MUNICIPALITY OF GRISE FIORD

Operation & Maintenance Plan for Municipal Water Licence: Solid Waste Disposal Facilities

December 2025

Updated by:
Government of Nunavut
Transportation and Infrastructure Nunavut and Dillon Consulting Limited

Document Control

Date	Document Title	Author	Details
October 2020	Solidwaste Operation and Maintenance Plan	Unknown	Previous manual
December 2025	Municipality of Grise Fiord Operation & Maintenance Plan for Municipal Water Licence: Solid Waste Disposal Facilities	Government of Nunavut, Transportation and Infrastructure (GN-TIN)	Consolidation of previous information into standardized template, addition of best practices for open burning, update to community population

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1.0 Site Description

Date this plan was prepared: December 2025

1.1 Location of the Solid Waste Disposal Facility (SWDF)

Municipality:	Grise Fiord
Latitude:	76°25'34.71"N
Longitude:	82°55'4.94"W
Proximity to Town:	0.8km NW
Landfill Dimensions:	345 m x 200 m
Metal Waste Area Dimensions:	Undefined

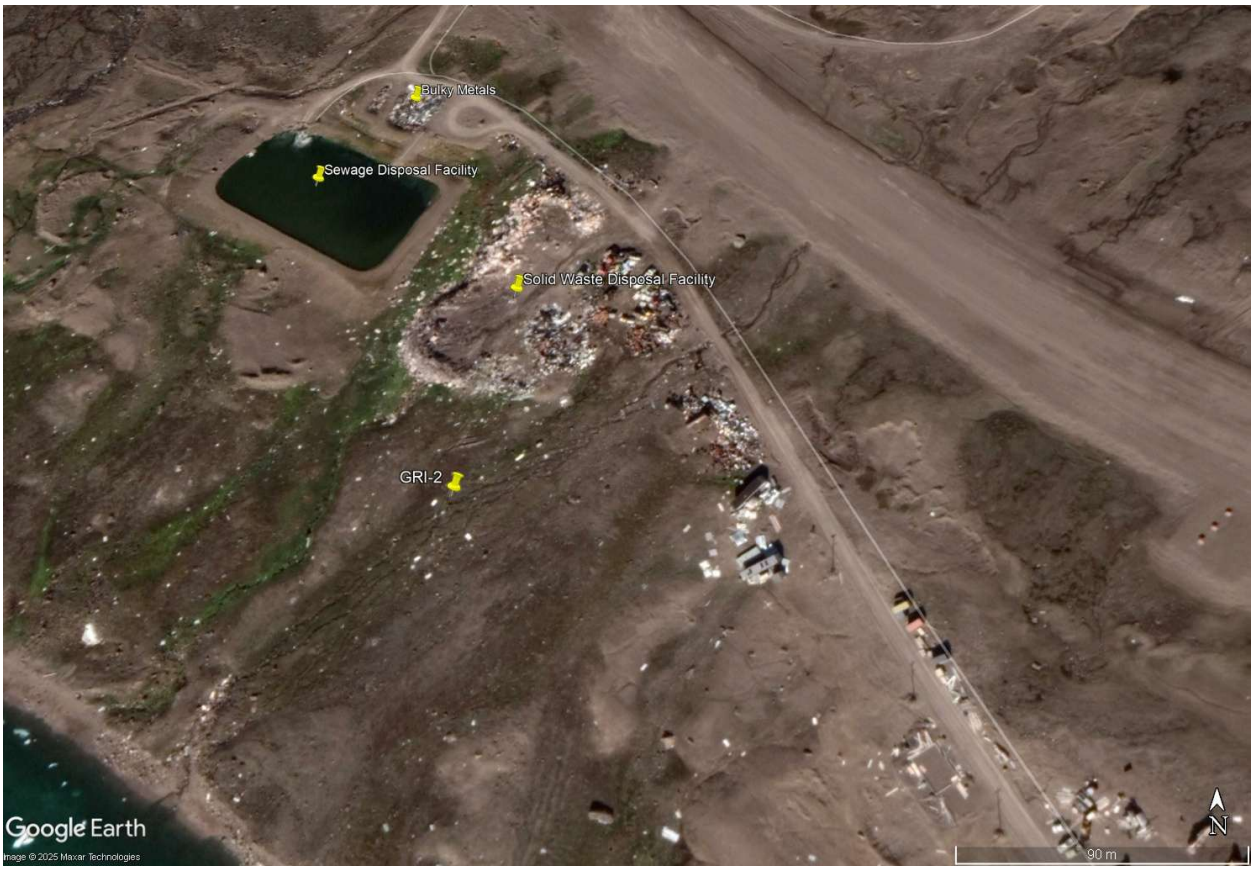


Figure 1: Municipality of Grise Fiord Solid Waste Disposal Facility. (Google Earth, 2025)

1.2 SWDF Site Summary

Year of commissioning the SWDF: Unknown

Design life of the SWDF: Unknown

1.2.1 Site History

The Municipality of Grise Fiord is located on the Southern tip of Ellesmere Island by the Baffin Bay. Located approximately 1,160 km North of the Arctic Circle, Grise Fiord has a population of 144 (Statistics Canada, 2021) and is in the Qikiqtaaluk Region of Nunavut.

Grise Fiord has a climate which consists of short cool summers and long cold winters. Annual snowfall and rainfall are approximately 118 cm and 15 cm, respectively. The typical temperature range for January is between a low of about -29°C and a high of about -23°C whereas in July, the temperatures range between a low of 3°C to a high of about 7°C. Usually, freeze up occurs during the month of November but it may happen as early as October or even September. In some years, early freeze up may thaw again before final freeze up occurs. Spring thaw typically takes place during the month of July, but the time frame can vary as much as freeze up. During spring runoff, the community experiences mild flooding.

