# REVISIONS HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Notes/Revisions</th>
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<tr>
<td>Water Management Plan</td>
<td>December 2014</td>
<td>All Sections: Spelling and grammar. Section 2.1: Correction to Water Treatment Plant Bullet, reference to potable water treatment plant updated to state temporary water treatment plant. Section 2.1.1: Updated to include water quality control. Section 2.1.3: Updated to include water quality control. Section 2.1.6: Clarification that independent geotechnical inspection carried out by design engineer. Section 2.1.8 and Section 3.2: Liner “keyed” replace to state “tied into freeze thaw resistant bedrock and mineral soils” Section 2.1.9 Figure 2-1: Updated Figure 2-1 (Water Balance) to include water quality control line. Section 2.5 Table 2-3: Updated Table 2-3 (Water Balance Estimates) to include water quality control. Section 2.1.3: Statement regarding recycled water for use in dust suppression was added. Section 2.1.9: Table 2-1 was updated to provide the linkage between the water treatment process and water licence discharge criteria for the interlock system. Section 2.1.9: Figure 2-1 was updated to include the data source “Q8 = Q6 + Q7”. Section 2.8.1: Table 2-4 was updated to include SNP 02-18. Section 2.8.1: Updated to reflect recent MVLWB extension compliance dates to January 2017. Section 3.3.2: Action Level exceedances notification to the Board. Section 3.3.3: Update to be consistent with MV2011L2-0004 Part G, item 9 specifically 30 day notification to MVLWB and Inspector.</td>
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<tr>
<td>Extended Care and Maintenance Water Management Plan V.1</td>
<td>April 2016</td>
<td>All Sections: The Extended Care and Maintenance Water Management Plan has been updated to reflect the proposed flooded condition at Snap Lake Mine and update organizational structures. This is considered an addendum to the previously provided Water Management Plan.</td>
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<td>All Sections: The Extended Care and Maintenance Water Management Plan has been updated to address remote monitoring and final closure. Section 2.1.5: Updated to reflect changes to the STP to an activated sludge treatment system. Section 2.1.9: Updated to reflect changes to the WTP system related to care and maintenance.</td>
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<td>All Sections: The Extended Care and Maintenance Water Management Plan has been updated to address remote monitoring and final closure. Section 2.1.5: Updated to reflect changes to the STP to an activated sludge treatment system. Section 2.1.9 Updated to reflect changes to the WTP system related to care and maintenance. Section 2.1.9 Description of the anticipated supplemental water treatment system, including treatment process, target contaminants and expected treatment efficiency. All Sections: Accounting for current and future expectations. Section 2.6.1.4 Sump maintenance, critical flow ditches and monitoring actions. All Sections: References to other sections in this version of the Plan reflect actual content within the Plan.</td>
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<tr>
<td>Version 4</td>
<td>March 2019</td>
<td>All Sections: Plan has been updated to align with the Final Closure Plan and water licence application package.</td>
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ACRONYMS AND ABBREVIATIONS

EAR  Environmental Assessment Report
Non-PAG  Not potentially acid generating
PAG  Potentially acid generating
PK Processed kimberlite
PKC  Processed kimberlite containment
PWCS  Perimeter water control structures
PWTP  Potable water treatment plant
PS  Perimeter sump
SBR  Sequencing batch reactor
SNP  Surveillance network program
STP  Sewage treatment plan
TWTP  Temporary water treatment plan
TSS  Total suspended solids
WMP  Water management pond
WTP  Water treatment plan

UNITS OF MEASURE

m  metre
m³  cubic metres
m³/d  cubic metres per day
mg/L  milligrams per litre
Mt  mega tonne
t  tonne
1. INTRODUCTION

The Snap Lake Mine (the Mine) is a former underground diamond mine owned and operated by De Beers Canada Inc. (De Beers). It is located about 220 kilometres northeast of Yellowknife in the Northwest Territories. The Snap Lake Mine operated from 2008 to 2015. In December of 2015, De Beers ceased diamond mining operations and put the Mine into a temporary closure phase called Care and Maintenance. Throughout 2016 De Beers explored options for the future of the Mine. These options included a) reopening the Mine, b) further optimization of care and maintenance, c) sale to a qualified operator, or d) final closure of the Mine. De Beers elected not to reopen the mine and did not find a qualified buyer. At the beginning of 2017 the underground workings of the Mine were allowed to flood with water. Care and Maintenance activities have generally been limited to maintenance of buildings and facilities, progressive reclamation of the North Pile, monitoring and compliance, and preparations for closure.

In December of 2017, De Beers announced its plan to put the Snap Lake Mine into final closure. During the 2018 calendar year, De Beers prepared a Final Closure Plan and updated all the environmental monitoring and management plans to align with plans for final closure of the Mine. These management plans, including this Water Management Plan are submitted as part of the water licence renewal process required by the Mackenzie Valley Land and Water Board. The entire package of environmental monitoring and management plans are designed to describe the activities at the Mine during closure and Post-Closure phases of the mine life.

In September of 2018 De Beers temporarily closed the camp and related facilities for the winter and began a period of zero occupancy. Remote monitoring and surveillance has continued during this time with a particular focus on all waste and water storage facilities. De Beers has continued to meet the terms and conditions of the water licence and land use permit as well as all approved environmental monitoring and management plans during the extended care and maintenance period. Activities at the Mine are now conducted on a seasonal or campaign basis. The Mine will maintain cycles of zero occupancy and seasonal camp occupancy based on planned site activities until the demolition phase of closure is reached.

It is assumed that the Closure phase begins upon approval of the Final Closure and Reclamation Plan and issuance of the renewed water licence. The Post-Closure phase begins when active management of the Mine has ceased and activities are predominantly limited to monitoring.

1.1 Purpose

The purpose of the Snap Lake Mine Water Management Plan (the Plan) is to describe activities related to water management at Snap Lake Mine during the remaining phases of the mine closure and Post-Closure. The purpose of the closure water management system(s) is to collect, contain, and control the release of water at the Mine (inclusive of an extreme event).

1.2 Objective

The overall goal of water management at Snap Lake Mine is to ensure that water is managed in such a way that the water in Snap Lake remains safe to drink and the fish remain safe to eat. De Beers will continue to manage site water so as to minimize the impacts from the Mine on the surrounding environment.
1.3 Overview

Water management at the Mine has changed significantly since diamond mining operations ceased. During diamond mining operations, a large volume of water was pumped from the underground to the surface for release to Snap Lake. This mine water was relatively high in total dissolved solids and total suspended solids and therefore had to be treated prior to discharge. Now that the underground is flooded, there is no longer a need to pump mine water to the surface. Water management is simplified greatly.

The remaining sources of managed water on the mine site include:

- the North Pile (i.e. seepage water);
- water intake from the North-eastern arm of Snap Lake; and
- surface runoff (from precipitation).

These water sources will be managed to ensure compliance with the new water licence for the upcoming phases of Closure and Post-Closure of the Mine. For the purposes of the Plan, water management is defined as the collection, storage, treatment, recycling, and discharge of water at the mine site, in a safe, efficient, and compliant manner.

The water management system comprises the infrastructure and practices that are designed to manage water quantity and quality. The water management system can be divided into two main parts:

- The site (domestic) water and wastewater facilities; the system contains infrastructure for water supply, potable water treatment and distribution, sewage collection and treatment, and return of treated effluent to Snap Lake; and
- The mine (surface) water facilities; the system contains facilities for collection and conveyance of surface water runoff and seepage from the North Pile, for storage and treatment and for the return of treated effluent to Snap Lake.

The Plan has been developed to include the following sections:

Water and Wastewater Management (Section 2)

- Predicted water balances to describe inflows, internal water transfers, and outflows related to project activities;
- Description of the management of domestic water system components and processes including raw water, potable water treatment, sewage treatment, effluent treatment and discharge; and
- Description of the management of surface water systems components and processes including the passive treatment system that will be constructed as part of closure and the active treatment system that will operate until the passive system is functional.

Monitoring (Section 3)

- Description of the monitoring program for water including a rationale for the components of the Water management system; and,
- Description of the linkages to other monitoring programs.
Description of the Response Framework for the Snap Lake Water Management Systems in closure. The Response Framework links monitoring results to actions with the purpose of maintaining the Assessment Endpoints.
2. WATER AND WASTEWATER MANAGEMENT

2.1 Water Balance

The site water balance provides a basis for design of the water management plan. The water balance describes the quantity of inflow [gains] to the site, the quantity of water conveyed internally within the mine site, and the quantity of outflow [losses] from the site. The water balance has been updated to reflect the flooding of the Snap Lake Mine underground and to predict water quality throughout the closure of Snap Lake.

