SWAN HILLS TREATMENT CENTRE

2024 ENVIRONMENTAL MONITORING PROGRAM

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1. Introduction

The Swan Hills Treatment Centre (SHTC) *(Appendix A - Figure 1)* is owned by the Alberta Government and operated on their behalf by Veolia Waste Services Alberta Inc. (Veolia) under an operating contract with Alberta Infrastructure. The SHTC is located approximately 17 kilometers northeast of the town of Swan Hills *(Appendix A - Figure 2)* and provides comprehensive treatment and disposal for hazardous waste.

In accordance with the Alberta Environmental Protection and Enhancement Act Approval (EPEA) No. 1744-03-00, as amended, specifically section 4.10, the SHTC conducts a comprehensive environmental monitoring program to identify, track and mitigate potential environmental impacts associated with the SHTC operations. Baseline data collection began in 1985, two years before the facility commenced operation in 1987 and has evolved over the years to include both onsite and offsite monitoring for:

- Air Quality
- Soils
- Sediments
- Groundwater
- Surface Water
- Vegetation
- Wildlife
- Fish

The scope of the 2024 Environmental Monitoring Program (EMP) is based on the annual program that has been in place since 2000. The annual monitoring program was rationalized in 2000 to consolidate sampling locations among program components and expand the analytical scope to provide consistent detailed analysis of contaminants of concern in all receptors. The program introduced the concept of “Triggers” at that time which specify additional monitoring requirements in response to events or potential emerging issues.

The SHTC has been in operation for over 30 years and significant changes have been observed in both the quantity and types of wastes processed over that time. In particular, the quantity of PCB wastes has decreased significantly as the inventory of these materials continues to decline in Canada. Under current regulations, the phase-out of any remaining in-service PCBs is to be completed in 2025. As a result; beginning in 2021, operations at SHTC have been scaled back in accordance with a reduced operating model as directed by Alberta Infrastructure. The facility

no longer accepts historic waste streams and will continue to focus on waste products that do not have any alternative treatment options. SHTC will continue to accept PCB, biomedical, and other selected waste streams when deemed appropriate. However, a significant reduction in annual waste processing volume is anticipated and appropriate steps have been implemented to accommodate this new operating scenario.

1.1. Expanded Monitoring Years

To ensure potential issues are not overlooked, the program expands on a five-year cycle to provide both relevant and reliable data regarding potential impacts of SHTC operations on the environment. The expansion is to include additional components to ensure that continuous surveillance of potential compounds of concern associated with the operation are monitored. The previous expanded monitoring year was last conducted in 2019, which included the analysis of PCBs at historical monitoring plots along with the extension of the analytical scope to include additional potential compounds of interest that are not included in the annual program. The 2024 monitoring program will be consistent with the scope of an expanded monitoring year, and incorporating any recommended changes as outlined in the following sections.

2. Summary of Proposed Changes for 2024

The results of the 2023 monitoring program were reviewed at the technical meeting which was held virtually on February 21, 2024. Participants include members of the Veolia staff, external consultants, representatives from Alberta Infrastructure, Alberta Health, and Alberta Environment and Protected Areas. Based on the findings of the 2023 monitoring year, several scope changes were recommended for the 2024 monitoring program. These recommendations were presented and discussed during the meeting and have been incorporated into the proposed 2024 and future monitoring programs.

Overall objectives for the 2024 monitoring program include:

1. Continue with the overall monitoring programs, reducing or expanding where necessary based on objectives and effectiveness.
2. Continue to review and monitor triggers to optimize the effectiveness of the current scope for sampling and analysis.

Table 1. Overview of 2024 expanded monitoring year and proposed changes.

Monitoring Program	Existing	Expanded Program	Changes for 2024
Air	• Program as specified in EPEA Approval No. 1744-03-00	N/A	• No changes proposed for 2024
Groundwater	• Routine water, PCB's, metals and Organic Carbon on all wells • BTEX, F1, AOX, Dioxin and Furan also analyzed on shallow wells	• Final year for dioxin/furans monitoring on select shallow wells	• Well maintenance • Replacement of dry upgradient sandstone wells
Soils and Vegetation	• Labrador Tea & Live Moss at 10 sites • Moss Bags & Lichen at 15 sites • Moss Bags at 3 additional fence line site	• Expanded to include historical sampling plots • Expanded analytical scope • Live moss sampling program • Final monitoring year for Mo at discharge site locations	• Complete a fly ash emission study
Wildlife	• 3 live trapping plots • 10 snap trapping plots	• Expanded to include historical sampling plots • Expanded analytical scope	• Reduce sample locations of vole tissue collection during "standard" monitoring years
Surface Water, Sediments and Fish	• Annual surface water sampling at 3 locations • Biennial sediment sampling at 4 locations	• Sediment sampling	• Increase WQM frequency • Increase range of carbon specie analysis • Biennial analysis of Edith Lake • Remove White Sucker program • Community outreach for additional fish head collection
Toxicology	• Annual fish tissue collection at 2 locations • Based on fish tissue and vole results	N/A	• Follow up with Regulators regarding the new TDI for PCB in fish tissue.

3. Air Quality Monitoring

3.1. 2023 Standard Monitoring Program

The location of monitoring plots employed in the program is presented in Appendix A – Figure 3. The air monitoring program is developed in accordance with EPEA Approval No. 1744-03-00 and complies with specific requirements outlined in Section 4.3, which include the following components:

- Meteorological parameters Site 11
- Ambient PCB monitoring at fence line sites (1, 2a, 5a), process area (E1) and offsite location (11)
- VOCs and THC at process area (E1)
- TSP at site 1 and site 9
- PM2.5 at sites 1, 5a and 9
- Mercury CEMS installed and functioning
    - Mercury levels continue to be evaluated

3.2. 2024 Expanded Monitoring Program

The 2024 expanded monitoring year will follow the same requirements outlined in Approval No. 1744-03-00 Section 4.3.

3.3. 2024 Program Changes

No program changes were recommended during the annual technical review meeting. The Air Quality Monitoring program will continue to adhere to conditions outlined in the EPEA Approval.

3.4. Triggers

Table 2. Air Quality Monitoring Triggers.

Trigger	Response
PCB concentration exceeds 150 ng/m^3 at fence line monitoring locations	• Verify result and investigate potential sources of fugitive emissions. Increase frequency of PCB air monitoring to NAPS cycle – once every 6 days if warranted.
VOC exceeds a level of 3 ppm or THC exceeds 5 ppm	• Report individual VOC compounds and compare with appropriate air quality and occupational health and safety guidelines and review trends over the period of record.