The community uses trucked services for both solid waste retrieval and disposal.

1.2.2 Ground Conditions

Grise Fiord is cradled by the Arctic Cordillera Mountain range. Topography consists of areas of moss surrounded by rock outcrops, bedrock and steep cliffs. Grise Fiord lies within the continuous permafrost zone. The Permafrost Map gives a permafrost and ground ice classification symbol of ‘Cl’ for Grise Fiord. This classification means that approximately 90% to 100% of the land area is underlain by permafrost, and that the ground ice content in the upper 10 m to 20 m is (% by volume of visible ice) is low (<10%). This includes segregated ice, intrusive ice, reticulate ice veins, ice crystals, and ice coatings on soil particles.

2.0 Staff

2.1 Senior Administrative Officer

Name: David General

Phone: 867-890-9959

Email: gfsao@qiniq.com

Responsibilities:

The SAO manages the municipal staff to ensure that:

- Proper operation of the SWDF is carried out
- Sampling and inspections are completed
- Information under the water licence monitoring program is provided to the Government of Nunavut Department of Community and Government Services (GN-CGS) for Annual Report preparation

2.2 Foreman

Name: Chris Dederick

Phone: 867-980-9060

Email: gfforeman@qiniq.com

Responsibilities:

- Daily operations and maintenance of the SWDF
- Managing waste collection
- Proper segregation of waste
- Compacting and burning of waste
- Completing inspections and other maintenance activities
- The leachate sampling program at the monitoring stations
- Maintaining signage at the SWDF and monitoring stations

2.3 Solid Waste Truck Drivers

Name: Various

Phone: N/A

Email: N/A

Responsibilities: The drivers collect solid waste within the municipality from storage containers and deliver it to the SWDF.