The North Pile foundation and outer embankments are aggrading permafrost at a quicker rate than predicted during the Environmental Assessment. This increased aggradation of permafrost will lead to reduced volumes and improved quality of seepage water in the coming years. As part of the FCRP De Beers has remodelled water quality from the North Pile under a conservative case. Water may be pumped to and from the underground as necessary to supplement flows or reduce flows being discharged directly into Snap Lake during summer months, however it is anticipated that in the future this may no longer be required once natural discharge achieves effluent quality criteria (EQC) consistently. For the purpose of this water management plan, De Beers provides the Water balance based on estimated timelines for mine closure. These will be optimized by De Beers during execution and will be communicated to the MVLWB as part of the annual reports.

The current base water balance estimates have been provided in Appendix A. Corresponding Schematics showing the locations of water management facilities are provided in Figure 2-1 (Closure) and Figure 2-2 (Post-Closure).

2.1.1 Water Inflows

Water inflows considered in the mine water balance for Closure to Post Closure will include:

- Raw water withdrawn from Snap Lake for domestic use, fire suppression, water quality control for emergency contingencies and industrial water supply;
- Direct precipitation to mine facilities; and
- Runoff to mine facilities from adjacent catchments.

Should it be necessary, De Beers will retain the ability to obtain water from underground workings as a contingency to ensure water licence compliance. The maximum amount of fresh water to be drawn from Snap Lake is not to exceed 188,000 m³/year. De Beers expects to withdraw 100-800 m³/day during periods of occupancy, for the purposes described above, while ensuring the maximum extraction volume is not exceeded as well as staying below the maximum extraction velocity of 156.1 L/s, as per De Beers’ DFO authorizations. Precipitation and runoff managed by the mine water management facilities will vary seasonally.
Figure 2-1  Water Balance Schematic Diagram - Closure
Note for Reviewers: Sump 3 becomes the East Influent Storage Pond and flows into the East wetland system (if constructed). Sump 5 becomes the west influent storage pond and flows into the West wetland system (if constructed).
2.1.2 Water Outflows

Water outflows considered in the mine water balance include:

- Water discharged to Snap Lake;
- Water used for dust suppression;
- Losses to groundwater seepage from water management facilities and the North Pile;
- Losses to evaporation from water management facilities; and,
- Water discharged to the underground.

The approximate amount of recycled water used for dust suppression is estimated to be 30-350 m$^3$/d, during months when road surfaces are dry and unfrozen. The approximate amount of treated domestic water to be discharged to Snap Lake during the closure program is estimated to be 200 m$^3$/d after treatment from the domestic systems. It will be scaled accordingly based on staffing levels throughout Closure. The amount of treated surface water to be discharged to Snap Lake will be limited to seasonal discharge.

2.2 Water Management System Components

Water management facilities at the Mine include both site (domestic) water and mine (surface) water oriented facilities.

Site (domestic) water systems includes:

- Raw water supply system;
- Potable Water Treatment Plant (PWTP); and
- Sewage Treatment Plant (STP).

Mine (surface) water systems includes:

- North Pile Perimeter Water Control Structures;
- Influent Storage Ponds (ISP);
- Constructed Wetlands;
- Water Management Pond (WMP);
- Water Treatment Plant;
- Underground Water Return System; and
- Diffuser.
2.2.1 Site (Domestic) Water System

2.2.1.1 Raw Water Supply System

Raw water and fire suppression water supply is withdrawn from Snap Lake at the raw water intake. Fresh water is withdrawn from the northwest arm of Snap Lake via a submerged intake line. The pump and screen at the raw water intake meets the Department of Fisheries and Oceans (DFO) 1995 criteria for the combined water withdrawal rate for fire suppression and domestic potable water use. As per the DFO policy intake screens are cleaned every two years. A habitat compensation plan was finalized with DFO Yellowknife for the habitat affected by the installation of the water intake embankment. This fisheries authorization is now closed.

Fresh water will be used for:
- potable water supply;
- fire suppression;
- dust suppression; and
- water quality control (only upon approval from the Inspector and MVLWB).

Water for fire suppression will be drawn directly from Snap Lake and distributed through a pressured system. De Beers primarily uses recycled water for dust suppression activities on site however, in the event of poor water quality or inadequate supply, raw water would be used. The use of Snap Lake water will continue to be used as a contingency measure in the event that it is not possible to use recycled water.

A single intake pipe is used for domestic potable water use (daily use), water quality control and for fire suppression (rare event). The peak domestic water withdrawal rate will be 800 m³/d (approximately 9.25 L/s) and the peak fire suppression withdrawal rate will be 12,960 m³/d (150 L/s) for a maximum total of 188,000 m³/year while not exceeding the maximum withdrawal rate of 156.1 L/s (DFO authorization). Consumption rates used in the model provide peak domestic water use, and will be reported annually in the water licence annual report. Due to staffing levels being varied throughout the Closure period, the 2015 operational actual values have been carried forward in the Water Balance as conservative estimates.

2.2.1.2 Potable Water Treatment Plant

Raw water is pumped from Snap Lake by overland pipeline to the Potable Water Treatment Plant. Water is treated with Ultra-Violet light for disinfection, chlorinated and stored in a storage tank in the Potable Water Treatment Plant. Treated water is piped to areas requiring potable water. Domestic water is supplied to camp through a standard piping system.

2.2.1.3 Sewage Treatment Plant

Sewage is collected from camp through a standard piping network. Sewage Treatment is conducted via an Activated Sludge Treatment plant with one C9 external membrane designed for a maximum capacity of 135 m³/d. The Sewage Treatment Plant is a modular, mobile design which allows for relocation as required. It contains membranes, automatic pre-filters, a membrane feed pump, and a membrane circulation pump.
At the final stage of the sewage treatment process, liquid that meets discharge criteria set out in the De Beers Water License MV2011L2-0004 is decanted as effluent and either pumped to the Water Management Pond and onwards to the Water Treatment Plant prior to release to Snap Lake, to an approved on-land sump, to the Influent Storage pond once it is established, or directly to Snap Lake if EQCs are met.

The operational parameters are listed below:

<table>
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<th>Parameters</th>
<th>Value</th>
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<td>Average Daily Permeate Flow</td>
<td>135 m³/d</td>
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<tr>
<td>Maximum Operating Temperature</td>
<td>30°C</td>
</tr>
<tr>
<td>Minimum Operating Temperature</td>
<td>4°C</td>
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<tr>
<td>Bioreactor TSS – Minimum</td>
<td>3,000 mg/L (ppm)</td>
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<tr>
<td>Bioreactor TSS – Optimal Operational Range</td>
<td>10,000 mg/L (ppm)</td>
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<td>Membrane Inlet Pressure</td>
<td>448,175 – 517,125 pa</td>
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<td>Membrane Outlet Pressure</td>
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<td>Maximum Membrane Inlet Pressure</td>
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<tr>
<td>Minimum Concentrate Flow Rate Per Train</td>
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<tr>
<td>Permeate Flow Rate Per Train</td>
<td>6.1 m³/hr</td>
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The sewage treatment plant includes phosphorus removal as part of an overall water management strategy to meet the total phosphorus loading limit set out in the Water License. Alum and caustic soda will be added to control total phosphorus (TP) level and pH adjustment in the effluent. Existing chemical storage and metering pump system will be used. Alum dosage will be manually set to minimum chemical usage while keeping TP under 1 ppm. Caustic soda dosage will be manually set to minimum chemical usage while keeping pH above 6.5. Management of sewage treatment is linked with the Aquatic Effects Monitoring Plan, as one component of the monitoring is to evaluate the effects of nutrients from the mine on productivity within Snap Lake.

Solids produced during sewage treatment are caked and pressed in the filter press to remove additional water. Dewatered solids are bagged and will be disposed of in the landfill. The landfill is covered to prevent the spread of debris, while any runoff from the landfill reports to the sumps in the same manner as seepage from the North Pile.

### 2.2.2 Mine (Surface) Water System

The Snap Lake Mine will transition from an active water treatment system to a passive water treatment system during Closure. Because both the passive treatment and active treatment systems will be in operation during Closure, both are described herein.

Two passive treatment systems (PTS), a west passive treatment system (WPTS) and an east passive treatment system (EPTS), will be constructed as part of Closure activities. Each PTS includes several components including the North Pile Perimeter Water Control Structures, an influent storage pond and a...
constructed wetland and spillway to passively discharge water to Snap Lake. Each component is described below. Further detail on the design is provided in the North Pile Passive Treatment Systems Detail Design (Golder, 2019).

The Active Treatment System which will be phased out as part of closure, includes the sumps and ditches that collect seepage and runoff water at the North Pile, the water management pond, the water treatment plant, the underground water return system and the diffuser. Each component is described below.

### 2.2.2.1 North Pile Perimeter Water Control Structures

The design objective of the North Pile Perimeter Water Control Structures (PWCS), comprising ditches and sumps, is to collect surface water runoff and internal seepage from the North Pile. These structures will be modified from their current design to the closure design as part of closure activities.