Trigger	Response
	• If deemed significant, the OTF fugitive emission survey would be triggered if not already conducted
A facility upset resulting in an off-site release of significant magnitude to warrant immediate assessment	• Review meteorological data and conduct dispersion modeling (if appropriate) to support initial assessment and guidance for environmental monitoring response. • Conduct additional air monitoring as recommended • Implement Emergency Response Plan and compile relevant data regarding the incident to facilitate development of an effective Environmental Monitoring Program response

4. Groundwater Monitoring

4.1. 2023 Standard Monitoring Program

The location of monitoring plots employed in the program is presented in Appendix A – Figure 4. The scope of the groundwater monitoring program complies with the requirements of Section 4.8 and Table 4.8-A in Approval No. 1744-03-00, which includes the following components:

- All wells sampled for (*Appendix B –Table 8*):
  - Routine Water Analysis (pH, EC, major ions)
  - PCB's
  - Dissolved Metals
  - Dissolved Organic Carbon
- Shallow wells sampled for (*Appendix B –Table 8*):
  - BTEX, F1
  - Adsorbable Organic Halide (AOX)
  - Use as a monitoring tool to screen for chlorinated compounds
- Dioxin and furan monitoring in select shallow wells for three years (2022, 2023 and 2024)
  - After the baseline is set, the sampling frequency can be adjusted based on the results

4.2. 2024 Expanded Monitoring Program

In general, the expanded groundwater monitoring program will remain similar to what is conducted in previous "standard" monitoring years. All wells will be sampled in September 2024

consistent with previous monitoring programs and will comply with the requirements of Section 4.8 in Approval No. 1744-03-00. The 2024 expanded program will serve as the final baseline year for monitoring dioxins/furans in select shallow wells. In 2025, the finalized data will be revisited to determine if adjustments are needed to the sample frequency for dioxins/furans monitoring.

4.3. 2024 Program Changes

A sandstone groundwater monitoring well replacement plan was developed by external consultants (AECOM, 2023), summarizing recommendations for maintaining the well network. This plan outlines which sandstone wells require replacement, along with their locations and rationales on well placement. The primary focus is on sandstone wells located upgradient to the SHTC, aiming to assess background groundwater parameters compared to down-gradient sandstone wells. This comparison can indicate if the source of groundwater contamination is the SHTC or other external influences. Additionally, select shallow/intermediate wells need to be verified for dryness or compromised equipment. To address this, it is recommended to establish new replacement wells and integrate them into the monitoring program. Further, vegetation clearing and general routine maintenance will be conducted on all necessary nested wells and access points.

There has been an increasing trend in chlorine levels at shallow well 07-SH. Additionally, chlorine levels above the detection limit were observed at intermediate well 07-IN, which historically have been insignificant and below the detection limit. It is suspected that surface runoff from road salt in the parking lot and surrounding road could contribute to this increase. To confirm this, monitoring of surface runoff in the area for chlorine concentrations is recommended. Samples will be collected and monitored during periods of surface runoff.

4.4. Triggers

Table 3. Groundwater Monitoring Triggers.

Trigger	Response
Statistically significant increase in key parameter (e.g. PCBs).	• Implement Response Plan and conduct follow up sampling to verify and assess results

Trigger	Response
A significant facility upset resulting in on-site spill of significant magnitude to warrant immediate assessment	• Incorporate additional monitoring as recommended by the Response Plan

5. Soils and Vegetation Monitoring

5.1. 2023 Standard Monitoring Program

- Labrador Tea sampled and analyzed annually at 10 sites
- Live moss sampled and analyzed biennially in years 1, 3 and 5 at 10 sites
- Moss bags deployed at 15 standard and 3 fence line sites for a 1-year exposure
- Lichen site monitoring at 15 sites
- Analytical includes routine parameters, metals, PCB's, Dioxins and Furans

5.2. 2024 Expanded Monitoring Program

The 2024 expanded monitoring year will incorporate historical monitoring locations and additional analytical parameters to the "standard" program scope. The location of monitoring plots employed in the program is presented in Appendix A – Figure 5. The expanded program includes the following components:

- Collection of live moss and vegetation samples from the 10 primary sites (Plots 4, 11, 70, 71, 109, 110, 114, 117, 128, and 402)
- Expanded analytical scope outlined in Appendix B – Table 9
- Collection of Labrador tea samples from 22 historic plots and analyzed for total PCBs
- Moss bags deployed at 15 standard sites and 3 fenceline sites for 1-year exposure period
- Collection of deeper soil horizons at the 10 primary plots and analyzed for total PCBs (as necessary)
- VOCs and SVOCs (including PAHs) at the 10 primary sites
- Assess lichen vitality
- Final monitoring year for molybdenum at 5 sampling locations at South Retention Pond #2 engineered spillway

5.3. 2024 Program Changes

In the event of any disturbances caused by SHTC operations, any further adjustments to the scope can be done to address potential emerging concerns. If a substantial amount of fly ash is processed in 2024, additional TSP sampling will be conducted using the high-volume samplers positioned along the SHTC perimeter. Three moss bags were deployed along the fenceline last spring to monitor potential impacts. The aim of this sampling is to determine if fly ash is being unintentionally released into the air during solidification or disposal processes.

Due to an increase in several dissolved metal parameters, particularly molybdenum, in the South Retention Pond #2 in recent years, surficial subsoil samples were collected at five sample sites along the spillway to monitor molybdenum concentrations. All molybdenum concentrations recorded in 2023 met criteria and were below the discharge limit of 0.01mg/L. The final year of monitoring will be conducted during the 2024 monitoring program, and the program will be revisited with the finalized data from the 2024 sampling program. Any recommendations for further monitoring will be discussed at the next technical review meeting in 2025.

5.4. Triggers

Table 4. Soil and Vegetation Monitoring Triggers.

Trigger	Response
Total TEQ increases above 75th percentile (last 10 years data) in the Labrador tea at plots (4, 11, 109, 114)	● Analyze archived live moss samples. ● If levels are elevated in both Labrador tea and live moss, expand monitoring scope in following year to include both Labrador tea and live moss from 10 Plots
A facility upset resulting in off-site emissions of significant magnitude to warrant immediate assessment	● Soil and vegetation monitoring to proceed at selected sites immediately following the incident. ● The number/location of sites and analytical scope would be based on meteorological conditions and the nature of the release.

6. Wildlife Monitoring

6.1. 2023 Standard Monitoring Program

The location of monitoring plots employed in the program is presented in Appendix A – Figure 7.