3.0 Health and Safety

All personnel working within the SWDF must follow the Nunavut Safety Act and be made aware of potential health hazards associated with working around solid waste. This is imperative so individuals make a conscious effort to perform all necessary safety procedures to protect themselves, their co-workers and family members at home. Safety precautions include:

- Ensure all equipment is kept as clean as possible
- Protective clothing such as coveralls, gloves, boots, and safety glasses are to be provided to personnel and always worn when working around waste
- Workers must always wear protective gloves
- Work clothing is not worn home
- Workers must wash their hands with soap and water on a regular basis, especially before delivering drinking water, eating, and before going home
- Workers must keep their vaccinations up to date

4.0 Security and Control

Access Control of the facility:

- Perimeter fencing around the SWDF
- Signage
- 450 m restricted land use development setback surrounding the SWDF

5.0 Facility Operations

5.1 Municipal Waste Disposal

Municipal Waste Collection:	Trucked pick-up
Other Waste:	Drop off
Number of days per week waste is collected:	5
SWDF Type:	Natural attenuation

Type of waste received at the SWDF:

- MSW
- Bulky metal waste
- Hazardous
- Industrial, construction and institutional

Overview of the SWDF:

The Municipality's current SWDF is 0.8 kilometers northwest of the community, in proximity to the sewage lagoon. Monitoring stations are located in the discharge areas of the solid waste site and the sewage treatment lagoon. The site is approximately 345 meters by 200 meters in size. The existing Solid Waste Management Facility (SWMF) contains the following features:

- An area that contains general household, commercial and institutional wastes, hazardous waste, construction and demolition waste, and other bulky materials;
- An adjacent area for bulky and metal waste material located at the east and west side of the main waste area;
- The airport runway is located northeast of the main waste area;
- The sewage waste treatment lagoon is located immediately east of the SWMF; and,
- Three seasonal streams that convey surface water from the solid waste disposal site, and surface drainage from northeast of the solid waste disposal facility to the ocean.

The current site is at capacity and is characterized as a non-engineered facility with no environmental controls. The Government of Nunavut (GN) engaged EXP Services Inc. (EXP) to complete a feasibility study for the development of a SWMF to provide future solid waste disposal capacity for the Municipality of Grise Fiord. The design of a new SWMF incorporates Nunavut Best Practices for a modified landfill site. As currently developed at this conceptual stage, it will include four bermed cells for the separation of waste.

Generation Data:

A capacity analysis was prepared for the Municipality based on the results of a waste audit completed by EXP in March 2018. The capacity was projected over a 20-year period, starting in 2021 (i.e., the anticipated year operation of the new site is expected to begin).

The waste audit measured residential waste collected from approximately 31 households during the week of March 28, 2018. The residential municipal solid waste (MSW) was sorted and measured based on weight. The total annual volume of residential waste collected was estimated through interviews with the Municipality's collection staff. For this capacity analysis, estimated uncompacted volumes of residential waste collected were calculated using published weight to volume waste conversions.

The volume of commercial MSW was estimated through two methods:

- Facility Manger / Operator / Staff Interviews - interviews were held with staff from the local Co-op store, Grise Fiord Public School, Health Centre, RCMP office, Power Corporation office, and the Nunavut Housing Association. These interviews were used to quantify the number of waste collection trips, typical fullness of collection vehicle, and reported composition of key wastes.
- Visual audits – A visual inspection was undertaken of the waste stored at the facility and used to corroborate the composition of key wastes as reported in the interviews.

The volume of MSW generated over the life of the 20-year landfill was extrapolated based on population projections from the Nunavut Bureau of Statistics. The population projections supplied by the Bureau are for the period 2014 to 2035. For the years 2036 to 2038, the peak projected population between 2014 and 2035 was used to be conservative. Over the 20-year lifespan of the landfill, the total amount of MSW was projected to be 58,581 m^3 (uncompacted).

It is a common practice for waste to be compacted once it enters a landfill. Assuming a compaction rate of 3:1, the total estimated volume of landfill space required for MSW at the Grise Fiord landfill is 19,527 m^3.