Currently, ditches intercept and route surface water runoff and internal seepage from the North Pile to the sumps. The sumps provide for collection prior to pumping to the WMP. The ditch flow direction is based on ground surface topography to provide gravity flow to the sumps. The water collected in the sumps is then actively pumped to the WMP and on to the water treatment plant. This system requires active management (pumping) and therefore is not suitable for continuation into closure. The ditches and sumps will be modified to facilitate passive flow of water as part of closure activities.

In closure, the ditches and sumps will be modified to passively direct seepage and runoff water from the North Pile to two influent storage ponds as per Figure 2-3 and Figure 2-4. The runoff and seepage will be controlled to prevent it from reporting to the downstream environment until it achieves EQCs. Two passive influent storage ponds (Section 2.2.2.77) will be constructed to store this water prior to flow through the passive wetlands (Section 2.2.2.8).

Should the monitoring of the sumps indicate that water quality does not require treatment in closure, De Beers will use the emergency spillways as discharge points. Should this come to realization De Beers will notify the MVLWB of this modification to design. Until relinquishment, the North Pile PWCS will be inspected annually by an independent geotechnical engineer (design engineer) to assess performance.

### 2.2.2.2 Influent Storage Ponds

Two influent storage ponds (ISP) will be constructed to store water collected in the PCWS. The East influent storage pond will replace the former Sump 3 and the West Influent storage pond will replace the former Sump 5. The purpose of the influent storage ponds is to store the volume of water from one open water season (1:200 flood event) to equalize seasonal flows and concentrations prior to flow through the passive wetlands.

The East influent storage pond will direct water to the East constructed wetland which will drain passively via a spillway to the Main Basin of Snap Lake. The West influent storage pond will direct water to the West constructed wetland which will drain passively via a spillway to the northwest arm of Snap Lake (FCRP Appendix L.2).

Should water quality within the ISPs meet the EQCs, the passive wetlands will not be constructed and the emergency discharge locations for both ISPs will be modified for direct discharge into the environment.
Figure 2-3 Water Conveyance at Snap Lake Mine Post Closure
Figure 2-4   Passive Water Flow at Snap Lake Mine Post-Closure
2.2.2.3 Constructed Wetlands

Two constructed wetlands (East and West) are planned to passively convey water and treat nitrate in water conveyed from the respective influent storage ponds to Snap Lake. These wetlands will only be constructed should water quality continue to require treatment prior to discharge into the environment. Both constructed wetlands will be designed to treat nitrate to 25 mg/L at the point of final discharge.

It is acknowledged that there is uncertainty associated with how quickly the constructed wetlands will mature and establish. To address this, construction of the ISPs is planned at the start of Closure. If monitoring indicates further water treatment is not necessary then the wetlands may not be constructed. It is anticipated that at least one year of monitoring post construction of the ISPs will occur prior to wetland construction to assist in making this determination.

The constructed wetland portion will be built, if required, early on in Closure. This will allow for a period of testing and validation prior to initiating full demolition of the site. During the early years following wetland construction, prior to establishment of sufficient vegetation, it is possible that passively treated water will not meet the EQC for discharge. In years where EQC are not met, water will either be re-circulated through the ISP and wetland to allow for longer treatment duration, or transferred to the water treatment facility for active treatment prior to discharge to Snap Lake. Complete engineering details are provided within the North Pile Passive Treatment Systems Detail Design submitted with the Final Closure Plan (Appendix L.2).

2.2.2.4 Water Management Pond

The WMP was created by two dams that were constructed in 2000. The dams consist of a rock fill embankment supporting an 80-mil textured HDPE liner on the upstream side. The liner is tied into the underlying intact bedrock (using a mixture of sand and powdered bentonite) and compacted into a key trench to minimize the seepage beneath the dams. Suitable granular bedding and cover layers were placed on either side of the liners. Small seepage losses from the WMP are expected and were scoped during the Environmental Assessment for the project.

The existing WMP will continue to be used to collect surface runoff and drainage from the North Pile with subsequent water treatment at the WTP or direct discharge to underground until such time as influent storage ponds are constructed. As part of closure, the WMP will be integrated into the East constructed wetland.

2.2.2.5 Water Treatment Plant

The Water Treatment Plant will continue to be used during Closure to actively treat and discharge water as required to meet EQCs. The Water Treatment Plant includes several sub-components including the RO module, the freshet flocculation tank, various sumps, tanks and piping networks. Modifications within the Plant may be made from time to time as required to improve efficiency within the Plant while ensuring the water quality objectives are met. The treatment system will be available for use until such time that the performance of the passive treatment wetlands has been validated or until drainage and runoff from the North Pile no longer requires treatment prior to discharge.
Water that does not meet EQC will be directed to the water treatment plant. If the discharge rate is less than 4,000 m$^3$/day, water will be directed to the underground using an existing pipeline, and as deep as can practically be achieved; if the discharge rate is more than 4,000 m$^3$/day, treated water will be discharged to Snap Lake via the submersed diffuser or spillway. When the water treatment plant is used, the residuals will be pumped to the underground.

The Water Treatment Plant is equipped with instrumentation for continuous monitoring of effluent flow rate, ammonia, pH, temperature, conductivity and turbidity, in accordance with the requirements of the Water Licence. Water will be managed throughout Site in order to ensure discharge quality criteria are met.

Upon the completion of construction of the two influent storage ponds (ISPs), De Beers will maintain the water treatment system (or an alternative) to ensure compliance with EQCs. Active treatment of water will cease only once the efficacy of passive treatment, via the ISPs, and if required the constructed wetlands, has been established or water is of sufficient quality to be directly discharged into the environment.

2.2.2.6 Underground Water Return System

De Beers will retain the ability to pump surface water underground to limit the amount of water discharged into the environment. A water pumping system has been established that has the capacity to pump water to the lowest practical level of the mine, as surface water (water that is impacted from mine residues present in the Processed Kimberlite Facility) will have a higher density compared to the water at the top of the mine. The water in the underground workings of the mine, will be of similar quality to that of Snap Lake. The source of water entering the Snap Lake Mine underground is ~98% from Snap Lake Mine. As such, stratification will occur in the lowest levels of the underground mine. Due to the nature of the Snap Lake Mine Underground, the upper levels of the mine will be buffered from turbulent flow (limited to seasonal discharge) associated with the pumping of surface water underground, allowing for the stabilization of the chemocline.

Over time it is anticipated that surface water quality around the reclaimed Snap Lake Mine Site will return to acceptable levels allowing for the direct discharge of mine (surface) water into Snap Lake or following treatment in the passive treatment system. The underground pumping system therefore provides flexibility in water management throughout closure.

2.2.2.7 Diffuser

The water outfalls are currently located on the eastern shoreline of the peninsula. The area affected by the outfalls includes part of a constructed shoreline embankment and a submerged area to approximately 24 m in water depth (2 locations at approximately 12m each). The submerged pipelines are weighted down near the lake bottom and cover an area of approximately 125 m out from the shore. At the end of the pipelines, there is a 60 m long diffuser structure with five evenly spaced outlet ports. During early Closure, water will be directed to maximize effluent mixing in the near field environment.

Note that the pipelines do not lie on the substrate of the lake but rather are weighted to sit slightly above the substrate. Once Water Treatment is no longer required both diffusers will be disconnected, filled with inert pre-cast concrete and left in place to ensure the system does not cause any damage to the artificial reefs constructed as per the DFO authorization.
2.3 Freshet Management Processes

The Mine is frozen for much of the year. The annual cycle of water management begins with spring melt (freshet) when the accumulated snow and ice from the winter melts. This melt water is collected in the water control structures described previously. Because much of the flow occurs during freshet, this section provides additional detail on the specific processes for water management during freshet. The purpose of freshet management is to provide a clear description of the steps that must be followed daily as well as during an emergency event, for consistency between personnel and for the understanding of new employees to the team.

The following sections highlight the water management processes that will be undertaken during Freshet to manage the seasonal flows.

2.3.1 Managing Freshet at the North Pile

As described above in Section 2.2.2.1, water captured by the North Pile PWCS is currently pumped to the Water Management Pond (WMP). There are currently five permanent sumps (SP1, SP2, SP3, SP4 and SP5), three water collection/diversion ditches (IL6 Ditch, West Ditch, SP3-SP4 Ditch) and the WMP. The purpose of the sumps is to capture water draining off and through the North Pile, and then pump to the WMP.

During events such as the annual freshet, it is often necessary to maintain water storage in the sumps below the design maximum liquid level; however this is required only on a short term temporary basis. To prepare for freshet, water is often pumped out of the sumps to ensure each sump has sufficient capacity remaining to contain the freshet inflows expected. The determination as to whether or not this is required is made each year depending on water levels within the sumps, snowpack, and pumping capacity. This type of active management of sumps during freshet is not sustainable for a closed mine. The re-design of the North Pile PWCP will allow for gravity drainage into large influent storage ponds, therefore eliminating the need for proactive pumping out of sumps ahead of freshet.

