 9.25 | 1.95 | 9.25 | 8.46 | 9.25 | 9.19 | 9.70 | 6.16 | 8.91 | 9.78 | 9.36 | 9.78 | 9.70 | 6.43 | 9.70 | 9.19 | 10.00 | 1.49 |
| Stream Flow Support (SFS) | 4.83 | 7.08 | 2.45 | 8.83 | 0.00 | 0.00 | 6.21 | 7.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.93 | 7.60 | 0.00 | 0.00 | 2.59 |
| Water Cooling (WC) | 5.42 | 6.18 | 7.20 | 2.21 | 2.67 | 0.00 | 8.40 | 4.26 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.40 |
| Sediment & Toxicant Retention & Stablization (SR) | 2.96 | 7.64 | 3.32 | 0.38 | 10.00 | 2.34 | 3.79 | 8.70 | 5.02 | 2.27 | 6.44 | 2.27 | 10.00 | 0.00 | 9.29 | 0.00 | 9.29 | 0.00 | 9.00 | 0.00 | 6.44 | 2.27 | 2.07 |
| Phosphorus Retention (PR) | 3.38 | 6.86 | 3.05 | 0.43 | 10.00 | 2.14 | 5.26 | 8.57 | 4.72 | 2.14 | 4.87 | 2.14 | 10.00 | 0.00 | 4.20 | 0.00 | 4.20 | 0.00 | 4.00 | 0.00 | 4.87 | 2.14 | 5.29 |
| Nitrate Removal & Retention (NR) | 3.26 | 10.00 | 2.75 | 4.00 | 10.00 | 5.00 | 3.00 | 10.00 | 10.00 | 4.00 | 10.00 | 3.33 | 10.00 | 0.00 | 10.00 | 0.00 | 10.00 | 0.00 | 3.62 | 0.00 | 10.00 | 3.33 | 1.71 |
| Carbon Sequestration (CS) | 5.17 | N/A | 4.71 | N/A | 1.58 | N/A | 6.34 | N/A | 7.92 | N/A | 7.44 | N/A | 4.41 | N/A | 7.00 | N/A | 6.78 | N/A | 6.31 | N/A | 8.35 | N/A | 5.25 |
| Organic Nutrient Export (OE) | 8.29 | N/A | 9.93 | N/A | 8.09 | N/A | 10.00 | N/A | 8.25 | N/A | 6.66 | N/A | 6.34 | N/A | 7.30 | N/A | 7.30 | N/A | 7.37 | N/A | 6.98 | N/A | 10.00 |
| Anadromous Fish Habitat (FA) | 4.87 | 2.62 | 3.41 | 5.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.27 |
| Resident & Other Fish Habitat (FR) | 3.32 | 2.50 | 2.81 | 5.37 | 0.00 | 0.00 | 5.17 | 1.99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.77 |
| Aquatic Invertebrate Habitat (INV) | 5.24 | 6.67 | 7.39 | 5.31 | 7.00 | 4.49 | 6.60 | 6.25 | 6.51 | 0.99 | 2.86 | 0.27 | 0.32 | 3.54 | 2.43 | 0.39 | 5.69 | 0.42 | 2.54 | 0.46 | 4.24 | 0.32 | 5.09 |
| Amphibian & Turtle Habitat (AM) | 3.95 | 3.43 | 3.14 | 4.90 | 7.54 | 2.98 | 5.76 | 2.91 | 1.52 | 0.59 | 0.42 | 1.91 | 2.93 | 4.61 | 0.26 | 2.10 | 0.44 | 2.10 | 0.55 | 2.12 | 0.45 | 1.96 | 3.57 |
| Waterbird Feeding Habitat (WBF) | 7.61 | 0.83 | 6.24 | 5.00 | 7.15 | 2.50 | 5.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.46 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.68 |
| Waterbird Nesting Habitat (WBN) | 7.01 | 0.00 | 5.12 | 5.00 | 6.53 | 2.50 | 8.61 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.54 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.14 |
| Songbird, Raptor, & Mammal Habitat (SBM) | 9.15 | 10.00 | 8.77 | 10.00 | 5.42 | 2.50 | 9.51 | 0.00 | 7.74 | 0.00 | 5.75 | 5.00 | 8.66 | 10.00 | 6.29 | 5.00 | 6.29 | 5.00 | 6.35 | 5.00 | 5.91 | 5.00 | 9.49 |
| Pollinator Habitat (POL) | 9.32 | 10.00 | 8.64 | 0.00 | 7.30 | 0.00 | 8.72 | 0.00 | 7.56 | 0.00 | 6.39 | 0.00 | 8.55 | 0.00 | 6.49 | 0.00 | 7.17 | 0.00 | 8.69 | 0.00 | 5.43 | 0.00 | 8.23 |
| Native Plant Habitat (PH) | 7.13 | 10.00 | 4.76 | 4.93 | 2.52 | 3.59 | 6.39 | 5.17 | 5.71 | 4.34 | 2.15 | 3.43 | 2.48 | 4.87 | 1.96 | 3.62 | 3.70 | 3.81 | 2.64 | 4.24 | 2.60 | 3.21 | 5.93 |
| Public Use & Recognition (PU) | N/A | 2.22 | N/A | 2.83 | N/A | 0.55 | N/A | 3.79 | N/A | 3.79 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A | 2.08 | N/A |
| Wetland Sensivity (Sens) | N/A | 7.85 | N/A | 8.59 | N/A | 9.90 | N/A | 7.30 | N/A | 9.75 | N/A | 6.05 | N/A | 8.80 | N/A | 7.49 | N/A | 9.80 | N/A | 7.87 | N/A | 10.00 | N/A |
| Wetland Ecological Condition (EC) | N/A | 7.10 | N/A | 10.00 | N/A | 5.65 | N/A | 10.00 | N/A | 10.00 | N/A | 4.78 | N/A | 6.52 | N/A | 4.78 | N/A | 8.26 | N/A | 3.62 | N/A | 7.39 | N/A |
| Wetland Stressors (STR) (higher score means more) | N/A | 5.07 | N/A | 4.75 | N/A | 4.86 | N/A | 4.94 | N/A | 4.94 | N/A | 4.88 | N/A | 4.88 | N/A | 4.88 | N/A | 5.31 | N/A | 5.09 | N/A | 4.88 | N/A |
| **Average Function/Benefit** | 5.47 | 5.76 | 5.04 | 4.88 | 5.46 | 3.07 | 5.95 | 4.75 | 4.32 | 2.74 | 3.66 | 2.41 | 4.76 | 3.38 | 3.82 | 2.09 | 4.16 | 2.45 | 3.50 | 2.51 | 3.79 | 2.77 | 5.23 |

| 2 | 14 | | 15 | | 16 | | 17 | | 18 | | 20 | | 21 | | 22 | | 23 | | 24 | | 25 | | 26 | | 29 | | 32 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 9.31 | 9.19 | 3.78 | 4.02 | 5.13 | 1.75 | 5.24 | 1.41 | 5.24 | 1.88 | 5.08 | 3.11 | 3.67 | 0.40 | 4.68 | 1.85 | 4.85 | 1.27 | 4.68 | 3.58 | 4.12 | 0.95 | 4.34 | 9.19 | 4.34 | 6.51 | 4.12 | 7.93 | 4.00 |
| 7.19 | 0.00 | 0.00 | 2.38 | 8.14 | 5.93 | 10.00 | 5.52 | 9.46 | 10.00 | 9.96 | 3.28 | 8.02 | 5.52 | 8.44 | 1.59 | 7.77 | 3.52 | 8.98 | 3.10 | 6.84 | 3.45 | 8.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2.93 | 0.00 | 0.00 | 0.00 | 0.00 | 7.80 | 7.41 | 5.13 | 6.65 | 6.71 | 7.13 | 6.96 | 2.40 | 2.40 | 7.15 | 3.15 | 1.87 | 8.30 | 8.26 | 0.00 | 0.00 | 5.13 | 7.50 | 0.00 | 0.00 | 2.40 | 0.00 | 0.00 | 0.00 |
| 1.89 | 5.73 | 1.36 | 5.73 | 0.45 | 2.56 | 1.21 | 1.76 | 8.02 | 3.41 | 7.92 | 3.59 | 7.76 | 0.52 | 0.85 | 1.37 | 1.05 | 2.16 | 7.92 | 3.59 | 0.91 | 1.24 | 0.38 | 6.44 | 1.04 | 10.00 | 0.89 | 4.30 | 1.04 |
| 2.14 | 3.49 | 1.29 | 2.67 | 0.43 | 0.91 | 0.86 | 0.66 | 6.86 | 1.82 | 8.48 | 2.48 | 7.59 | 1.65 | 0.98 | 1.77 | 1.34 | 1.47 | 7.05 | 0.58 | 0.86 | 1.58 | 0.43 | 3.54 | 0.98 | 10.00 | 0.98 | 3.36 | 0.98 |
| 3.33 | 10.00 | 3.33 | 3.47 | 4.00 | 2.81 | 4.17 | 2.01 | 10.00 | 4.17 | 10.00 | 3.12 | 10.00 | 1.94 | 2.83 | 2.60 | 3.50 | 3.33 | 10.00 | 2.78 | 2.22 | 2.45 | 1.33 | 10.00 | 5.00 | 10.00 | 5.00 | 10.00 | 5.00 |
| N/A | 8.67 | N/A | 7.36 | N/A | 4.61 | N/A | 4.29 | N/A | 4.31 | N/A | 3.78 | N/A | 3.65 | N/A | 3.73 | N/A | 3.90 | N/A | 5.19 | N/A | 2.51 | N/A | 5.96 | N/A | 2.40 | N/A | 3.38 | N/A |
| N/A | 5.16 | N/A | 8.12 | N/A | 10.00 | N/A | 8.54 | N/A | 9.54 | N/A | 9.22 | N/A | 7.55 | N/A | 7.41 | N/A | 9.47 | N/A | 8.44 | N/A | 8.69 | N/A | 6.17 | N/A | 4.74 | N/A | 7.51 | N/A |
| 1.84 | 0.00 | 0.00 | 0.00 | 0.00 | 6.17 | 2.67 | 4.61 | 2.79 | 5.48 | 3.39 | 4.40 | 3.58 | 4.21 | 2.71 | 0.00 | 0.00 | 4.52 | 4.07 | 0.00 | 0.00 | 5.01 | 2.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.87 | 0.00 | 0.00 | 0.00 | 0.00 | 5.01 | 2.55 | 3.78 | 2.68 | 8.35 | 3.29 | 5.65 | 3.47 | 3.93 | 2.60 | 0.00 | 0.00 | 3.26 | 3.97 | 0.00 | 0.00 | 3.09 | 2.74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.10 | 5.08 | 0.96 | 4.23 | 0.73 | 4.81 | 6.43 | 3.18 | 6.43 | 2.77 | 7.98 | 7.58 | 7.84 | 1.00 | 5.23 | 4.25 | 3.50 | 6.69 | 5.37 | 4.74 | 0.91 | 3.98 | 5.77 | 2.74 | 0.24 | 1.27 | 2.53 | 3.62 | 0.29 |
| 3.57 | 1.59 | 1.54 | 1.39 | 1.29 | 5.10 | 4.65 | 6.95 | 4.97 | 6.83 | 4.28 | 5.76 | 8.01 | 4.01 | 4.16 | 4.66 | 2.15 | 4.76 | 4.84 | 2.96 | 2.21 | 6.16 | 3.97 | 2.31 | 0.79 | 4.65 | 2.63 | 2.31 | 0.85 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.21 | 5.00 | 5.72 | 5.00 | 8.21 | 2.50 | 8.99 | 10.00 | 5.39 | 5.00 | 5.53 | 0.83 | 5.77 | 5.00 | 0.00 | 0.00 | 5.97 | 2.50 | 0.00 | 0.00 | 3.88 | 3.33 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.38 | 5.00 | 5.32 | 5.00 | 6.98 | 2.50 | 7.75 | 10.00 | 5.06 | 5.00 | 3.60 | 0.00 | 3.05 | 5.00 | 0.00 | 0.00 | 3.01 | 2.50 | 0.00 | 0.00 | 2.24 | 3.33 | 0.00 | 0.00 |
| 10.00 | 7.58 | 2.50 | 6.86 | 2.50 | 8.98 | 5.00 | 9.43 | 10.00 | 8.16 | 10.00 | 9.46 | 10.00 | 7.43 | 10.00 | 7.35 | 0.00 | 9.03 | 10.00 | 6.60 | 10.00 | 9.25 | 10.00 | 4.49 | 3.33 | 6.33 | 3.33 | 4.67 | 3.33 |
| 0.00 | 8.73 | 0.00 | 8.43 | 0.00 | 9.36 | 0.00 | 9.32 | 10.00 | 8.55 | 0.00 | 9.53 | 0.00 | 9.65 | 0.00 | 9.64 | 0.00 | 9.45 | 10.00 | 6.74 | 0.00 | 8.82 | 0.00 | 6.59 | 3.33 | 9.50 | 3.33 | 6.23 | 3.33 |
| 5.03 | 3.62 | 4.61 | 3.06 | 4.32 | 5.23 | 5.19 | 2.33 | 10.00 | 4.34 | 4.73 | 5.92 | 5.38 | 2.92 | 4.82 | 2.56 | 4.80 | 2.21 | 10.00 | 2.90 | 3.78 | 3.43 | 5.12 | 1.91 | 4.23 | 2.04 | 5.57 | 2.13 | 4.19 |
| 3.70 | N/A | 2.05 | N/A | 2.65 | N/A | 2.13 | N/A | 2.13 | N/A | 2.48 | N/A | 4.10 | N/A | 2.48 | N/A | 2.25 | N/A | 2.31 | N/A | 2.13 | N/A | 2.48 | N/A | 0.91 | N/A | 0.83 | N/A | 0.83 |
| 6.12 | N/A | 5.75 | N/A | 9.21 | N/A | 7.91 | N/A | 8.59 | N/A | 10.00 | N/A | 8.97 | N/A | 3.84 | N/A | 7.61 | N/A | 8.38 | N/A | 5.97 | N/A | 5.91 | N/A | 7.25 | N/A | 6.07 | N/A | 7.65 |
| 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 2.46 | N/A | 5.65 | N/A | 0.87 | N/A | 3.62 | N/A | 3.04 | N/A | 6.52 | N/A | 5.65 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 | N/A | 7.10 | N/A | 7.39 |
| 4.88 | N/A | 4.42 | N/A | 4.75 | N/A | 4.48 | N/A | 4.66 | N/A | 6.72 | N/A | 5.74 | N/A | 6.06 | N/A | 5.90 | N/A | 6.76 | N/A | 5.25 | N/A | 4.82 | N/A | 5.72 | N/A | 5.83 | N/A | 5.72 |
| 4.11 | 4.05 | 2.01 | 3.40 | 2.55 | 5.39 | 4.34 | 4.70 | 6.53 | 5.97 | 5.65 | 5.92 | 6.32 | 3.95 | 4.20 | 3.59 | 2.84 | 4.83 | 6.75 | 3.01 | 2.54 | 4.40 | 3.99 | 3.49 | 2.21 | 4.47 | 2.89 | 3.26 | 2.35 |

| 34 | | 42 | | 46 | | 47 | | 51 | | 52 | | 53 | | 54 | | 55 | | 56 | | 57 | | 58 | | 61 | | 64 | | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score |
| 9.28 | 3.42 | 0.00 | 3.70 | 7.48 | 5.33 | 8.51 | 4.64 | 8.93 | 4.07 | 3.35 | 3.82 | 8.93 | 4.70 | 8.93 | 3.63 | 9.42 | 5.64 | 5.15 | 5.24 | 8.94 | 5.19 | 8.52 | 4.68 | 7.79 | 4.74 | 8.46 | 4.23 | 9.02 |
| 0.00 | 0.00 | 5.59 | 8.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.83 | 6.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 7.55 | 8.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 |
| 7.86 | 1.13 | 1.50 | 7.26 | 4.30 | 1.36 | 5.02 | 1.36 | 6.44 | 0.91 | 6.16 | 0.91 | 5.59 | 0.91 | 6.16 | 0.91 | 7.86 | 1.13 | 10.00 | 0.76 | 6.44 | 0.91 | 5.73 | 0.91 | 4.30 | 0.91 | 7.15 | 0.91 | 6.44 |
| 4.81 | 0.43 | 1.12 | 6.86 | 0.00 | 1.29 | 0.00 | 1.29 | 0.01 | 0.86 | 0.70 | 0.86 | 0.00 | 0.86 | 0.00 | 0.86 | 2.68 | 0.43 | 10.00 | 0.86 | 3.81 | 0.86 | 3.51 | 0.86 | 3.30 | 0.86 | 3.04 | 0.86 | 3.81 |
| 10.00 | 4.00 | 3.32 | 10.00 | 10.00 | 3.33 | 10.00 | 3.33 | 10.00 | 4.17 | 2.88 | 4.17 | 10.00 | 2.22 | 10.00 | 4.17 | 10.00 | 2.67 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 | 4.17 | 10.00 |
| 5.90 | N/A | 2.71 | N/A | 7.69 | N/A | 7.72 | N/A | 7.25 | N/A | 5.50 | N/A | 7.21 | N/A | 7.25 | N/A | 7.72 | N/A | 1.40 | N/A | 7.89 | N/A | 7.19 | N/A | 6.62 | N/A | 7.63 | N/A | 6.31 |
| 7.77 | N/A | 9.17 | N/A | 4.41 | N/A | 4.73 | N/A | 5.36 | N/A | 5.65 | N/A | 4.23 | N/A | 5.01 | N/A | 8.19 | N/A | 3.78 | N/A | 7.93 | N/A | 8.15 | N/A | 9.40 | N/A | 6.98 | N/A | 8.22 |
| 0.00 | 0.00 | 7.91 | 5.74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 6.16 | 5.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.58 | 0.58 | 8.34 | 8.46 | 4.91 | 0.63 | 5.73 | 0.71 | 7.94 | 1.20 | 7.45 | 1.18 | 6.98 | 0.84 | 5.91 | 1.20 | 5.91 | 1.08 | 0.50 | 1.45 | 6.31 | 1.04 | 5.64 | 1.05 | 8.08 | 1.18 | 7.23 | 1.32 | 7.44 |
| 0.40 | 2.31 | 4.77 | 3.47 | 2.47 | 1.94 | 1.04 | 1.34 | 3.37 | 1.48 | 3.43 | 1.45 | 2.90 | 2.13 | 3.51 | 1.45 | 2.90 | 2.44 | 1.72 | 1.91 | 2.95 | 2.37 | 3.11 | 1.35 | 3.05 | 1.52 | 3.44 | 1.63 | 3.24 |
| 0.00 | 0.00 | 7.50 | 0.83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.07 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 9.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.28 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.89 | 5.00 | 9.37 | 10.00 | 5.85 | 5.00 | 7.00 | 2.50 | 7.41 | 10.00 | 7.32 | 2.50 | 6.37 | 5.00 | 7.33 | 2.50 | 7.25 | 5.00 | 3.08 | 5.00 | 7.05 | 5.00 | 7.03 | 2.50 | 7.52 | 2.50 | 7.83 | 10.00 | 7.30 |
| 7.42 | 0.00 | 7.97 | 10.00 | 6.13 | 0.00 | 6.87 | 0.00 | 7.07 | 0.00 | 7.71 | 0.00 | 8.04 | 0.00 | 7.01 | 0.00 | 8.82 | 0.00 | 6.74 | 0.00 | 6.54 | 0.00 | 6.14 | 0.00 | 6.61 | 0.00 | 7.17 | 0.00 | 7.53 |
| 5.16 | 4.05 | 7.79 | 10.00 | 1.42 | 3.39 | 3.95 | 3.93 | 4.33 | 4.10 | 5.29 | 4.25 | 4.17 | 4.07 | 4.61 | 4.06 | 5.00 | 4.54 | 2.10 | 2.76 | 3.19 | 3.85 | 3.82 | 3.74 | 5.48 | 4.01 | 3.74 | 4.25 | 4.74 |
| N/A | 2.83 | N/A | 2.43 | N/A | 0.34 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 1.87 | N/A | 2.48 | N/A | 2.13 | N/A | 2.13 | N/A | 0.69 | N/A | 0.64 | N/A | 1.91 | N/A |
| N/A | 8.99 | N/A | 6.97 | N/A | 6.49 | N/A | 10.00 | N/A | 10.00 | N/A | 7.61 | N/A | 9.64 | N/A | 10.00 | N/A | 9.22 | N/A | 3.74 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A |
| N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 7.10 | N/A | 5.94 | N/A | 3.62 | N/A | 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 3.04 | N/A | 7.39 | N/A | 6.52 | N/A |
| N/A | 5.01 | N/A | 4.42 | N/A | 4.08 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.09 | N/A | 4.81 | N/A | 4.48 | N/A | 4.48 | N/A | 4.40 | N/A | 4.34 | N/A | 4.35 | N/A |
| 4.18 | 2.42 | 5.89 | 6.37 | 3.22 | 2.00 | 3.56 | 2.28 | | | 3.66 | 2.45 | 3.79 | 2.23 | 3.87 | 2.02 | 4.46 | 2.51 | 3.75 | 2.58 | 4.18 | 2.36 | 4.05 | 1.97 | 4.24 | 2.22 | 4.28 | 2.64 | 4.94 |

| 7 | 72 | | 74 | | 83 | | 117 | | 130 | | 133 | | 144 | | 145 | | 147 | | 148 | | 149 | | 150 | | 151 | | 154 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 3.89 | 7.45 | 4.06 | 9.77 | 10.00 | 0.79 | 4.74 | 9.24 | 4.40 | 0.51 | 4.74 | 0.71 | 4.51 | 0.06 | 4.33 | 9.74 | 3.89 | 8.63 | 4.83 | 0.48 | 4.46 | 8.91 | 4.83 | 8.77 | 4.23 | 0.71 | 7.39 | 8.38 | 5.14 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 8.26 | 0.00 | 0.00 | 6.90 | 8.26 | 5.52 | 8.41 | 6.28 | 8.20 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 8.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 7.42 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.79 | 3.68 | 0.00 | 0.00 | 8.40 | 2.32 | 2.63 | 7.19 | 8.90 | 2.63 | 0.00 | 0.00 | 0.00 | 0.00 | 8.90 | 3.59 | 0.00 | 0.00 | 0.00 | 0.00 | 3.92 | 4.53 | 0.00 | 0.00 |
| 0.91 | 5.02 | 0.91 | 9.29 | 0.00 | 1.59 | 7.56 | 6.44 | 0.91 | 3.14 | 0.83 | 1.00 | 0.76 | 2.10 | 7.56 | 7.86 | 0.45 | 4.30 | 1.36 | 2.63 | 7.56 | 5.02 | 1.36 | 5.73 | 0.91 | 1.60 | 0.57 | 4.30 | 1.36 |
| 1.50 | 2.53 | 0.86 | 2.01 | 0.00 | 3.25 | 7.29 | 2.86 | 0.86 | 1.85 | 0.43 | 2.67 | 0.86 | 2.01 | 7.29 | 2.34 | 0.43 | 4.32 | 1.29 | 3.68 | 7.29 | 4.66 | 1.29 | 2.74 | 0.86 | 2.69 | 0.64 | 3.30 | 1.29 |
| 4.17 | 10.00 | 4.17 | 10.00 | 0.00 | 2.66 | 10.00 | 10.00 | 2.22 | 2.27 | 3.33 | 1.71 | 3.33 | 2.33 | 10.00 | 10.00 | 2.50 | 10.00 | 3.33 | 2.74 | 10.00 | 10.00 | 3.33 | 10.00 | 2.50 | 3.59 | 2.67 | 10.00 | 3.33 |
| N/A | 5.36 | N/A | 7.86 | N/A | 5.95 | N/A | 8.16 | N/A | 3.84 | N/A | 3.54 | N/A | 5.86 | N/A | 6.11 | N/A | 8.20 | N/A | 5.95 | N/A | 7.05 | N/A | 6.68 | N/A | 5.64 | N/A | 6.74 | N/A |
| N/A | 8.23 | N/A | 7.91 | N/A | 8.97 | N/A | 7.19 | N/A | 7.77 | N/A | 7.80 | N/A | 9.30 | N/A | 7.81 | N/A | 6.96 | N/A | 10.00 | N/A | 7.19 | N/A | 5.26 | N/A | 9.35 | N/A | 7.29 | N/A |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.43 | 4.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.28 | 3.25 | 0.00 | 0.00 | 4.55 | 1.11 | 3.51 | 4.54 | 5.02 | 2.79 | 0.00 | 0.00 | 0.00 | 0.00 | 5.38 | 2.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.15 | 6.27 | 1.42 | 6.66 | 0.58 | 4.79 | 5.06 | 5.63 | 0.58 | 4.43 | 5.28 | 3.16 | 6.00 | 8.63 | 5.86 | 5.65 | 1.26 | 1.67 | 0.88 | 9.41 | 6.07 | 4.14 | 0.94 | 3.14 | 0.98 | 4.53 | 4.53 | 4.44 | 0.79 |
| 1.44 | 3.44 | 1.75 | 2.36 | 1.90 | 5.61 | 6.78 | 0.52 | 2.29 | 5.03 | 4.70 | 5.40 | 2.81 | 6.03 | 4.19 | 3.86 | 1.46 | 1.82 | 1.40 | 6.24 | 4.30 | 1.78 | 1.48 | 3.33 | 1.20 | 7.72 | 4.48 | 1.73 | 1.30 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.45 | 10.00 | 0.00 | 0.00 | 4.56 | 5.00 | 5.47 | 0.00 | 6.19 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 6.63 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 6.27 | 5.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.66 | 10.00 | 0.00 | 0.00 | 6.07 | 5.00 | 5.32 | 0.00 | 5.87 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.99 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 4.94 | 5.00 | 0.00 | 0.00 |
| 2.50 | 8.18 | 2.50 | 5.71 | 5.00 | 9.08 | 10.00 | 6.82 | 10.00 | 9.68 | 5.00 | 9.28 | 0.00 | 9.69 | 2.50 | 7.35 | 2.50 | 7.17 | 2.50 | 9.61 | 2.50 | 7.41 | 2.50 | 6.62 | 2.50 | 7.56 | 5.00 | 6.88 | 10.00 |
| 0.00 | 8.75 | 0.00 | 5.23 | 0.00 | 8.27 | 0.00 | 8.02 | 10.00 | 8.42 | 0.00 | 8.47 | 0.00 | 8.62 | 0.00 | 7.35 | 0.00 | 6.34 | 0.00 | 8.56 | 0.00 | 8.13 | 0.00 | 7.55 | 0.00 | 8.22 | 0.00 | 5.99 | 0.00 |
| 4.20 | 3.24 | 4.79 | 2.21 | 3.10 | 5.56 | 4.92 | 3.02 | 10.00 | 5.20 | 5.14 | 3.87 | 5.03 | 7.34 | 5.19 | 4.09 | 4.16 | 2.13 | 3.83 | 6.44 | 5.15 | 4.58 | 4.40 | 3.11 | 4.00 | 4.35 | 4.46 | 2.59 | 3.65 |
| 1.91 | N/A | 1.91 | N/A | 1.82 | N/A | 2.23 | N/A | 0.60 | N/A | 2.08 | N/A | 2.69 | N/A | 0.64 | N/A | 0.72 | N/A | 2.34 | N/A | 0.55 | N/A | 2.25 | N/A | 1.09 | N/A | 0.81 | N/A | 2.69 |
| 9.36 | N/A | 10.00 | N/A | 10.00 | N/A | 5.32 | N/A | 9.60 | N/A | 7.47 | N/A | 3.61 | N/A | 8.97 | N/A | 10.00 | N/A | 6.01 | N/A | 10.00 | N/A | 7.93 | N/A | 7.08 | N/A | 6.70 | N/A | 10.00 |
| 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 6.52 | N/A | 8.26 | N/A | 4.78 | N/A | 3.04 | N/A | 8.26 | N/A | 8.26 | N/A | 3.04 | N/A | 8.26 | N/A | 3.04 |
| 4.35 | N/A | 4.35 | N/A | 4.35 | N/A | 2.29 | N/A | 4.34 | N/A | 1.63 | N/A | 3.27 | N/A | 1.55 | N/A | 1.88 | N/A | 2.29 | N/A | 1.55 | N/A | 1.96 | N/A | 1.96 | N/A | 3.45 | N/A | 3.27 |
| 2.30 | 4.03 | 2.28 | 4.06 | 2.19 | 4.90 | 5.77 | 3.99 | 3.37 | 4.86 | 3.53 | 4.38 | 3.37 | 5.54 | 4.47 | 4.24 | 1.79 | 3.62 | 1.74 | 5.78 | 4.58 | 4.05 | 2.13 | 3.70 | 1.60 | 4.51 | 3.73 | 3.63 | 2.41 |