- 3 live trapping plots for population monitoring
- 10 snap trapping plots to collect vole tissue for contaminant analysis

6.2. 2024 Expanded Monitoring Program

The 2024 expanded monitoring year will incorporate historical monitoring locations (Appendix A – Figure 7) and additional analytical parameters to the “standard” program scope (Appendix B – Table 10. The expanded program includes the following components:

- 10 live trapping plots for population monitoring
- 24 snap trapping plots to collect vole tissue for total PCB contaminant analysis
- Expanded analysis at the ten primary sites (PAHs and metals) which are not part of the annual program

6.3. 2024 Program Changes

A significant declining trend has been observed in vole tissue contaminant concentrations across all sites in the past monitoring years. Levels of PCBs, dioxins and furans have consistently been below the threshold of concern, with only sites nearest to the SHTC showing elevated levels above background plots. Furthermore, contaminant levels have never shown a correlation with population trends. Proposed changes to wildlife program include reducing the number of annual tissue collection sites from ten to six plots, while retaining the plots closest to the SHTC. Consistent trends across all plots indicate a decreasing concentration of contaminants of concern (PCBs, dioxins, and furans), and the reduced number of sites will focus on areas where these concentrations have been highest (Plots 4, 11, 109, 114, 70 and 71) during “standard” monitoring years.

In the event of any disturbances caused by SHTC operations, any further adjustments to the scope can be done to address potential emerging concerns.

6.4. Triggers

Table 5. Wildlife Monitoring Triggers.

Trigger	Response
Statistically significant change in June vole population levels correlated with the April/May tissue contaminant levels	• Collect and analyze September vole tissue from population monitoring plots (11, 114 and 70) for PCBs, dioxins and furans
Elevated Total TEQ in live moss and Labrador tea is observed	• Expand vole tissue collection to 10 plots consistent with the Soil and Vegetation program
A facility upset resulting in off-site emissions of significant magnitude to warrant immediate assessment	• Additional sampling of vole tissue. Timing, sample locations and analytical scope would be determined based on meteorological conditions and the nature of the release.

7. Surface Water, Sediments and Fish Monitoring

7.1. 2023 Standard Monitoring Program

- Annual surface water sampling
    - 3 Sample Locations: S5A Coutts River, S12 Chrystina Lake, Edith Lake (Appendix A – Figure 8)
    - Parameters (Appendix A – Table 11): Routine Water analysis (dissolved solids and ions), Nutrients (total and dissolved), Metals
- Biennial (odd years) sediment sampling
    - 4 Sample Locations: S5A Coutts River, S12 Chrystina Lake, Edith Lake, S6 Unnamed tributary (Appendix A – Figure 8)
    - Parameters (Appendix A – Table 11): Metals, Organics (PCB's, dioxins and furans)
- Annual fish tissue analysis from Edith and Chrystina Lake to be analyzed for a range of compounds including metals and organic contaminants (PCBs, dioxins and furans)
- Brook trout will continue to be tagged and sampled for age analysis

7.2. 2024 Expanded Monitoring Program

In general, the expanded surface water, sediment and fish monitoring program will closely resemble what has been conducted in previous “standard” monitoring years. However, as it is an expanded monitoring year, sediment sampling will also be carried out, despite typically being conducted in odd years. Additional components will be incorporated in the 2024 expanded monitoring year and will be revisited in the technical review meeting in 2025 to discuss if further monitoring will be required. The additional components include:

- Monitor the seasonal pH trends at our surface water sites (Chrystina Lake and Coutts River)
- Expand the analysis of carbon species (TOC, DIC, DOC, TIC etc.) at our surface water sites (Chrystina Lake and Coutts River)

Historically, White Sucker samples were archived and analyzed during expanded monitoring years. However, this component was dropped from the expanded program in 2019 due to consistently low contaminant levels.

7.3. 2024 Program Changes

Routine water analyses have been conducted annually since 2000, and they have recently revealed a downward trend in pH levels in Chrystina Lake. In 2023, a significant decrease in pH was observed, prompting an investigation into pH trends at the current sampling locations (Chrystina Lake and Coutts River). Numerous factors can contribute to waterbody acidification, primarily natural processes involving interactions with surrounding rock formations (particularly carbonate forms), wetland/marsh ecosystems, and atmospheric CO_2. Additionally, seasonal precipitation variations, nutrient runoff, and anthropogenic pollutants may influence water chemistry, specifically pH levels. Given the complexity of factors influencing pH levels, sampling frequency will be increased throughout the year to monitor pH trends across seasons, providing a stronger understanding of pH dynamics around the SHTC. Additionally, an increase in cyanobacteria was observed, which could also be related to water chemistry parameters. To better understand the patterns in total organic carbon, an expanded analysis of carbon species will be conducted to widen our understanding of water chemistry in areas around the SHTC.

The White Sucker program will be removed from the trigger policies due to several factors: their tissue contaminant levels consistently remained below levels observed in Brook trout, they are not present in Edith Lake (reference lake), and they are not considered a sport fish which would be consumed.

Changes will be made to Edith Lake sampling program, transitioning to biennially sampling, sampling during expanded program years or if triggered by changes in water quality, sediment, or fish tissue contaminant levels. While Edith Lake will continue to serve as a reference lake, its stability, and low levels of contaminants of concern in sediment and fish tissue no longer warrant annual monitoring.

To improve the sample size and accuracy of age analysis for Brook trout in Chrystina Lake and Edith Lake, community involvement could be integrated to obtain fish head samples. This initiative aims to enhance our understanding of population dynamics and potential contaminants of concern by gathering data on the age distribution of the Brook trout population. Chrystina Lake experiences significantly more sport fishing activity than Edith Lake, which can affect the analysis of age distribution. Given that the current sampling program is limited to a sampling period and may not provide a representative sample, public participation would be beneficial for both Chrystina and Edith Lake. By engaging the local community and fishermen to contribute fish head samples, we can gather a more comprehensive dataset and conduct a more accurate analysis of age distribution and PCB toxicity.

In the event of any disturbances caused by SHTC operations, any further adjustments to the scope can be done to address potential emerging concerns.

7.4. Triggers

Table 6. Surface Water, Sediment, and Fish Monitoring Triggers.