The main objective of the North Pile surface water management structures in closure is to allow gravity collection and conveyance of North Pile Drainage (seepage and runoff) primarily to the ISP’s and to the passive treatment facilities (if required) or direct discharge into the environment via spillways from the ISP’s.

Two design events were considered for the detailed design of the North Pile Closure Water Management Structures:

- Environmental Design Flood (EDF): 200-year 24-hour precipitation or snowmelt; and
- Inflow Design Flood (IDF): 24-hour probable maximum precipitation or snowmelt.

The water management design developed to meet the above criteria includes the following infrastructure:

- Swales to collect runoff from the closure cover of the North Pile;
- Outlet channels constructed down the east and west embankments of the North Pile to convey runoff from the top surface of the North Pile, considering the detailed design of the closure cover, and direct it into the passive treatment system;
• Perimeter channels constructed along the north and south of the North Pile to collect seepage and runoff from the North Pile and direct it into the passive treatment system;

• A channel through the West Cell Divider Dyke to prevent ponding of water behind the dyke and direct drainage to the passive treatment system on the west side of the North Pile; and

• Passive treatment systems to reduce concentrations of the key parameter of concern (nitrate) prior to discharge to Snap Lake.

The layout and closure modifications are provided in the FCRP design documentation with summary flow patterns provided in Figure 2-3 and Figure 2-4 within this Water Management Plan.

2.3.2 Freshet Flocculation Tank – Auxiliary Treatment

The Freshet flocculation tank is an auxiliary component of the water treatment plant. This 400 cubic metre settling tank was installed in 2013 in order to assist with settling of suspended solids in mine water prior to discharge. This settling tank is available for use during Freshet to aid in turbidity control by pre-treating and settling high turbidity water before it enters the WMP. The main objective of this flocculation tank is to ensure that there is no hindrance to pumping from the WMP to the WTP due to turbidity issues.

2.3.3 Ice Management

De Beers will maintain sumps as necessary prior to freshet including the maintenance of infrastructure such as pumps, pipelines, and generators. Ice accumulation in sumps requires action, as ice reduces the available storage volume and puts upstream water management at risk. Water and ice must both be managed in sumps, whether by pumping or excavating. Sump icing is to be monitored prior to freshet. Ice formation in the sumps will be monitored either visually or remotely during winter and such results will be shared with the Engineer of Record to determine appropriate action to be taken. Ice formation will also be monitored in the critical flow ditches which need to remain clear for water management.

Once the North Pile PWCS is modified to allow for passive collection and conveyance of water from the North Pile to the influent storage ponds, ice will no longer be actively managed.

2.3.4 IL6 Ditch

The primary purpose of IL6 Ditch is to capture runoff flow from the tundra between the temporary sump 4 (previously known as TS4) and IL6 Ditch during freshet. The IL6 Ditch directs any captured flow into IL6 and this area is monitored, pumped, and de-iced if required. IL6 will be modified in closure and will form part of the influent storage pond as shown in Figure 2-3 and Figure 2-4.
3. MONITORING

The Water Management Plan will incorporate all necessary measures and procedures to comply with the requirements of the Water License.

De Beers monitors water quality and quantity within the water management system for the following purposes:

- to identify any changes to water quality and quantity that may require management response; and
- to identify the potential for Mine-related effects on water quality in the receiving environment.

Water quality and quantity monitoring within the site is conducted through the Surveillance Network Program (SNP). The downstream is monitored via the Aquatic Effects Monitoring Program (AEMP). The AEMP is described fully within the Aquatic Effects Design Plan (Golder, 2019), and therefore will not be discussed in detail herein. The SNP program is described below.

3.1 Surveillance Network Program

The Surveillance Network Program (SNP) has been designed to monitor inflows and outflows at the site during the Closure and Post-Closure phases in the life of the mine. A summary table of the proposed SNP stations for closure and Post-Closure is provided below (Table 3-1). A longer, more detailed table of all SNP stations found in the current water licence (MV2011L2-0004), and all stations proposed for the next water license are provided in Appendix B. Specific tables are also provided within Appendix B for each SNP station listed in the current water licence. For those stations that are recommended to be eliminated from the next water licence, rationale is provided to support that recommendation. For those stations that are recommended to be retained in the next licence, the station description, location, sampling frequency, sampling parameters, rationale, and status are provided similar to the format of the current water licence.

Table 3-1 Proposed SNP stations in Closure and Post-Closure

<table>
<thead>
<tr>
<th>SNP station #</th>
<th>Description</th>
<th>Closure</th>
<th>Post-Closure</th>
</tr>
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<tbody>
<tr>
<td>02-02</td>
<td>North Pile drainage collection ditch north of Water Management Pond</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>02-02b</td>
<td>East Influent Storage Pond</td>
<td>Active</td>
<td>Active</td>
</tr>
<tr>
<td>02-02c</td>
<td>West Influent Storage Pond</td>
<td>Active</td>
<td>Active</td>
</tr>
<tr>
<td>02-14</td>
<td>Water Management Pond (stilling well near the pumphouse)</td>
<td>Active</td>
<td>Inactive</td>
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<tr>
<td>02-15</td>
<td>Water Intake from Snap Lake</td>
<td>Active</td>
<td>Inactive</td>
</tr>
<tr>
<td>02-16j</td>
<td>Sewage effluent from Sewage Treatment Plant, prior to mixing with Water Treatment Plant effluent</td>
<td>Active</td>
<td>Inactive</td>
</tr>
</tbody>
</table>
SNAP LAKE MINE
Water Management Plan V.4

SNP station # | Description | Closure | Post-Closure
---|---|---|---
02-17b | Final Combined Water Treatment Plant and Sewage Treatment Plant effluent that is discharged via a diffuser into Snap Lake. Under normal conditions 02-17b is used which measures the permanent water treatment plant. | Active | Inactive
02-17c | Discharge from East Passive wetland system to Snap Lake | Inactive | Active
02-17d | Discharge from West Passive wetland system to Snap Lake | Inactive | Active
02-20d | In Snap Lake, one of four stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser | Active | Inactive
02-20g | In Snap Lake, one of four stations located in a radius of 120 degrees at 200 meters from the diffuser, on the edge of the mixing zone around the diffuser | Active | Inactive
SNP 02-20h,i | Mixing Zone Stations (from East Passive Wetland) within Snap Lake | Inactive | Active
SNP 02-20j,k | Mixing Zone Stations (from West Passive Wetland) within Snap Lake | Inactive | Active

### 3.2 Adaptive Management

De Beers has taken an adaptive management approach for all aspects of site operations, including water management. Action levels have been defined where applicable in order to facilitate clear and decisive decision points to correct issues early. For each action level, there are defined management responses. For water management, the action levels are the effluent quality criteria.

At each step in the process of water management, De Beers will determine, through testing, whether water quality meets or doesn’t meet the water licence EQC. If water quality meets EQC, it will be discharged. If it doesn’t, it will either be discharged to the underground, or will be subject to further treatment. As described in the sections above, active treatment will remain the primary method for treating water at Snap Lake until such time as treatment is not required or the passive treatment system is functional. During periods where components of the water management system remain under construction or are not yet fully functional, De Beers will continue to rely on existing systems to ensure water meets EQC prior to discharge. For example, while the passive wetlands are under construction, De Beers will maintain the water treatment plant to actively treat water; while the influent storage ponds are under construction, De Beers will maintain the Water Management Pond to collect water prior to treatment or discharge. In this way, the system will ensure a level of redundancy adequate to meet the EQC and remain in compliance with the water licence.

During Post-Closure, the options for adaptive management are somewhat reduced. There will no longer be an active treatment option as the water management plant will be removed from site. Although an active treatment option will no longer exist, the risk of an exceedance, is also reduced. Water quality at site will improve over time and the performance of the constructed wetlands will also improve over time. The risk of an exceedance large enough to cause an environmental effect during the Post-Closure period is considered to be negligible. There are nonetheless several management responses that could be exercised during Post-Closure, depending on the issue (Table 3-2). De Beers will monitor discharge water from the constructed wetlands during Post-Closure, as per the SNP. Should monitoring indicate that EQC are not
achieved at the discharge point, De Beers will implement one or more of the following defined actions: notify the inspector, conduct additional monitoring, investigate the cause of the non-conformance, identification of appropriate mitigation measures, implementation of mitigation as required.