| 155 | | 156 | | 157 | | 158 | | 159 | | 160 | | 161 | | 162 | | 163 | | 164 | | 168 | | 169 | | 170 | | 172 | | 173 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 8.91 | 5.30 | 0.61 | 5.02 | 8.07 | 4.68 | 1.88 | 4.74 | 0.44 | 5.13 | 9.19 | 3.21 | 0.75 | 4.51 | 9.32 | 4.68 | 9.07 | 5.13 | 9.19 | 4.85 | 8.80 | 4.68 | 9.32 | 4.06 | 9.18 | 3.95 | 0.56 | 3.95 | 0.25 | 4.12 |
| 0.00 | 0.00 | 5.59 | 8.43 | 0.00 | 0.00 | 2.62 | 7.55 | 5.93 | 8.03 | 0.00 | 0.00 | 4.83 | 7.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.24 | 7.66 | 6.28 | 7.94 |
| 0.00 | 0.00 | 8.90 | 3.77 | 0.00 | 0.00 | 6.38 | 1.84 | 2.75 | 3.61 | 0.00 | 0.00 | 8.90 | 4.51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.65 | 1.58 | 8.15 | 2.56 |
| 5.02 | 1.36 | 3.52 | 7.26 | 4.30 | 0.91 | 1.70 | 0.38 | 0.77 | 0.76 | 6.44 | 0.91 | 3.34 | 0.76 | 6.44 | 0.91 | 7.15 | 0.45 | 6.44 | 0.91 | 5.73 | 0.91 | 6.44 | 0.91 | 6.44 | 0.91 | 3.20 | 7.56 | 2.45 | 7.56 |
| 4.66 | 1.29 | 4.48 | 6.86 | 3.30 | 0.86 | 3.13 | 0.43 | 1.90 | 0.86 | 3.09 | 0.86 | 4.79 | 0.86 | 4.81 | 0.86 | 3.65 | 0.43 | 4.86 | 0.86 | 3.50 | 0.86 | 4.81 | 0.86 | 4.81 | 0.86 | 3.93 | 7.29 | 2.85 | 7.29 |
| 10.00 | 3.33 | 4.72 | 10.00 | 10.00 | 2.22 | 3.16 | 2.50 | 2.08 | 2.50 | 10.00 | 2.67 | 2.94 | 5.00 | 10.00 | 2.50 | 10.00 | 1.11 | 10.00 | 2.50 | 10.00 | 2.22 | 10.00 | 2.22 | 10.00 | 2.50 | 2.99 | 10.00 | 2.21 | 10.00 |
| 6.08 | N/A | 5.00 | N/A | 5.09 | N/A | 5.26 | N/A | 3.68 | N/A | 7.44 | N/A | 5.54 | N/A | 7.91 | N/A | 7.45 | N/A | 7.97 | N/A | 7.44 | N/A | 6.77 | N/A | 7.91 | N/A | 5.22 | N/A | 5.86 | N/A |
| 7.19 | N/A | 9.64 | N/A | 8.76 | N/A | 8.51 | N/A | 9.18 | N/A | 4.64 | N/A | 9.85 | N/A | 7.81 | N/A | 7.28 | N/A | 7.19 | N/A | 7.29 | N/A | 7.60 | N/A | 7.81 | N/A | 10.00 | N/A | 10.00 | N/A |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.51 | 3.41 | 5.15 | 5.33 |
| 6.35 | 0.97 | 8.54 | 4.65 | 5.32 | 1.21 | 3.53 | 4.36 | 3.09 | 3.95 | 5.02 | 0.57 | 6.42 | 4.05 | 7.56 | 1.16 | 5.78 | 0.59 | 6.88 | 0.79 | 4.38 | 0.74 | 7.25 | 0.71 | 8.24 | 1.08 | 7.64 | 5.71 | 8.55 | 5.57 |
| 1.89 | 1.49 | 4.80 | 4.88 | 3.30 | 2.52 | 6.02 | 4.67 | 5.13 | 4.45 | 0.86 | 4.23 | 3.17 | 7.20 | 3.08 | 4.53 | 0.67 | 2.27 | 1.00 | 4.49 | 1.47 | 2.29 | 2.49 | 0.01 | 3.05 | 2.40 | 5.05 | 4.10 | 5.05 | 4.96 |
| 0.00 | 0.00 | 5.24 | 5.00 | 0.00 | 0.00 | 5.03 | 5.00 | 4.29 | 5.00 | 0.00 | 0.00 | 6.16 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.09 | 2.50 | 6.07 | 5.00 |
| 0.00 | 0.00 | 6.20 | 5.00 | 0.00 | 0.00 | 4.76 | 5.00 | 4.33 | 5.00 | 0.00 | 0.00 | 3.71 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.84 | 2.50 | 5.98 | 5.00 |
| 7.43 | 2.50 | 9.60 | 5.00 | 7.50 | 5.00 | 9.20 | 5.00 | 9.20 | 5.00 | 6.59 | 10.00 | 9.64 | 10.00 | 7.45 | 10.00 | 6.77 | 5.00 | 7.33 | 10.00 | 6.83 | 5.00 | 6.11 | 0.00 | 7.14 | 5.00 | 9.53 | 2.50 | 9.12 | 5.00 |
| 7.98 | 0.00 | 9.25 | 0.00 | 7.53 | 0.00 | 9.13 | 0.00 | 9.28 | 0.00 | 6.42 | 0.00 | 9.83 | 0.00 | 9.34 | 0.00 | 7.02 | 0.00 | 8.43 | 0.00 | 6.24 | 0.00 | 7.58 | 0.00 | 7.32 | 0.00 | 9.83 | 0.00 | 9.43 | 0.00 |
| 5.16 | 4.36 | 6.40 | 5.34 | 3.48 | 4.25 | 4.49 | 5.19 | 5.17 | 5.23 | 4.13 | 3.68 | 5.70 | 5.51 | 5.23 | 4.74 | 3.96 | 3.90 | 5.05 | 4.45 | 2.91 | 3.71 | 3.70 | 3.86 | 5.11 | 4.10 | 7.22 | 5.48 | 6.10 | 5.25 |
| N/A | 2.25 | N/A | 0.72 | N/A | 1.75 | N/A | 0.72 | N/A | 0.72 | N/A | 2.43 | N/A | 0.55 | N/A | 0.64 | N/A | 2.17 | N/A | 0.55 | N/A | 2.17 | N/A | 0.66 | N/A | 0.55 | N/A | 0.72 | N/A | 1.24 |
| N/A | 10.00 | N/A | 8.55 | N/A | 10.00 | N/A | 8.29 | N/A | 6.93 | N/A | 9.02 | N/A | 8.78 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 8.36 | N/A | 5.81 |
| N/A | 8.26 | N/A | 10.00 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 6.52 | N/A | 8.26 | N/A | 3.04 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 |
| N/A | 1.96 | N/A | 3.31 | N/A | 3.43 | N/A | 1.88 | N/A | 1.88 | N/A | 2.94 | N/A | 1.55 | N/A | 1.55 | N/A | 4.42 | N/A | 1.55 | N/A | 1.96 | N/A | 4.34 | N/A | 4.34 | N/A | 4.40 | N/A | 4.66 |
| 4.16 | 2.27 | 5.44 | 4.94 | 3.92 | 2.19 | 4.40 | 3.46 | 3.95 | 3.54 | 3.75 | 2.38 | 5.03 | 4.69 | 4.64 | 2.62 | 4.05 | 2.21 | 4.37 | 2.59 | 3.80 | 1.98 | 4.24 | 1.89 | 4.53 | 2.31 | 5.62 | 4.53 | 5.50 | 5.03 |

| 174 | | 176 | | 180 | | 184 | | 186 | | 187 | | 191 | | 193 | | 194 | | 195 | | 196 | | 199 | | 201 | | 203 | | 207 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 1.32 | 6.03 | 9.22 | 5.13 | 8.66 | 2.93 | 6.59 | 4.91 | 9.07 | 5.24 | 9.07 | 3.27 | 9.74 | 4.00 | 5.79 | 3.78 | 0.56 | 4.79 | 9.60 | 3.72 | 0.70 | 7.33 | 1.47 | 5.64 | 9.32 | 3.27 | 9.32 | 3.21 | 0.00 | 3.55 |
| 6.90 | 6.61 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.62 | 7.98 | 0.00 | 0.00 | 7.24 | 8.51 | 2.62 | 5.79 | 0.00 | 0.00 | 0.00 | 0.00 | 5.93 | 6.24 |
| 9.40 | 2.26 | 0.00 | 0.00 | 0.00 | 0.00 | 4.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.65 | 0.00 | 3.88 | 2.32 | 0.00 | 0.00 | 8.90 | 1.76 | 8.40 | 1.53 | 0.00 | 0.00 | 0.00 | 0.00 | 8.40 | 2.97 |
| 3.48 | 8.58 | 7.15 | 0.45 | 5.73 | 0.91 | 10.00 | 0.76 | 6.91 | 0.45 | 7.15 | 0.45 | 7.86 | 0.45 | 10.00 | 0.45 | 0.92 | 0.38 | 7.86 | 0.45 | 3.64 | 8.02 | 3.50 | 0.95 | 7.15 | 0.45 | 7.15 | 0.45 | 1.78 | 0.45 |
| 2.00 | 7.93 | 1.93 | 0.43 | 3.51 | 0.86 | 10.00 | 0.86 | 3.65 | 0.43 | 2.76 | 0.43 | 5.01 | 0.43 | 10.00 | 0.43 | 1.86 | 0.43 | 5.01 | 0.43 | 4.03 | 7.95 | 3.05 | 1.07 | 4.71 | 0.43 | 4.71 | 0.43 | 2.01 | 0.43 |
| 2.52 | 10.00 | 10.00 | 2.50 | 10.00 | 2.22 | 10.00 | 2.50 | 10.00 | 1.11 | 10.00 | 3.33 | 10.00 | 2.50 | 10.00 | 3.33 | 2.39 | 2.50 | 10.00 | 2.50 | 2.98 | 10.00 | 3.02 | 4.58 | 10.00 | 3.33 | 10.00 | 3.33 | 3.29 | 3.33 |
| 5.92 | N/A | 7.04 | N/A | 7.00 | N/A | 5.32 | N/A | 6.40 | N/A | 7.73 | N/A | 7.76 | N/A | 4.62 | N/A | 4.17 | N/A | 7.21 | N/A | 5.07 | N/A | 5.12 | N/A | 7.73 | N/A | 7.91 | N/A | 4.61 | N/A |
| 8.31 | N/A | 4.96 | N/A | 7.30 | N/A | 6.07 | N/A | 7.28 | N/A | 7.03 | N/A | 7.17 | N/A | 5.85 | N/A | 7.13 | N/A | 7.81 | N/A | 8.72 | N/A | 8.60 | N/A | 7.81 | N/A | 7.81 | N/A | 10.00 | N/A |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.52 | 2.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.71 | 1.68 | 0.00 | 0.00 | 6.63 | 1.61 | 4.13 | 1.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6.82 | 5.81 | 3.78 | 0.27 | 4.15 | 0.53 | 3.53 | 4.46 | 2.28 | 0.53 | 3.16 | 1.29 | 5.13 | 0.82 | 3.82 | 2.95 | 2.08 | 4.52 | 5.52 | 1.34 | 7.03 | 6.32 | 5.82 | 5.80 | 5.54 | 1.21 | 4.18 | 1.12 | 6.16 | 4.41 |
| 4.92 | 3.97 | 0.22 | 3.97 | 0.70 | 2.18 | 5.70 | 6.83 | 1.17 | 2.08 | 3.70 | 1.53 | 1.37 | 2.42 | 2.45 | 3.22 | 4.70 | 4.43 | 3.88 | 1.55 | 5.64 | 5.43 | 6.50 | 2.87 | 3.70 | 1.43 | 3.56 | 1.34 | 5.02 | 3.74 |
| 5.64 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 5.37 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.84 | 2.50 | 4.27 | 5.00 | 0.00 | 0.00 | 6.58 | 5.00 | 5.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.55 | 2.50 |
| 6.83 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 4.93 | 10.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.55 | 2.50 | 4.47 | 5.00 | 0.00 | 0.00 | 6.20 | 5.00 | 6.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.41 | 2.50 |
| 9.53 | 2.50 | 5.87 | 10.00 | 6.53 | 5.00 | 9.29 | 10.00 | 6.25 | 5.00 | 7.54 | 2.50 | 7.20 | 5.00 | 8.98 | 2.50 | 9.17 | 5.00 | 7.61 | 2.50 | 10.00 | 5.00 | 9.77 | 0.00 | 7.27 | 2.50 | 7.01 | 2.50 | 9.84 | 2.50 |
| 8.87 | 0.00 | 6.39 | 0.00 | 6.34 | 0.00 | 8.70 | 0.00 | 5.18 | 0.00 | 7.63 | 0.00 | 7.32 | 0.00 | 7.77 | 0.00 | 8.19 | 10.00 | 7.50 | 0.00 | 8.97 | 10.00 | 8.40 | 0.00 | 7.35 | 0.00 | 7.09 | 0.00 | 8.12 | 0.00 |
| 7.57 | 5.22 | 3.21 | 3.47 | 2.71 | 3.65 | 3.67 | 5.10 | 1.95 | 3.24 | 3.99 | 4.29 | 4.41 | 4.11 | 2.66 | 4.75 | 3.14 | 10.00 | 4.09 | 4.28 | 7.08 | 10.00 | 5.24 | 5.15 | 3.47 | 4.14 | 3.28 | 3.99 | 5.86 | 5.10 |
| N/A | 0.55 | N/A | 0.69 | N/A | 0.51 | N/A | 0.43 | N/A | 2.08 | N/A | 0.55 | N/A | 0.64 | N/A | 1.09 | N/A | 2.17 | N/A | 0.55 | N/A | 0.46 | N/A | 0.46 | N/A | 1.09 | N/A | 1.09 | N/A | 0.55 |
| N/A | 8.92 | N/A | 10.00 | N/A | 9.27 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 9.57 | N/A | 9.21 | N/A | 7.20 | N/A | 10.00 | N/A | 9.04 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 8.51 |
| N/A | 6.52 | N/A | 3.04 | N/A | 3.04 | N/A | 4.78 | N/A | 3.04 | N/A | 3.04 | N/A | 8.26 | N/A | 3.04 | N/A | 4.78 | N/A | 4.78 | N/A | 4.78 | N/A | 4.78 | N/A | 3.04 | N/A | 3.04 | N/A | 6.52 |
| N/A | 4.34 | N/A | 4.40 | N/A | 4.40 | N/A | 4.34 | N/A | 1.72 | N/A | 1.55 | N/A | 1.55 | N/A | 1.96 | N/A | 1.96 | N/A | 1.55 | N/A | 1.66 | N/A | 1.22 | N/A | 1.96 | N/A | 1.96 | N/A | 1.55 |
| 5.62 | 4.54 | 3.52 | 2.33 | 3.68 | 1.87 | 5.53 | 3.95 | 3.54 | 1.84 | 4.10 | 1.70 | 4.29 | 2.09 | 5.00 | 2.20 | 3.96 | 4.22 | 4.48 | 1.77 | 5.85 | 5.68 | 5.16 | 2.69 | 4.36 | 1.73 | 4.24 | 1.71 | 4.76 | 2.89 |

| 209 | | 213 | | 215 | | 217 | | 219 | | 221 | | 227 | | 229 | | 237 | | 239 | | 242 | | 244 | | 245 | | 246 | | 247 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 9.49 | 3.27 | 8.77 | 4.00 | 0.39 | 3.44 | 9.35 | 3.67 | 8.51 | 4.06 | 9.35 | 5.08 | 6.63 | 4.51 | 1.17 | 6.43 | 8.63 | 5.64 | 9.61 | 4.68 | 9.19 | 4.34 | 8.91 | 5.26 | 9.61 | 4.40 | 8.66 | 5.26 | 2.77 | 4.34 |
| 0.00 | 0.00 | 0.00 | 0.00 | 6.21 | 6.83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 8.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 8.40 | 2.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.50 | 0.00 | 7.40 | 8.38 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7.86 | 0.79 | 6.44 | 0.45 | 3.38 | 0.38 | 7.86 | 0.45 | 6.44 | 0.45 | 7.86 | 0.45 | 10.00 | 0.38 | 2.83 | 8.20 | 4.30 | 1.36 | 7.86 | 0.45 | 7.15 | 0.45 | 5.02 | 1.36 | 7.86 | 0.45 | 5.02 | 1.36 | 7.15 | 0.45 |
| 1.81 | 0.43 | 3.79 | 0.43 | 3.58 | 0.43 | 3.94 | 0.43 | 1.66 | 0.43 | 3.94 | 0.43 | 10.00 | 0.43 | 2.50 | 7.50 | 4.37 | 1.29 | 5.06 | 0.43 | 4.76 | 0.43 | 4.66 | 1.29 | 5.06 | 0.43 | 3.60 | 1.29 | 4.76 | 0.43 |
| 10.00 | 2.50 | 10.00 | 1.33 | 2.63 | 3.33 | 10.00 | 1.11 | 10.00 | 1.33 | 10.00 | 1.11 | 10.00 | 2.50 | 2.31 | 10.00 | 10.00 | 3.33 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 3.33 | 10.00 | 1.11 | 10.00 | 3.33 | 2.72 | 1.33 |
| 6.46 | N/A | 7.28 | N/A | 4.93 | N/A | 6.68 | N/A | 6.97 | N/A | 6.75 | N/A | 5.61 | N/A | 4.84 | N/A | 6.04 | N/A | 7.44 | N/A | 7.53 | N/A | 6.74 | N/A | 6.74 | N/A | 7.37 | N/A | 7.15 | N/A |
| 8.13 | N/A | 9.19 | N/A | 8.57 | N/A | 6.89 | N/A | 7.79 | N/A | 7.28 | N/A | 6.50 | N/A | 8.72 | N/A | 6.98 | N/A | 6.98 | N/A | 6.98 | N/A | 6.98 | N/A | 6.98 | N/A | 6.91 | N/A | 7.61 | N/A |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.39 | 3.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 4.54 | 1.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.38 | 3.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5.86 | 1.35 | 7.83 | 1.23 | 7.35 | 5.67 | 7.36 | 1.25 | 8.38 | 1.29 | 5.18 | 0.68 | 3.90 | 4.63 | 9.03 | 8.06 | 3.21 | 0.80 | 4.85 | 0.84 | 4.26 | 0.88 | 5.12 | 0.94 | 5.94 | 0.61 | 7.30 | 1.27 | 4.58 | 0.52 |
| 3.72 | 1.61 | 3.64 | 2.47 | 6.06 | 3.97 | 3.74 | 1.47 | 3.51 | 2.58 | 1.22 | 2.27 | 6.94 | 3.75 | 5.37 | 5.42 | 1.54 | 1.35 | 1.44 | 2.43 | 1.33 | 2.51 | 1.80 | 1.48 | 0.83 | 4.28 | 3.86 | 1.47 | 0.71 | 4.19 |
| 0.00 | 0.00 | 0.00 | 0.00 | 5.33 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.36 | 2.50 | 6.63 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 6.12 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.98 | 2.50 | 6.77 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7.76 | 2.50 | 7.35 | 5.00 | 9.81 | 2.50 | 7.38 | 2.50 | 7.66 | 5.00 | 6.78 | 5.00 | 9.18 | 2.50 | 9.93 | 5.00 | 7.04 | 2.50 | 7.23 | 5.00 | 7.45 | 5.00 | 7.39 | 2.50 | 6.74 | 10.00 | 7.36 | 2.50 | 6.48 | 10.00 |
| 8.27 | 0.00 | 8.27 | 0.00 | 8.84 | 0.00 | 7.97 | 0.00 | 9.02 | 0.00 | 7.87 | 0.00 | 7.86 | 0.00 | 9.18 | 0.00 | 7.60 | 0.00 | 6.17 | 0.00 | 6.57 | 0.00 | 6.67 | 0.00 | 7.17 | 0.00 | 7.16 | 0.00 | 6.59 | 0.00 |
| 3.92 | 4.54 | 3.74 | 4.42 | 5.38 | 5.29 | 3.71 | 4.34 | 3.42 | 4.71 | 3.36 | 4.14 | 4.40 | 4.83 | 8.56 | 5.42 | 2.82 | 4.14 | 3.47 | 3.80 | 3.47 | 3.98 | 3.64 | 3.99 | 3.79 | 3.94 | 3.26 | 4.12 | 2.47 | 3.70 |
| N/A | 0.55 | N/A | 0.64 | N/A | 0.55 | N/A | 0.55 | N/A | 0.64 | N/A | 2.17 | N/A | 0.55 | N/A | 1.23 | N/A | 2.43 | N/A | 0.55 | N/A | 2.17 | N/A | 2.25 | N/A | 2.17 | N/A | 0.64 | N/A | 2.25 |
| N/A | 8.69 | N/A | 10.00 | N/A | 10.00 | N/A | 9.39 | N/A | 8.47 | N/A | 10.00 | N/A | 10.00 | N/A | 9.55 | N/A | 8.88 | N/A | 10.00 | N/A | 10.00 | N/A | 7.53 | N/A | 10.00 | N/A | 6.56 | N/A | 6.72 |
| N/A | 8.26 | N/A | 10.00 | N/A | 8.26 | N/A | 8.26 | N/A | 10.00 | N/A | 8.26 | N/A | 8.26 | N/A | 7.10 | N/A | 3.04 | N/A | 4.78 | N/A | 3.04 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 4.78 |
| N/A | 5.56 | N/A | 1.55 | N/A | 1.55 | N/A | 1.55 | N/A | 1.55 | N/A | 1.96 | N/A | 1.55 | N/A | 2.29 | N/A | 2.94 | N/A | 1.55 | N/A | 1.96 | N/A | 1.96 | N/A | 1.96 | N/A | 1.55 | N/A | 1.96 |
| 4.31 | 2.11 | 4.49 | 2.19 | 5.38 | 3.27 | 4.41 | 1.84 | 4.32 | 2.13 | 4.09 | 2.19 | 5.64 | 2.57 | 6.21 | 5.79 | 3.68 | 1.98 | 4.12 | 1.87 | 4.04 | 1.89 | 3.94 | 1.93 | 4.16 | 2.51 | 4.15 | 1.98 | 3.12 | 2.14 |

| 248 | | 249 | | 250 | | 251 | | 255 | | 284 | | 287 | | 291 | | 292 | | 294 | | 296 | | 300 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score | Function Score | Benefits Score |
| 9.49 | 3.16 | 8.32 | 3.33 | 8.46 | 5.19 | 9.07 | 9.02 | 9.18 | 3.21 | 8.91 | 5.37 | 6.53 | 4.88 | 0.15 | 4.50 | 4.63 | 4.82 | 9.39 | 4.56 | 9.67 | 4.94 | 9.18 | 3.27 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.86 | 7.18 | 4.14 | 8.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.63 | 0.00 | 4.29 | 3.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7.86 | 0.45 | 5.02 | 0.45 | 5.02 | 0.45 | 6.44 | 1.59 | 7.15 | 0.45 | 5.02 | 1.36 | 10.00 | 0.76 | 1.56 | 8.17 | 6.44 | 0.91 | 6.44 | 0.91 | 7.86 | 0.45 | 6.44 | 0.91 |
| 1.81 | 0.43 | 1.65 | 0.43 | 1.60 | 0.43 | 3.74 | 1.50 | 4.71 | 0.43 | 4.66 | 1.29 | 10.00 | 0.86 | 4.53 | 7.71 | 4.19 | 0.86 | 5.68 | 0.86 | 5.87 | 0.43 | 4.81 | 0.86 |
| 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 1.11 | 10.00 | 5.00 | 10.00 | 1.11 | 10.00 | 3.33 | 10.00 | 4.17 | 3.28 | 10.00 | 3.10 | 5.00 | 10.00 | 7.50 | 10.00 | 2.50 | 10.00 | 2.22 |
| 7.98 | N/A | 6.07 | N/A | 6.68 | N/A | 7.33 | N/A | 7.16 | N/A | 8.12 | N/A | 4.93 | N/A | 3.07 | N/A | 6.24 | N/A | 7.50 | N/A | 8.01 | N/A | 7.73 | N/A |
| 7.28 | N/A | 8.25 | N/A | 8.23 | N/A | 7.49 | N/A | 7.60 | N/A | 7.06 | N/A | 5.75 | N/A | 8.80 | N/A | 8.89 | N/A | 7.74 | N/A | 7.45 | N/A | 7.60 | N/A |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3.96 | 0.76 | 4.44 | 0.54 | 3.17 | 0.61 | 4.94 | 0.60 | 5.52 | 0.82 | 7.85 | 1.54 | 2.46 | 4.51 | 3.06 | 3.93 | 7.87 | 1.31 | 8.85 | 1.41 | 7.11 | 1.08 | 7.63 | 1.49 |
| 1.01 | 4.44 | 0.50 | 4.27 | 0.88 | 4.27 | 0.92 | 4.25 | 2.57 | 4.19 | 4.27 | 1.74 | 6.78 | 3.67 | 4.50 | 3.39 | 3.92 | 1.50 | 4.30 | 1.56 | 2.02 | 1.61 | 3.98 | 1.73 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.26 | 2.50 | 3.78 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.86 | 2.50 | 4.87 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7.19 | 10.00 | 6.70 | 10.00 | 6.70 | 10.00 | 6.65 | 10.00 | 6.48 | 10.00 | 8.14 | 2.50 | 9.01 | 2.50 | 9.51 | 2.50 | 7.47 | 2.50 | 7.62 | 2.50 | 7.78 | 2.50 | 8.11 | 2.50 |
| 8.20 | 0.00 | 8.37 | 0.00 | 7.09 | 0.00 | 6.59 | 0.00 | 7.46 | 0.00 | 9.28 | 0.00 | 8.91 | 0.00 | 8.37 | 0.00 | 7.78 | 0.00 | 6.57 | 0.00 | 7.47 | 0.00 | 9.22 | 0.00 |
| 3.00 | 4.35 | 3.11 | 4.26 | 2.33 | 3.90 | 3.50 | 3.75 | 3.15 | 3.94 | 5.45 | 4.93 | 3.74 | 5.08 | 6.10 | 5.07 | 5.75 | 4.32 | 5.26 | 4.03 | 5.26 | 4.32 | 3.90 | 4.90 |
| N/A | 2.17 | N/A | 2.17 | N/A | 2.17 | N/A | 2.69 | N/A | 2.08 | N/A | 0.61 | N/A | 0.72 | N/A | 1.00 | N/A | 0.55 | N/A | 0.55 | N/A | 0.55 | N/A | 0.55 |
| N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 | N/A | 8.82 | N/A | 10.00 | N/A | 7.03 | N/A | 9.41 | N/A | 6.59 | N/A | 10.00 | N/A | 10.00 | N/A | 10.00 |
| N/A | 4.78 | N/A | 6.52 | N/A | 3.04 | N/A | 4.78 | N/A | 6.52 | N/A | 8.26 | N/A | 6.52 | N/A | 4.78 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 | N/A | 8.26 |
| N/A | 1.96 | N/A | 1.96 | N/A | 1.96 | N/A | 3.61 | N/A | 1.63 | N/A | 1.88 | N/A | 1.88 | N/A | 1.63 | N/A | 1.55 | N/A | 1.55 | N/A | 1.55 | N/A | 1.55 |
| 3.99 | 2.30 | 3.67 | 2.37 | 3.54 | 2.27 | 3.92 | 2.99 | 4.18 | 2.27 | 4.63 | 2.25 | 5.35 | 2.50 | 4.22 | 4.11 | 4.14 | 2.43 | 4.67 | 2.30 | 4.62 | 2.01 | 4.62 | 2.01 |

# Appendix G.3

## Wetland Compensation Plan

PRELIMINARY WETLAND COMPENSATION PLAN

# Goldboro Gold Project, Goldboro Nova Scotia

PREPARED FOR

**Anaconda Mining Inc.**
Suite 790, Cabot Place,
100 New Gower Street
St. John's, NL
A1C 6K3

PREPARED BY

**McCallum Environmental Ltd.**
2 Bluewater Road, Suite 115
Bedford, Nova Scotia
B4B 1G7

May 2022

McCallum Environmental Ltd.