Trigger	Response
Contaminant levels exceed the 95th percentile value in Chrystina Lake sediments	• Verify result and include sediment sampling in both Chrystina and Edith lakes during the next annual program if warranted
Contaminant levels exceed 95th percentile value and/or the Interim	• Verify results and initiate additional downstream sampling in following sampling period if warranted

Trigger	Response
Sediment Quality Guidelines (ISQG) in stream sediment samples	
Organic contaminant levels in Chrystina Lake brook trout exceed the recommended toxicity trigger	• Analyze any archived samples to verify results • Sample Edith Lake brook trout in the following year
A facility upset resulting in off-site emissions of significant magnitude to warrant immediate assessment	• Initiate immediate water quality, sediment and fish tissue sampling as recommended.

8. Toxicology Monitoring

8.1. 2023 Standard Monitoring Program

Tissue contaminant levels are assessed annually, with this program incorporating assessments for adult, child, toddler, and adolescent based on the current fish consumption advisory established by Alberta Health (PCB tolerable daily intake [TDI] of 0.00001mg/kg/day). The following components are conducted during “standard” monitoring:

- Toxicity exposure limits will be reviewed to ensure toxicity assessments and human health risk assessments (HHRA) results and recommendations remain valid
- An abbreviated HHRA will be prepared based on the annual fish tissue results

8.2. 2024 Expanded Monitoring Program

In general, the expanded toxicology monitoring program will remain similar to programs conducted in previous “standard” monitoring years. However, the updated PCB TDI to 0.00001mg/kg/day from Alberta Health in 2021 has altered the exposure ratio established for fish consumption samples. The 2024 expanded monitoring program will focus on re-evaluating current TDI liabilities and triggers.

8.3. 2024 Program Changes

Efforts will be undertaken to re-evaluate PCB TDI liability and triggers to ensure exposure ratios remain an accurate reflection of current HHRA advisories. In the event of any disturbances caused by SHTC operations, any further adjustments to the scope can be done to address potential emerging concerns.

8.4. Triggers

Table 7. Toxicology Monitoring Triggers.

Trigger	Response
New toxicity information becomes available (i.e. significant change in end-point toxicity of the compounds of interest – PCBs, PCDD/F)	• Conduct full HHRA on fish tissue results • Re-evaluate vole toxicity assessment
Chrystina Lake fish tissue level exceeds Toxicity Trigger	• Conduct full HHRA and assess fish tissue levels in Edith Lake
Any new compounds are identified at elevated levels (e.g. heavy metals) in animal or fish tissue.	• Assess vole toxicity • Expand HHRA to incorporate new compounds of interest

9. References

(AECOM) Groundwater Monitoring Well Network Condition Report and Sandstone Groundwater Monitoring Well Replacement Plan. April 2023.

(AECOM) 2023 Groundwater Monitoring Report – Swan Hills Treatment Centre. March 2024.

(MARTIX) 2023 Soil Management Program – Swan Hills Treatment Centre. Matrix Solutions Inc. March 2024.

(MATRIX) 2023 Soil and Vegetation Monitoring Program Report – Swan Hills Treatment Centre. Matrix Solutions Inc. March 2024.

(CPP) 2023 Surface Water and Sediment Quality Monitoring Report. Charette Pell Poscente (CPP) Environmental. March 2024.

(WORLEY) 2023 Fish Tissue Monitoring Program – Swan Hills Treatment Centre. Worley Consulting. March 2024a.

WORLEY) 2023 Human Health Risk Assessment Through Consumption of Fish near Swan Hills Treatment Centre – Based on 2023 Fish Monitoring Data. Worley Consulting. March 2024b.

(WILDLAND) 2023 Wildlife Monitoring Report. Wildland Management Consultants Ltd. March 2024.

APPENDIX A

Figure 1. Swan Hills Treatment Centre Facility

Figure 2. Swan Hills Treatment Centre Location

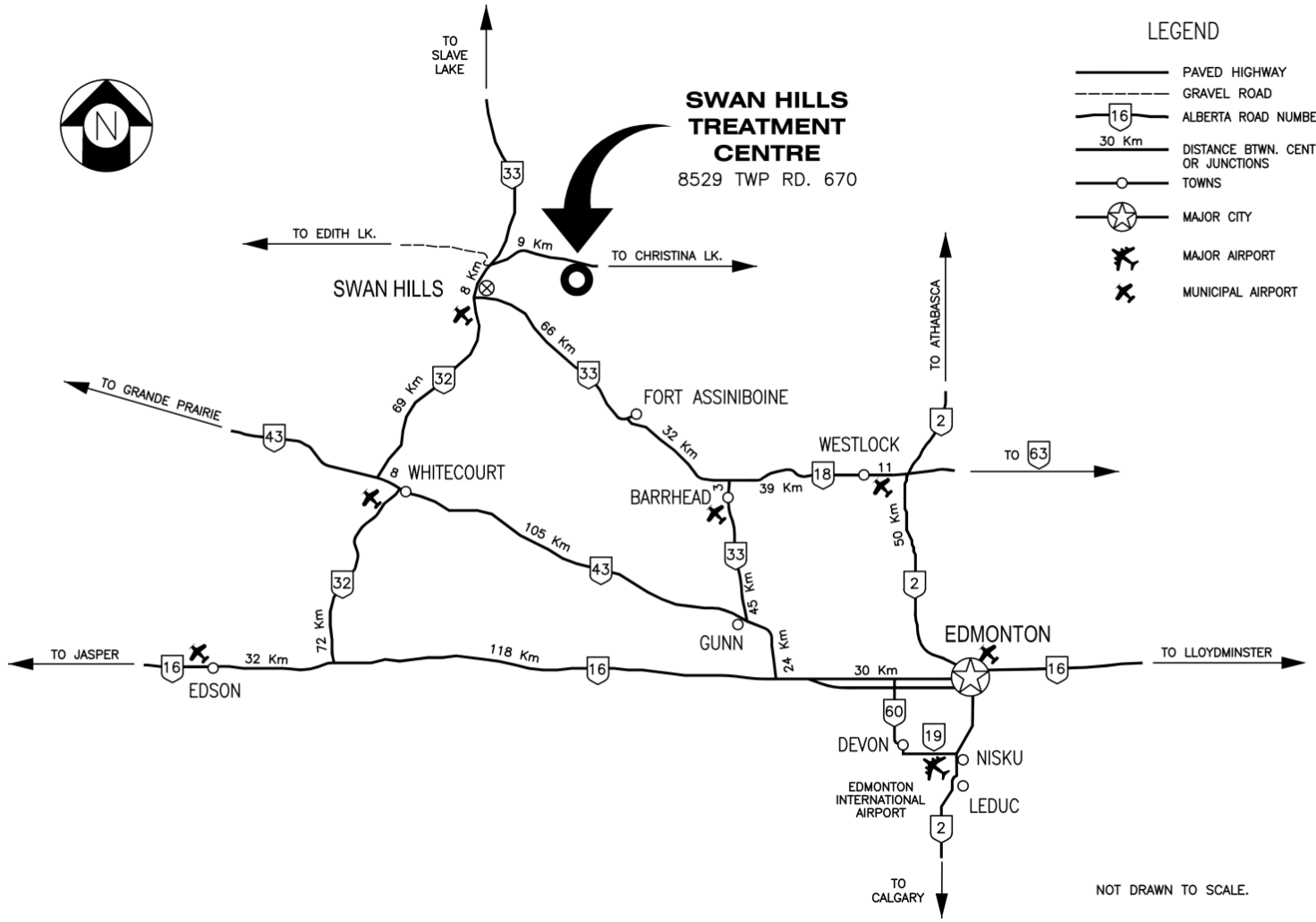


Figure 3. Air Quality Monitoring Sites.