Table 3-2  Water Management Action Levels for Closure and Post-Closure

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<thead>
<tr>
<th>Phase</th>
<th>Action level</th>
<th>Management Response</th>
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<td>Closure</td>
<td>Water quality does not meet EQC</td>
<td>• Active treatment</td>
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<td>• Passive treatment</td>
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<td></td>
<td>• Discharge to the underground</td>
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<tr>
<td>Post-Closure</td>
<td>Water quality at discharge location does not meet EQC</td>
<td>• Notify Inspector</td>
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<td></td>
<td>• Additional monitoring</td>
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<td></td>
<td></td>
<td>• Investigation of cause</td>
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<td>• Identification and implementation of appropriate mitigation measures</td>
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</table>

As in any adaptive management system, monitoring is the key to success. De Beers will continue to monitor water inputs and outputs as per the water licence requirements and respond appropriately.

The general process for adaptive decision making regarding water management during Closure and Post-Closure is illustrated in Figure 3-1 below. Figure 3-1 illustrates how decisions will be made during the transition period from active to passive treatment. The active treatment system components of the water management system which are illustrated in Figure 3-2. The passive treatment system components which will be operational in Post-Closure are provided in Figure 3-3. The transition from active to passive treatment will take place during Closure.
Figure 3-1  Water Management Decision Tree during Transition from Active to Passive Treatment

- North Pit (Surface run-off)
- North Pit (Deepsewage)
- Particular Water Control Structures
- Influent Storage Ponds / Water Management Pond
- SNP O2-02
- SNP O2-02,etc.

Decision Point
- Treatment Process
- Water Influx
- Water Discharge Point
- Water Management Component

SNP Station
- Active flow (pumping)
- Gravity flow
- Contingency pumping

SNP = Surveillance Network Program
EQC = Effluent Quality Criteria
SL = Snap Lake
UG = Underground
WTP = Water Treatment Plant
Figure 3-2  Active Water Treatment System prior to Establishment of Passive Treatment in Closure
Figure 3-3 Passive Water Treatment System Applicable during the Post-Closure Period

- Passive Water Treatment System
- Influent Storage Ponds
- North Pile (Surface runoff)
- North Pile (Seepage)
- Permeable water control structures
- Does not Meet EQC
- Meets EQC
- Constructed wetlands
- Passively Treat
- Discharge to SL (via spillway)
- SNP 02-02a
- SNP 02-02b
- SNP 02-02c

Decision Point:
- Treatment Process
- Water Inputs
- Water Discharge Point
- Water Management Component

SNP = Surveillance Network Program
EQC = Efficient Quality Criteria
SL = Snap Lake
US = Underground
WTP = Waste Treatment Plant
4. REFERENCES


APPENDIX A  CURRENT MONTHLY BASE WATER BALANCE ESTIMATES
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|------------|-------------|-----|----------|------------------|-----------|---------------------------------|------------------|----------------|-------------------------------|--------------------------|-------------------------------|---------|----|---|----|---|----|---|---|---|---|---|---|---|---|-----------|------|---------|
| March 2019 | 0.000        | 7.0 | 7.0      | 20.0             | 5.0       | 100.0                           | 50.0             | 0.5            | 500.0                         | 100.0                     | 500.0                          | 1.0     | 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5| 0.5         | 0.5  | 0.5     |</p>
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<td>Value 15</td>
<td>Value 16</td>
</tr>
<tr>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
<td>Value 5</td>
<td>Value 6</td>
<td>Value 7</td>
<td>Value 8</td>
<td>Value 9</td>
<td>Value 10</td>
<td>Value 11</td>
<td>Value 12</td>
<td>Value 13</td>
<td>Value 14</td>
<td>Value 15</td>
<td>Value 16</td>
</tr>
<tr>
<td>Value 1</td>
<td>Value 2</td>
<td>Value 3</td>
<td>Value 4</td>
<td>Value 5</td>
<td>Value 6</td>
<td>Value 7</td>
<td>Value 8</td>
<td>Value 9</td>
<td>Value 10</td>
<td>Value 11</td>
<td>Value 12</td>
<td>Value 13</td>
<td>Value 14</td>
<td>Value 15</td>
<td>Value 16</td>
</tr>
</tbody>
</table>

**De Beers Group**
APPENDIX B  SURVEILLANCE NETWORK STATIONS PROPOSED FOR INCLUSION/EXCLUSION IN THE SNAP LAKE CLOSURE WATER LICENCE
### SNP Station Summary Table

<table>
<thead>
<tr>
<th>Station</th>
<th>Description</th>
<th>ECM</th>
<th>Closure</th>
<th>Post-Closure</th>
<th>Recommendation for New Water Licence</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNP 02-01</td>
<td>Final Mine water collection Sump, underground</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-02</td>
<td>North Pile Drainage collection ditch north of Water Management Pond</td>
<td>Active</td>
<td>Active</td>
<td>Inactive</td>
<td>Retain</td>
</tr>
<tr>
<td>SNP 02-02b</td>
<td>East Influent Storage Pond</td>
<td>Inactive</td>
<td>Active</td>
<td>Active</td>
<td>Create</td>
</tr>
<tr>
<td>SNP 02-02c</td>
<td>West Influent Storage Pond</td>
<td>Inactive</td>
<td>Active</td>
<td>Active</td>
<td>Create</td>
</tr>
<tr>
<td>SNP 02-03</td>
<td>Core facilities area collection ditch east of the centre of the water management pond</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-04.1</td>
<td>Uncontrolled surface runoff at culvert on north side of center of airstrip;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-04.2</td>
<td>Uncontrolled surface runoff at culvert on north side of western end of airstrip;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-04.3</td>
<td>Uncontrolled surface runoff at culvert on north side of airstrip</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-05</td>
<td>Uncontrolled surface runoff at Bulk Sample Mine Rock Pad</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-06</td>
<td>Uncontrolled surface runoff at Quarry Site on south side of North Pile</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-07.1</td>
<td>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond downstream of explosive magazine;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-07.2</td>
<td>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west of small AN Pad;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-07.3</td>
<td>Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west side of small AN Pad;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-08</td>
<td>Uncontrolled surface runoff at Winter Access Road</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-09.1</td>
<td>Uncontrolled surface runoff and standing water at Emulsion Plant Area; pond north of Bulk Emulsion Ammonium Nitrate Pad;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-09.2</td>
<td>Pond downslope and north-northeast from Ammonium Nitrate Pad;</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>Station</td>
<td>Description</td>
<td>ECM</td>
<td>Closure</td>
<td>Post-Closure</td>
<td>Recommendation for New Water Licence</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>--------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>SNP 02-09.3</td>
<td>Downslope from SNP station 02-09</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-09.4</td>
<td>Base of Ammonium Nitrate Pad Sump, south of Ammonium Nitrate Pad</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-09.5</td>
<td>Pond downslope of Ammonium Nitrate Pad</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-10</td>
<td>Any other points where observable flow to Snap Lake or Inland Lake 5 (IL5) is observed.</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-11</td>
<td>Seepage monitoring well down gradient from Water Management Pond Dam 1, near Snap Lake shoreline</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-12</td>
<td>Seepage monitoring well down gradient from Water Management Pond Dam 1</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-13</td>
<td>Seepage monitoring well down gradient from Water Management Pond Dam 2</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-14</td>
<td>Water Management Pond</td>
<td>Active</td>
<td>Active</td>
<td>Inactive</td>
<td>Retain</td>
</tr>
<tr>
<td>SNP 02-15</td>
<td>Water Intake from Snap Lake</td>
<td>Active</td>
<td>Active</td>
<td>Inactive</td>
<td>Retain</td>
</tr>
<tr>
<td>SNP 02-16j</td>
<td>Sewage Treatment Plant Effluent</td>
<td>Active</td>
<td>Active</td>
<td>Inactive</td>
<td>Retain</td>
</tr>
<tr>
<td>SNP 02-17</td>
<td>Final Combined Water Treatment Plant and Sewage Treatment Plant Effluent discharged via diffuser into Snap Lake</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-17b</td>
<td>Final Combined Water Treatment Plant and Sewage Treatment Plant Effluent</td>
<td>Active</td>
<td>Active</td>
<td>Inactive</td>
<td>Retain</td>
</tr>
<tr>
<td>SNP 02-17c</td>
<td>Discharge from East Passive wetland system to Snap Lake</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Active</td>
<td>Create</td>
</tr>
<tr>
<td>SNP 02-17d</td>
<td>Discharge from West Passive wetland system to Snap Lake</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Active</td>
<td>Create</td>
</tr>
<tr>
<td>SNP 02-18</td>
<td>Monitoring stations in the main basin of Snap Lake used to calculate a whole lake average concentration of TDS</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-19</td>
<td>Sewage discharge from the temporary Sewage Disposal Facility</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-20defg</td>
<td>Mixing Zone Stations (from Diffuser) within Snap Lake</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Retain 2 of 4</td>
</tr>
<tr>
<td>Station</td>
<td>Description</td>
<td>ECM</td>
<td>Closure</td>
<td>Post-Closure</td>
<td>Recommendation for New Water Licence</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------</td>
<td>---------</td>
<td>--------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>SNP 02-20h,i</td>
<td>Mixing Zone Stations (from East Passive Wetland) within Snap Lake</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Active</td>
<td>Create</td>
</tr>
<tr>
<td>SNP 02-20j,k</td>
<td>Mixing Zone Stations (from West Passive Wetland) within Snap Lake</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Active</td>
<td>Create</td>
</tr>
<tr>
<td>SNP 02-21</td>
<td>Outflow from Snap Lake flowing into the Lockhart River System</td>
<td>Active</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-22</td>
<td>Diffuser construction</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-23</td>
<td>Water intake construction</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td>SNP 02-24</td>
<td>Snap Lake sites in close proximity to fisheries compensation works.</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Inactive</td>
<td>Eliminate</td>
</tr>
<tr>
<td></td>
<td>Corresponds to AEMP stations SNAP05, and SNAP29 (Water intake)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SNP 02-01: Final Mine water collection Sump, underground

**Station Description:**
This was an in-line station used to monitor underground mine water as it was pumped to the surface.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
Recommend eliminating this station as water is no longer pumped from the underground mine to the surface.