# Table of Contents

# 1.0 Preliminary Wetland Compensation Plan

Anaconda Mining Inc. (Anaconda) is proposing the construction, operation, and closure of an open pit gold mine in Goldboro, Nova Scotia. The Goldboro Gold Project (the Project) is located approximately 175 kilometres (km) northeast of Halifax, 60 km southeast of Antigonish, and 1.6 km northeast of the community of Goldboro on the eastern shore of Isaac's Harbour, in Guysborough County, Nova Scotia, Canada. Anaconda Mining Inc. (Anaconda) proposes to develop the Project as a 4,000-tonne per day (tpd) mine and processing facility. For the purposes of this environmental assessment, a Project Area (PA) was defined as the footprint of Project related infrastructure plus a buffer of 100 – 200 m. The mine plan includes two surface extraction areas (open pits), an ore processing facility, a tailings management facility (TMF), three waste rock storage areas (WRSAs), overburden and organic stockpiles, support buildings including an employee accommodation building, and associated infrastructure. The anticipated mine life for extraction of ore is approximately 11 years.

The Project has been designed to avoid wetland habitat wherever possible. Several iterations of Project design have been considered, with wetland avoidance as a key consideration for adjustment of infrastructure to reduce impacts to wetlands, associated fish habitat, and habitat which supports potential species at risk (SAR). Where wetlands could not be avoided, minimization of impacts and mitigation measures were prioritized. Once all avoidance, minimization, and mitigation techniques were considered, Anaconda acknowledges a residual loss of wetland habitat and function as a result of the Project. In total approximately 95.974 ha of wetland area is expected to be altered by the Project through direct and predicted indirect impacts and will require compensation. Some of the wetlands proposed for alteration exist as potential Wetlands of Special Significance (WSS). These wetlands are described in the Project's Wetland Baseline Report and EARD Wetland VC. In consideration of industry standards and previously applied compensation ratios (i.e., 4:1 for WSS), it is expected that the Project will result in approximately 285 ha of wetland compensation requirements. Final compensation requirements will be determined through permitting in consultation with NSECC.

This Preliminary Wetland Compensation Plan has been prepared to provide a conceptual approach to wetland compensation to offset wetland alteration as a result of the Project.

## 1.1 Regulatory Context

Anaconda is committed to the implementation of wetland compensation project(s) to satisfy the Nova Scotia Wetland Conservation Policy's (NSECC 2011) objective of preventing no net loss of wetland habitat and function. Anaconda acknowledges that NSECC considers restoration of wetland function as a focus of wetland compensation in Nova Scotia, and as such, this objective will be integral to wetland compensation efforts associated with this Project.

Anaconda understands that NSECC's preferred method of compensation is restoration of highly degraded wetland habitats or wetlands previously lost to historic conversion in proximity to the wetland losses (within the same or adjacent watersheds) at a minimum 2:1 ratio (area) with careful consideration of replacement of lost function. Furthermore, the province expects compensation projects to be completed in advance of wetland alteration, or directly following wetland alteration (limited time lag) and expects the compensation project be self-sustaining and permanent. Anaconda will endeavor to ensure that these objectives are upheld as part of the wetland compensation project(s). In collaboration with McCallum Environmental Ltd (MEL - a NSECC designated Wetland Restoration Professional), Anaconda has been active in identifying preliminary compensation projects in 2021 and 2022 to support the Project wetland compensation requirements as described in this document.

## 1.2 Wetland Compensation Type

Anaconda, with support from MEL, has completed preliminary identification of Primary and Secondary Methods of wetland compensation. Primary and Secondary methods of wetland compensation can be implemented in combination with each other to meet the objectives for wetland compensation requirements associated with the Project.

Primary and Secondary methods of compensation are outlined below:

1. Primary Compensation: physical, on the ground compensation via wetland restoration, creation, enhancement or wetland expansion activities; and
2. Secondary Compensation: Anaconda understands that secondary methods require consultation and negotiation with NSECC, and the scope of what classifies as a secondary option is continually evolving. Methods include ones that NSECC regards as important tools in support and development of the Wetland Conservation Policy i.e., scientific research studies, watershed studies, wetland education (trails, signage, interpretive endeavors), and others.

# 2.0 Wetland Compensation Process

Identification of wetland compensation project(s) is already underway with the goal of identifying opportunities prior to Project construction. There are several steps involved in the selection of a Primary or Secondary wetland compensation project including engagement with the Mi'kmaq of Nova Scotia and key stakeholders, site identification, study concept development, project design, reporting, and identification of monitoring commitments. These steps are described in this section.

## 2.1 Engagement

As part of the wetland compensation process, Anaconda have, and will continue to engage early with key Rightsholders (Mi'kmaq of Nova Scotia) and stakeholders, including regulatory agencies, to ensure all possible avenues for wetland compensation have been explored in the site identification process. Engagement allows Anaconda to understand what opportunities there may be in close proximity to the Project, and as well, to learn from communities and interest groups who may have concepts and objectives related to wetland compensation. Engagement will involve the following types of groups and organizations:

- Nova Scotia Environment and Climate Change (NSECC);
- Nova Scotia Department of Natural Resources and Renewables (NSDNRR);
- Environment and Climate Change Canada (ECCC);
- Mi'kmaq of Nova Scotia communities and organizations;

- Private Forestry Lands Groups and Co-operatives;
- Local Municipalities; and
- Non-Governmental Organizations such as:
  - Eastern Shore Forest Watch;
  - Nova Scotia Nature Trust;
  - Nature Conservancy of Canada;
  - Ecology Action Centre; and
  - Others as determined through engagement efforts.

Anaconda have held meetings with the Unama'ki Institute of Natural Resources (UINR), Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) and Paqtnkek First Nation regarding the wetland compensation process and to discuss potential collaboration in the future. As presented in Section 3.2.1, a potential Secondary method of wetland compensation has been identified with UINR.

## 2.2 Compensation Project Identification Process

The process to select suitable wetland compensation projects has been initiated and will continue during the environmental assessment and provincial alteration permitting process. For Primary wetland compensation projects, with the support of a Wetland Restoration Professional (WRP), Anaconda will complete feasibility studies and preliminary design concepts to determine the scope of work, and specific compensation objectives. For Secondary compensation projects, Anaconda and the WRP will work with NSECC to identify potential opportunities for projects (i.e., studies, research, education etc.) that directly supports the NSECC wetland program.

An evaluation of the value of the compensation project will be determined by comparing the proposed outcomes of the compensation project to the broader objectives of the Nova Scotia Wetland Conservation Policy (NSE 2011), as well as local watershed benefits and support of any initiatives that the compensation project would provide to the Mi'kmaq of Nova Scotia, stakeholders and local communities.

Parallel to the definition of Primary compensation project concepts and objectives, collaboration and discussions with landowners of potential compensation sites will take place. This process is a crucial element of determining the feasibility of a site for wetland compensation purposes. The process includes written agreements with landowners which outline compensation project goals and objectives, and in some cases, could include land purchase agreements.

Anaconda will prioritize identification of functionally valuable wetland compensation projects within the affected watershed. Although this is the preferred approach, it should be acknowledged however that the subject watershed (New Harbour/Salmon Primary Watershed) is largely undeveloped, and therefore the likelihood of a suitable wetland compensation project being identified is limited. Ideally, wetland compensation would occur within the spatial boundaries of the Project. However, the nature of the wetland alteration at the Goldboro Mine Site (e.g., open pit and stockpiles) may limit the overall opportunity for on-site compensation through site reclamation, given the footprint area of the stockpiles and the open pits will remain at closure. On-site options for wetland compensation may be considered during the reclamation process, acknowledging the time lag associated with this option, and could include reclamation of partially impacted wetlands or riparian areas. Potential opportunities for on-site reclamation may be considered as part of the Project's Reclamation Plan, which will be iteratively updated through the life of the Project, in consultation with NSECC.

An initial evaluation of Primary wetland compensation sites has been completed within the affected watershed (Country Harbour Primary Watershed) that has resulted in the identification of two potential projects (See Section 3.1.2 and 3.1.3). Anaconda, with support of the WRP have also been assessing adjacent watersheds such as the New Harbour/ Salmon, St. Marys and Liscomb Primary Watersheds for potential Primary projects. Potential projects have been identified within these watersheds at a desktop level and will be further evaluated during 2022 through completion of aerial helicopter and ground truthing surveys. In consultation with NSECC, Anaconda will also identify other areas within the province where wetland compensation opportunities are present. This will include locations where historical water management and wetland degradation within agricultural areas have contributed to watershed health issues in rural areas of Nova Scotia. Two such areas include the Musquodoboit River Secondary watershed and the Shubenacadie Secondary watershed in lands adjacent to the Stewiacke River. Anaconda will investigate wetland compensation opportunities in these areas as well as other watersheds with a high proportion of degraded wetland habitat as a result of agricultural practices.

## 2.3 Compensation Project Design

Preliminary project design for Primary wetland compensation projects will be initiated during the site selection process concurrent with engagement activities. However, as discussions with landowners advance, and securing of land appears feasible to implement the compensation project, project design will advance into a more detailed stage.

For Secondary wetland compensation projects, Anaconda will work with the WRP to define a scope of work and objectives for submission and review by the provincial wetland specialist at NSECC. In collaboration with the wetland specialist, the WRP will refine and finalize the Secondary wetland compensation project including the wetland compensation credit value (i.e., comparative to on the ground area credit).

The following sections outline in detail the design process for Primary wetland compensation opportunities.

### 2.3.1 Preliminary Design

A desktop review process will be initiated on potential compensation sites to determine existing characteristics (i.e., level of historical disturbance), hydrological conditions (inflows and outflows of water), soil characteristics, and presence of a local reference site (undisturbed wetland habitat). The desktop review process will be followed by a field assessment and feasibility study to identify landscape characteristics, review potential reference site(s), and refine the preliminary design further. As well as evaluating the project site for characteristics discussed above, details relating to vegetative composition, habitat, species at risk presence and potential fish habitat is also evaluated. In addition, information regarding adjacent land use and its potential interaction with a compensation project is obtained.

Baseline monitoring is typically completed between spring and late fall to support the design process. As well, baseline monitoring is completed to understand detailed conditions about the site which can be compared to post project completion conditions to determine the success of project objectives. Baseline monitoring typically involves monitoring of baseline hydrology through installation of water data loggers and the completion of detailed vegetation and habitat assessments through plot installations. Wetland

functional assessment is also completed at this stage: a repeat of this process post project completion is performed to determine if functional characteristics have been modified to meet project objectives.

Hydrology data from loggers is converted into a hydrograph so that baseline hydrological characteristics are understood to inform the detailed design process.

Having a proper understanding of site conditions and adjacent site conditions (reference site) is paramount to meeting the goals of the wetland compensation project. For example, if site conditions cannot support (at baseline or through restoration) a vegetative community or hydrological environment required to support wetland habitat, it may not be a considered a viable option.

Based on these conditions, preliminary project design(s) can be put in place.

### 2.3.2 Detailed Design

The detailed design process includes the modelling of specific hydrological conditions and detailing the groundwork activities that are required to be implemented at the site to meet the objectives of the compensation project. Tasks completed as part of this process include confirmation of water budget and detailed design, surveying, construction methodology, seeding and planting techniques, management of herbivory challenges and monitoring requirements. Utilization of a hydrograph will aid this process by facilitating the determination of available water to the compensation site. Water should be managed on the site to meet compensation objectives (i.e., pre-degraded or enhanced conditions as demonstrated in the available reference site).

Specific details/drawings of the compensation project(s) will be developed and will made available to NSECC for review in Annual Wetland Compensation Plans, Wetland Compensation Concept Plans or documentation to support regulatory permitting that the compensation project may require (i.e., wetland or watercourse alteration). The exact scope required for the detailed design process will be determined in consultation with NSECC.

### 2.3.3 Reporting

Anaconda proposes that an annual wetland compensation report be provided to NSECC throughout the wetland compensation implementation period (to be determined by NSECC as part of provincial wetland permitting and will likely correspond to the construction and first few operational phases of the Project). The annual report will include the following information:

- An annual survey of the Project to identify the exact alteration footprint as a result of Project related activities completed that year;
- An updated schedule for the alteration areas expected for the forthcoming year;
- Wetland Compensation Plan (WCP): The WCP will exist as a living document and will be updated annually. The WCP will detail wetland compensation efforts completed to date (including Secondary projects) and continue to document progress made with site identification and project design.

Implementation of Primary wetland compensation projects will be initiated on the ground within three years, sooner if possible, of the first wetland alteration activity occurring on the site;

- The WCP will provide a detailed monitoring plan to confirm and document objectives based on performance indicators as determined by the iterative approach of the WCP and annual reporting; and
- Anaconda is committed to engaging one (or more) wetland restoration professionals (WRP) to support them in fulfilling the wetland compensation tasks associated with this Project. Details related to the agreements between Anaconda and the WRP will be provided in the annual update.

## 2.4 Wetland Compensation Monitoring

Wetland monitoring associated with Primary wetland compensation projects is proposed to include visual surveys, hydrology, and vegetation plots. Monitoring will be completed to determine if wetland compensation objectives (i.e., restoration, enhancement or creation of wetland area and function) are being achieved.

The following subsections outline the surveys proposed. The final scope and scale (i.e., timing and number of surveys) of monitoring will be outlined in the final version of the WCP. Monitoring timelines will be based on known performance indicators and extended as necessary, based on results of annual reporting and development of adaptive management strategies as needed.

### 2.4.1 Visual Surveys

General visual surveys will be conducted to determine the success of restoring or enhancing habitat to pre-defined objectives. The assessment will take place during a seasonally appropriate time. Visual surveys will assess the following:

- Evidence of Primary and Secondary indicators of wetland hydrology (e.g., water marks, drainage channels) supporting criteria a) and b) within the Compensation Site; and,
- To document transitions in habitat and general vegetative composition. This can be completed via visual evidence observations made during site assessments and aerially via the use of a drone.

### 2.4.2 Vegetation Plots

Detailed 5 m x 5 m vegetation plots will be assessed during baseline conditions across each compensation site that can be used during future post-construction monitoring events to assess potential changes in vegetative characteristics and support the determination of whether the compensation plan objectives have been met.   Absolute percent cover estimates will be completed within the vegetation plot for the herbaceous, shrub and tree stratums. Photographs will be taken to document vegetation cover in, and immediately around the vegetation plot.

### 2.4.3 Hydrology

Data loggers will be re-deployed into previously installed monitor wells within each wetland compensation site to evaluate and compare post construction hydrological conditions to baseline conditions. Potential hydrological changes, including analysis of seasonal fluctuations in the water table will be performed to determine if hydrological objectives for the compensation project are being met.

#### 2.4.4 Monitoring Summary and Adaptive Management

Monitoring will support the determination of whether the wetland compensation project has met its objectives. Should results suggest that the compensation project is not functioning as it was predicted, monitoring results can be used to identify what modifications may be required within the compensation site to correct these issues.

## 2.5 Preliminary Wetland Compensation Options

The following sections present the engagement that has occurred to date and potential Primary and Secondary wetland compensation projects being considered for the expected future Project wetland compensation requirements.

Anaconda have initiated wetland compensation planning through completion of preliminary engagement efforts, Primary wetland compensation site identification and development of potential Secondary wetland compensation projects. Identification of potential Primary wetland compensation projects to date has been focussed within the Project watershed and neighbouring watersheds (i.e., New Harbour/Salmon, St. Marys and Liscomb Primary Watersheds). This has consisted of an initial desktop review and examination of aerial imagery. Potential sites will be advanced throughout 2022 though implementation of aerial (helicopter and drone surveys) and field evaluation work. In addition, other known potential Primary projects that are not located within the local watershed, but that provide potentially valuable wetland compensation opportunities have been included below.

## 2.6 Primary Wetland Compensation

Potential Primary wetland compensation opportunities known of to date are discussed below.

#### 2.6.1 Gays River Floodplain Restoration

The Gays River Floodplain Restoration/Enhancement Project has been identified along two private properties adjacent to the Gays River and Shubenacadie River in Milford, NS (Figure 1 (below). The tract of land indicated in red encompasses approximately 40 ha of potential floodplain restoration area. MEL currently has an access agreement in place with the landowners to perform baseline monitoring in support of a potential wetland restoration/enhancement project. The Shubenacadie River is known to support populations of the Atlantic Salmon Inner Bay of Fundy Population (a SAR), and the waterways in this region are also known for support populations of Wood Turtle and Snapping Turtle (also SAR). Snapping turtle nesting sites are frequently found on the gravelly tractor trails that extend adjacent to the site.

Historically, this floodplain was altered to accommodate agricultural activities (primarily hay production). The primary alteration to this tract of land was the relocation of the Gays River from its historical location (shown in pink on Figure 1, below), to the straightened route that it exists as today. Anaconda have presented the potential for restoring the former route of the Gays River as part of a fisheries offsetting project associated with the Goldboro Gold Project. This is presented in detail in the “Goldboro Gold Project – Conceptual Fish Habitat Offsetting Plan”. Additional alteration to the floodplain has occurred through installation of two dykes alongside the Gays River as well as a ditching network. Water flow is also controlled by aboiteaus prior to draining back into the into the Gays River and Shubenacadie River. The historical photo provided below (Figure 2) provides an example of the active agriculture occurring at the site in 1954.

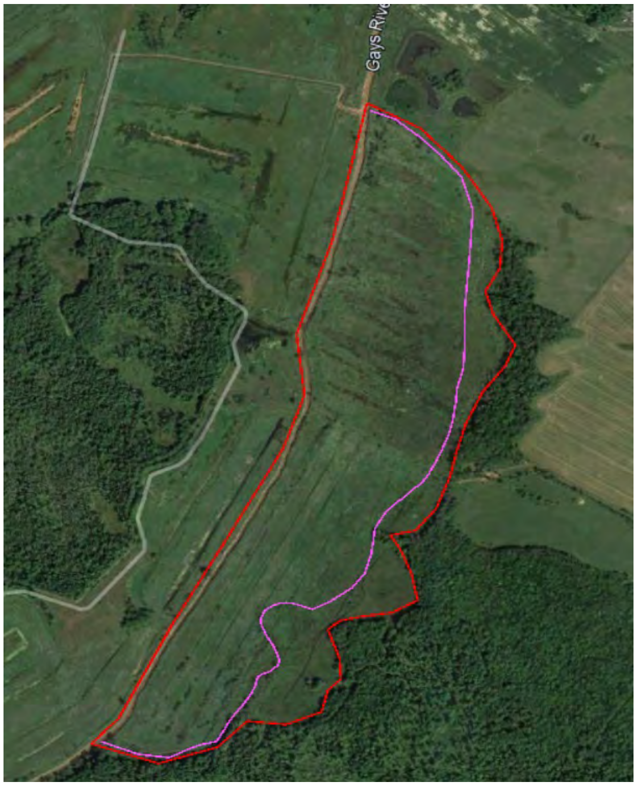


**Figure 1: Potential Compensation Site**

**Figure 2: 1954 Aerial Image**

As discussed in the Goldboro Gold Project – Conceptual Fish Habitat Offsetting Plan, the proposed fisheries offsetting project includes the restoration of the Gays River. This would be achieved by diverting water from the existing straightened channel into the original river alignment. Upon completion of the river restoration project a wetland restoration component of the floodplain could commence. While the dykes have been breached naturally over time, the drainage ditches within the floodplain are still functioning and affecting the natural floodplain characteristics of the land. Although conceptual at this stage, along with the river restoration, elimination of the drainage ditch functions as well as removal of aboiteaus could restore the pre-agricultural floodplain characteristics, including interception and detention of flood waters across the floodplain. Crucially, completion of the restoration of this floodplain through the provincial wetland compensation program would protect the floodplain from future agricultural activities which threatens wood turtle and snapping turtle survival in this area. As part of the floodplain restoration project the restoration team would also consider potential habitat enhancement features for wood turtles and snapping turtles (i.e., potential creation of overwintering habitat).

Additional feasibility studies, baseline data collection and background research needs to be completed to refine the goals and objectives of this potential restoration project. The Gays River restoration project is dependant on regulatory review by the Department of Fisheries and Oceans (DFO) as such, until this process has been completed confirmation of whether it will be implemented is unknown. Once this process is complete the restoration team can further evaluate whether this floodplain restoration/enhancement project is feasible to support Primary wetland compensation requirements for the Goldboro Gold Mine. Should the project be determined feasible, potential wetland restoration/enhancement area associated with this site is between 30-40 ha.

### 2.6.2 Port Bickerton Bog

MEL has identified a former peat harvesting facility on Crown Land approximately 4.6 km northeast of Port Bickerton, NS and 7 km southwest of the proposed Goldboro Gold Project site (Figure 3). In consultation with the local Technician at NS Department of Natural Resources and Renewables (NSDNRR), this site was issued a Crown Land lease in 1998 for the purposes of harvesting peat from two bog areas identified in Figure 3. Peat harvesting operations occurred between 1998 and 2020 at which point the lease was terminated and operations ceased. Anecdotal information provided by NSDNRR suggests that the peat operation at the site may not have been economically viable. Site rehabilitation, which appears to have been limited to intermittent ditch blocking, was approved as complete by NSDNRR and NSECC in 2020 prior to the former lessee being successfully released from any further obligations.


**Figure 3: Port Bickerton Peat Bog**

Upon examination of aerial imagery, MEL identified potential impacts to the bog habitat as a result of the peat harvesting operations that are potentially affecting the wetlands' health, characteristics and overall function. These initial observations include remnant anthropogenic drainage ditches and exposed, disturbed peat surfaces lacking vegetation. As such, MEL conducted a field reconnaissance visit in April 2022 to further examine the condition of the bog. MEL visited the westernmost bog where harvesting impacts appeared to be greatest. Figures 4 and 5 show the two natural bog areas from 1991, prior to disturbance. Post-harvesting conditions from 2005 are shown Figures 6 and 7.