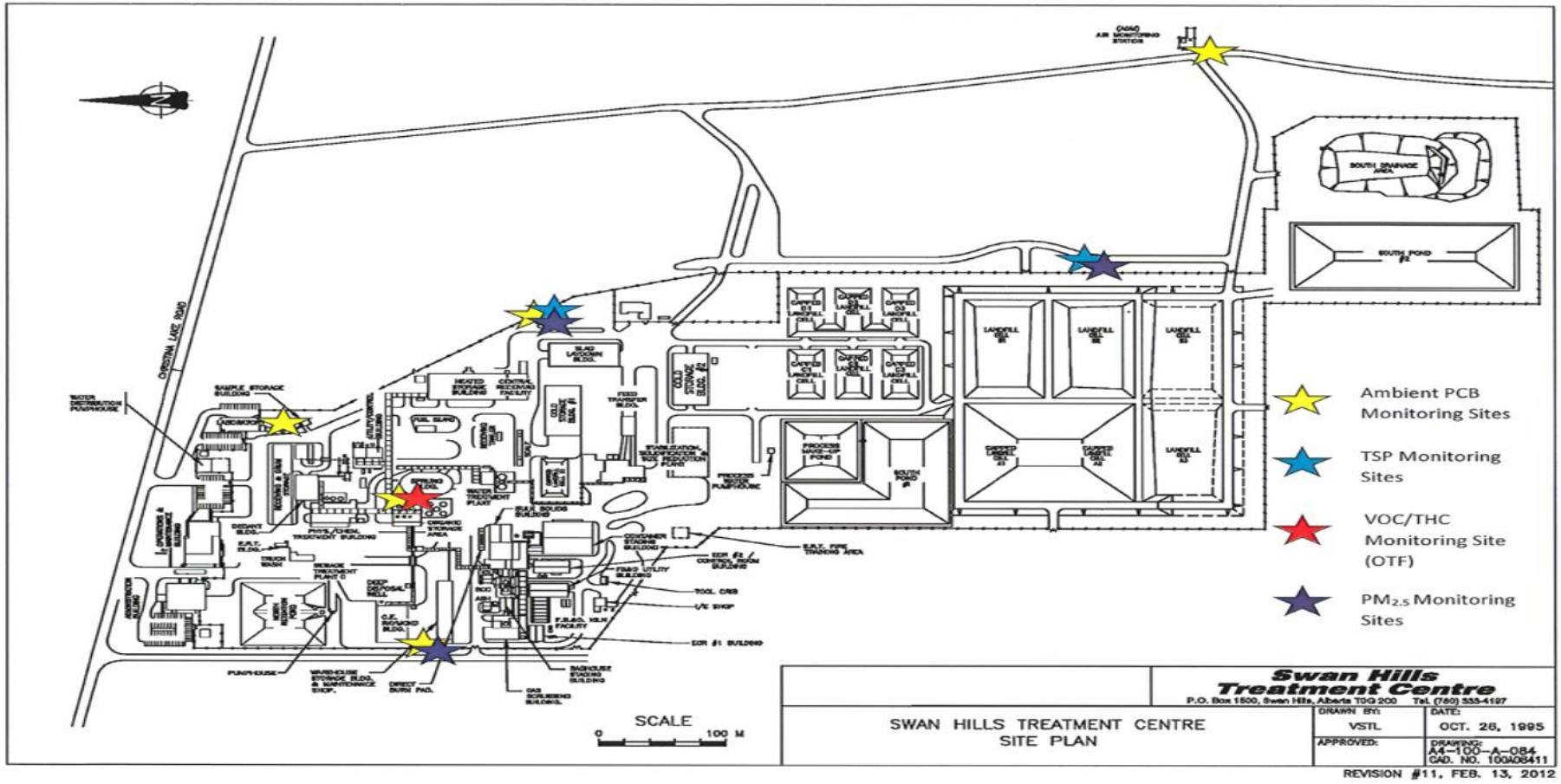
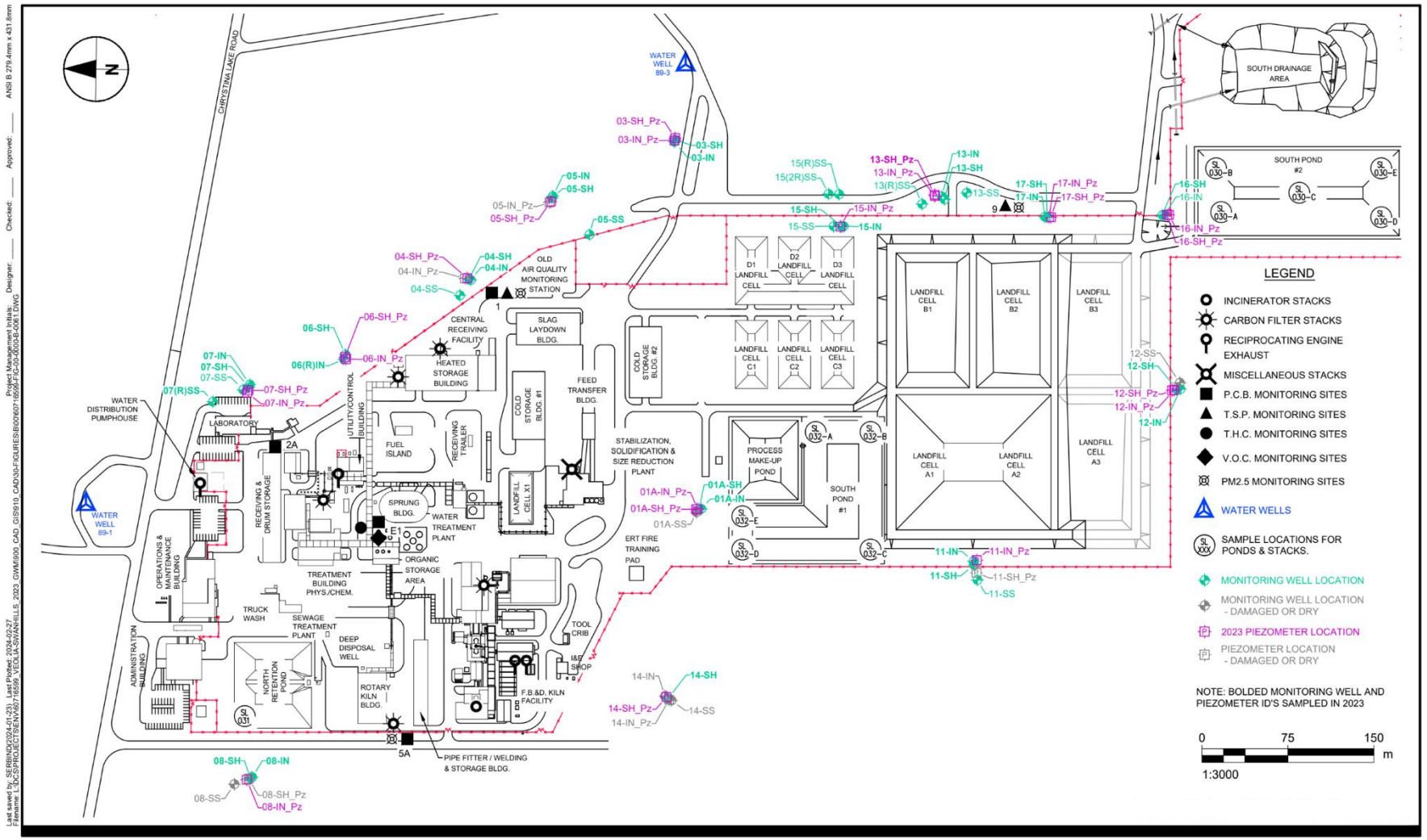