### SNP 02-02: North Pile Drainage collection ditch north of Water Management Pond

**Station Description:**
North Pile drainage collection ditch north of Water Management Pond

**Location:**
N 7052663, E 0506400

<table>
<thead>
<tr>
<th>Sampling Frequency</th>
<th>Location</th>
<th>Sampling Parameters</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuously by in-line monitoring during pumping operations</td>
<td>N 7052663, E 0506400</td>
<td>Flow, temperature, pH, conductivity, turbidity</td>
<td>Closure monitoring to evaluate the quantity and quality of seepage and runoff coming from the North Pile Facility. Discontinue during Post-Closure because sump will be allowed to flow into passive wetland.</td>
</tr>
<tr>
<td>Every two weeks when pumping</td>
<td></td>
<td>Turbidity, TSS, pH, conductivity, major ions¹, nutrients², ICP-MS scan³ (total and dissolved), BTEX⁴</td>
<td></td>
</tr>
</tbody>
</table>

**Summary of Changes:**
Retain this station. Recommend retaining the same frequency of monitoring of physical parameters (continuously during pumping operations). Recommend eliminating the weekly monitoring of TSS and turbidity during freshet and heavy rainfall events. Recommend adjusting the frequency of sampling during Closure to every 14 days when pumping. Recommend removing specific metals (e.g., total mercury and arsenic) from the parameter list. Recommend removing extractable petroleum hydrocarbons from the parameter list. Discontinue monitoring of this station during Post-Closure as active pumping will not occur during Post-Closure.

**Detailed Rationale to Support Changes:**
This station is used to monitor site water which is destined for further settling in either the water management pond (current) or in the west influent storage pond (future). TSS and turbidity will be reduced in either of those storage areas prior to the water being released to Snap Lake. There is no utility in measuring those parameters prior to this settling stage or at a higher frequency than other parameters. Monitoring chemistry every two weeks when pumping will be adequate to understand the water quality of seepage water during closure. Specific metals (e.g., total mercury and arsenic) should not be individually listed in the water licence as they are included in the ICP-MS metals scan. Hydrocarbons should be removed as levels are extremely low. All 2018 hydrocarbon data at this station were non-detectable. The very few detectable historical values obtained from this station were all close to the detection limit. Monitoring during Post-Closure is not necessary as there is no active pumping or management of the water; water will drain passively to the passive wetland.
### SNP 02-02b: East Influent Storage Pond
### SNP 02-02c: West Influent Storage Pond

**Station Description:**
East and West Influent Storage Ponds

**Location:**

<table>
<thead>
<tr>
<th>Sampling Frequency</th>
<th>East and West Influent Storage Ponds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once annually</td>
<td>Monthly during discharge</td>
</tr>
</tbody>
</table>

**Sampling Parameters:**
- Turbidity, TSS, pH, conductivity, major ions¹, nutrients², ICP-MS scan³ (total and dissolved), temperature, TDS
- Elevation (masl) to calculate Volume (m³)

**Rationale:** Closure monitoring to evaluate the quantity and quality of seepage and runoff coming from the North Pile Facility and collected in the influent storage ponds.

**Status:** Active once water is routed from the North Pile drainage ditches to these ponds

**Summary of Changes:**
Create these stations. Monitor water quality and volume.

**Detailed Rationale to Support Changes:**
These stations will be used to monitor site water prior to treatment in the passive wetlands. Taking measures of water quality prior to passive treatment to assist in understanding the efficacy of the passive treatment. Monitoring elevation of water within the ponds will allow for a calculation of volume. Frequency of water quality should be annually. Frequency of elevation should be monthly during discharge.

### SNP 02-03: Core facilities area collection ditch east of the centre of the water management pond

**Station Description:**
This station was used primarily to provide information about the geochemical stability/rate of weathering of the rock used for construction of the site.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
Many years of monitoring during construction and operations have occurred at this site. There is no evidence of acid generation, which was the primary reason for monitoring this site. Additional monitoring for acid generation is not warranted.

### SNP 02-04.1: Uncontrolled surface runoff at culvert on north side of center of airstrip
### SNP 02-04.2: Uncontrolled surface runoff at culvert on north side of western end of airstrip
### SNP 02-04.3: Uncontrolled surface runoff at culvert on north side of airstrip

**Station Description:**
These sites were used to provide information about the geochemical stability/rate of weathering of the rock used for construction of the airstrip as part of the acid rock drainage and geochemical monitoring report.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
Many years of monitoring during construction and operations have occurred at this site. There is no evidence of acid generation, which was the primary reason for monitoring this site. The Acid Rock Drainage and Geochemical Monitoring Program will not be continued into closure. Additional monitoring for acid generation is not warranted at the airstrip.
### SNP 02-05: Uncontrolled surface runoff at Bulk Sample Mine Rock Pad

**Station Description:**
This station was to monitor surface runoff at the Bulk Sample Mine Rock Pad.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
After more than a decade of monitoring, there is no evidence of acid generation. The Acid Rock Drainage and Geochemical Monitoring Program will not be continued into closure. Additional monitoring for acid generation is not warranted.

### SNP 02-06: Uncontrolled surface runoff at Quarry Site on south side of North Pile

**Station Description:**
This station is used to monitor the quality of runoff from the quarry site. The purpose is to monitor for acid rock drainage. Monitoring is twice weekly during freshet or daily during heavy rainfall events if measurable flow is present.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
After more than a decade of monitoring, there is no evidence of acid generation. The Acid Rock Drainage and Geochemical Monitoring Program will not be continued into closure. Additional monitoring for acid generation is not warranted.

### SNP 02-07.1: Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond downstream of explosive magazine

### SNP 02-07.2: Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west of small AN Pad

### SNP 02-07.3: Uncontrolled surface runoff and standing water at Road to Bulk Emulsion Plant, pond west side of small AN Pad

**Station Description:**
These stations are used to monitor uncontrolled surface runoff and standing water to evaluate potential spills of AN from trucks using the road.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
Mining has ceased and bulk AN is no longer transported around the site in large quantities.

### SNP 02-08: Uncontrolled surface runoff at Winter Access Road

**Station Description:**
This station was used to monitor uncontrolled surface at the winter access road

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
There will not be a winter access road in most years, and even on those years when there is, there is no reason to monitor surface runoff. Monitoring of previous winter roads has not resulted in any surface water quality concerns.
| SNP 02-09.1: | Uncontrolled surface runoff and standing water at Emulsion Plant Area; pond north of Bulk Emulsion Ammonium Nitrate Pad |
| SNP 02-09.2: | Pond downslope and north-northeast from Ammonium Nitrate Pad |
| SNP 02-09.3: | Downslope from SNP station 02-09 |
| SNP 02-09.4: | Base of Ammonium Nitrate Pad Sump, south of Ammonium Nitrate Pad |
| SNP 02-09.5: | Pond downslope of Ammonium Nitrate Pad |

**Station Description:**
These stations were used to monitor uncontrolled surface runoff and standing water at the Emulsion Plant to evaluate water quality due to surface runoff over AN, and for acid rock drainage from construction of the pad itself.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
Mining has ceased and bulk AN is no longer processed at the Emulsion Plant. After more than 15 years of monitoring, there is no evidence of acid generation at this site. The Acid Rock Drainage and Geochemical Monitoring Program will not be continued into closure.