Figure 4: Port Bickerton Peat Bog (western) - 1991


Figure 5: Port Bickerton Peat Bog (eastern) - 1991

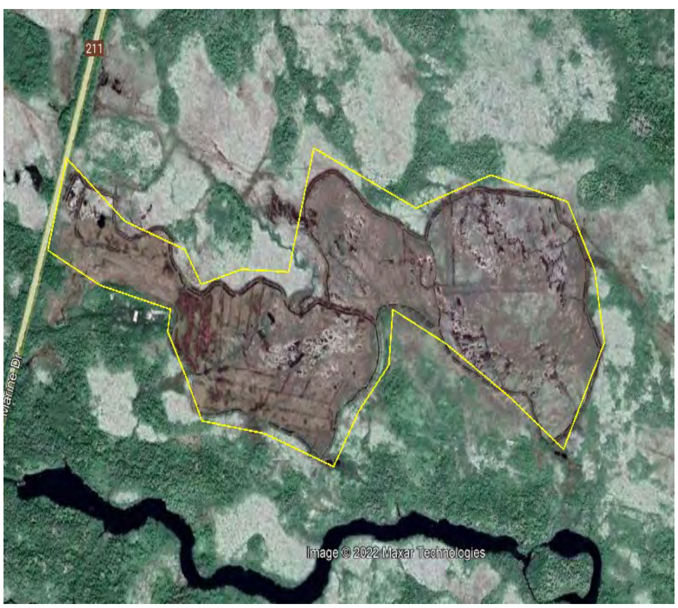


Figure 6: Port Bickerton Peat Bog (western) - 2005

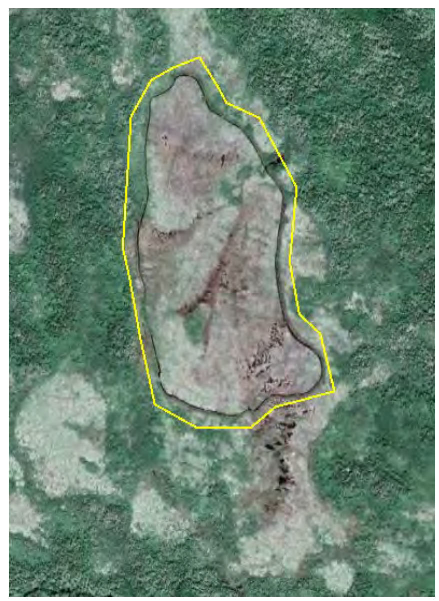


Figure 7: Port Bickerton Peat Bog (eastern) - 2005

Field observations within the western bog indicated the following conditions. A photolog of site conditions is provided in Appendix A.

Physical Bog Characteristics

- The western bog comprises of distinct domed sections defined by topography, which predominantly slope down towards the south toward Quinces Brook (Figure 4, above). The westernmost area appears to encompass the majority of historical peat harvesting (as evidenced by extensive ground disturbance), whereas the eastern portion of the bog (and the separate eastern bog (Figure 5 and 7) that was not visited) appear to have been ditched and drained, but no peat harvesting looks to have occurred.

- As indicated on Figures 6 and 7, naturally both bogs comprised a congregation of small ponds that were altered through a combination of physical disturbance/removal and/or dewatering through drainage.

- Where the peat surface and profile remain intact, the bog was observed to be characterized by 1-2 m of peat with surface vegetation dominated by Sphagnum moss and Carex species. A more detailed evaluation of vegetation is required during the growing season to better define conditions.

Hydrology

- An outer drainage ditch encompasses the bogs, which drain into down gradient settling ponds. This feature was previously installed to aid in dewatering and facilitate the peat harvesting process. The outer ditch has been intermittently blocked with borrowed peat material to attempt to mitigate the anthropogenic drainage from the bog. The majority of blocks are retaining water near the surface and limiting further drainage. However, in some areas the blocks were observed to be breached or eroded, resulting in inconsistent water levels which were in places >1.5 m below the bog surface

- A smaller interior ditch network (predominantly within the western bog) exists and acts as a subsidiary drainage network that drains water into the outer main ditch. Many of the subsidiary ditches run parallel to each other from the centre (peak) of the bog. The ditches observed typically exhibited low water levels and, in some cases, only conveyed a trickle of water.

- The small naturally occurring ponds within the bog appear to have been connected to each other via ditching and discharging into the subsidiary ditches as part of the historical drainage methods. Pools were observed to have low water levels (>30 cm) and exposed peat during the April 2022 site visit.

- Given the typically wet time of year (April) observed pool and ditch water levels suggests that water is not being adequately held within the bog. This suggests that groundwater levels may not be at natural levels within the surrounding bog habitat. Bog water levels are usually within 30 cm of the surface, to maintain surface saturation through capillary rise.

- While surface conditions across the bog were generally saturated during the April 2022 site visit, suggesting the current ditch blocking may be maintaining site hydrology, a more accurate determination of this would be in the summer months (growing season). Additional commentary regarding potential degradation as evidenced by vegetation is provided below.

Vegetative Conditions

- Within the former peat harvesting operation (i.e., bog portions within the outer drainage ditch system), vegetation cover and condition was observed to be variable. Predominant areas of disturbance were observed in the western side of the westernmost bog, closest to the road, where it appears harvesting commenced and was focused. This area is characterized by peat that has been stripped over its living vegetive surface, resulting in larger bare peat areas, rutting, surface subsidence, frost heaving and poor vegetation establishment. Where vegetation appears to have regenerated, Sphagnum moss cover is limited. The Carex species present in adjacent unaffected bog habitat is prominent. Despite harvesting operations having occurred ~20 years prior, exposed areas typically comprised a subsiding bare peat surface with little to no vegetation reestablishment, specifically lacking peat forming species in abundances necessary for natural bog function.

- Surface conditions in the eastern areas of the westernmost bog are more intact, although the subsidiary ditches and drained ponds appear to be impacting vegetation health and composition along their periphery and may be having further hydrological impacts on vegetation community and function. Evidence of surface drying as a result of dewatering ditches was observed through desiccating Sphagnum moss, a particular species found in saturated/inundated habitats (e.g., pool edges) with less ability to self regulate moisture.

Although the easternmost bog was not visited, a review of aerial imagery suggests that it may be affected hydrologically via the presence of an outer ditch. Ground disturbance and vegetation cannot be determined at this time.

Based on the preliminary findings, it is MEL's opinion that both bogs have been altered from their natural conditions and could benefit from various restoration activities. Additional baseline studies area required across the site to define what restorative activities are recommended for the various conditions present, however the following preliminary aspects of a peatland restoration are currently being considered.

1. Surface Conditions
    a. Remediate rutting and re-contouring of land in areas that present unnatural exposed peat.
2. Revegetation
    a. General revegetation within exposed/bare areas of the bogs.
    b. Sphagnum moss reestablishment in the western segment of the western bog. Various techniques could be considered including sphagnum moss transplantation (e.g., Rochefort, Boismenu & Quinty, 2009).

3. Hydrological

    a. Modifications and/or removal of outer and subsidiary ditching to restore natural peatland hydrology.

    b. Restoration of small ponds and disassociation with anthropogenic ditches.

    c. Potential site recontouring (e.g., bund construction), as deemed necessary, to retain water on the site.

Anaconda and MEL are planning to initiate a baseline monitoring program across the bogs discussed herein during 2022. As well, an aerial helicopter survey will be completed to assist the design of a restoration concept plan and objectives. Monitoring will require approval from NSDNRR under the Application for the Use of Crown Land for non forestry activities. MEL are currently initiating that application process.

Based on the areas of bog habitat subject to potential restoration shown on Figure 3 (above), restoration of the peatland is expected to range between 40 ha – 60 ha of Primary wetland compensation area.

### 2.6.3 Port Bickerton ATV Restoration

All Terrain Vehicle (ATV) use in wetlands can adversely affect wetlands in the following ways:

- Soil rutting and compaction;
- Impacted vegetation (including potential rare species), bare ground and introduction of noxious and invasive plants;
- Increased sedimentation and siltation; and,
- Pollution of source water and garbage.

MEL has identified Crown Lands north of Fishermans Harbour Lake and adjacent to Highway 211 north of Port Bickerton where ATV damage has been identified (Figure 8). In discussion with local Forest Technician at the NSDNRR, ATV use in this area is high, and users often travel through the bogs identified to reach summer camps and to hunt. The wetlands in question are located approximately 7 – 10 km from the Goldboro Gold Project.

Upon review of aerial imagery, it is evident that ATV's have created surface disturbances within five (5) bog habitats. Examples of surface rutting is visible as shown in Figures 9 and 10.

Restoration of wetlands impacted by ATV's typically involve a combination of passive restoration through restriction of ATV access to the wetland and potential land works to restore vegetation, re-contour damaged surfaces and manage anthropogenic drainage that maybe occurring. Crucially, engaging and collaboration with ATV users in the local area will be paramount to the long-term success of this compensation project. As part of local engagement associated with the Goldboro Gold Project, Anaconda have an ongoing relationship with local ATV users and are proposing to discuss the wetland areas discussed above as a potential compensation opportunity for the Goldboro Gold Project.

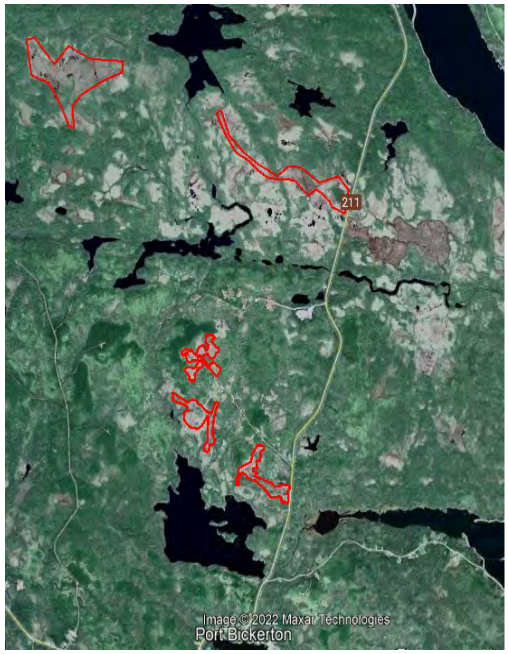



**Figure 8: ATV Impacted Wetlands**

**Figure 9: ATV Impacted Wetland**

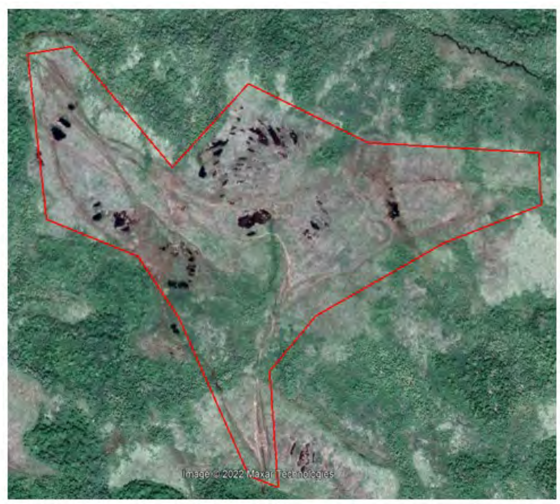



**Figure 10: ATV Impacted Wetland**

Of primary importance will be maintaining access for ATV users to camps and hunting grounds and could involve creation of more established access routes that avoid wetlands and watercourses.

Anaconda will evaluate the condition of the impacted wetlands during 2022 via aerial and ground surveys to define a restoration concept plan and objectives. This potential wetland compensation project would involve NSDNRR and any restoration activities would require approval under the Application for the Use of Crown Land for non forestry activities.

Based on the areas of disturbance, restoration of the wetlands and prevention of future ATV access use are expected to range between 40 ha – 60 ha of Primary wetland compensation area.

### 2.6.4 Primary Wetland Restoration Summary

Based on the wetland alteration area expected through development of the Project (95.974 ha), and taking into consideration impacts to the potential WSS, a minimum of 142.5 ha of Primary wetland compensation area is expected to be required by NSECC to meet the Project requirements. Between the potential compensation projects discussed above, 110-160 ha of proposed Primary compensation projects have been identified. This accounts for approximately 77% of the Primary compensation area requirements on the low end and surpasses the 142.5 ha Primary compensation area at the high end.

Anaconda have also identified potential additional potential Primary wetland compensation projects at a desktop level to supplement the opportunities already identified. These include some floodplain opportunities along the East River St Mary’s (20-40 ha) and multiple agricultural opportunities within the Musquodoboit Valley and Stewiacke Valley that exceed 50 ha. Along with the opportunities discussed in Sections 2.6.1-2.6.4, these projects will be evaluated during 2022 to potentially support Anaconda’s Project needs.

## 2.7 Secondary Wetland Compensation

The Secondary wetland compensation projects presented below are at various stages of development. The barachois pond wetland study and WESP-AC Calibration Study are a continuation of Secondary compensation projects that have been partially implemented by others and can be considered for completion. The Non-Forested Freshwater Wetland Vegetation Community Classification System is a new proposal that requires further scoping and development in consultation with NSECC and NSDNRR.

### 2.7.1 Barachois Wetland Study

During 2017-2019 the UINR implemented a Wetlands Research Project as a Secondary wetland compensation project. The purpose of the study was to “contribute knowledge, both ecological and cultural, on the barachois ponds and their associated salt marshes along the Bras d’Or Lake to aid in the long-term conservation of these important ecosystems in the face of increasing development pressures and climate change” (UINR, 2018).

The program included four main research objectives:

1. Update provincial inventory of salt marsh and coastal saline pond wetland classes along the Bras d’Or;
2. Understand the cultural and ecological values of barachois ponds, especially the significance of these systems to the culture and livelihoods of the Mi’kmaq peoples within the Bras d’Or lakes watershed;
3. Collect information to aid in the understanding of the current and future threats to, and appropriate restoration/conservation measures, for barachois pond sites and their associated salt marshes; and,
4. Knowledge to aid in site restoration and stewardship.

The study incorporated three main components, the results of which were combined to identify the representation of the importance that barachois ponds play in the overall health of the Bras d'Or Lake. The components assessed are outlined in Table 1.

Table 1: Study Components

| Study Component | 2017-2019 Study Details | Proposed Future Study |
|---|---|---|
| Rapid pond assessments | Assessed ~ 200 barachois ponds and assessed:<br>• Terrestrial and aquatic vegetation<br>• Wildlife habitat/evidence<br>• Fish barriers<br>• Inlets/outlets and pond depths<br>• Field water quality measurements (salinity. Temperature, conductivity, dissolved oxygen). | Repeat the Rapid Pond Assessment component across the remaining ~ 300 ponds. |
| In Depth Pond Assessments | In depth assessments were completed at six pond locations and included: | Complete the following in depth assessments: |
| | • Monthly fish surveys between June and November 2017 (minnow/crab traps and fyke nets). | Due to issues with fish capture techniques replace with EDNA sampling within a 10% subset of 300 ponds (see discussion below). |
| | • Physical land characterization (surrounding land use/disturbance level, pollution sources, wetland types, stream inflow assessments, vegetation cover, in pond features, above surface and below surface aquatic vegetation) | Complete this work in a 10% subset of remaining 300 ponds. |
| | • Monthly water quality parameters (field, turbidity and water sample analysis). | Complete this work in a 10% subset of remaining 300 ponds. |
| | • Data loggers in three ponds to record water level, salinity and temperature). | Complete this work on a 10% subset of remaining 300 ponds. |
| | • WESP was completed to evaluate wetland function. | Re-run WESP analysis in the original 200 wetlands using new WSS calculator tool see discussion below).<br><br>Complete WESP in 10% subset of remaining 300 ponds. |
| | • Bird surveys at various locations in June 2017. | Complete WESP in 10% subset of remaining 300 ponds. |

| Study Component | 2017-2019 Study Details | Proposed Future Study |
|---|---|---|
| | • Winter creel survey in winter 2018/2019 to understand potential socio-cultural value Barachois ponds have. | No additional assessment recommended. |
| Mi'kmaq Ecological Knowledge Study | A MEKS was completed to understand the cultural and ecological values of barachois ponds to the Mi'kmaq people. Results helped pick which ponds would be used in the detailed study. | No additional assessment recommended. |

Two reports authored by UINR outlining results of the 2017-2019 study are provided attached (Appendix B). The Study was prematurely ended in 2019 due to wetland compensation funds becoming unavailable.

Anaconda has met with UNIR to discuss collaboration in completing the barachois pond study as a method of Secondary wetland compensation associated with the Goldboro project needs. UINR are eager to finish the Study and have identified some modifications that can be made to it that will increase the value of its outcomes and support general knowledge and functional understanding of barachois ponds.

In addition to the initial objectives noted in 1-4 on Page 13, the overarching objective of completing (and enhancing) the Study is to provide NSSECC a clear understanding of the ecological and socio-cultural functional value of barachois ponds. This information can be used by NSECC to support regulatory management of barachois ponds in the future.

There are approximately 500 barachois ponds along the shoreline of the Bras d'Or lakes and to date UINR have completed ~ 200 rapid pond assessments and 6 detailed pond assessments plus the MEKS. The intention is to complete the Study on all remaining ponds. The proposed continuation of the Study will remove some components that are no longer required and to add some Study components that enhance the Study outcomes. Table 1 (above) provides an overview of the proposed Study with additional explanation provided below.

The rapid pond assessments will be completed in all remaining barachois ponds (~300) along the shorelines of the Bras d'Or Lake.

As part of the detailed pond assessments, fish capture completed during 2017 was troublesome due to pond depth and variable conditions within each pond. As such, fish counts are believed to be much lower and less representative of actual fish species and numbers utilizing the ponds. As an alternate method UNIR are recommending the completion of EDNA sampling to determine fish species use within the ponds. EDNA using metabarcoding analysis will be used within some barachois ponds to provide a broad picture of general biodiversity (including fish species) using these features. Data logger results collected in three ponds as part of the 2017-2019 study indicated that the ponds fall within the brackish range, although salinity was quite variable ranging from fresh to highly brackish. The variability in salinity and the potential for stratification within the pond water column is expected to have an influence on the biotic community and freshwater and marine species that habituate them. As such, EDNA sampling study design will be done so to encompass the variable conditions and habitats within each pond and samples will be collected at variable depths depending on the stratification at each sample location. Triplicate sampling will be performed to increase the quality and detection rates of the program. Sample size (i.e., number of barachois ponds to be sampled) for the EDNA program will be determined based on pre-determined pond characteristics, but for the purposes of this preliminary plan we are accounting for a 10% of remaining ponds to be included in the program (~30 ponds). The remainder of the detailed pond assessment work will be completed as done so in 2017-2019 within a 10% subset of the ~300 ponds (n=30) remaining. Using desktop review methods, the subset will be determined to comprise a group of barachois ponds presenting variable characteristics including (but not limited to) physical components (i.e., vegetation cover, size), geographical locations around the lake, level of apparent disturbances/proximity to anthropogenic impacts, accessibility, and proximity to traditional/cultural users etc.

The Study team believe they have enough information collected from the MEKS and winter creel surveys to support the discussion of socio-cultural value.

Anaconda is currently working with UINR to create a defined scope of work for the proposed Study including timelines, schedules and level of effort. The defined scope of work will be formally presented to NSECC for review as a Secondary wetland compensation project in 2022. UINR technical staff and wetland ecologists will implement the majority of field studies with specialist sub-contractor support when required. A final report and recommendations related to future management of barachois ponds will be provided to NSECC upon completion of the field program.

Development of the defined scope of work will support the discussion of Secondary wetland compensation area value, however, Anaconda expects implementation of the Study to equate to approximately 10 ha of Secondary wetland compensation area value.

### 2.7.2 WESP-AC Calibration Project

The Wetland Ecosystem Services Protocol – Atlantic Canada (WESPAC) serves as a rapid method for assessing individual wetland functions and values. WESP-AC addresses 17 specific functions wetlands may provide and enables a comparison to be made between individual wetlands within a province to gain a sense of the importance each has in providing ecosystem services. In 2016, MEL facilitated the funding of Secondary wetland compensation project to satisfy wetland compensation needs. The Secondary project provided NSECC a valuable dataset of information to support the introduction of the WESPAC functional assessment tool in NS. WESPAC has since been rolled out as the functional assessment tool in NS however NSECC have been eager to build on the 2016 study and further develop and refine the use of WESPAC in the province.

In summer 2021, in collaboration with NSECC, MEL initiated an additional WESPAC project as a method of Secondary wetland compensation. This initiative (which is ongoing) is being undertaken in support of wetland compensation requirements associated with wetland losses for other Proponents. By the end of 2022 the WESPAC project will result in completion of the scope of work and objectives outlined below for a specific geographical extent of Nova Scotia (NS). The WESPAC project needs to be completed throughout the remainder of NS before it can be fully implemented as a regionalized tool that encompasses variable wetland characteristics across the province. Anaconda is proposing that the remainder of the regionalized

WESPAC project is completed to support wetland compensation requirements for the Goldboro Gold Project.

Development of the WESPAC project includes multiple tasks including field calibration of wetlands throughout the province. Results of the calibration site process are used to expand the baseline numerical scores for the WESPAC tool and are proposed to be regionalized for the various ecoregions in NS. Development of the 2021 project scope of work included NSECC wetland specialist Ian Bryson and the developer of the WESPAC, Paul Adamus and included the following tasks:

1. Cluster Analysis
2. Calibration Site Identification
3. Calibration Planning and Coordination
4. Field Calibration
5. Data Compilation (desktop and field forms)

Anaconda proposes that the tasks outlined above be completed for the remaining ecoregions in NS in order for the WESPAC functional tool to be fully regionalized and then be rolled out for use. Based on the geographical extent being completed as part of the 2021-2022 project (600 wetlands within a portion of four ecoregions), the remaining number of wetlands required across the province is expected to be between 600-700 wetlands. Completion of the WESPAC Secondary wetland compensation project discussed above is anticipated to equate to between 19 hectares - 24 hectares of Secondary wetland compensation credit that can be applied to the Goldboro Gold Project. Upon NSECC's preliminary acceptance of this option, Anaconda will provide a proposal to NSECC which will define the scope of work and recommended an accurate wetland compensation area credit value based on the level of effort required. The monetary costs will be consistent with large scale Primary wetland compensation projects that MEL have and continue to be implementing in NS.

### 2.7.3 Non-Forested Freshwater Wetland Vegetation Community Classification System

Existing classifications such as the Forest Ecosystem Classification System (NSDNRR, 2010), in part, defines many of our forested wetland communities in Nova Scotia. However, these classifications are inefficient in defining shrubbed, open peatlands and marsh communities. Existing non-forested classifications described for Maine and New Hampshire exist and although in many cases are applicable to Nova Scotia, many of the community types do not fit well with what is seen in this province. Classification of vegetation communities is a very useful tool in understanding potential environmental impacts of proposed developments within, or adjacent to wetland habitat.

A formal method for classification of wetland vegetation communities is becoming of increasing interest for regulators in NS such as NSDNRR and NSECC. Development of a user friendly fresh-water vegetation wetland classification guide/system will enable consultants, proponents, conservationists and government officials to define more thoroughly what vegetation communities are found in Nova Scotia wetlands and ultimately support the determination of value that these communities may provide (e.g., habitat to support

Species at Risk or provincially rare species). By developing this classification system there are several applications/benefits:

1. Vegetation Community Mapping (Habitat) for wetlands – This system can be used to determine what vegetation communities are found in a wetland (which could be mapped out using GIS software) and used in land use planning such as wetland alteration applications, Environmental Assessments, and other regulatory applications. By defining wetland vegetation communities more thoroughly to include those non-forested wetland habitat types and mapping them, a clear vision of what habitat types are expected to be impacted by a project will be achieved which will help in project planning and the regulatory decision-making process.
2. Vegetation Communities and Conservation Ranks – Currently there is no habitat conservation ranking system in NS. Defining wetland vegetation communities within Nova Scotia is the initial step in determining which communities are considered rare. This classification system could be a steppingstone used in assigning conservation ranks to vegetation communities in the future.
3. A user-friendly way to defining vegetation communities within a wetland - A classification system/guide would be similar to the FEC manual. It would consist of a user-friendly resource that individuals with varying knowledge of wetlands and plants could utilize to assess vegetation communities within wetlands confidently.

At this time a detailed scope of work has not been developed but based on initial feedback provided by NSECC and NSDNRR there is interest in pursuing this study. The development of this classification system would involve the collaboration with NSDNRR, NSECC and NGOs such as Atlantic Canada Data Centre (ACCDC), to determine the level of effort and survey design. Baseline work would likely take place within all ecodistricts across Nova Scotia to ensure adequate survey effort has been conducted to capture the geological, climatic, and floristic variation found within the province. Study sample size and selection of sites will be determined by competing detailed desktop review and using available and developed datasets and expert-knowledge and opinions on unique non-forested freshwater wetland communities found within the province. Utilizing the data collected from the field program, statistical analysis will be completed to determine vegetation types present. It is recommended that the Mi'kmaq of Nova Scotia are provided every opportunity to be Involved in this project.

Anaconda is interested in supporting the development of the Non-Forested Freshwater Wetland Vegetation Classification System as a means of Secondary wetland compensation for the Goldboro Gold Project by funding the baseline work required. Due to the preliminary nature of the proposed study at this time and undefined level of effort, the associated Secondary wetland compensation credit that can be applied to the Goldboro Gold Project is unknown.

In collaboration with NSECC and NSDNRR Anaconda would be pleased to evaluate this opportunity further and develop a defined scope of work and agreed upon compensation credit equivalency.

### 2.7.4 Secondary Wetland Restoration Summary

Based on the wetland alteration area expected through development of the Project (95.974 ha), and taking into consideration impacts to the potential WSS, a maximum of 142.5 ha of Secondary wetland compensation area could be implemented in combination with a minimum of 142.5 ha of Primary wetland compensation to meet wetland compensation requirements. Not including the Non-Forested Freshwater Wetland Vegetation Community Classification System project, the potential Secondary compensation projects discussed above could provide between 29-34 ha of compensation area credit. This accounts for 20% - 24% of the maximum allowable Secondary compensation projects that could be completed to support the Project's wetland compensation needs. It should be noted however that although a detailed scope is yet to be defined for the Non-Forested Freshwater Wetland Vegetation Community Classification System project, its Secondary wetland compensation area credit is anticipated to be similar to the WESP-AC Calibration Project in level of effort and associated wetland compensation credit. Inclusion of this opportunity will increase the proportion of Secondary options.

Anaconda plan to engage with NSECC to understand if there are other valuable Secondary wetland compensation projects that can be completed in association with Anaconda's future wetland compensation requirements. All opportunities will be evaluated in consultation with the NSECC wetland specialist to ensure they are valuable in supporting the provincial wetland program.

## 2.8 Wetland Restoration Summary

Anaconda is committed to implementing valuable, and functionally significant wetland compensation opportunities which meet the expectations of NSECC through the Wetland Conservation Policy. Anaconda will secure valuable wetland compensation project(s), which aim to replace wetland area and function or otherwise support the NS Wetland Conservation Policy (i.e., Secondary projects).

Based on the preliminary wetland compensation options discussed in this report, Table 2 presents the potential wetland compensation projects currently under consideration for the Goldboro Gold Project.