Figure 4. Groundwater Monitoring Sites.



2023 Groundwater Monitoring Report
Swan Hills Treatment Centre
VEOLIA
Project No.: 60716599 Date: 2024-02-27

Groundwater Monitoring Well Locations

AECOM
Figure 6.1

Figure 5. Soil and Vegetation Monitoring Sites.

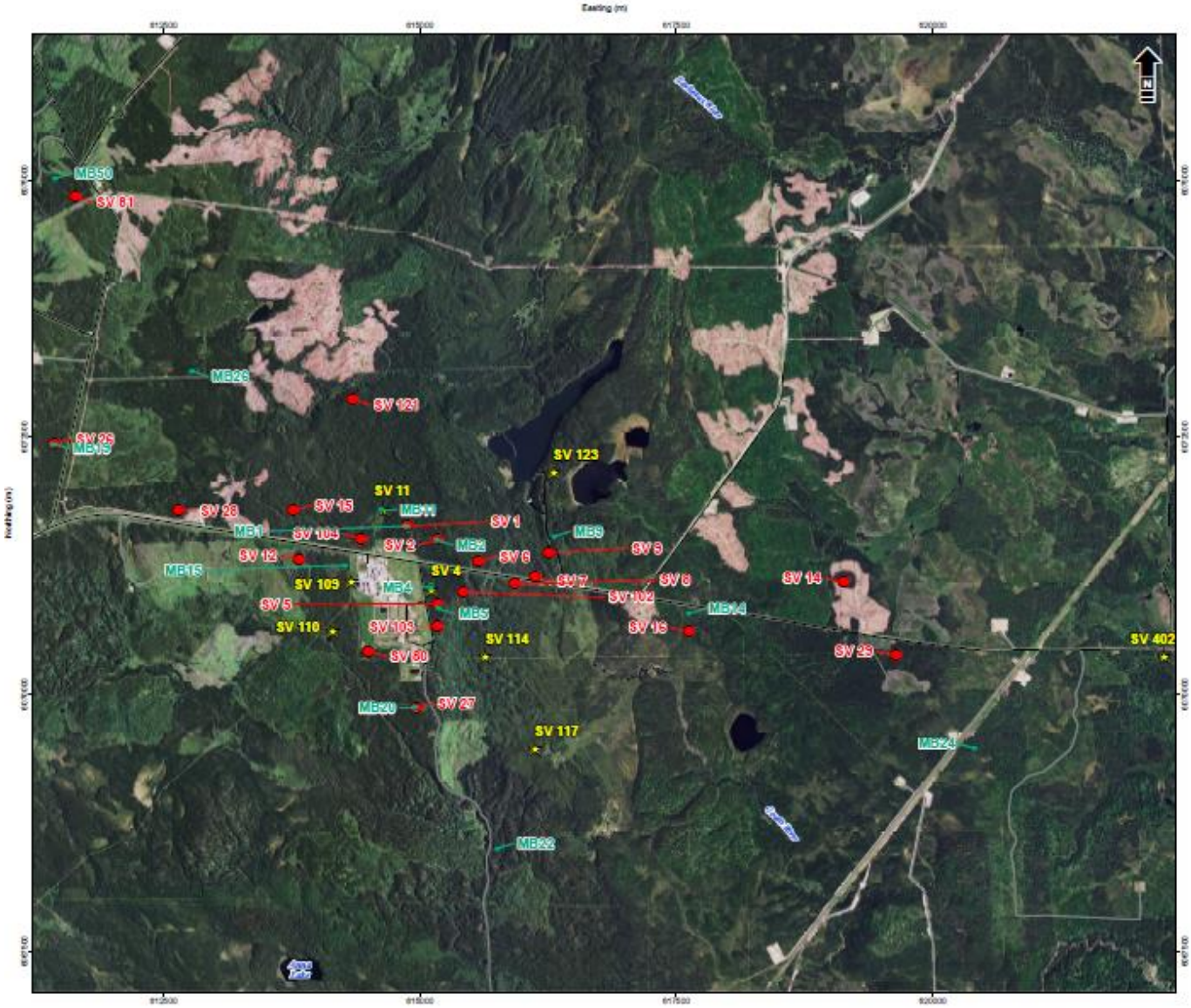


Figure 6. South Retention Pond #2 Monitoring Sites.

Figure 7. Wildlife Monitoring Sites.