| SNP 02-10: | Any other points where observable flow to Snap Lake or Inland Lake 5 (IL5) is observed. |
| **Station Description:** | This station was for general monitoring of runoff wherever it occurs. |
| **Summary of Changes:** | Eliminate this station. |
| **Detailed Rationale to support Changes:** | Patterns of surface runoff at Snap Lake are well established and controlled and well monitored via other SNP stations. |

| SNP 02-11: | Seepage monitoring well down gradient from Water Management Pond Dam 1, near Snap Lake shoreline |
| **Station Description:** | This station was used to evaluate performance of the water management pond dam 1 near the Snap Lake shoreline. |
| **Summary of Changes:** | Eliminate this station. |
| **Detailed Rationale to support Changes:** | The water management pond dam has not shown any indication of concern. This station is unnecessary. Engineered structures including the water management pond and other water retaining dykes at site are inspected by the Engineer of Record on an annual basis. Additional downstream monitoring is not warranted. |

| SNP 02-12: | Seepage monitoring well down gradient from Water Management Pond Dam 1 |
| **Station Description:** | This station was used to evaluate performance of the water management pond dam 1 near the Snap Lake shoreline. |
| **Summary of changes:** | Eliminate this station. |
| **Detailed Rationale to support Changes:** | The water management pond dam has not shown any indication of concern. This station is unnecessary. Engineered structures including the water management pond and other water retaining dykes at site are inspected by the Engineer of Record on an annual basis. Additional downstream monitoring is not warranted. |
### SNP 02-13: Seepage monitoring well down gradient from Water Management Pond Dam 2

**Station Description:**
This station was used to evaluate performance of the water management pond dam 1 near the Snap Lake shoreline.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
The water management pond dam has not shown any indication of concern. This station is unnecessary. Engineered structures including the water management pond and other water retaining dykes at site are inspected by the Engineer of Record on an annual basis. Additional downstream monitoring is not warranted.

---

### SNP 02-14: Water Management Pond

**Station Description:**
Water Management Pond

**Location:**
N 7052620, E 0506480

<table>
<thead>
<tr>
<th>Sampling Frequency</th>
<th>Every two weeks when pumping to the Water Treatment Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>Turbidity, TSS, pH, conductivity, major ions(^1), nutrients(^2), CCMS scan(^3) (total and dissolved), total mercury, total arsenic, extractable petroleum hydrocarbons, BTEX(^4)</td>
</tr>
</tbody>
</table>

| **Rationale:**                           | Closure monitoring to monitor water quality in the water management pond |

**Status:**
Active during closure, inactive during Post-Closure.

**Recommendation:**
Retain this station. No changes recommended for flow. Flow will continue to be monitored continuously during periods of pumping. Recommend that the frequency of monitoring water quality is reduced to every two weeks during periods of pumping. Recommend cessation of the quarterly monitoring requirement.

**Detailed Rationale to Support Recommendation:**
Monitoring chemistry parameters every two weeks basis during periods of active pumping to the water treatment plant will be adequate to understand the water quality in the water management pond ahead of treatment. Additional quarterly monitoring is not warranted. Water management is not active more ¾ of every year. Monitoring during Post-Closure is not necessary as there is no active pumping or management of the water; water will drain passively to the passive wetland.
### SNP 02-15: Water Intake from Snap Lake

**Station Description:**
This station is used to monitor water extracted from Snap Lake for use at the Snap Lake Mine.

**Location:**
N 7053276, E 0506515

<table>
<thead>
<tr>
<th>Sampling Frequency</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly, if extracting water from Snap Lake</td>
<td>N 7053276, E 0506515</td>
</tr>
<tr>
<td>Quarterly, if extracting water from Snap Lake</td>
<td>N 7053276, E 0506515</td>
</tr>
<tr>
<td>Annually, if extracting water from Snap Lake</td>
<td>N 7053276, E 0506515</td>
</tr>
</tbody>
</table>

**Sampling Parameters:**
- *E. coli*, Major Ions, nitrate, TDS (measured and calculated\(^1\)), volume of water intake
- Microbial Pathogens (*Gardia*, *Cryptosporidium*, and total heterotrophic plate count)
- Turbidity, TSS, pH, conductivity, major ions\(^1\), nutrients\(^2\), CCMS scan\(^3\) (total and dissolved), total mercury, total arsenic

**Rationale:**
Closure Monitoring; to evaluate safety of drinking water and amount of water withdrawal.

**Status:**
Active during Closure; inactive during Post-closure.

**Summary of Changes:**
Retain this station. Recommend adding volume of water intake (L).

**Detailed Rationale to support Changes:**
Water will continue to be required to support the Snap Lake Mine Operations, thus volumes and quality will continue to be monitored at this location.

### SNP 02-16: Sewage Treatment Plant Effluent

**Station Description:**
This station is used to monitor grey water discharge from the sewage treatment plant.

**Sampling Frequency:**
- Continuously, by in-line monitoring during periods of operation
- Once every two weeks during pumping operations
- Annually if in operation

**Sampling Parameters:**
- Flow, pH, temperature, conductivity, turbidity
- Biological oxygen demand (BOD), Nutrients\(^2\), Total Oil and Grease, TSS, *E. Coli*, Faecal Coliforms
- CCMS scan\(^3\) (total and dissolved)

**Rationale:**
Closure monitoring: to evaluate whether sewage has been adequately treated before discharge.

**Status:**
Active during Closure; Inactive during Post-Closure.

**Summary of Changes:**
Retain this station. No changes proposed to sampling frequency. Recommend removing specific metals (e.g., total mercury and arsenic) from the parameter list.

**Detailed Rationale to support Changes:**
Specific metals (e.g., total mercury and arsenic) should not be individually listed in the water licence as they are included in the ICP-MS metals scan.
SNP 02-17: Final Combined Water Treatment Plant and Sewage Treatment Plant Effluent discharged via diffuser into Snap Lake

Station Description:
This station is only used if the Temporary Sewage Treatment Plant is operated. Licence says “temporary water treatment plant but there is no temporary water treatment plant, so it is assumed that this was a typo in the licence.

Summary of Changes:
Eliminate this station.

Detailed Rationale to support Changes:
This effluent discharge line still exists but is no longer in use. SNP02-17b is the primary discharge line and will continue to be during closure.

SNP 02-17b: Final Combined Water Treatment Plant and Sewage Treatment Plant Effluent

Station Description: Final Combined Water Treatment Plant and Sewage Treatment Plant effluent that is discharged via a diffuser into Snap Lake.

Location: N 7052727, E 0506761

<table>
<thead>
<tr>
<th>Sampling Frequency</th>
<th>Location</th>
<th>Monitoring</th>
<th>Every two weeks during discharge</th>
<th>Once annually</th>
<th>Monthly during periods of discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling Parameters</td>
<td>Flow, pH, temperature, conductivity, turbidity</td>
<td>TDS (measured and calculated)</td>
<td>Acute and chronic toxicity tests</td>
<td>pH, Major Ions, CCMS scan (total only), extractable petroleum hydrocarbons, BTEX, E. Coli, , biological oxygen demand (BOD),</td>
<td></td>
</tr>
</tbody>
</table>

Rationale: Water Licence Compliance Monitoring during closure. Discontinue once discharge from this station has ceased.

Status: Active only while discharge is occurring.

Summary of Changes:
Retain this station. No changes for frequency of physical parameters such as flow, pH, temperature, and conductivity. Recommend eliminating the daily measurements of electrical conductivity. Recommend that water chemistry parameters such as TDS, nutrients, etc. are monitored every two weeks during periods of discharge. Recommend removing specific metals (e.g., total mercury and arsenic) from the parameter list. This station is only required while there is discharge from the combined treatment plants into Snap Lake. Acute and chronic toxicity tests should occur once annually. Chronic toxicity testing for algae should be discontinued.

Detailed Rationale to support Changes:
This station is used to monitor effluent discharged to Snap Lake Mine via in-line monitoring of water in the pipe prior to discharge at the diffuser. Daily monitoring of electrical conductivity provides no useful information for management of water. Adjusting the frequency of monitoring of water quality to every two weeks during discharge will be sufficient to characterize the water entering Snap Lake. Water is only pumped to Snap Lake during and following freshet each year, and not year round. Specific metals (e.g., total mercury and arsenic) should not be individually listed in the water licence as they are included in the ICP-MS metals scan.

Once annual toxicity testing is appropriate for discharges because no acute toxicity was observed in effluent since 2005 and no chronic toxicity has been observed since 2015. During Closure, treated effluent discharge into Snap Lake will occur during a short period of time under open water conditions and effluent quality is expected to improve with treatment. The timing of the toxicity testing should remain flexible to allow for toxicity testing and water chemistry sampling to occur at the same time in the treated effluent and lake.
SNP 02-17c: Discharge from East Passive Wetland to Snap Lake
SNP 02-17d: Discharge from West Passive Wetland to the northwest arm of Snap Lake

**Description:** Monitoring to characterize the quality of water discharged from the passive wetland system to Snap Lake.