Table 2: Summary of Potential Wetland Compensation

| Compensation Project | Potential Wetland Compensation Area |
|---|---|
| **PRIMARY PROJECTS** | |
| Port Bickerton Peatland Restoration | 40 ha – 60 ha |
| Port Bickerton ATV Restoration | 40 ha – 60 ha |
| Gays River | 30 ha – 40 ha |
| TOTAL POTENTIAL PRIMARY | 110 ha – 160 ha |
| **SECONDARY PROJECTS** | |

| Compensation Project | Potential Wetland Compensation Area |
|---|---|
| Barachois Wetland Study | 10 ha |
| WESP-AC Calibration Project | 19 ha – 24 ha |
| Non-Forested Freshwater Wetland Vegetation Community Classification System | To be determined |
| TOTAL POTENTIAL SECONDARY | 29 ha minimum |

Based on the wetland alteration area expected through development of the Project (95.974 ha), and taking into consideration impacts to the potential WSS, the 139-189 ha of proposed compensation projects identified to date presented in Table 2 equates to 49-66% of the Project's proposed wetland alterations (applying standard compensation ratios). This does not include the potential compensation area of the Non-Forested Freshwater Wetland Vegetation Community Classification System project, which is expected to increase the compensation area credit. The proposed compensation projects described in this report will continue to be developed in consultation with NSECC. This will include ongoing feasibility, baseline monitoring and landowner discussions. In addition, as discussed in Sections 2.6.4 and 2.7.4, identification of additional Primary and Secondary compensation projects will continue throughout 2022 and 2023 to supplement the projects already identified and meet the Project's wetland compensation requirements. Final wetland alteration extents and compensation ratios will be determined through the permitting process.

## 3.0 Closure

We look forward to your attention to this Preliminary Wetland Compensation Plan. Please do not hesitate to contact the undersigned with any questions you might have.

Sincerely,

Meghan Milloy

Meghan Milloy, MES
Vice President
McCallum Environmental Ltd.

Andy Walter, BSc
Senior Project Manager and Wetland Restoration Professional
McCallum Environmental Ltd.

# 4.0 References

NSE (Nova Scotia Environment). 2011. Nova Scotia Wetland Conservation Policy. September 2011. Revised in 2019. 27 pp.

Rochefort, L., Boismenu, C. and Qunity, F. 2009. Peatland restoration in Canada by the sphagnum moss layer transfer method. Canadian Reclamation Journal. 1: 26-31.

Unama'ki Institute of Natural Resources (UINR). 2018. Wetland Assessments. Monthly survey of seasonal presence and abundance of striped bass, eel and forage species, habitat structure aquatic vegetation and anthropogenic threats, and water quality in three coastal saline ponds in the Bras d'Or Lakes.

# Appendix A: Port Bickerton Bog Photolog

**Port Bickerton Bog**
**March 30, 2022, Site Visit**

**Photo 1:** Secondary, interior ditches (~0.5-1 m wide) in harvested (west) portion of westernmost bog where vegetation has been removed.

**Photo 2:** Frost heaving in unvegetated bare peat.

**Photo 3:** Representative re-established vegetation cover of harvested bog area. Sparse cover of sedge and grass species, little to no sphagnum moss cover.

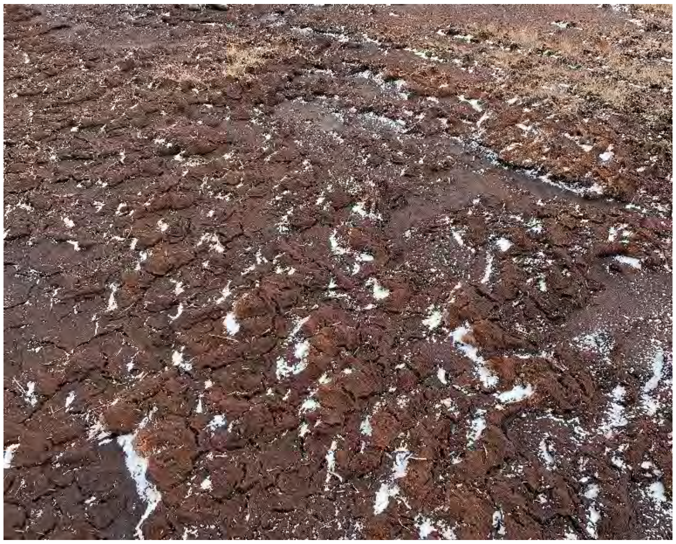


**Photo 4:** Drying unvegetated peat surface of harvested bog area.

**Photo 5:** Overview of harvested portion of westernmost bog.

**Photo 6:** Representative vegetation cover where vegetation was not removed (~100% sphagnum moss coverage).

**Photo 7:** Drained pool in unharvested (east) portion westernmost bog.

**Photo 8:** Observed water levels in pools >30 cm below natural levels. Exposed peat where surface water should be present.

**Photo 9:** Example of eroded ditch block of main exterior ditch. Water levels vary by >1 m on either side of the block.

**Photo 10:** Example of settling ponds located at drainage outflows.

**Appendix B: Barachois Wetland Study Reports**

# UINR Wetlands Research Project 2017-2019

Project Staff: Lisa Isaacman, Wetlands Research Coordinator and Jennifer Sylliboy, Wetlands Research Assistant

**Project planning and training**

The first few months after hire we spent on project planning and training. It was determined that the purpose of the wetlands research program is to contribute knowledge, both ecological and cultural, on the barachois ponds and their associated salt marshes along the Bras d'Or Lake to aid in the long-term conservation of these important ecosystems in the face of increasing development pressures and climate change. This study aims to provide necessary knowledge on the significance of such habitats to the livelihood of the Mi'kmaq people in communities within the Bras d'Or Lake watershed. The anticipated benefits of this program include providing information in support of more appropriate local, provincial and private land-use decision-making, including the need for special and stronger protection, and an ongoing integrated coastal zone management planning process for the Bras d'Or Lakes.

The program includes four main research objectives:

- Update provincial inventory of salt marsh and coastal saline pond wetland classes along the Bras d'Or
- Understand the cultural and ecological values of barachois ponds, especially the significance of these systems to the culture and livelihoods of the Mi'kmaq peoples within the Bras d'Or lakes watershed
- Collect information to aid in the understanding of the current and future threats to, and appropriate restoration/conservation measures, for barachois pond sites and their associated salt marshes.
- Knowledge to aid in site restoration and stewardship

Training has been continuous throughout the program and has included things such as pleasure craft operators course, Wilderness First Aid, Wetlands Delineation Training, WESP Training, fish identification, plant & tree identification, and aquatic veg & algae identification.

**Rapid Pond Assessments**

The summer of 2017 was spent visiting as many ponds as possible to conduct rapid pond asessments. Plants, trees, aquatic vegetation, wildlife & evidence of wildlife, barrier composition, inlets & outlets, pond depth and basic water quality using a YSI that recorded salinity, temperature, conductivity and dissolved oxygen was done at each pond. Presence of any wetlands was noted and delineations of salt marshes if evident are done at time of visit if feasible. These rapid pond assessments have continued through each field season. There are 553 barachois ponds identified in and around the Bras d'Or Lake and we have visited nearly 200 ponds to date. The most efficient method of visiting these ponds has been via boat and has been the primary method used to visit the ponds.

**Mi'kmaq Ecological Knowledge Study**

In order to "Understand the cultural and ecological values of barachois ponds, especially the significance of these systems to the culture and livelihoods of the Mi'kmaq peoples within the Bras d'Or lakes watershed" a Mi'kmaq Ecological Knowledge Study was planned for the winter of 2017. Workshops were done in each of the Mi'kmaq communities of Unama'ki (Eskasoni, Membertou, Potlotek, We'koqmaq, and Wagmatcook) as well as three individual interviews, for a total of 52 participants. Another workshop was held to add to existing knowledge and to review content for correct interpretation of the knowledge gathered. A "Barachois Ponds in the Bras d'Or Lake MEK Report" was created and is available.

The results of the Barachois Pond MEK helped to inform which ponds would be selected for the detailed study.

**Detailed study: in-depth pond assessments**

Monthly fish surveys took place at each of the 6 pond locations beginning in early June and ending in early November. The number of fish species caught varied between ponds and mostly consisted of mummichogs, killifish, grass shrimp, sand shrimp, three-spine stickleback, four-spine stickleback, green crabs and cunner. Perch, blackspotted stickleback, nine-spine stickleback, winter flounder, smooth flounder, Atlantic silversides, brook trout, tomcod, mussels, pipefish, rock gunnel, eel, rock crab, lion's mane jellyfish and moon jellyfish were also found at least once. The only eel found was at Big Beach 1 pond. In the one freshwater pond (Big Beach 2) there were only tadpoles, giant water beetles, and killifish caught.

In an attempt to catch larger or different fish species, a fyke net was placed one time in each of the ponds (except for Big Beach 2). The fyke net did not catch any different fish species and we felt that the minnow and green crab traps were sufficient so the fyke net was not used again.

Physical data such as surrounding land use/habitat, existing land use/disturbances, potential pollution sources, wetland types on site, inflowing streams were recorded at each site. There was evidence of human use and/or development at each of the 6 sites and this was also documented on field sheets along with other information including but not limited to vegetation cover type, features (e.g. rock, woody debris, macrophytes and undercut banks), aquatic plant species and their relative abundance. Using opening measurements taken at the beginning of the assessment, it was apparent that the opening to Big Beach 1 pond had obviously been altered prior to one of the site visits. It appeared as though an ATV had been used to close the opening of the pond to allow access to the remaining beach that led to Big Beach 2 pond. The remaining pond barriers and openings did not show any evidence of human alteration.

Aquatic vegetation was observed and documented from shorelines, using a kayak and GoPro camera or from a Zodiac boat using an underwater viewer. Samples of aquatic vegetation was collected and taken to lab for identification. Prior to aquatic vegetation surveys, a training session was arranged with aquatic plant and algae expert Dr. Herb Vandermuel who provided guidance on identification when needed. This proved very useful because in the beginning, we found both freshwater and saltwater plants (e.g. *Stuckenia pectinata* and *Ruppia maritima*) cohabiting the same ponds, often growing together and we thought our aquatic plant identifications were incorrect. The intertidal habitats outside of the ponds (in the Bras d'Or Lake) remained constant between sites and was comprised of various seaweeds and marine algae, the most abundant being eel grass, knotweed, common rockweed, Irish moss, sea lettuce, tangle weed and cord weed.

Water quality parameters were measured at each of the six ponds using a YSI probe, and were measured monthly. Monthly water sample analysis was done in three of the ponds (Benacadie, East Bay and Big Beach 1) twice during the monitoring season, in July and again in September. The water sample analysis was done by Maxxam Analytics and parameters such as nitrate/nitrite, ammonium, phosphorous and chlorophyll a were measured and reported and fell within accepted water quality ranges for aquatic life. Nitrates, phosphates, metals were not detected in any of the samples. Preliminary examination of these results indicates good overall health of the ponds but additional testing should be done to see if the results change.

Data loggers were placed in 3 of the ponds (Benacadie, East Bay and Big Beach 1) in late June and removed in early November. These loggers recorded water level, salinity and temperatures at 4 hour intervals. The data was downloaded once in August and again when the loggers were removed in November. The data loggers only record data at a single location in the pond and may not reflect the temperature, depth and salinity variability in the ponds.

During each visit throughout the monitoring season, a YSI probe was used to collect single point measurements near the opening of each pond. During one visit, the Zodiac was deployed in order to gather measurements from different parts of the pond that were not accessible without a boat (a kayak was used for Big Beach 2 as there was no way to get the Zodiac into the pond). Turbidity using a Secchi disk was measured from the center of each pond. The Secchi disk proved difficult to use in Big Pond and Benacadie due to flow of water through the pond but approximate measurements were still able to be recorded.

The Wetland Ecosystem Services Protocol (WESP) was also done at each of the 6 ponds. WESP is a standardized template for creating regionalized methods which then can be used to rapid assess ecosystem services (functions and values) of all wetland types throughout a focal region. The tool is designed for assessing Tidal or Non-Tidal wetlands in the Atlantic Provinces. Nova Scotia Environment currently suggests using NovaWET to assess wetland function but is exploring WESP as an alternative method.

The Bras d'Or Lake is tidal by definition but its tidal range is significantly smaller than say that of the Bay of Fundy or shoreline surrounding Cape Breton. Due to the unique nature of the Bras d'Or Lake and the wetlands found within, the tidal and non-tidal calculators were used for 5 of the ponds that had openings to the Bras d'Or Lake and the results of each compared. The 6$^{th}$

pond (Big Beach 2) remained closed the entire monitoring season and only the non-tidal calculator was used. We found that the non-tidal calculator required more information and was better equipped to assess the Bras d'Or Lake barachois.

The majority of the ponds were given a benefits rating of 'Higher' which indicates these barachois ponds provide higher function and value than similar wetlands in other areas. It is still undetermined whether or not a separate calculator that combines both tidal and non-tidal attributes and functions is better suited for ponds in and around the Bras d'Or Lake. Additional WESP assessments need to be done on more ponds in the lake in order to better evaluate the accuracy of the ratings given in the Non-Tidal WESP results.

A bird survey was done by Dave Harris and Dave McCorquodale in the early morning hours of June 12, 2018. A count method was employed and the results of that survey are detailed below. There were a variety of bird species observed at each of the ponds and a variety of species observed between the ponds. Additional bird surveys were done at the Marble Point Road pond by the landowners, George and Donald MacInnis for one day in June and over 3 weeks in July. These surveys were more of a presence-based survey as opposed to the count method employed by Dave and Dave.

A Winter Creel survey was done in the winter of 2018-2019. The purpose of this survey was to collect information on winter fish and other wildlife species and fishing activity in Bras d'Or Lake barachois ponds. The information collected will add to our knowledge on what fish and wildlife species use the ponds and their socio-cultural value to Cape Breton. The data will be combined with other MEK and field data to provide an overall picture of the biodiversity and use of the ponds.

This small initial survey provides supplemental information to our MEK and field studies on the biodiversity and socio-cultural value of the barachois ponds around the Bras d'Or Lake. Fifteen fish and 16 wildlife species were reported as observed by respondents at the ponds this winter. Despite getting few respondents, the results from this survey, as well as information from the MEK study and UINR staff knowledge, indicate that many ponds are quite popular for winter fishing by both Mi'kmaq and non-indigenous fishers. To recruit more respondents in future, especially from the Mi'kmaq communities, we recommend conducting in person surveys at targeted ponds. The lessons learned from this initial survey has helped us refine our method of delivery for future creel surveys of the Bras d'Or Lake barachois ponds.

The information collected in this detailed study will be used as baseline data for future work and monitoring of barachois ponds in and around the Bras d'Or Lake.

A full report on the results of the detailed study is available.

**Other Work**

*Stewarship Workshop*

To support the protection coastal and aquatic ecosystems, UINR hosted a 1-day roundtable discussion on March 5, 2019 in Membertou to provide an opportunity for land and environmental managers, practitioners and decision-makers from the five Bands to:

- discuss *the importance of and challenges to* protecting aquatic ecosystems on reserves; and
- identify what the Mi'kmaq communities can do, individually and collectively, to support long-term stewardship/Netukulimk.

The results of this workshop will be used by UINR to help guide future initiatives around aquatic stewardship on reserves. they are dealt with "piece meal" or not at all.

Band councilors and staff, including land managers, public works managers, fishery managers and guardians, responsible for environmental management and decision-making from the five Bands were invited to participate. Fourteen representatives from all five Bands expressed interest in attending. However, due to inclement weather and other obligations, only participants from Membertou (fishery guardians) and Potlotek (Public Works and band councilor) were able to attend.

In addition to the Band participants, UINR Aquatics Research staff; Jessica Seward, Climate Change Adaptation Officer with the Confederacy of Mainland Mi'kmaq; and Fred Baechler, a Cape Breton-based hydrogeologist/hydrologist, were on hand to support the discussions and offer their professional knowledge and experiences. Many key challenges and concerns were discussed by particpants and mainly centered around capacity to monitor or enforce them. Paths forward and potential actions were also proposed to help address challenges and gaps in aquatic systems stewardship on reserves.

Full details from the workshop and participant responses were compiled into a report and is available.

*Wetlands Workshop & Symposium*

The Unama'ki Institute of Natural Resources in collaboration with Cape Breton University, The Cape Breton Island Wildlife Association and CBRM Water Utility hosted "Wet Loss, Net Loss: The Impact of Policy and Climate Change on Wetlands", a symposium and workshop focused on management planning and policy change around Nova Scotia Wetlands.

The events took place at Cape Breton University on May 15 and 16, 2019. The two-day event brought together wetland practitioners, land-use policy and decision-makers from academia, municipal, provincial and First Nations governments, and non-government organizations (including, but not limited to, hunting, fishing, wildlife and environmental groups).

Discussion topics were designed to:

i) Inform and educate about wetlands habitats;

ii) Enhance the appreciation and understanding of wetland habitat conservation, stewardship and policy among the public and within industry;
iii) Identify policies impacting wetland habitats in NS; and
iv) Highlight emerging issues of policy implementation in NS within the context of climate change, using Cape Breton Island/Unama'ki as a case study.

The two-day event was a success and provided direction for future work. Suggested next steps would be to:

- Engage Provincial, Federal, Municipal and Indigenous government representatives to schedule a series of meetings for collaborative discussion of current policy constraints and to develop recommended policy modifications for review and decision by partner organizations.
- Coordinate with partner organizations to determine a suitable date for the 2020 Wetlands Symposium and Workshop.
- Foster continued communication among stakeholders, including follow up consultations and a request for stakeholder feedback following the release of this summary report to identify next steps and timeline for implementation.

A full report on the Workshop & Symposium is available.

**Future work**

Further analysis on the data collected will be done over the 2019 Winter months in order to provide a more accurate representation of the importance barachois ponds play in the overall health of the Bras d’Or Lake. The data collected over the 2018 monitoring season does show that there is a wide variety of plants, animals, fish and aquatic life that live in and around these ponds. It is also evident that these wetlands are very dynamic and are always changing. Two of our ponds studied changed dramatically with one being blown open and reconnected to the Bras d’Or Lake as a result of a very strong storm surge and another was closed off also as a result of a storm surge. Continued monitoring needs to be done to determine what impact factors such as climate change will have on these valuable ecosystems.

2018AFSAR3166

# Wetland Assessments

*Monthly survey of seasonal presence and abundance of striped bass, eel and forage species, habitat structure aquatic vegetation and anthropogenic threats, and water quality in three coastal saline ponds in the Bras d'Or Lakes*

Jennifer Sylliboy & Lisa Isaacman
UINR

# Table of Contents

# 1.0 Introduction

Coastal saline (barachois) ponds along the Bras d'Or Lakes in Cape Breton, Nova Scotia, are under increasing pressures from human activities and climate change. Many have already been lost or altered. Because of their relatively low flushing rates, coastal ponds are favorable habitats for primary producers (phytoplankton and aquatic plants), thereby supporting high rates of secondary production compared to other aquatic ecosystems. They contribute to the overall productivity of coastal waters by supporting a variety of habitats, including open waters, submerged aquatic vegetation, fringing wetlands, salt marshes and seagrass beds (Kennish and Paerl 2010). While no in-depth systematic fish or habitat surveys have been conducted on these systems, evidence from locally-derived knowledge, particularly local Mik'maw Elders and fishers, suggest that they serve as important nursery, feeding and refuge areas for numerous freshwater, estuarine, and marine fish species. MEK study indicates that ponds in the Bras d'Or Lakes are frequented by American eels throughout the year, probably for feeding and shelter. They are considered important over-wintering areas for eels which are a source of food, skins, and medicines for Mi'kmaq all year. Barachois tend to be the first areas to freeze and last to thaw making them important ice fishing areas during the winter. Additionally, striped bass are often found in many of the ponds with larger, more permanent connections to the Bras d'Or Lake, most likely due to the high abundance of forage fish. Gaps in knowledge on these sensitive ecosystems are evident, leaving them vulnerable to further degradation and loss (Hatcher 2015).

The objective of this portion of the project is to understand the seasonal usage of barachois ponds by eel and striped bass in the Bras d'Or Lake in relation to prey availability and habitat conditions; to understand the role these ecosystems play for eel and striped bass populations in the Bras d'Or and how threats to these habitats (such as coastal development, water quality degradation and climate change [sea level rise, storm surges) might affect these species, and to provide baseline data for monitoring of these sites.

The expected outcomes is to have data and knowledge for input into management plans. These data are being gathered to develop a better understanding of the ecological function of coastal wetlands in the Bras d'Or Lake and the potential impact of their loss or degradation on sensitive and at-risk species, such as eel and striped bass. This project will support various local, provincial and private land-use planning, stewardship and conservation measures, including Integrated Coastal Management planning efforts for the Bras d'Or Lake spearheaded by the Bras d'Or Lake Collaborative Environmental Planning Initiative (CEPI). Given the importance of these two species to the culture and well-being of the Mi'kmaq people, the information may be used to help inform Provincial and Federal environmental assessment and Indigenous consultation processes around coastal land development applications. The results will also help in developing better tools for assessing the functional and conservation value of barachois ponds and other coastal wetlands in the Bras d'Or Lake, which will lead to more appropriate coastal land-use decision-making.

In order to better understand the ecosystem services provided by barachois, six barachois pond sites around the Bras d'Or Lake were selected for a more in-depth study based on information obtained through a Mi'kmaq Ecological Knowledge Study conducted in the fall and winter of 2017-2018. These six sites were assessed using the WESP-AC protocol. Field assessments were conducted between May and October of 2018. The protocol followed the methodology as described in the WESP-AC Manual. Field assessments included site visits to determine general site conditions, barrier details, water quality, bird surveys, fish and aquatic habitat, and aquatic and terrestrial plant surveys as well as data logger information. A winter creel survey was also conducted for the entire Bras d'or Lake area and results of that survey have also been included in this report.

# 2.0 Methods

## 2.1 Site Selection

The six sites chosen, including UTM coordinates were Benacadie pond (0676668/5086471), Stott's (0691635 / 5093055), East Bay (0701026/5097762), Big Pond (0692933 / 5089738), Big Beach 1 (0678922/5097940) and Big Beach 2. Results of the field assessments have been broken down and detailed below.

## 2.2 Site visits & general site conditions

A survey was done at each of the ponds at every visit where general site condition was recorded. Weather, air temperature, rainfall in the last 24hrs, wildlife observations, land use observations and/or disturbances, potential pollution sources, wetlands types on site, wildlife observations, and presence of inflowing streams.

The results varied between ponds and the information for each can be viewed upon request. The information collected was documented on a data sheet for each site and majority of the information was used in the WESP calculators and for creating a larger Excel file to be used for continued monitoring so that we may be easily able to identify and document any major changes to the ponds.

# 3.0 Methods & Results

## 3.1 Bird Survey

A bird survey was done by Dave Harris and Dave McCorquodale in the early morning hours of June 12, 2018. A count method was employed and the results of that survey are detailed below. There were a variety of bird species observed at each of the ponds and a variety of species observed between the ponds.

Benacadie mouth

| | |
|---|---|
| American widgeon | 3 adults (1 pair) |
| Red winged blackbird | 1 |
| Grackle | 1 |
| Song sparrow | 2 |
| Red eyed vireo | 2 |
| Alder flycatcher | 3 |
| Crow | 6 |
| Common merganser | 1 |
| Blue jay | 1 |
| Bald eagle | 1 |
| Belted king fisher | 1 |
| Black duck | 1 |
| American goldfinch | 4 |
| Yellow warbler | 1 pair (2 adults) |
| Raven | 2 |
| Spotted sandpiper | 1 |
| Black capped chickadee | 2 |
| Robin | 1 |
| Flicker | 1 |

Benacadie

| | |
|---|---|
| Belted kingfisher | 3 |
| Black capped chickadee | 2 |
| Canada goose | 18 adults; 1 young ~1/2 grown |
| Raven | 2 |
| Crow | 5 |
| Song sparrow | 3 |
| Alder flycatcher | 2 |
| Ring billed gull | 1 |
| Robin | 4 |
| Black duck | 4 |
| Spotted sandpiper | 2 |
| Blue jay | 1 |
| Grackle | 1 |
| Yellow rumped warbler | 1 |
| American widgeon | 1 pair (2 adults) |

| | |
|---|---|
| Common tern | 1 |

Stott's

| Species | Observations |
|---|---|
| Black duck | 2 young, 1 chick ~1 week old (still downy) |
| Canada goose | 2 Pair (4 adults). One pair with 6 young, other with 3 young; all 1/2 grown |
| Tree swallow | 3 |
| Alder flycatcher | 3 |
| Flicker | 1 |
| Grackle | 3 |
| Robin | 4 |
| White throated sparrow | 1 |
| Song sparrow | 2 |
| Crow | 2 |
| Red winged blackbird | 2 |
| Red eyed vireo | 2 |
| Starling | 1 |
| American goldfinch | 4 |
| Double crested cormorant | 7 |
| Raven | 1 |
| Ring billed gull | 1 |
| Cedar waxwing | 6 |
| Belted kingfisher | 1 |
| Parula warbler | 1 |

Big Beach

| | |
|---|---|
| Ruby crowned kinglet | 1 |
| Black and white warbler | 2 |
| Song sparrow | 2 |
| Black capped chickadee | 1 |
| Alder flycatcher | 1 |
| Common loon | 1 |
| Double crested cormorant | 1 |
| Robin | 2 |
| Yellow rumped warbler | 1 |

| | |
|---|---|
| American goldfinch | 1 |

East Bay

| | |
|---|---|
| Blue headed vireo | 1 |
| Double crested cormorant | 5 |
| Spotted sandpiper | 1 |
| Crow | 2 |
| Mallard duck | 3 |
| Song sparrow | 2 |
| Common tern | 1 |
| American goldfinch | 4 |
| Alder flycatcher | 1 |
| Black capped chickadee | 2 |
| Dark eyed junco | 1 |
| Eastern wood peewee | 1 |
| Parula warbler | 1 |
| Magnolia warbler | 1 |
| Black/mallard hybrid | 1 |

Big Pond

| | |
|---|---|
| Spotted sandpiper | 2 |
| Red eyed vireo | 1 |
| Yellow warbler | 1 |
| Black and white warbler | 1 |
| Crow | 3 |
| Song sparrow | 2 |
| Common yellowthroat | 1 |
| Belted kingfisher | 1 |
| Red tailed hawk | 1 |
| Parula warbler | on road down to pond |
| Mourning warbler | on road down to pond |
| Canada warbler | 1 (female) on road down to pond |

Additional bird surveys were done at the Marble Point Road pond by the landowners, George and Donald MacInnis for one day in June and over 3 weeks in July. These surveys were more of a presence-based survey as opposed to the count method employed by Dave and Dave.