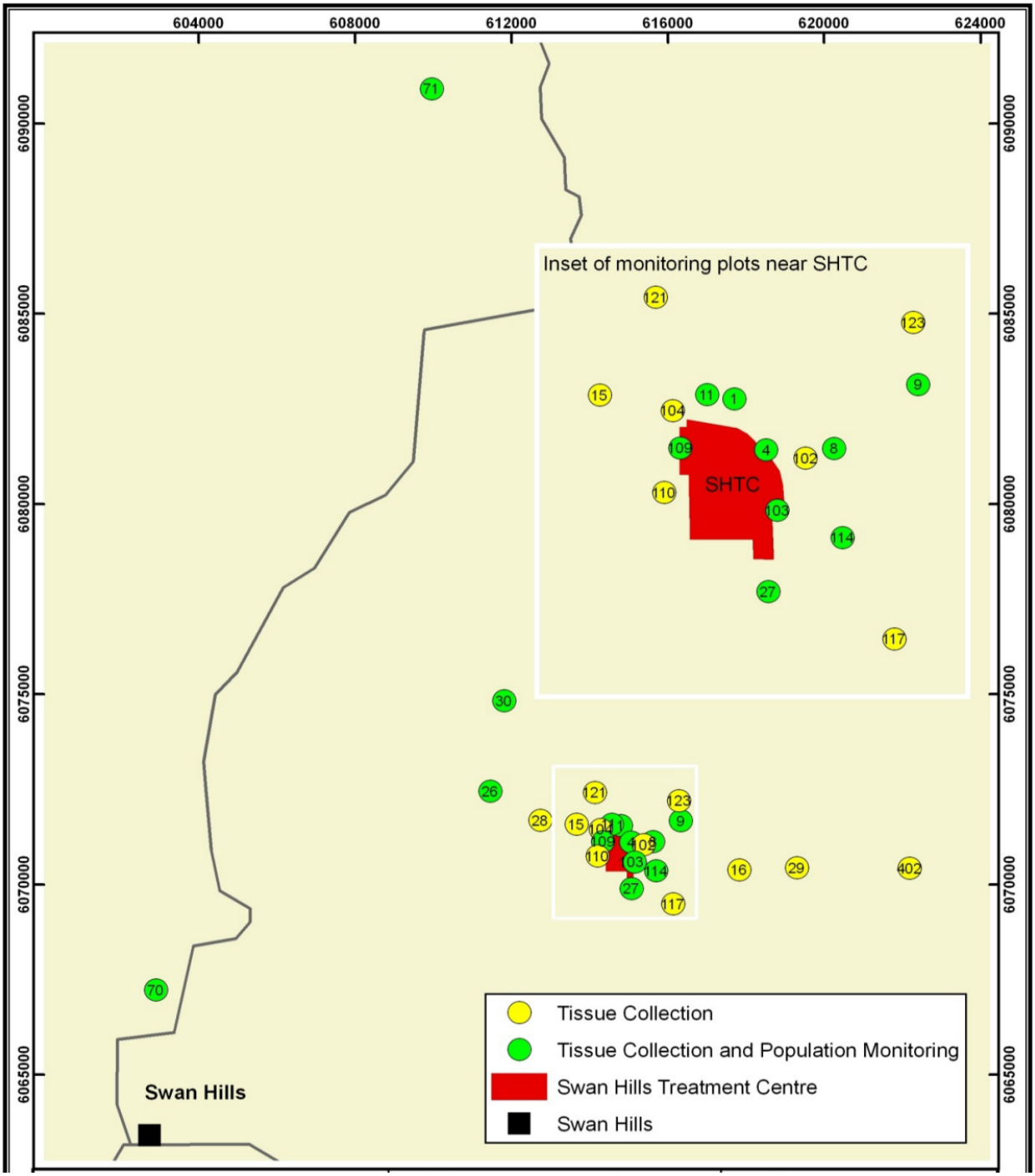
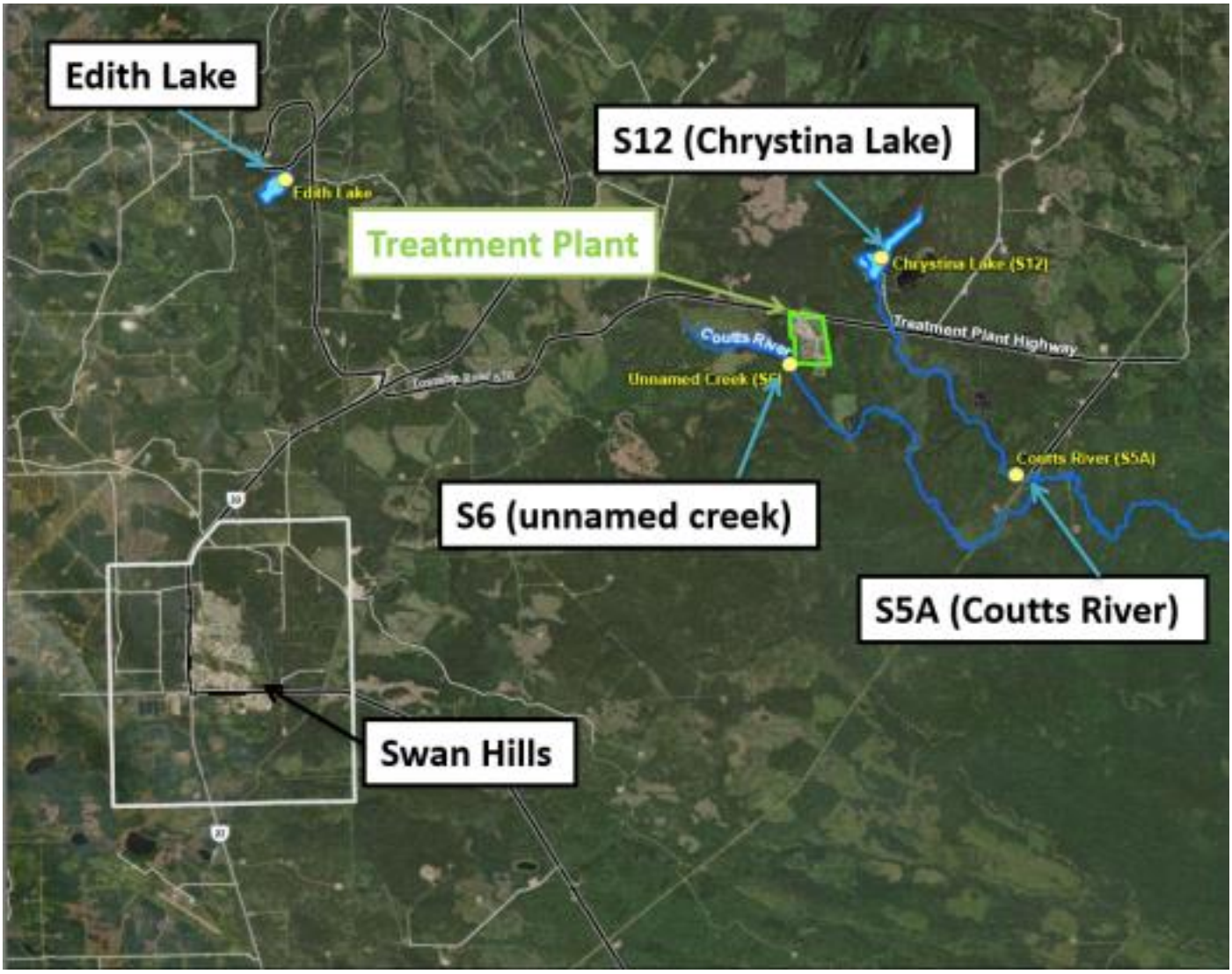