The volume of bulky waste was calculated based on reported waste audit values and per capita values as reported in the Nunavut Solid Waste Management Plan, unless otherwise noted. The estimated volume of bulky waste generated in the municipality over the landfill's 20-year life span is 1,913 m^3 (1,622 m^3 for bulky wastes and 291 m^3 for bulky metal waste). This is based on the approximate annual (2018) generation of the following bulky waste materials:

- Bulky Metal Wastes:
    - Appliances – 2 m^3 (0.8 tonnes);
    - Oil tanks – 3.1 m^3 (0.14 tonnes);
    - End of Life Vehicles (ELV) – 9.0 m^3 (5.4 tonnes).
- Other Bulky Wastes
    - Tires – 0.34 m^3 (0.13 tonnes);
    - Wood waste (including C&D waste) – 70.4 m^3 (17.8 tonnes); and
    - Other C&D waste – 7.8 m^3 (0.82 tonnes)

Operations:

- The SWDF needs to be properly signed to inform operators and residents of the correct location to dispose of or store certain wastes. At a minimum, the SWDF should have disposal/storage areas for:
    - Domestic non-burnable waste (for landfilling)
    - Hazardous waste
    - Bulky Metal waste
    - Domestic burnable waste
- The waste truck driver collects municipal solid waste (MSW) from community buildings five times per week. The non-compactor truck is used to collect and transport municipal waste to the SWDF.
- The Waste Truck Driver is also responsible for ensuring collected waste is properly segregated and refusing the collection of hazardous waste if present. If properly trained, this individual may also be required to operate heavy equipment within the solid waste disposal facility

5.2 Open Burning

Operations:

- Wastes for burning are identified and separated. Burning should only occur at the designated location at the SWDF and when winds are light and blowing away from the community. To prevent incomplete combustion and/or leachate from contaminated ash residual from impacting any surrounding waters, waste that cannot be burned includes:
    - Non-wood building / construction materials (e.g. Styrofoam, roofing materials, electrical wire, insulation, plastics, asbestos, etc.)
    - Treated wood (e.g. telephone poles, pilings, cribbing, foundation wood)
    - Asphalt & asphalt products
    - Tires
    - Hazardous wastes
    - Waste paint
    - Fuel & lubricant containers
    - Aerosol cans & other compressed gas containers (e.g. propane tanks)

- Staff shall burn municipal waste in accordance with the GN's Environmental Guideline for the Burning and Incineration of Solid Waste (2012):
    - Wastes that can be safely open burned include: paper products, paperboard packing including boxboard and carboard, untreated wood including lumber and plywood, and natural fiber textiles.
    - Anything that can be done to reduce the moisture of waste burned will decrease the amount of smoke produced and increase the completeness of combustion. Waste should be covered or stored inside sheds or other secure buildings to keep rain and snow out of the waste. This will also lessen the opportunity for wildlife to access the waste. If wet waste must be burned, the wet waste should be mixed or layered with dry waste to reduce the overall moisture content of the waste burned.
    - Large quantities of dark smoke indicate problems and inefficiencies with the combustion process and the generation of pollutants.
    - If waste is to be open burned on the ground, the use of deep or steep-walled 'pits' should be avoided as this will prevent the necessary turbulent mixing of oxygen with the burnable gases.
    - Any bottom ash not meeting the criteria set out in the *Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities* is considered to be a hazardous waste. This ash is not suitable for landfilling and its

management must comply with the *Environmental Guideline for the General Management of Hazardous Waste*.

- Keep records of when, how much and what waste was burned, how the waste was loaded into the burning device or incinerator, the amount of smoke and bottom ash generated, how the fire was started and any other information that would help remind the operator of what worked well, and what didn't.

- The Municipality will also apply for a permit to burn through the Fire Department. Controlling the open burn is extremely important to reduce the risk of uncontrolled fire and hazards to the public, employees, and the surrounding environment.
- The weather forecast must be checked prior to any burning. If heavy rain is or will be present, burning should be postponed (burning during heavy rain events may result in poor or incomplete combustion and the potential to generate harmful contaminants). Confirmation of wind speed and direction prior to any burning. If loose debris can be carried by the wind, burning should be postponed.
- The SWDF must be closed to the public during burn events
- Burning only in the designated burn area and ensuring burning does not occur in landfill piles.
- Presence of an attendant during initial stages of the burn and periodic inspection of the burn once it has been established.
- Maintaining a minimum of 5 m buffer zone around the burning area and all ensuring attendants or personnel remain upwind of the burn area.
- Confirmation the waste is no longer hot or burning prior to the addition of more waste or covering with granular material. This can be accomplished by moving around the ash and remaining materials to ensure the fire is out and material can cool.