June

| | |
|---|---|
| Chestnut-sided warbler | |
| Downey Woodpecker | |
| Common snipe | |
| Bald eagle | |
| Red-winged blackbird | |
| Red-breasted nuthatch | |
| Woodcock | |

July

| | |
|---|---|
| Red vireo | nesting |
| Yellow warbler | nest with 4 young |
| Dark eyed junco | carrying food |
| Pileated woodpecker | territorial behaviour |
| Song sparrow | nest |
| Parula warbler | territorial behaviour |
| Chipping sparrow | territorial behaviour |
| Common loon | territorial behaviour |
| Red winged blackbird | territorial behaviour |
| Tree swallow | nest with 4 young |
| Sharp shinned hawk | territorial behaviour |
| Black capped chickadee | carrying food |
| Blue jay | territorial behaviour |
| Red tailed hawk | territorial behaviour |
| American woodcock | singing |

## 3.2 Barrier

A general description of each barrier was documented to include the material it comprised of, if there appeared to be any seepage or over-wash and was measured at the maximum and minimum widths. The condition of any openings was recorded, the direction of flow, channel width, water depth, and if fish were observed in the opening. All of the ponds had an opening in the barrier except for Big Beach 2 which remained closed for the entire monitoring season[1].

Big Beach 1 barrier is comprised of sand and gravel. The maximum width of the barrier was 13.87 m with no seepage or over-wash. The condition of the opening varied dramatically over the monitoring season with respect to width and water depth and speed of flow, but the flow of water in the channel was always flowing out into the Bras d'Or Lake. Killifish/Mummichugs,

[1] Big Beach 2 barrier was opened during a large rain/wind storm in early December 2018 and a visit to East Bay in early 2019 noted that it was now closed with a wide barrier beach.

Three Spined Sticklebacks and Atlantic Silversides were seen swimming in the openings during site visits.

Big Beach 2 had two barriers. That were wide sandy beaches. On the north side the barrier was sparsely vegetated and had lots of dead trees/stumps along it, many appeared to have been cut but were also bleached and stripped of bark indicating they had been there for some time. Evidence of extensive beaver activity was noted. On the west side the barrier was a sandy beach with shrubs growing closer to the pond water.  No opening was observed.

Stott's barrier is comprised of sand, gravel and cobble and had a maximum width of 11.28 m with no evidence of seepage or over-wash. There is one opening that varied in width from a maximum of 3.96 m to a minimum <1 m.  Water depth in the channel remained steady at an average of 30 cm, the flow was always strong and steady and water was either flowing in or flowing out depending on the day visited.  Jelly fish and other baby fish were observed swimming in or out of the channel on several occasions.  We were unable to determine fish species in the channel as they were only observed from land for a brief time.

East Bay barrier is comprised of gravel and cobble with a maximum with of 8.53 m and no evidence of seepage over-wash[2].  There is one opening that was ~3 m wide and varied from ~30 cm to >1m deep.  The flow in the channel was strong and varied between flowing in or out to the Bras d'Or Lake.  Schools of small fish were observed and during one visit, there were lots of lion's mane and moon jellyfish moving in and out of the pond.  Towards the end of the monitoring season the channel appeared to be getting narrower and shallow, indicating that it may close eventually.

Big Pond barrier is very long with low sections of barrier slightly over-washed at almost every visit. There are 2 wide over-wash sections of the barrier and one main channel opening that is 2.4 m wide and varied from ~20cm to ~1 m deep. The flow in the channel is strong and fish were often observed moving in and out of the pond.

Benacadie has a wide sand bar barrier that changes shape depending on weather.  Strong storm surges push sand inwards and heavy rain/freshwater flow pushes sand out. There is one main opening that started out at 18 m wide and was seen to be wider than usual during later visits. The water depth in the channel was observed to be 100-200 cm and the flow was strong and varied between flowing in or flowing out. No fish were observed in the channel.

## 3.3 Fish & Aquatic Habitat

Barachois ponds are aquatic habitats that provide food, water, shelter and space essential for the survival of many species within the Bras d'Or Lake. Previous studies on barachois ponds (aka coastal saline ponds) in other regions indicate they tend to be highly productive ecosystems. They support a variety of habitats including open waters, submerged aquatic vegetation, fringing wetlands, salt marshes and seagrass beds that serve as nursery, feeding and refuge areas for

[2] Signs of overwash from the Bras d'Or Lake were evident during a November 2018 visit with plants at middle of barrier flattened.

numerous freshwater, estuarine, marine and terrestrial organisms. They contribute to the overall productivity of the Bras d'Or Lake but how much they contribute has not been studied.

Fish & aquatic habitat surveys were conducted monthly between June and November 2018 in each of the six ponds. Minnow traps, modified green crab traps and fyke nets were deployed in the pond in the afternoon and were checked in the morning. The traps were left to soak for approximately 16 hours. Numerous bait options were used such as crackers, bread, herring, fish pellets and mackerel once. A general description of each pond was recorded, the substrate type of the pond bottom, aquatic vegetation cover, aquatic plant species, other species and distinguishing features were also recorded.

The information gathered will serve as a baseline for future studies.

Many of the same species of fish were found in all of the ponds with a few outliers that were only found in one or two ponds. This does not mean that the other ponds do not have the same species, it only indicates that we did not catch those species during our trapping times. Killifish/mummichugs, Atlantic Silversides, Stickleback species (3 spine, 4 spine & black spotted nine spine), perch, cunners, flounder, pipefish, rock gunnel and tomcod were the various fish species found in the ponds. We also found moon and lions mane jellyfish, green crabs, rock crab, mussels, grass and sand shrimp the ponds. The one freshwater pond had tadpoles, giant water beetles and killifish/mummichugs species. The majority of the fish species were young of the year (YOY) indicating that these ponds are used as nursery sites for many species.

We found it difficult to fish in the ponds because of the substrate (mud/silt) of the bottoms and because of the overall composition of the ponds prevented us from fishing all parts of the ponds. We also experienced problems where we couldn't fish in the openings as many were shallow or not very wide and we did not want to completely block off the opening. This prevented us from being able to catch fish that were traveling in and out of the ponds and from catching fish that would inhabit deeper areas. We tweaked our techniques several times over the monitoring season and still felt that we didn't have a method that would allow us to catch all species and sizes of fish in the ponds. For future monitoring, we will work to come up with better methods.

## 3.4 Plants

A visual survey of terrestrial and wetland plants in the barachois site, as well as submerged aquatic vegetation in the pond and adjacent Bras d'Or Lakes was conducted at each of the six ponds. The intent was to focus on identifying traditionally used and rare species; however, it was determined after completion of site visits that there were no rare species and very few traditionally used ones. It was comforting to learn that there were also very few invasive species and that the presence of the invasive Rosa Rugosa species was sparse compared to its presence in mainland Nova Scotia.

BENACADIE POND

| **Common Name** | **Scientific Name** | **Wetland Indicator** |
|---|---|---|
| Spotted Jewelweed | *Impatiens capensis* | fac |
| Blue flag iris | *Iris versicolor* | facw+ |

| | | |
|---|---|---|
| Curled dock | *Rumex crispus* | fac |
| Lesser tussock sedge | *Carex diandra* | obl |
| Chaffy sedge | *Carex palacea* | obl |
| Little green sedge | *Carex viridula* | facw |
| Estuary sedge | *Carex recta* | obl |
| Marsh straw sedge | *Carex hormathodes* | obl |
| Soft stemmed bulrush | *Schoenoplectus tabernaemontani* | obl |
| 3 square bulrushes | *Schoenoplectus pungens* | obl |
| Cottongrass bulrush | *Scirpus cyperinus* | facw |
| Fringed sedge | *Carex crinita* | obl |
| Cyperus-like sedge | *Carex pseudocyperus* | obl |
| Hedge bindweed | *Calystegia sepium* | facw |
| Cattails | *Typha angustifolia* | obl |
| Saltwater cordgrass | *Spartina alterniflora* | obl |
| Silverweed | *Argentina egedii* | obl |
| Virginia rose | *Rosa virginiana* | fac |
| Marsh cinquefoil | *Comarum palustre* | obl |
| Tufted vetch | *Vicia cracca* | fac |
| Bayberry | *Myrica gale* | obl |
| Bittersweet nightshade | *Solanum ducamara* | fac |
| Seaside arrowgrass | *Triglochin maritima* | obl |
| Creeping saltbush | *Atriplex prostrata* | obl |
| Speckled alder | *Alnus incana* | facw |
| Richardson's pondweed | *Potamogeton richardsonii* | obl |
| Clasping-leaved pondweed | *Potamogeton perfoliatus* | obl |
| Sago pondweed | *Stukenia pectinata* | obl |
| Eelgrass | *Zostera marina* | obl |
| Widgeon grass | *Ruppia maritima* | obl |
| | *Corda* | |
| | *Fucus sp.* | |
| Marram grass | *Ammophila* | facu |
| Aster sp. | | |
| Sea Lyme grass | *Leymus arenarius* | fac |
| Beach pea | *Lathyrus japonicus* | fac |
| Knapweed | *Centaurea* | fac |
| Common Yarrow | *Achillea millefolium,* | Fac- |
| clover sp. | *Trifolium sp.* | facu/upl |
| spreading orache | *Atriplex patula* | fac |

| | | |
|---|---|---|
| cow parsnip | *Heracleum maximum* | fac |

BIG BEACH 1

| | | |
|---|---|---|
| Hedge bindweed | *Calystegia sepium* | facw |
| Curled dock | *Rumex crispus* | fac |
| Marsh cinquefoil | *Comarum palustre* | obl |
| Cattails | *Typha angustifolia* | obl |
| Beach rose | *Rosa rugosa* | facu |
| Blue flag iris | *Iris versicolor* | facw+ |
| Sea rocket | *Cakile edentula* | facw+ |
| Marsh thistle | *Cirsium palustre* | FACW |
| Softstemmed bulrush | *Schoenoplectus tabernaemontani* | obl |
| Estuary sedge | *Carex recta* | obl |
| Marsh straw sedge | *Carex hormathodes* | obl |
| Bayberry | *Myrica gale* | obl |
| Seaside arrowgrass | *Triglochin maritima* | obl |
| Soft rush | *Juncus effusus* | facw |
| Spike rush | *Eleocharis palustris* | obl |
| Cockle bur | *Xanthium strumarium* | obl |
| Large cranberry | *Vaccinium macrocarpon* | facw+ |
| Marsh St. John's Wort | *Triadenum fraseri* | obl |
| Speckled alder | *Alnus incana* | facw |
| Common stonewort | *Chara vulgaris* | |
| Widgeon grass | *Ruppia maritima* | obl |
| Richardson's pondweed | *Potamogeton richardsonii* | obl |
| Clasping-leaved pondweed | *Potamogeton perfoliatus* | obl |
| Sago pondweed | *Stukenia pectinata* | obl |
| english rye grass | *Lolium perenne* | facu |
| beach pea | *Lathyrus japonicus* | fac |
| Northern bayberry | *merica pensylvanica* | |
| spreading orache | *Atriplex patula* | fac |
| wild rose | *Rosa* | |
| tufted vetch | *Vicia cracca* | fac |
| Purple Loosestrife | *Lythrum salicaria* | facw |
| Fresh water cordgrass | *S. Pectinata* | facw+ |
| Saltwater cordgrass | *S. Alterniflora* | obl |
| | *Scirpus sp.* | |

BIG BEACH 2

| | | |
|---|---|---|
| Curled Dock | *Rumex crispus* | fac |
| Marsh St. John's-wort | *Triadenum fraseri* | obl |
| Marsh Cinquefoil | *Comarum palustre* | obl |
| Cattails | *Typha angustifolia* | obl |
| Large cranberry | *Vaccinium macrocarpon* | facw+ |
| Purple loosestrife | *Lythrum salicaria* | facw |
| Blue flag iris | *Iris versicolor* | facw+ |
| Bayberry | *Myrica gale* | obl |
| Northern bayberry | *Myrica pensylvanica* | fac |
| Softstemmed bulrush | *Schoenoplectus tabernaemontani* | obl |
| Canada goldenrod | *Solidago canadensis* | fac |
| Spike rush | *Eleocharis palustris* | obl |
| Seaside arrowgrass | *Triglochin maritima* | obl |
| Beach pea | *Lathyrus japonicus* | fac |
| Canary grass | *Phalaris canariensis* | upl |
| Sea rocket | *Cakile edentula* | facw+ |
| Seabeach groundsel | *Senecio pseuodoarnica* | obl |
| Beach rose | *Rosa rugosa* | facu |
| Virginia rose | *Rosa virginiana* | fac |
| Soft rush | *Juncus effusus* | facw |
| Colts foot | *Tussilago farfara* | fac |
| Spruce sp. | | |
| Speckled alder | *Alnus incana* | facw |
| Richardson's pondweed | *Potamogeton richardsonii* | obl |
| Clasping-leaved pondweed | *Potamogeton perfoliatus* | obl |
| Common bladderwort | *Utricularia vulgaris* | obl |
| seabeach sandwort | *Honckenya peploides* | obl |
| dusty miller | *Jacobaea maritima* | |
| dock s.p. (not curled) | *Rumex sp.* | |
| english rye grass | *Lolium perenne* | facu |
| white spruce | *Picea glauca* | fac |
| American beech grass | *Ammophila breviligulata* | facu |

STOTT'S POND

| | | |
|---|---|---|
| Winter cress | *Barbarea vulgaris* | fac |
| Hedge bindweed | *Calystegia sepium* | facw |
| Beach pea | *Lathyrus japonicus* | fac |
| Seaside goldenrod | *Solidago sempervirens* | facw+ |

| | | |
|---|---|---|
| Canada goldenrod | *Solidago canadensis* | fac |
| Common thistle | *Cirsium vulgare* | fac |
| Silverweed | *Argentina egedii* | obl |
| Orache | *Atriplex* | obl |
| Marsh straw sedge | *Carex hormathodes* | obl |
| Estuary sedge | *Carex recta* | obl |
| Goosefoot | *Chenopodium* | |
| Dwarf spikerush | *Eleocharis parvula* | obl |
| Bayberry | *Myrica gale* | obl |
| Curled dock | *Rumex crispus* | fac |
| Softstemmed bulrush | *Scirpus tabernaemontanii* | obl |
| Seaside arrowgrass | *Triglochin maritima* | obl |
| Cattail | *Typha angustifolia* | obl |
| Tufted vetch | *Vicia cracca* | fac |
| Yellow clover | *Trifolium aureum* | facu |
| Bittersweet nightshade | *Solanum ducamara* | fac |
| Coltsfoot | *Tussilago farfara* | fac |
| Blueflag iris | *Iris versicolor* | facw+ |
| Rose | *Rosa virginiana* | fac |
| Burreed | *Sparganium sp.* | obl |
| Sea rocket | *Cakile edentula* | facw+ |
| Daisies | *Bellis perennis* | upl |
| Timothy Hay | *Phleum pratense* | facu |
| Red raspberry | *Rubus idaeus* | fac |
| Strawberry | *Fragaria virginiana* | fac |
| Angelica | *Angelica lucida* | facw |
| Cyperus-like sedge | *Carex pseudocyperus* | obl |
| Sedge #7 | | |
| Large cranberry | *Vaccinium macrocarpon* | facw+ |
| Speckled alder | *Alnus incana* | facw |
| Red spruce | *Picea rubens* | fac |
| White birch | *Betula papyrifera* | facu |
| Eelgrass | *Zostera marina* | obl |
| Widgeon grass | *Ruppia maritima* | obl |
| Sea lettuce | *Ulva* | |
| Ulva intestinalus | *Ulva intestinalus* | |
| Sago pondweed | *Stukenia pectinalus* | obl |

EAST BAY POND

| | | |
|---|---|---|
| Yellow flowered knotweed | *Polygnum ramosissimum* | obl |
| Hedge bindweed | *Calystegia sepium* | facw |
| Silverweed | *Argentina egedii* | obl |
| Beach pea | *Lathyrus japonicus* | fac |
| Seabeach sandwort | *Honckenya peploides* | obl |
| Creeping saltbush | *Atriplex prostrata* | obl |
| Sea rocket | *Cakile edentula* | facw+ |
| Cockle bur | *Xanthium strumarium* | obl |
| Scot's Lovage | *Ligusticum scoticum* | facw |
| Cattails | *Typha angustifolia* | obl |
| Fresh water cordgrass | *Spartina pectinata* | facw+ |
| Marsh cinquefoil | *Comarum palustre* | obl |
| Bayberry | *Myrica gale* | obl |
| Soft rush | *Juncus effusus* | facw |
| Spike rush | *Eleocharis palustris* | obl |
| Curled dock | *Rumex crispus* | fac |
| Colts foot | *Tussilago farfara* | fac |
| Blue flag iris | *Iris versicolor* | facw+ |
| Common stonewort | *Chara vulgaris* | |
| Widgeon grass | *Ruppia maritima* | obl |
| Sago pondweed | *Stuckenia pectinata* | obl |
| Eelgrass | *Zostera marina* | obl |
| | *Lithothamnion glaciale* | |
| | *Fucus sp.* | |
| | *Corda* | |
| Irish moss | *Chondrus crispus* | |
| | *Ulva intestinalis* | |
| Rough tangle weed | *Stilophora rhizodes* | |
| sea lettuce | *Ulva* | |
| beach grass | *Ammophila breviligulata* | facu |
| purple nightshade | *Solanum xanti* | facu |
| red fescue | *Festuca rubra* | fac |
| oxeye daisy | *Chrysanthemum leucanthemum* | |
| sea lavender | *Limonium carolinianum* | obl |
| Tuckerman's pondweed | | |
| cow parsnip | *Heracleum maximum* | fac |
| Jewelweed | *Impatiens capensis* | fac |
| black grass | *Juncus gerardii* | obl |
| evening primrose | *Oenothera oakesiana* | upl |

| | | |
|---|---|---|
| dandelion | *Taraxacum officinale* | facu |

BIG POND

| | | |
|---|---|---|
| Yellow-flowered Knotweed | *Polygnum ramosissimum* | FAC |
| Saltwater cordgrass | *Spartina alterniflora* | obl |
| Seaside goldenrod | *Solidago sempervirens* | facw+ |
| Beach pea | *Lathyrus japonicus* | fac |
| Canary grass | *Phalaris canariensis* | upl |
| Fresh water cordgrass | *Spartina pectinata* | facw+ |
| 3 square bulrushes | *Schoenoplectus pungens* | obl |
| Softstemmed bulrush | *Schoenoplectus tabernaemontani* | obl |
| Black grass | *Juncus gerardii* | obl |
| Cockle bur | *Xanthium strumarium* | obl |
| Sea rocket | *Cakile edentula* | facw+ |
| Sago pondweed | *Stukenia pectinata* | obl |
| | *Lithothamnion glaciale* | |
| | *Pilayella littoralis?* | |
| | *Ulva linza* | |
| | *Ulva intestinalis* | |
| | *Ulva lactuca* | |
| Knotted wrack | *Ascophyllum nodosum* | |
| Irish moss | *Chondrus* | |
| sea wrack | *Fucus distichus* | Obl |
| eelgrass | *Zostera marina* | obl |
| Rough tangleweed | *Stilophora rhizodes* | |
| | *Fucus sp.* | |
| Dwarf raspberry | *Rubus pubescens* | fac |
| Sea lavender | *Limonium carolinianum* | obl |
| Common yarrow | *Achillea millefolium* | Facu- |
| White birch | *Betula papyrifera* | Facu |

## 3.5 Water quality

Water quality monitoring helps to determine the overall condition or health of barachois ponds. Water depth, salinity, temperature, conductivity, dissolved oxygen were taken at each site visit using a YSI. These measurements were recorded from inside the pond and outside of the pond. Temperature, salinity and water levels were recorded by data loggers placed in the ponds and the results are detailed later in this report. The dissolved oxygen results can be found in the table below.

Dissolved oxygen is one of the most important indicators of water quality. It is essential for the survival of fish and other aquatic organisms. Dissolved oxygen readings (mg/L) for each of the 6 ponds during the monitoring season varied between and within ponds. There were some high DO readings that currently cannot be explained. The DO sensor on the YSI was calibrated regularly as per the directions. On average, the dissolved oxygen readings over the entire monitoring season were pretty consistent between each of the ponds as you can see in the table below.

| Pond | Min | Max | Average |
|---|---:|---:|---:|
| Stott's | 6.23 | 9.68 | 8.36 |
| Benacadie | 7.4 | 14.96 | 9.15 |
| East Bay | 7.4 | 10.99 | 9.39 |
| Big Pond | 6.64 | 10.29 | 8.19 |
| Big Beach 1 | 5.53 | 10.22 | 8.02 |
| Big Beach 2 | 6.7 | 16.52 | 8.91 |

Additional water quality testing was done at three of the ponds (Big Beach 1, Benacadie & East Bay) during the monitoring season where water was collected in bottles provided by Maxxam Analytics in Sydney, NS and sent to be analyzed for inorganics, metals and chlorophyll in algae. This was done in July and again in September 2018.

The water quality results from Maxxam Analytics didn't report any unusual water quality issues and many of the parameters (e.g. nitrates, phosphates, metals) were not detected in any of the samples. Preliminary examination of these results indicates good overall health of the ponds but additional testing should be done to see if the results change.

## 3.6 Data logger 2018

Water temperature and salinity are important habitat variables for many aquatic and wetland species. To understand pond ecology and the potential effects of habitat alterations and climate change, it is important to understand the patterns and drivers of these variables. This section presents the data collected from the data loggers deployed in Big Beach 1, Benacadie and East Bay Pond in 2018. Only preliminary analysis has been performed to date to understand the level of variability in these habitat variables. Full statistical analyses, as well as a comparison of these variables with weather variables (e.g. precipitation, air temperature, wind) and barrier condition (status of opening) still needs to be performed to understand the drivers of these important habitat variables.

**Methods**

Solinst Edge LTD Level loggers were deployed in the three ponds between June 27 and Nov. 5 to record daily and seasonal variability in water level, water temperature and conductivity/salinity. Data loggers were deployed inside a perforated PVC pipe attached to a patio stone to hold it in place on the pond bottom (pic). Loggers were deployed in areas where people would be less likely to encounter them (Figure 1). Initially, the data logger in East Bay Pond was placed in a densely vegetated area and was subsequently relocated to a less vegetated area for easier retrieval. Loggers were set to take recordings every 4 hours. Water level records were compensated using barometric pressure measurements taking using a Solinst Baralogger installed at Crane Cove, Eskasoni.

## Results

### Big Beach 1

Figure 2 shows the water temperature, salinity and water level readings from Big Beach 1 during the entire deployment period.

Water temperature follows a general increasing trend until the end of July then decreases through the rest of the summer and fall. Big Beach 1 had the highest monthly average water temperatures of all three ponds (Table 1). Water temperature varies daily (as well as within the day) and occasionally can change several degrees (and up to 10.2 ℃ between Aug 19 and 20) from one day to the next. The highest daily temperature was 30.1℃ recorded on July 25 and the lowest was 9.1 ℃ on Nov 5. Water level and salinity appeared fairly constant from mid-July to mid-September with exception of a few days with large swings (e.g. ~August 19). The large swings in these variables in the spring and fall may be due to the more variable weather conditions. Water level ranged from 0.34m on July 4 to 0.96m on October 13 and experienced changes of up to 30% in less than 24 hours. Salinity ranged from <0.1 to 19.2, with both the highest and lowest values occurring within 48 hours of each other (a 99.7% increase in salinity between October 29 and 30). While it appears that large shifts in water level and salinity occurred around the same dates, the nature of the changes (increase vs. decrease and proportion of change) were not consistent. For example, on August 19, a large spike in water level corresponded with a more gradual decline in salinity; however, on October 17/18, both variables seemed to increase and decrease in a similar pattern.

Table: Monthly averages for Water Level, water temperature and salinity data logger readings for Big Beach 1, Benacadie and Campbell’s Ponds in 2018.

| | Average Water Level (m) | | | Average Water Temperature (℃) | | | Average Salinity | | |
|---|---|---|---|---|---|---|---|---|---|
| | Big Beach 1 | Benacadie | Campbell’s | Big Beach 1 | Benacadie | Campbell’s | Big Beach 1 | Benacadie | Campbell’s |
| July | 0.485761 | 1.316766 | 0.611668* | 24.46055 | 20.02849 | 22.60578 | 10.31169 | 18.97641 | 18.7434 |
| Aug | 0.514399 | 1.41313 | 0.693313 | 25.22771 | 24.12801 | 23.88208 | 5.337769 | 19.45126 | 19.78608 |
| Sep | 0.575844 | 1.404083 | 0.677362 | 19.61753 | 18.85559 | 18.79896 | 5.942772 | 20.88031 | 9.972961 |
| Oct | 0.734626 | 1.648826 | 0.78463 | 13.97512 | 12.76784 | 11.97055 | 10.28647 | 16.89237 | 9.394473 |

*average taken from data starting July 20 at 3pm following relocation of logger to shallower location.

### Benacadie

Figure 3 shows the water temperature, salinity and water level readings from Benacadie during the entire deployment period. Water temperature followed a general increasing trend until the end of July, remained at a fairly constant high in early August, and then decreased through the rest of the summer and fall. Water temperature varied daily (as well as within the day) and occasionally changed several degrees from one day to the next. The highest daily temperature was 26.5 ℃ recorded on August 8 and the lowest was 8.7℃ on November 4. Water level ranged from 1.2 m on July 23 to 1.9 m on October 17. With the exception of a few events (e.g. August and September 18/19), average daily water level appeared fairly consistent from late June to late September, followed by a gradual increase through early October with fewer and less drastic major change events compared to Big Beach 1. There appeared to be a fairly consistent daily rise and fall pattern in water level, suggesting a possible strong tidal influence in this pond. Both the low and high in salinity occurred in October, 0.6 on October 29 and 22.0 on October 8, respectively. While there were few major change events in salinity between late July to late September, salinity was highly variable in the late spring and fall salinity changes of up to 99.7% within a 24 hour period (e.g. between October 28 and 29).

### East Bay

Figure 4 shows the water temperature, salinity and water level readings from East Bay during the entire deployment period. Water temperature followed a general increasing trend until the end of July, remained at a fairly constant high in early August then decreased through the rest of the summer and fall. Water temperature varied daily (as well as within the day) and occasionally changed several degrees from one day to the next. East Bay appeared to have experienced the most frequent >2°C changes in water temperatures of the three ponds. The highest daily temperature was 28.6°C recorded on July 25 and the lowest was 6.0 °C on October 27. There appeared to be a fairly consistent daily rise and fall pattern in water level, suggesting a possible strong tidal influence in this pond. Water level fluctuated more widely throughout the deployment period compared to the other ponds, with the most noticeable changes beginning in October. The drop in water level recorded on July 20 at East Bay reflects the relocation of the data logger to a shallower location, not changes in conditions at the pond. Water level after the relocation ranged from 0.54m on July 24 to 1.1m on October 18. While East Bay occasionally experienced changes of up to 24% in a 24 hour period, there were fewer and less drastic major change events compared to Big Beach 1. Salinity ranged from a low of 6.9 on September 16 to a high of 21.1 on August 21. While there were few major changes in salinity in this pond throughout the deployment period, a drop in salinity of approximately 53% occurred within a 12 hour period on September 5/6. Following this drop salinity remained below 12 for the remainder of the deployment period.