Figure 8. Surface Water, Sediment and Fish Monitoring Sites.



APPENDIX B

Table 8. Groundwater Analytical Scope.

Parameter	Shallow Till	Intermediate Till	Sandstone Aquifer
General parameters			
pH	✓	✓	✓
Electrical Conductivity	✓	✓	✓
Calcium	✓	✓	✓
Magnesium	✓	✓	✓
Sodium	✓	✓	✓
Potassium	✓	✓	✓
Chloride	✓	✓	✓
Sulphate	✓	✓	✓
Sulphide	✓	✓	✓
Bicarbonate	✓	✓	✓
Nitrate – nitrogen	✓	✓	✓
Nitrite – nitrogen		✓	
Cyanide	✓		
Total Alkalinity		✓	✓
Total Hardness		✓	✓
Total Dissolved Solids (TDS)	✓	✓	✓
Ion Balance	✓		
Metals			
Antimony	✓	✓	✓
Arsenic	✓	✓	✓
Barium	✓	✓	✓
Beryllium	✓	✓	✓
Cadmium	✓	✓	✓
Chromium	✓	✓	✓
Cobalt	✓	✓	✓
Copper	✓	✓	✓
Lead	✓	✓	✓
Mercury	✓	✓	✓
Molybdenum	✓	✓	✓
Nickel	✓	✓	✓
Selenium	✓	✓	✓
Silver	✓	✓	✓
Thallium	✓	✓	✓
Vanadium	✓	✓	✓
Zinc	✓	✓	✓
Organic Parameters			
Dissolved Organic Carbon	✓	✓	✓
BTEX	✓		
Total PCBs	✓	✓	✓

Table 9. Soil and Vegetation Analytical Scope.

Parameter	Vegetation	Soils	Moss Bag
General parameters			
Electrical Conductivity		✓	
pH		✓	
Macronutrients	✓		
Non-Routine			
Aluminum	✓	✓	
Antimony	✓	✓	✓
Arsenic	✓	✓	✓
Barium	✓	✓	
Beryllium	✓	✓	✓
Boron	✓	✓	✓
Cadmium	✓	✓	✓
Calcium	✓	✓	
Chromium	✓	✓	✓
Cobalt	✓	✓	
Copper	✓	✓	✓
Iron	✓	✓	✓
Lead	✓	✓	✓
Lithium	✓	✓	
Magnesium	✓	✓	
Manganese	✓	✓	✓
Mercury	✓	✓	✓
Molybdenum	✓	✓	✓
Nickel	✓	✓	✓
Potassium	✓	✓	
Selenium	✓	✓	✓
Silver	✓	✓	
Sodium	✓	✓	
Strontium	✓	✓	
Sulphur	✓	✓	✓
Thallium	✓	✓	
Tin	✓	✓	✓
Titanium	✓	✓	
Uranium	✓	✓	
Vanadium	✓	✓	✓
Zinc	✓	✓	✓
Zirconium	✓	✓	
Organic Parameters			
Total & Congener PCB	✓	✓	
Dioxin/Furans	✓	✓	

Table 10. Wildlife Analytical Scope.

Parameter	Standard Program	Expanded Program (every 5 years)
Routine Parameters		
Calcium	✓	✓
Magnesium	✓	✓
Potassium	✓	✓
Sodium	✓	✓
Fluoride	✓	✓
Metals[1]		
Antimony		✓
Arsenic		✓
Barium		✓
Beryllium		✓
Cadmium		✓
Chromium		✓
Cobalt		✓
Copper		✓
Lead		✓
Mercury		✓
Molybdenum		✓
Nickel		✓
Selenium		✓
Silver		✓
Thallium		✓
Vanadium		✓
Zinc		✓
Organic Parameters		
Aroclor PCB		✓
Total & Congener PCBs (by HRMS)	✓	✓[2]
Dioxins/Furans/TEQ	✓	✓[2]

[1] Metals analysis in the expanded program, is conducted on samples from the 10 standard program sites only

[2] The organic parameters specified will be included for samples from the 10 standard program sites only

Table 11. Surface Water, Sediment, and Fish Analytical Scope.

Parameter	Surface Water	Sediment	Fish
General Parameters			
pH	✓		
Conductance	✓		
Calcium	✓		
Magnesium	✓		
Potassium	✓		
Sodium	✓		
Chloride	✓		
Sulphate	✓		
Bicarbonate	✓		
Nitrate – nitrogen	✓		
Total Dissolved Solids	✓		
Metals			
Antimony	✓	✓	✓
Arsenic	✓	✓	✓
Barium	✓	✓	✓
Beryllium	✓	✓	✓
Cadmium	✓	✓	✓
Chromium	✓	✓	✓
Cobalt	✓	✓	✓
Copper	✓	✓	✓
Lead	✓	✓	✓
Mercury	✓	✓	✓
Molybdenum	✓	✓	✓
Nickel	✓	✓	✓
Selenium	✓	✓	✓
Silver	✓	✓	✓
Thallium	✓	✓	✓
Vanadium	✓	✓	✓
Zinc	✓	✓	✓
Selected Dissolved Metals (e.g. Al)	✓		
Organic Parameters			
Total Organic Carbon	✓	✓	
Total & Congener PCBs (by HRMS)		✓	✓
Dioxins/Furans		✓	✓
Total Inorganic Carbon	✓		
Dissolved Organic Carbon	✓		
Dissolved Inorganic Carbon	✓		