**Location:** Outflow from the passive wetland treatment system to Snap Lake via the East and West wetlands

**Sampling Frequency:** Once monthly during discharge (June, July, August) | Once annually during discharge

**Sampling Parameters:** Turbidity, TDS (measured and calculated), nutrients, TSS, pH, conductivity, major ions, CCMS scan (total only), biological oxygen demand (BOD) | Acute and chronic toxicity tests

**Rationale:** To evaluate water quality from the North Pile (PS3) that is treated in the passive wetland treatment system then passively draining to Snap Lake.

**Status:** Active once the passive wetland system is discharging to Snap Lake

**Summary of Changes:**
Create these stations. Recommend monthly measurements of physical parameters and water quality and once/annual acute and chronic toxicity during discharge. These stations will only become active once the Passive Wetlands are discharging to Snap Lake.

**Detailed Rationale to support Changes:**
It is proposed that these stations are monitored once the passive wetland system is functioning and water is discharged via the wetland to Snap Lake. The monthly measures of water quality would occur during the ice free period each year (June, July, August).

SNP 02-18: Monitoring stations in the main basin of Snap Lake used to calculate a whole lake average concentration of TDS

**Station Description:** These stations were used to calculate whole lake average concentrations of TDS.

**Summary of Changes:**
Eliminate this set of stations.

**Detailed Rationale to support Changes:**
The volume of water being discharged to Snap Lake in closure and Post-Closure is a fraction of what it was during Operations. Monitoring has demonstrated a decrease in the whole lake average concentration of TDS in the main basin of Snap Lake since operations ceased in 2015. This decline is predicted to continue. The Aquatic effects monitoring program will continue to report on aquatic health including water quality in Snap Lake.

SNP 02-19: Sewage discharge from the temporary Sewage Disposal Facility

**Station Description:**
This station was removed from the water licence in 2007.

**Summary of Changes:**
Eliminate this station.

**Detailed Rationale to support Changes:**
Discharge from the Sewage Treatment Plant is already monitored at SNP 02-16j.
### SNP 02-20 (SNP 02-20ef): Mixing Zone Stations (from Diffuser) within Snap Lake

<table>
<thead>
<tr>
<th><strong>Station Description:</strong></th>
<th>In Snap Lake, 2 stations located 200 meters from the diffuser, on the edge of the mixing zone (SNP 02-20e, and 02-20f).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td>02-20e: N 7052607, E 0507158; 02-20f: N 7052949, E 0507316;</td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Monthly during discharge.</td>
</tr>
<tr>
<td><strong>Sampling Parameters:</strong></td>
<td>At the depth of maximum conductivity: measurements of temperature, dissolved oxygen, pH, and conductivity</td>
</tr>
<tr>
<td></td>
<td>Samples taken from the depth of maximum conductivity shall be analyzed for: turbidity, TDS (measured and calculated(^\text{10})), TSS, pH, conductivity, major ions(^1), nutrients(^2), BOD, CCMS scan(^3) (total only)</td>
</tr>
<tr>
<td></td>
<td>If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom.</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Closure Monitoring to evaluate whether Water Quality Objectives are being met at the edge of the mixing zone.</td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Active during closure; Inactive during Post-Closure</td>
</tr>
</tbody>
</table>

**Summary of Changes:**
Retain two (2) of the four (4) of these stations: SNP 02-20e and SNP 02-20f. Recommend elimination of the under ice sampling as part of the SNP. No changes recommended to the water chemistry measures taken on a monthly basis during discharge (turbidity, TDS, TSS, pH etc.). Recommend elimination of the early life stage toxicity testing and the 7-day test of larval growth survival using fathead minnows. Recommend discontinuation of the sediment sampling for metals. Recommend elimination of the yearly early life stage toxicity test and 7-day test of larval growth and survival using fathead minnows.

**Detailed Rationale to support Changes:**
Water is not discharged during the winter and there is no human occupation of the site during the winter during closure. Under-ice water quality is not predicted to exceed the SSWQO for Snap Lake. Sampling of under-ice water quality is not required as part of the SNP, however some under-ice sampling is retained within the AEMP. Chronic toxicity testing of effluent is also conducted at SNP 17-b and will continue to be monitored at this station once annually. Sediment sampling will be completed as part of the AEMP and does not belong in the SNP. Annual sampling of early life stage toxicity testing or the 7-day larval growth and survival testing on fathead minnows is also not warranted given the low volumes of water to be pumped to Snap Lake during Closure and Post-Closure. There has not been sufficient variation in the sub-station results in the past to warrant the continued use of 4 sub-stations in the future. Two sub-stations will be sufficient for monitoring into the future.
### SNAP 02-20h,t: Mixing Zone Stations (from East Passive Wetland) within Snap Lake

<table>
<thead>
<tr>
<th><strong>Description:</strong></th>
<th>In Snap Lake main basin, two stations located on the edge of the mixing zone 200m from the wetland discharge location.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sampling Frequency:</strong></td>
<td>Once annually</td>
</tr>
</tbody>
</table>
| **Sampling Parameters:** | Samples taken from the depth of maximum conductivity shall be analyzed for: turbidity, TDS (measured and calculated[^1]), nutrients[^2], TSS, pH, conductivity, major ions[^4], CCMS scan[^3] (total only), biological oxygen demand (BOD)  
If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom. | Chronic toxicity[^5] |
| **Rationale:** | Once the passive wetland treatment system is established to confirm that water quality within Snap lake, at the edge of the mixing zone is acceptable. |
| **Status:** | Active during discharge from the passive wetland. |

**Summary of Changes:**
Create these stations. Monitor the water quality and physical parameters at these stations during discharge. Test for chronic toxicity once annually during open water conditions.

**Detailed Rationale to support Changes:**
Once the passive wetland treatment system is established it would be beneficial to confirm that water quality within Snap lake, at the edge of the mixing zone, continues to meet the SSWQO in the same way as when water was discharged via the diffuser from the active treatment system. Samples to be taken during peak flow to reflect the poorest potential water quality in any given year. Toxicity sampling to occur once annually to confirm water is not posing risk to aquatic life.
SNP 02-20j,k: Mixing Zone Stations (from West Passive Wetland) within Snap Lake

**Station Description:**
In Snap Lake northwest arm, two stations located on the edge of the mixing zone 200m from the wetland discharge location

<table>
<thead>
<tr>
<th>Location:</th>
<th>Sampling Frequency:</th>
<th>Once annually</th>
<th>Once Annually</th>
</tr>
</thead>
</table>

**Sampling Parameters:**
Samples taken from the depth of maximum conductivity shall be analyzed for: turbidity, TDS (measured and calculated\(^7\)), nutrients\(^2\), TSS, pH, conductivity, major ions\(^1\), CCMS scan\(^3\) (total only), biological oxygen demand (BOD)

If no conductivity gradient is observed, a sample shall be taken at mid-depth between surface and bottom.

<table>
<thead>
<tr>
<th>Rationale:</th>
<th>Chronic Toxicity(^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once the passive wetland treatment system is established to confirm that water quality within Snap lake, at the edge of the mixing zone is acceptable.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status:</th>
<th>Active during discharge from the passive wetland</th>
</tr>
</thead>
</table>

**Summary of Changes:**
Create these stations. Monitor the water quality and physical parameters at these stations during discharge. Test for chronic toxicity once annually during open water conditions.

**Detailed Rationale to support Changes**
Once the passive wetland treatment system is established it would be beneficial to confirm that water quality within Snap lake, at the edge of the mixing zone, continues to meet the SSWQO in the same way as when water was discharged via the diffuser from the active treatment system. Samples to be taken during peak flow to reflect the poorest potential water quality in any given year. Toxicity sampling to occur once annually to confirm water is not posing risk to aquatic life.

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SNP 02-21: Outflow from Snap Lake flowing into the Lockhart River System

**Station Description:**
This station was used to monitor the outlet of Snap Lake on an annual basis.

**Summary of Changes:**
Eliminate this Station.

**Detailed Rationale to support Changes:**
The volume of water to be discharged on an annual basis to Snap Lake is a fraction of Operational volumes and poses no concern for flow at the outlet. This station will continue to be monitored as part of the AEMP.
<table>
<thead>
<tr>
<th>Station Code</th>
<th>Description</th>
<th>Summary of Changes</th>
<th>Detailed Rationale to support Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNP 02-22</td>
<td>Diffuser construction</td>
<td>Eliminate this station.</td>
<td>No longer needed. Diffuser is already constructed and in place.</td>
</tr>
<tr>
<td>SNP 02-23</td>
<td>Water intake construction</td>
<td>Eliminate this station.</td>
<td>No longer needed. Water intake is constructed.</td>
</tr>
<tr>
<td>SNP 02-24</td>
<td>Snap Lake sites in close proximity to fisheries compensation works. Corresponds to AEMP stations SNAP05, and SNAP29 (Water intake).</td>
<td>Eliminate this station.</td>
<td>No longer needed, volume of water drastically reduced and TDS no longer a concern.</td>
</tr>
</tbody>
</table>