**Summary**

Statistical analysis is required to determine if there is a significant relationship between the three variables within and/or between the three ponds. Data loggers only record data at a single location in the pond; however, it should be noted that water temperature, depth and salinity may differ depending on location and degree of mixing within the pond. Thus, these data best reflect the overall conditions and seasonal variability in the ponds. Qualitatively, water temperature and water level appear to follow somewhat similar seasonal and weekly patterns among the three ponds; however, there appears to be considerable variability in salinity patterns between the ponds. Major changes in variables seem to correspond to climate events (precipitation events, dry periods); however, the exact nature of the changes varied by pond and conditions.
While Big Beach 1 had the highest average water temperatures every month, water temperature in each pond followed a similar patter, highest in mid-summer and lowest in early June and late fall. All three ponds experienced a large dip and rebound in water temperature in mid-August (19-21) possibly in response to a storm event with high precipitation and wind.

The data loggers recorded the temporal variability in water levels at a single location within a pond. Benacadie had the highest range in water level (0.72m), followed by Big Beach (0.62) and East Bay (0.55). The highest levels were experienced in October and the lowest in July for all ponds, though the exact dates differed. Regular daily fluctuations in water level suggest a possible stronger tidal influence in Benacadie and East Bay compared to Big Beach 1, possibly explained by the more permanent openings of the former two compared to the ephemeral opening at Big Beach 1.

While all the ponds fall within the brackish range, salinity appears quite variable ranging from almost fresh to highly brackish. The frequent and often sudden fluctuations in salinity may have a major influence on the biotic community in the ponds. This is supported by the observation that the ponds seem to contain both freshwater and marine species often co-existing in the same locations. Large sudden changes may lead to die-offs, especially of less mobile organisms; however, resident organisms may be adapted to these variable conditions. Moreover, salinity may vary within a single pond, especially for larger ponds. For example, the upper reach of Benacadie tend to be much fresher compared to the lower reach. This may allow mobile species to move to more favourable locations when rapid salinity changes occur.

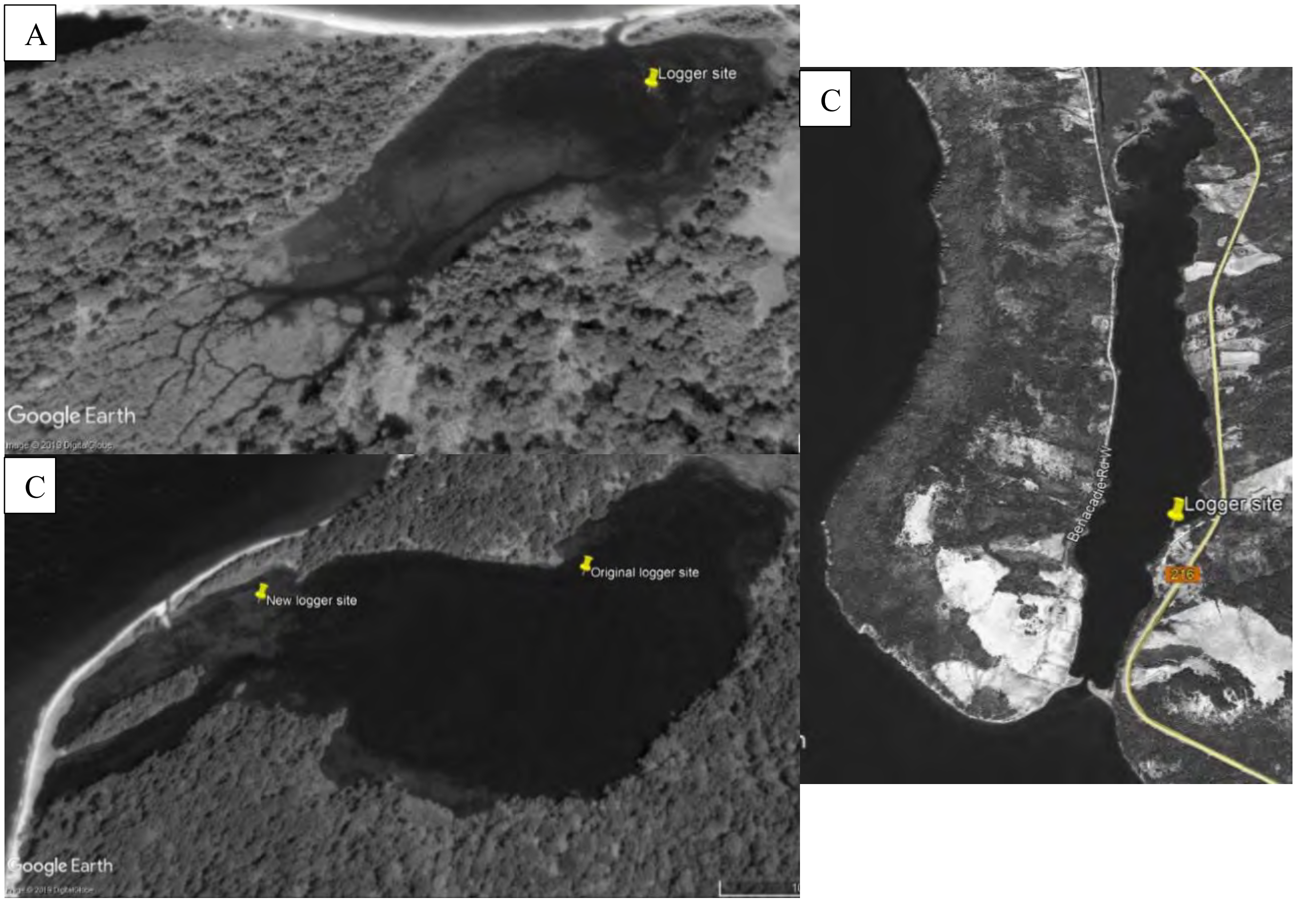


Figure 1: Locations of level loggers in a) Big Beach 1 Pond, b) Benacadie Pond, and c) Campbell's Pond

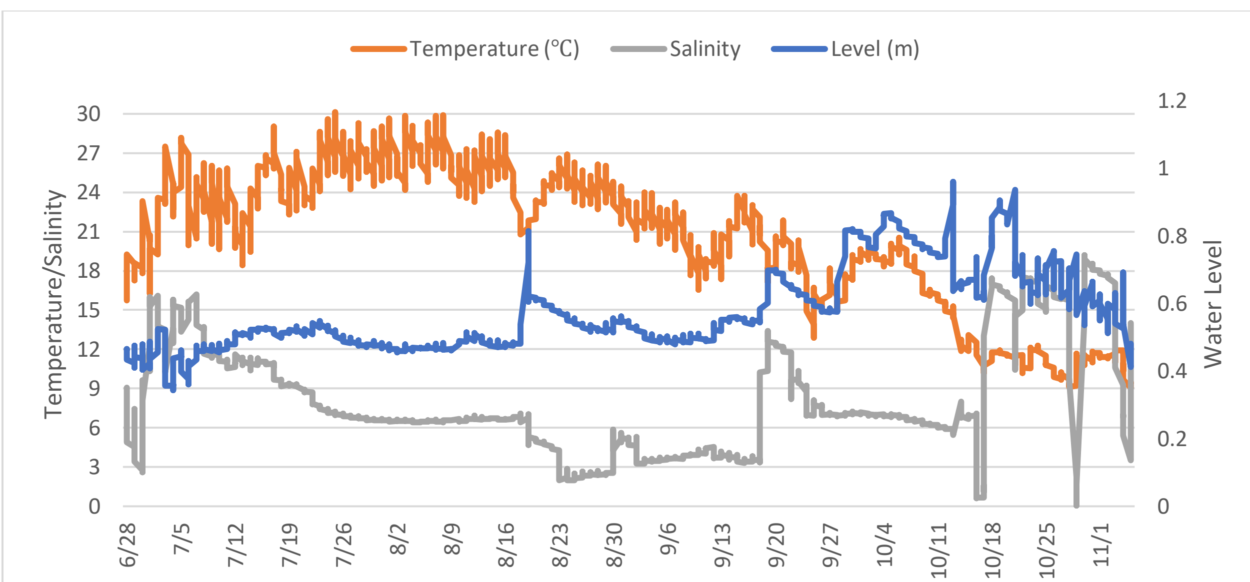


Figure 2: Water level, water temperature and salinity data logger readings from Big Beach 1 Pond in 2018

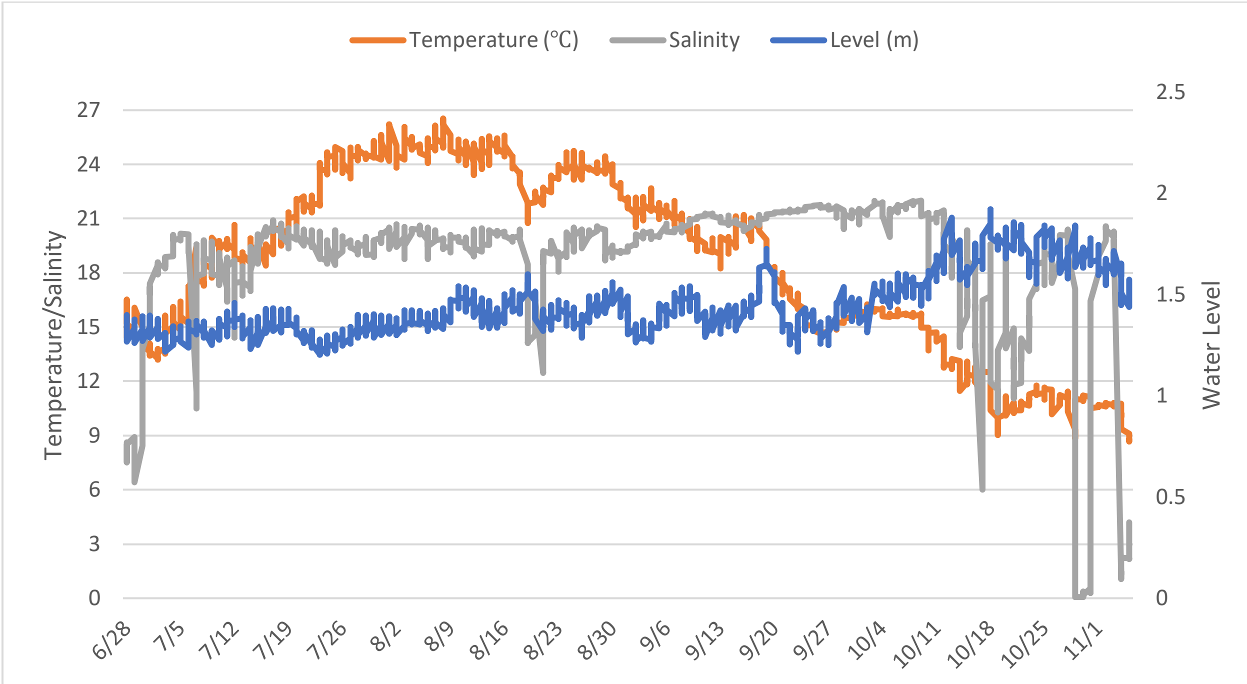


Figure 3: Water level, water temperature and salinity data logger readings from Benacadie Pond in 2018.

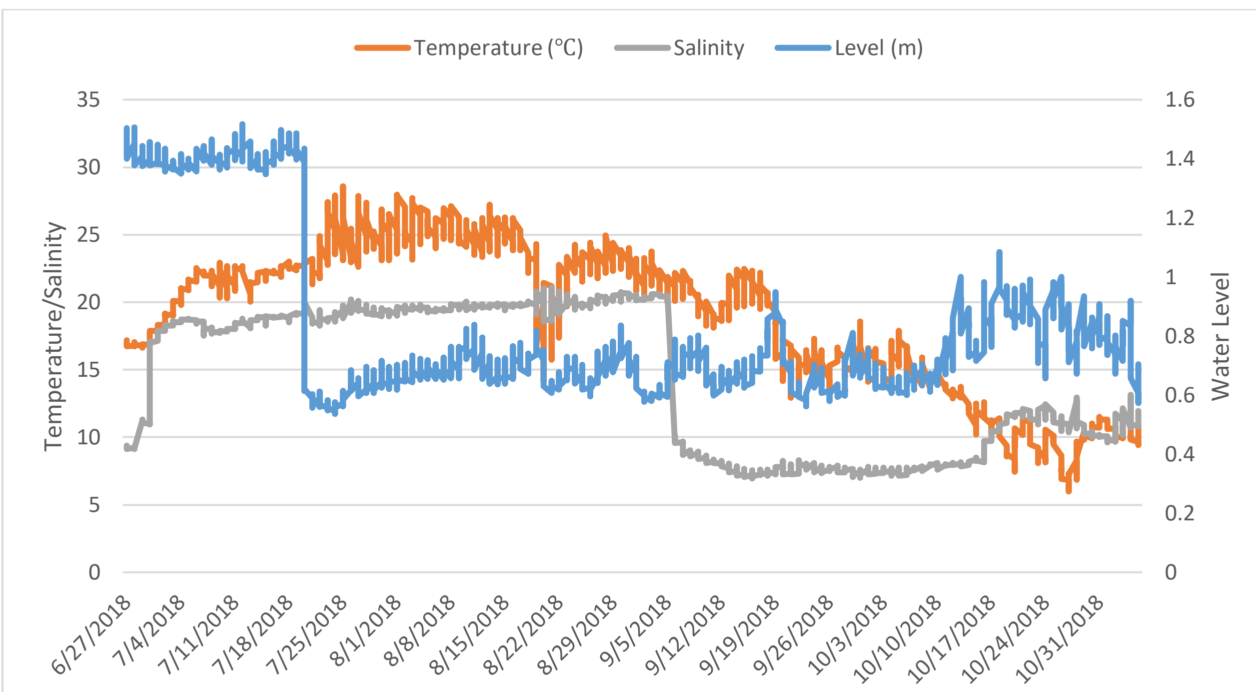


Figure 4: Water level, water temperature and salinity data logger readings from Campbell's Pond in 2018

## 3.6 WESP

The Wetland Ecosystem Services Protocol (WESP) is a standardized template for creating regionalized methods which then can be used to rapid assess ecosystem services (functions and values) of all wetland types throughout a focal region.

**Methods**

A WESP assessment requires completing a single three-part data form, taking about 1-3 hours. Responses to questions on that form are based on review of aerial imagery and observations during a single site visit; GIS is not required. After data are entered in an Excel spreadsheet, the spreadsheet uses science-based logic models to automatically generate scores intended to reflect a wetland's ability to support the following functions: Water Storage and Delay, Stream Flow Support, Water Cooling, Sediment Retention and Stabilization, Phosphorus Retention, Nitrate Removal and Retention, Carbon Sequestration, Organic Nutrient Export, Aquatic Invertebrate Habitat, Anadromous Fish Habitat, Non-anadromous Fish Habitat, Amphibian & Reptile Habitat, Waterbird Feeding Habitat, Waterbird Nesting Habitat, Songbird, Raptor and Mammal Habitat, Pollinator Habitat, and Native Plant Habitat. For all but two of these functions, scores are given for both components of an ecosystem service: function and benefit. In addition, wetland Ecological Condition (Integrity), Public Use and Recognition, Wetland Sensitivity, and Stressors are scored.

Scores generated by WESP may be used to (a) estimate a wetland's relative ecological condition, stress, and sensitivity, (b) compare relative levels of ecosystem services among different wetland types, or (c) compare those in a single wetland before and after restoration, enhancement, or loss. This information should be used to inform restoration design and performance standards. Where compensation of lost or degraded wetland functions is required, WESP can be used to adjust or qualify mitigation ratios so they ensure mitigation sites have values and functions comparable to or greater than altered sites, as well as being in similar or better ecological condition.

The WESP assessment method was used on each of the 6 ponds identified in the detailed study. The tool is designed for assessing Tidal or Non-Tidal wetlands in the Atlantic Provinces. Nova Scotia Environment currently suggests using NovaWET to assess wetland function but is exploring WESP as an alternative method.

The Bras d'Or Lake is tidal by definition but its tidal range is significantly smaller than say that of the Bay of Fundy or shoreline surrounding Cape Breton. Due to the unique nature of the Bras d'Or Lake and the wetlands found within, the tidal and non-tidal calculators were used for 5 of the ponds that had openings to the Bras d'Or Lake and the results of each compared. The 6$^{th}$ pond (Big Beach 2) remained closed the entire monitoring season and only the non-tidal calculator was used. We found that the non-tidal calculator required more information and was better equipped to assess the Bras d'Or Lake barachois.

**Results**

The results of the 6 ponds can be found below beginning with tidal[3] and followed by non-tidal results. The majority of the ponds were given a benefits rating of 'Higher' which indicates these

[3] Only done on 5 of the 6 ponds as Big Beach 2 was completely closed off with no tidal influence at all.

barachois ponds provide higher function and value than similar wetlands in other areas. It is still undetermined whether or not a separate calculator that combines both tidal and non-tidal attributes and functions is better suited for ponds in and around the Bras d'Or Lake. Additional WESP assessments need to be done on more ponds in the lake in order to better evaluate the accuracy of the ratings given in the Non-Tidal WESP results.

WESP Tidal Calculator Pond Scores - July 2018

| **Functions or Attributes** | **Benacadie** | **Stott's** | **Big Beach 1** | **Big Pond** | **East Bay** |
|---|---|---|---|---|---|
| Storm Surge Interception (SS) | Higher | Lower | Higher | Lower | Moderate |
| Water Purification (WP) | Higher | Higher | Higher | Higher | Higher |
| Organic Nutrient Export (OX) | Moderate | Moderate | Moderate | Moderate | Lower |
| Fish Habitat (FH) | Higher | Higher | Moderate | Moderate | Moderate |
| Waterbird Habitat (WH) | Lower | Lower | Lower | Lower | Lower |
| Songbird & Raptor Habitat (SRH) | Higher | Lower | Higher | Moderate | Higher |
| Biodiversity Maintenance (BM) | Higher | Higher | Higher | Higher | Higher |
| Wetland Stability (WS) | Higher | Higher | Moderate | Higher | Moderate |
| Public Use & Recognition (PUR) | Higher | Higher | Moderate | Higher | Higher |

Big Pond – Non Tidal

| Wetland Functions or Other Attributes: | Function Score (Normalised) | Function Rating | Benefits Score (Normalised) | Benefits Rating |
|---|---|---|---|---|
| Water Storage & Delay (WS) | 2.33 | Lower | 7.05 | Higher |
| Stream Flow Support (SFS) | 2.10 | Moderate | 3.71 | Moderate |
| Water Cooling (WC) | 3.71 | Moderate | 2.61 | Moderate |
| Sediment Retention & Stabilisation (SR) | 2.76 | Lower | 9.95 | Higher |
| Phosphorus Retention (PR) | 1.87 | Lower | 9.46 | Higher |
| Nitrate Removal & Retention (NR) | 3.02 | Moderate | 10.00 | Higher |
| Carbon Sequestration (CS) | 2.74 | Lower | | |
| Organic Nutrient Export (OE) | 5.51 | Moderate | | |
| Anadromous Fish Habitat (FA) | 5.04 | Higher | 10.00 | Higher |
| Resident Fish Habitat (FR) | 8.33 | Higher | 10.00 | Higher |
| Aquatic Invertebrate Habitat (INV) | 8.05 | Higher | 8.45 | Higher |
| Amphibian & Turtle Habitat (AM) | 8.62 | Higher | 6.23 | Higher |
| Waterbird Feeding Habitat (WBF) | 8.83 | Higher | 10.00 | Higher |
| Waterbird Nesting Habitat (WBN) | 9.79 | Higher | 10.00 | Higher |
| Songbird, Raptor, & Mammal Habitat (SBM) | 5.20 | Moderate | 10.00 | Higher |
| Pollinator Habitat (POL) | 7.99 | Higher | 10.00 | Higher |
| Native Plant Habitat (PH) | 3.01 | Lower | 7.03 | Moderate |
| Public Use & Recognition (PU) | | | 7.79 | Higher |
| Wetland Sensitivity (Sens) | | | 3.32 | Lower |
| Wetland Ecological Condition (EC) | | | 0.00 | Lower |
| Wetland Stressors (STR) (higher score means more stress) | | | 9.37 | Higher |
| **Summary Ratings for Grouped Functions:** | | | | |
| HYDROLOGIC Group (WS) | 2.33 | Lower | 7.05 | Higher |
| WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS) | 2.79 | Lower | 9.90 | Higher |
| AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC) | 6.45 | Moderate | 6.69 | Higher |
| AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN) | 8.96 | Higher | 9.62 | Higher |
| TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL) | 6.70 | Moderate | 9.51 | Higher |
| WETLAND CONDITION (EC) | | | 0.00 | Lower |
| WETLAND RISK (average of Sensitivity & Stressors) | | | 6.34 | Higher |

Benacadie – Non tidal

| **Wetland Functions or Other Attributes:** | Function Score (Normalised) | Function Rating | Benefits Score (Normalised) | Benefits Rating |
|---|---|---|---|---|
| Water Storage & Delay (WS) | 1.32 | Lower | 2.82 | Lower |
| Stream Flow Support (SFS) | 3.17 | Moderate | 5.27 | Moderate |
| Water Cooling (WC) | 6.35 | Higher | 10.00 | Higher |
| Sediment Retention & Stabilisation (SR) | 3.69 | Lower | 9.30 | Higher |
| Phosphorus Retention (PR) | 1.84 | Lower | 8.30 | Higher |
| Nitrate Removal & Retention (NR) | 3.75 | Moderate | 10.00 | Higher |
| Carbon Sequestration (CS) | 0.72 | Lower | | |
| Organic Nutrient Export (OE) | 7.61 | Higher | | |
| Anadromous Fish Habitat (FA) | 10.00 | Higher | 10.00 | Higher |
| Resident Fish Habitat (FR) | 10.00 | Higher | 10.00 | Higher |
| Aquatic Invertebrate Habitat (INV) | 10.00 | Higher | 10.00 | Higher |
| Amphibian & Turtle Habitat (AM) | 8.83 | Higher | 6.49 | Higher |
| Waterbird Feeding Habitat (WBF) | 8.58 | Higher | 10.00 | Higher |
| Waterbird Nesting Habitat (WBN) | 9.77 | Higher | 10.00 | Higher |
| Songbird, Raptor, & Mammal Habitat (SBM) | 6.13 | Moderate | 10.00 | Higher |
| Pollinator Habitat (POL) | 7.39 | Moderate | 10.00 | Higher |
| Native Plant Habitat (PH) | 6.22 | Higher | 10.00 | Higher |
| Public Use & Recognition (PU) | | | 8.70 | Higher |
| Wetland Sensitivity (Sens) | | | 4.08 | Moderate |
| Wetland Ecological Condition (EC) | | | 7.54 | Higher |
| Wetland Stressors (STR) (higher score means more stress) | | | 10.00 | Higher |
| **Summary Ratings for Grouped Functions:** | | | | |
| HYDROLOGIC Group (WS) | 1.32 | Lower | 2.82 | Lower |
| WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS) | 3.42 | Lower | 9.60 | Higher |
| AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC) | 8.39 | Higher | 9.21 | Higher |
| AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN) | 9.72 | Higher | 9.65 | Higher |
| TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL) | 6.99 | Moderate | 10.00 | Higher |
| WETLAND CONDITION (EC) | | | 7.54 | Higher |
| WETLAND RISK (average of Sensitivity & Stressors) | | | 7.04 | Higher |

Stott's – Nontidal

| Wetland Functions or Other Attributes: | Function Score (Normalised) | Function Rating | Benefits Score (Normalised) | Benefits Rating |
|---|---|---|---|---|
| Water Storage & Delay (WS) | 1.37 | Lower | 9.87 | Higher |
| Stream Flow Support (SFS) | 3.17 | Moderate | 10.00 | Higher |
| Water Cooling (WC) | 2.79 | Moderate | 10.00 | Higher |
| Sediment Retention & Stabilisation (SR) | 2.70 | Lower | 8.73 | Higher |
| Phosphorus Retention (PR) | 1.36 | Lower | 8.30 | Higher |
| Nitrate Removal & Retention (NR) | 3.11 | Moderate | 10.00 | Higher |
| Carbon Sequestration (CS) | 0.64 | Lower | | |
| Organic Nutrient Export (OE) | 6.10 | Moderate | | |
| Anadromous Fish Habitat (FA) | 6.36 | Higher | 10.00 | Higher |
| Resident Fish Habitat (FR) | 8.24 | Higher | 10.00 | Higher |
| Aquatic Invertebrate Habitat (INV) | 5.81 | Higher | 6.72 | Higher |
| Amphibian & Turtle Habitat (AM) | 8.88 | Higher | 3.85 | Moderate |
| Waterbird Feeding Habitat (WBF) | 7.48 | Higher | 10.00 | Higher |
| Waterbird Nesting Habitat (WBN) | 8.74 | Higher | 10.00 | Higher |
| Songbird, Raptor, & Mammal Habitat (SBM) | 0.00 | Lower | 0.00 | Lower |
| Pollinator Habitat (POL) | 0.00 | Lower | 0.00 | Lower |
| Native Plant Habitat (PH) | 3.43 | Moderate | 3.33 | Lower |
| Public Use & Recognition (PU) | | | 8.99 | Higher |
| Wetland Sensitivity (Sens) | | | 3.98 | Moderate |
| Wetland Ecological Condition (EC) | | | 5.36 | Moderate |
| Wetland Stressors (STR) (higher score means more stress) | | | 10.00 | Higher |
| **Summary Ratings for Grouped Functions:** | | | | |
| HYDROLOGIC Group (WS) | 1.37 | Lower | 9.87 | Higher |
| WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS) | 2.75 | Lower | 9.51 | Higher |
| AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC) | 5.28 | Moderate | 9.45 | Higher |
| AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN) | 8.41 | Higher | 9.38 | Higher |
| TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL) | 2.28 | Moderate | 2.22 | Lower |
| WETLAND CONDITION (EC) | | | 5.36 | Moderate |
| WETLAND RISK (average of Sensitivity & Stressors) | | | 6.99 | Higher |