After every burn, once the MSW is confirmed to be cold and not burning, the CAT bulldozer should push the ash and remaining material to the landfill tipping face.

5.3 Hazardous Waste Management

Hazardous wastes are those that are known to be dangerous due to their chemical, physical or biological properties, are no longer used for their original purpose, and are intended for recycling, treatment, disposal, or storage. All hazardous wastes require special handling, storage, and disposal methods to prevent human health and environmental exposure.

The Environmental Guideline for the General Management of Hazardous Waste (GN, 2010) provides information regarding the proper management of hazardous waste in Nunavut. The generator of any hazardous waste is ultimately responsible for ensuring it will be properly managed from is creation to its disposal. Generators typically use carriers to transport the hazardous waste to appropriate receivers for disposal.

The bulk metal/hazardous waste storage area is currently used to store hazardous wastes from the community. This area is filled but not bermed or lined and runoff from the facility presently flows into the sewage treatment wetland. If use of this area is to continue for storage of hazardous wastes, it is recommended that an engineered berm and liner system be installed as this will limit the amount of potentially hazardous leachate entering the surrounding environment.

The following hazardous waste operations and maintenance procedures deal with household hazardous wastes (HHW) only. Typical HHW which may be found in the municipality include:

- Pesticides and herbicides
- Paint
- Solvents (e.g., paint cleaners)
- Flammable liquids
- Corrosive cleaners
- Batteries (wet and dry cell)
- Used fuel and oil
- Corrosive Explosive Flammable Poison
- Certain items considered HHW cannot be stored at the MSW disposal facility, however. These include:
    - Ammunition, flares and explosives (including fireworks) – contact the RCMP for proper disposal
    - Prescriptions, medications, and bio-hazardous wastes (includes syringes) – dispose of these at the Nursing Station and/or Health Care Centre
    - Reactive chemicals – contact the Government of Nunavut Department of Environment (GN-DOE) office for disposal options

Contaminated soil can be accepted in a designated area and is typically stored in 205 L steel drums or bags approved for contaminated soil storage and must be shipped out of the municipality. Private entities responsible for creating the contaminated soil must contact the CAO to discuss storage options and provide a plan to ship the contaminants out of the municipality. The decision to store contaminated soil from industrial sources rests with the municipality.

Operations:

- The SWDF needs to have an area set aside as a hazardous waste storage area. This area should be fenced with a lockable gate and have appropriate storage options for expected HHW. This area also needs to be properly signed as the "Hazardous Waste Storage Area". Proper signage helps operators, as well as the general public when residents arrive to dispose of their wastes. This area is intended for storage only, not disposal.
- The bulk metal/hazardous waste storage area is intended for storage only, not disposal. It is expected that hazardous wastes will be stored for up to five years. This should be sufficient time for the community to build up enough waste to make it economical for a back haul out of the community to a licensed waste receiver.
- Since the SWDF is generally accessible to the public, residents can come and drop off HHW throughout the year. However, the general public should not have direct access to the Hazardous Waste Storage Area for health and safety reasons. A designated public drop-off area for HHW should be used. The public drop-off area should be tended to regularly by the Foreman.
- Inspection of the hazardous waste storage area should occur weekly inspections by the Foreman.

5.3.1 Storage

Hazardous waste storage containers are designed to hold, store and transport small quantities of waste. Many different types of containers are available (i.e. barrels, bottles, bags and boxes) and are made from a variety of materials (i.e. aluminum, plastic, steel, and stainless steel). Selecting the proper container requires an understanding of the properties of the waste to be stored. If transport is to be undertaken, the generator should consult the Transport Authority to confirm the container meets all legislated requirements. The following are additional general points for consideration:

- Hazardous waste should be stored in their original containers where possible or in containers specially manufactured for the purpose of storing hazardous waste. The containers must be sound, sealable and not damaged or leaking. Sea can is the best option.
- Containers should be clearly labeled to identify their contents according to requirements of the Workplace Hazardous Materials Information System (WHMIS) and the relevant Transport Authority, if transport is planned.
- Small quantities of compatible hazardous waste should be bulked into 16 gauge or equivalent metal or plastic 205 litre (45 gallon) drums for the purpose of secondary containment.
- Containers should be closed and sealed at all times, except while waste is being added or removed.