East Bay – Nontidal

| **Wetland Functions or Other Attributes:** | Function Score (Normalised) | Function Rating | Benefits Score (Normalised) | Benefits Rating |
|---|---|---|---|---|
| Water Storage & Delay (WS) | 2.39 | Lower | 0.00 | Lower |
| Stream Flow Support (SFS) | 2.28 | Moderate | 3.92 | Moderate |
| Water Cooling (WC) | 2.79 | Moderate | 2.59 | Moderate |
| Sediment Retention & Stabilisation (SR) | 2.46 | Lower | 7.84 | Higher |
| Phosphorus Retention (PR) | 1.78 | Lower | 7.29 | Higher |
| Nitrate Removal & Retention (NR) | 2.12 | Lower | 10.00 | Higher |
| Carbon Sequestration (CS) | 1.86 | Lower | | |
| Organic Nutrient Export (OE) | 4.74 | Moderate | | |
| Anadromous Fish Habitat (FA) | 7.37 | Higher | 8.57 | Higher |
| Resident Fish Habitat (FR) | 8.80 | Higher | 8.38 | Higher |
| Aquatic Invertebrate Habitat (INV) | 5.73 | Higher | 7.69 | Higher |
| Amphibian & Turtle Habitat (AM) | 9.53 | Higher | 10.00 | Higher |
| Waterbird Feeding Habitat (WBF) | 8.99 | Higher | 10.00 | Higher |
| Waterbird Nesting Habitat (WBN) | 9.46 | Higher | 10.00 | Higher |
| Songbird, Raptor, & Mammal Habitat (SBM) | 0.00 | Lower | 0.00 | Lower |
| Pollinator Habitat (POL) | 0.00 | Lower | 0.00 | Lower |
| Native Plant Habitat (PH) | 1.85 | Lower | 3.33 | Lower |
| Public Use & Recognition (PU) | | | 7.90 | Higher |
| Wetland Sensitivity (Sens) | | | 4.64 | Moderate |
| Wetland Ecological Condition (EC) | | | 1.88 | Lower |
| Wetland Stressors (STR) (higher score means more stress) | | | 6.01 | Moderate |
| **Summary Ratings for Grouped Functions:** | | | | |
| HYDROLOGIC Group (WS) | 2.39 | Lower | 0.00 | Lower |
| WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS) | 2.29 | Lower | 9.19 | Higher |
| AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC) | 4.81 | Moderate | 6.21 | Higher |
| AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN) | 9.18 | Higher | 9.70 | Higher |
| TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL) | 1.23 | Moderate | 2.22 | Lower |
| WETLAND CONDITION (EC) | | | 1.88 | Lower |
| WETLAND RISK (average of Sensitivity & Stressors) | | | 5.33 | Moderate |

Big Beach 1 – Nontidal

| **Wetland Functions or Other Attributes:** | Function Score (Normalised) | Function Rating | Benefits Score (Normalised) | Benefits Rating |
|---|---|---|---|---|
| Water Storage & Delay (WS) | 1.68 | Lower | 0.11 | Lower |
| Stream Flow Support (SFS) | 1.93 | Moderate | 4.33 | Moderate |
| Water Cooling (WC) | 3.92 | Moderate | 2.36 | Moderate |
| Sediment Retention & Stabilisation (SR) | 2.43 | Lower | 8.03 | Higher |
| Phosphorus Retention (PR) | 1.25 | Lower | 7.29 | Higher |
| Nitrate Removal & Retention (NR) | 2.38 | Moderate | 10.00 | Higher |
| Carbon Sequestration (CS) | 2.31 | Lower | | |
| Organic Nutrient Export (OE) | 7.37 | Higher | | |
| Anadromous Fish Habitat (FA) | 6.02 | Higher | 6.31 | Higher |
| Resident Fish Habitat (FR) | 9.11 | Higher | 6.41 | Higher |
| Aquatic Invertebrate Habitat (INV) | 9.96 | Higher | 7.52 | Higher |
| Amphibian & Turtle Habitat (AM) | 9.36 | Higher | 4.27 | Moderate |
| Waterbird Feeding Habitat (WBF) | 8.77 | Higher | 10.00 | Higher |
| Waterbird Nesting Habitat (WBN) | 10.00 | Higher | 10.00 | Higher |
| Songbird, Raptor, & Mammal Habitat (SBM) | 0.00 | Lower | 0.00 | Lower |
| Pollinator Habitat (POL) | 0.00 | Lower | 0.00 | Lower |
| Native Plant Habitat (PH) | 4.17 | Moderate | 10.00 | Higher |
| Public Use & Recognition (PU) | | | 6.92 | Higher |
| Wetland Sensitivity (Sens) | | | 4.40 | Moderate |
| Wetland Ecological Condition (EC) | | | 4.78 | Moderate |
| Wetland Stressors (STR) (higher score means more stress) | | | 7.21 | Higher |
| **Summary Ratings for Grouped Functions:** | | | | |
| HYDROLOGIC Group (WS) | 1.68 | Lower | 0.11 | Lower |
| WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS) | 2.23 | Lower | 9.22 | Higher |
| AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC) | 7.87 | Higher | 6.13 | Higher |
| AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN) | 9.33 | Higher | 8.70 | Higher |
| TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL) | 2.78 | Moderate | 6.67 | Moderate |
| WETLAND CONDITION (EC) | | | 4.78 | Moderate |
| WETLAND RISK (average of Sensitivity & Stressors) | | | 5.80 | Higher |

Big Beach 2 – Nontidal

| Wetland Functions or Other Attributes: | Function Score (Normalised) | Function Rating | Benefits Score (Normalised) | Benefits Rating |
|---|---|---|---|---|
| Water Storage & Delay (WS) | 6.16 | Moderate | 0.06 | Lower |
| Stream Flow Support (SFS) | 0.00 | Lower | 0.00 | Lower |
| Water Cooling (WC) | 4.33 | Moderate | 0.00 | Lower |
| Sediment Retention & Stabilisation (SR) | 10.00 | Higher | 1.13 | Moderate |
| Phosphorus Retention (PR) | 10.00 | Higher | 1.29 | Moderate |
| Nitrate Removal & Retention (NR) | 10.00 | Higher | 5.00 | Moderate |
| Carbon Sequestration (CS) | 4.96 | Moderate | | |
| Organic Nutrient Export (OE) | 4.79 | Moderate | | |
| Anadromous Fish Habitat (FA) | 0.00 | Lower | 0.00 | Lower |
| Resident Fish Habitat (FR) | 7.80 | Higher | 5.50 | Higher |
| Aquatic Invertebrate Habitat (INV) | 10.00 | Higher | 7.90 | Higher |
| Amphibian & Turtle Habitat (AM) | 9.77 | Higher | 6.66 | Higher |
| Waterbird Feeding Habitat (WBF) | 9.40 | Higher | 10.00 | Higher |
| Waterbird Nesting Habitat (WBN) | 10.00 | Higher | 10.00 | Higher |
| Songbird, Raptor, & Mammal Habitat (SBM) | 5.86 | Moderate | 10.00 | Higher |
| Pollinator Habitat (POL) | 8.27 | Higher | 10.00 | Higher |
| Native Plant Habitat (PH) | 3.52 | Moderate | 10.00 | Higher |
| Public Use & Recognition (PU) | | | 7.86 | Higher |
| Wetland Sensitivity (Sens) | | | 5.10 | Moderate |
| Wetland Ecological Condition (EC) | | | 5.65 | Moderate |
| Wetland Stressors (STR) (higher score means more stress) | | | 5.97 | Moderate |
| **Summary Ratings for Grouped Functions:** | | | | |
| HYDROLOGIC Group (WS) | 6.16 | Moderate | 0.06 | Lower |
| WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS) | 10.00 | Higher | 3.74 | Moderate |
| AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC) | 7.39 | Higher | 5.27 | Higher |
| AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN) | 8.70 | Higher | 8.22 | Higher |
| TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL) | 7.08 | Moderate | 10.00 | Higher |
| WETLAND CONDITION (EC) | | | 5.65 | Moderate |
| WETLAND RISK (average of Sensitivity & Stressors) | | | 5.53 | Moderate |

## 3.7 Winter Creel Survey

The purpose of this survey was to collect information on winter fish and other wildlife species and fishing activity in Bras d'Or Lake barachois ponds. The information collected will add to our knowledge on what fish and wildlife species use the ponds and their socio-cultural value to Cape Breton. The data will be combined with other MEK and field data to provide an overall picture of the biodiversity and use of the ponds.

**Methods**

A survey was developed and distributed using Survey Monkey to collect information on fish, wildlife and fishing activity in barachois ponds over the winter. Requests for participation, with a link to the survey, were circulated throughout the Mi'kmaq and non-native fisher community via UINR's Facebook page, as well as through Word of Mouth via fishery guardians, local fishing groups and other partners. The requests included a description of what a barachois pond is (and is not), as well as a photo example. Respondents were entered into a draw for a $50 gift certificate for each entry submitted. Each entry referred to an individual pond so respondents could submit multiple entries for different ponds.

**Results**

Twelve different respondents submitted a total of 17 entries, of which four were excluded for not pertaining to barachois areas in the Bras d'Or Lake. From the 13 remaining entries, eight separate pond areas were identified (Figure 5). Castle Bay Pond [3] and Big Pond in Barrachois Harbour [4]) each had more than one entry.


Figure 5: Map of Sites Identified by Respondents

***Residency of Respondents***

More than half (62.5%) of respondents indicated they lived within the Bras d'Or Lake watershed, the remaining 37.5% indicated they lived elsewhere in the Cape Breton Regional Municipality. Of the respondents who lived in the watershed, all fished at ponds in/near the community in which they resided. The respondents who lived outside the area travelled from approximately 20 to 65 km to reach the fishing sites.

***Fishing Activity***
The majority of respondents visited the same specific pond multiple times over the winter, with 61.5% saying they returned at least five times (Figure 6). All of the respondents had fished the same site in previous winters, with more than 30% having fished the same site for more than 10 years. All but two sites were considered popular spots for winter fishing.

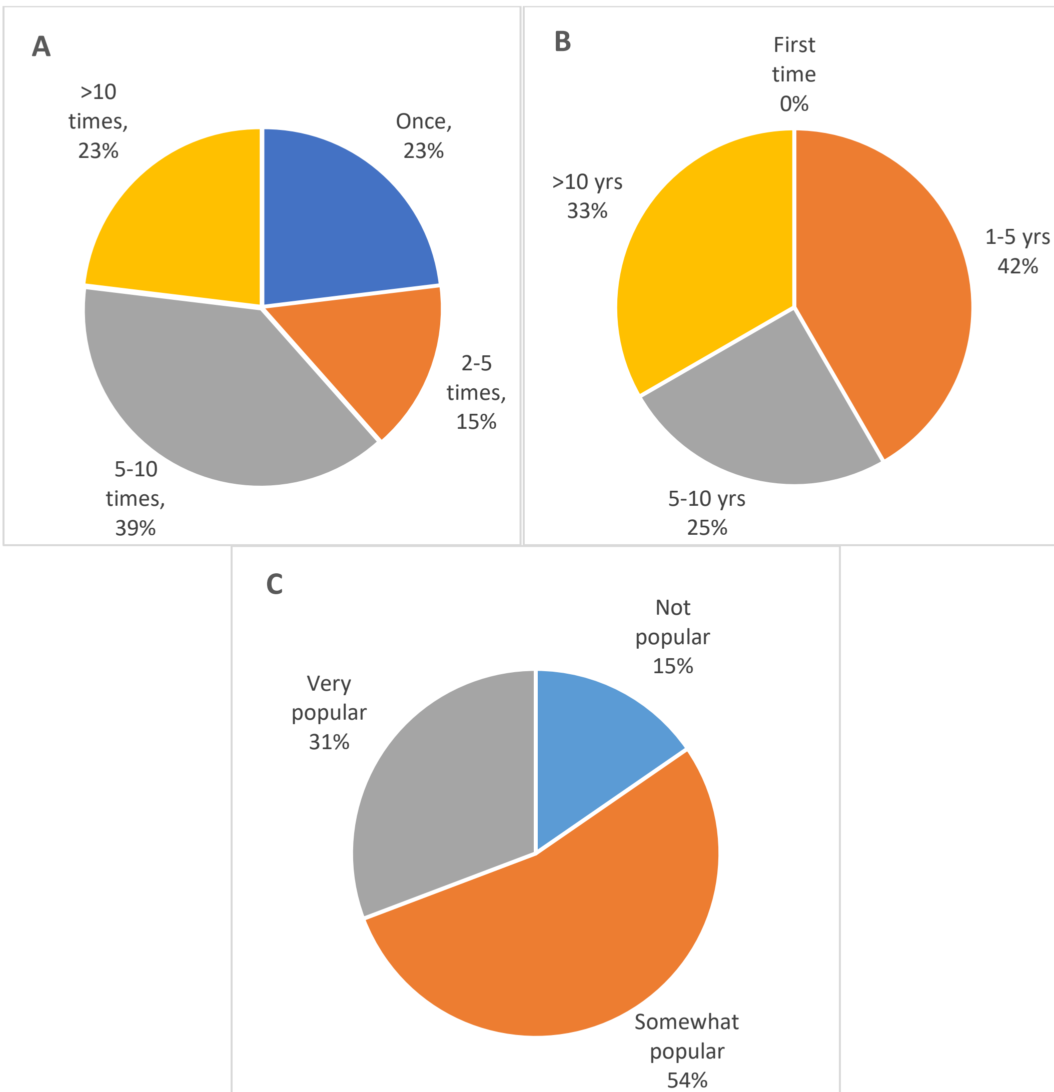



Figure 6: Respondents responses to survey questions: a) How often have you fished this pond this winter?; b) How many winters have you fished this pond?; c) How popular is this spot for winter fishing?

***Fish and Wildlife Species***

Table 1 lists the fish and wildlife species respondents observed at each site, as well as the changes they had observed over the years of fishing that site. Fifteen fish species were reported having either been caught or seen at the ponds during the winter. Speckled trout and rainbow smelt were reported at all sites. Rainbow trout and brown trout were the next most frequently reported, at six and five sites, respectively, followed by tomcod, white perch and silversides. Atlantic salmon were reported being caught at /big Pond-Barrachois Harbour. One respondent commented that striped bass and Atlantic cod had disappeared from a few sites; however, the same respondent also reported having caught those species at those sites this winter. While this appears contradictory it may simply imply that the species had declined significantly from previous years. Eels were only reported at two sites in this survey; however, this may more reflect the type and interest of the fishers who responded than the presence of eels. MEK research and personal communications with local fishers indicate that eels are known to overwinter in barachois ponds and ponds are popular spots for winter eel fishing (MEK, draft). All respondents reported catching speckled trout and 62.5% reporting brown trout and/or rainbow trout (Figure 7). Rainbow smelt were also popular, reported by 87.5% of respondents. All other species were reported by less than 40% (three) of the respondents. Respondents noted changes in the fish communities over the years (increase/decrease in particular species); however, the nature of which differed between ponds, with no apparent pattern.

Sixteen wildlife species were reported, many of which were common to most ponds. Eagles were reported at all but one pond. Other commonly reported species were deer, coyote, crow, muskrat and fox. One respondent reported bobcat tracks at Big Pond-Barrachois Harbour.

Fish and Wildlife Species Reported by Respondents being caught or seen in winter 2018/19, as well as observed changes over time.

| *Site* | *What fish species have you caught/seen or know of others having caught at this pond this winter?* | | *What other wildlife have you seen at this pond this winter?* | | *What changes have you observed in catch over that time?* |
|---|---|---|---|---|---|
| *Big Pond, Barrachois Harbour* | Speckled trout<br>Brown trout<br>Rainbow trout<br>Rainbow smelt<br>Atlantic salmon<br>Atlantic tomcod | American eel<br>White perch<br>Striped bass<br>White hake<br>Atlantic silverside<br>Flatfish | Deer<br>Bobcat tracks<br>Weasel<br>Muskrat<br>Beaver<br>Coyote tracks<br>Rabbits<br>Fox | Crow<br>Ducks<br>Eagle | • More smelt this year<br>• More what seem to be wild rainbow; More bigger browns; Still some adult salmon around; Less striped bass this year and last compared to previous 4 years; Less shiners in this one particular cove than last year<br>• Striped bass have disappeared from Barrachois |
| *Lochmore Harbour* | Speckled trout<br>Brown trout<br>Rainbow trout<br>Rainbow smelt | Atlantic tomcod<br>Cod<br>Flounder | | Eagle<br>Crow | • Atlantic cod have disappeared; smelts are low in numbers |
| *Fishers Pond, Little narrows* | Speckled trout<br>Rainbow trout | Rainbow smelt | Fox | Crow<br>Eagle | • A lot of rainbow trout in the pond |
| *Castle Bay Pond* | Speckled trout<br>Brown trout<br>Rainbow trout<br>Rainbow smelt<br>Atlantic tomcod | American eel<br>White perch<br>Flounder (winter)<br>Atlantic silverside | Fox<br>Mink<br>Rabbit<br>Muskrat<br>Deer | Eagle<br>Crow<br>Seagull<br>Geese<br>All kinds of small shore birds | • 2018 winter there was a lack of all species<br>• Less brown trout now and more smelt, the bar on the eastern side of the barachois has opened due to erosion and looks soon to be permanently opened. The size of speckled trout has always been the same with a few big ones around. |
| *Ben Eoin* | Speckled trout<br>Brown trout<br>Rainbow trout<br>Rainbow smelt<br>Atlantic tomcod | American eel<br>Cod<br>Sticklebacks<br>Flounder<br>Atlantic silverside | Fox<br>Coyote<br>Deer<br>Weasel | Crow<br>Raven<br>Eagle | • Atlantic cod disappeared 20 years ago |
| *Pooles Pond, Whycocomagh* | Speckled trout<br>Brown trout | Rainbow smelt<br>Tiger trout | Deer<br>Fox | Crow<br>Eagle | • Rainbow trout are smaller this year |

| | | | | | |
|---|---|---|---|---|---|
| | Rainbow trout | | | Raven<br>Seagull | |
| *Amaguadees Pond* | Speckled trout | Rainbow smelt | | Geese | n/a |
| *Piper's Cove, Alba* | Speckled trout<br>Rainbow smelt | Atlantic silverside<br>Sticklebacks | Coyote<br>Rabbit | Eagle<br>Deer | • Always a good catch of smelt, put back a lot of trout over the years always big healthy fish |

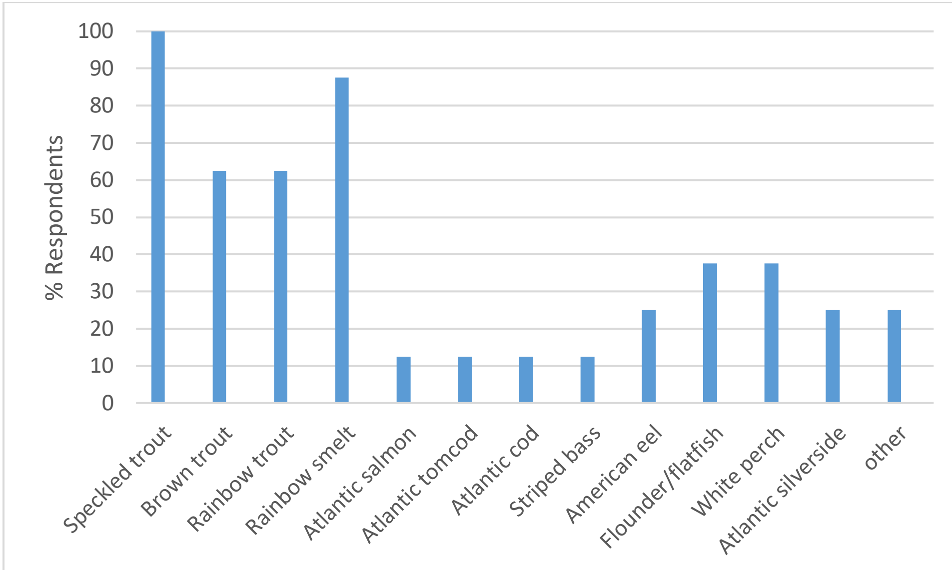



Figure 7: Percentage of respondents reporting each fish species

**Summary**

This small initial survey provides supplemental information to our MEK and field studies on the biodiversity and socio-cultural value of the barachois ponds around the Bras d'Or Lake. Fifteen fish and 16 wildlife species were reported as observed by respondents at the ponds this winter. Despite getting few respondents, the results from this survey, as well as information from the MEK study and UINR staff knowledge, indicate that many ponds are quite popular for winter fishing by both Mi'kmaq and non-indigenous fishers. To recruit more respondents in future, especially from the Mi'kmaq communities, we recommend conducting in person surveys at targeted ponds. The lessons learned from this initial survey has helped us refine our method of delivery for future creel surveys of the Bras d'Or Lake barachois ponds.

## 4.0 Conclusions & Recommendations

Monthly fish surveys took place at each of the 6 pond locations beginning in early June and ending in early November. The number of fish species caught varied between ponds and mostly consisted of mummichogs, killifish, grass shrimp, sand shrimp, three-spine stickleback, four-spine stickleback, green crabs and cunner. Perch, blackspotted stickleback, nine-spine stickleback, winter flounder, smooth flounder, Atlantic silversides, brook trout, tomcod, mussels, pipefish, rock gunnel, eel, rock crab, lion's mane jellyfish and moon jellyfish were also found at least once. The only eel found was at Big Beach 1 pond. In the one freshwater pond (Big Beach 2) there were only tadpoles, giant water beetles, and killifish caught.

In an attempt to catch larger or different fish species, a fyke net was placed one time in each of the ponds (except for Big Beach 2). The fyke net did not catch any different fish species and we felt that the minnow and green crab traps were sufficient so the fyke net was not used again.

Physical data such as surrounding land use/habitat, existing land use/disturbances, potential pollution sources, wetland types on site, inflowing streams were recorded at each site. There was evidence of human use and/or development at each of the 6 sites and this was also documented on field sheets along with other information including but not limited to vegetation cover type, features (e.g. rock, woody debris, macrophytes and undercut banks), aquatic plant species and their relative abundance. Using opening measurements taken at the beginning of the assessment, it was apparent that the opening to Big Beach 1 pond had obviously been altered prior to one of the site visits. It appeared as though an ATV had been used to close the opening of the pond to allow access to the remaining beach that led to Big Beach 2 pond. The remaining pond barriers and openings did not show any evidence of human alteration.

Aquatic vegetation was observed and documented from shorelines, using a kayak and GoPro camera or from a Zodiac boat using an underwater viewer.  Samples of aquatic vegetation was collected and taken to lab for identification. Prior to aquatic vegetation surveys, a training session was arranged with aquatic plant and algae expert Dr. Herb Vandermuel who provided guidance on identification when needed. This proved very useful because in the beginning, we found both freshwater and saltwater plants (e.g. *Stuckenia pectinata* and *Ruppia maritima*) cohabiting the same ponds, often growing together and we thought our aquatic plant identifications were incorrect. The intertidal habitats outside of the ponds (in the Bras d'Or Lake) remained constant between sites and was comprised of various seaweeds and marine algae, the most abundant being eel grass, knotweed, common rockweed, Irish moss, sea lettuce, tangle weed and cord weed.

Water quality parameters were measured at each of the six ponds using a YSI probe, and were measured monthly.  Monthly water sample analysis was done in three of the ponds (Benacadie, East Bay and Big Beach 1) twice during the monitoring season, in July and again in September. The water sample analysis was done by Maxxam Analytics and parameters such as nitrate/nitrite, ammonium, phosphorous and chlorophyll a were measured and reported and fell within accepted water quality ranges for aquatic life. Nitrates, phosphates, metals were not detected in any of the samples. Preliminary examination of these results indicates good overall health of the ponds but additional testing should be done to see if the results change.

Data loggers were placed in 3 of the ponds (Benacadie, East Bay and Big Beach 1) in late June and removed in early November. These loggers recorded water level, salinity and temperatures at 4 hour intervals. The data was downloaded once in August and again when the loggers were removed in November. The data loggers only record data at a single location in the pond and may not reflect the temperature, depth and salinity variability in the ponds.

During each visit throughout the monitoring season, a YSI probe was used to collect single point measurements near the opening of each pond. During one visit, the Zodiac was deployed in order to gather measurements from different parts of the pond that were not accessible without a boat (a kayak was used for Big Beach 2 as there was no way to get the Zodiac into the pond). Turbidity using a Secchi disk was measured from the center of each pond. The Secchi disk proved difficult to use in Big Pond and Benacadie due to flow of water through the pond but approximate measurements were still able to be recorded.

The information collected in this detailed study will be used as baseline data for future work and monitoring of barachois ponds in and around the Bras d'Or Lake. Further analysis on the data collected will be done over the 2019 Winter months in order to provide a more accurate representation of the importance barachois ponds play in the overall health of the Bras d'Or Lake. The data collected over the 2018 monitoring season does show that there is a wide variety of plants, animals, fish and aquatic life that live in and around these ponds. It is also evident that these wetlands are very dynamic and are always changing. Two of our ponds studied changed dramatically with one being blown open and reconnected to the Bras d'Or Lake as a result of a very strong storm surge and another was closed off also as a result of a storm surge. Continued monitoring needs to be done to determine what impact factors such as climate change will have on these valuable ecosystems.

## 5.0 Literature Cited


Adamus, P.R. 2016. Manual for the Wetland Ecosystem Services Protocol (WESP). people.oregonstate.edu/~adamusp

Atlantic Canada Conservation Data Centre. 2015. Nova Scotia - All Taxa. Retrieved: April 2018.

Denny, S. no date. Mi'kmaq Ecological Knowledge Workshop Report: Barachois Ponds. Unama'ki Institute of Natural Resources.

Hatcher, A. 2015. Closing Knowledge gaps for Bras d'Or Lakes Ecosystem Management Planning. Barachois Progress Report. Hatcher Research Associates.

Kennish, M.J. and Paerl, H.W. 2010. Coastal Lagoons Critical Habitats of Environmental Change. In: Kennish, M.J. and Paerl, H.W. (Eds.). Coastal Lagoons: Critical Habitats of Environmental Change (Marine Science Series), CRC Press, Boca Raton, 1-16.

National Wetlands Working Group. 1997. The Canadian Wetland Classification System. Second Edition. Wetlands Research Centre, University of Waterloo. Waterloo, ON.

Province of Nova Scotia. 2011. Nova Scotia Wetland Conservation Policy.

Taylor, R. B. and Shaw, J. 2002. Coastal character and coastal barrier evolution in the Bras d'Or Lakes, Nova Scotia. Proceedings of the Nova Scotia Institute of Science 42(1): 149-181.