It is important to know which types of waste do not mix well when storing them. This helps prevent violent, explosive reactions and toxic fumes. To store wastes safely, different systems have been created. One example is the 'Hazardous Waste Compatibility Chart' adopted by the United States' Environmental Protection Agency.

All HHW collected needs to be properly stored in sea cans to minimize any environmental and human health hazards. The GN-DOE provides information on proper storage of specific HHW; these include:

- **Antifreeze** – use original containers where possible, or bulk-store waste antifreeze into good condition 16 gauge or lower gauge steel or plastic 205 L drums.
- **Batteries** – bulk-store waste batteries into good condition 16 gauge or lower gauge steel or plastic 205 L drums, or other form of containment away from weather; wooden pallets should be used to keep batteries and containers off the ground during storage and transport.
- **Fluorescent light tubes/compact fluorescent light bulbs** – use original containers where possible and prevent breakage of light tubes/bulbs; keep away from weather.
- **Ozone Depleting Substances (ODS)** – do not landfill; wastes with ODS (i.e., refrigerators and refrigeration equipment, vehicle air conditioners, ODS-containing fire extinguishers (typically purchased before 1997) should be diverted to the bulk metal waste disposal area. The Hamlet can hire technicians to remove ODS from stored equipment.
- **Paint** – use original containers where possible, or bulk-store compatible paints into good condition 16 gauge or lower gauge steel or plastic 205 L drums; do not mix different types of paint (i.e., alkyd and latex).
- **Solvent** – use original containers where possible, or bulk-store compatible waste solvents into good condition 16 gauge or lower gauge steel or plastic 205 L drums.

As the Hamlet currently stores waste oil in drums at the bulk metal/hazardous waste storage area (if not burned within BLCS' waste oil burners), it is recommended they register the site as a hazardous waste storage facility with the GN-DOE Environmental Protection Services (R. Eno, pers. comm.).

5.3.2 Classifications of Dangerous Goods:

Class 1 – Explosives

Class 2 – Compressed Gases
- Division 2.1 – Flammable Gases
- Division 2.2 – Non-flammable and Non-toxic Gases
- Division 2.3 – Poison Gases

Class 3 - Flammable Liquids

Class 4 – Flammable Solids
- Division 4.1 – Flammable Solids
- Division 4.2 – Spontaneously Combustible
- Division 4.3 – Water Reactive

Class 5 - Oxidizing Substances and Organic Peroxides
- Division 5.1 – Oxidizing Substances
- Division 5.2 – Organic Peroxides

Class 6 - Toxic and Infectious Substances
- Division 6.1 – Toxic Substances
- Division 6.2 – Infectious Substances

Class 7 - Radioactive Materials 2

Class 8 - Corrosives

Class 9 - Miscellaneous

1. Class 1 substances (Explosives) are regulated by Natural Resources Canada under the Explosives Act.
2. Class 7 substances (Radioactive Materials) are regulated by the Canadian Nuclear Safety Commission under the *Nuclear Safety and Control Act and Nuclear Liability Act.*

6.0 Maintenance

Overview of Maintenance Activities:

- Annual inspections will be undertaken by Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) accompanied by a licensee and/or a licensee representative from GN-CGS. The inspection report and recommendations will be reviewed by a GN-CGS municipal engineer and submitted in the Annual Report submitted to the Nunavut Water Board (NWB).
- Regular visual inspections by municipal staff of the:
  - Berms
  - Fence
  - Signage
  - Presence of water runoff in the SWDF

Any issues identified by municipal staff must be reported to the regional municipal engineer. Follow-up actions will be undertaken by the municipality with technical support from the GN-CGS.

7.0 Monitoring

Regulatory Inspection:

The annual Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) inspection will take place accompanied by the licensee from the Municipality and/or with a licensee representative from GN-TIN. The inspection will be reviewed by a GN-TIN municipal engineer and submitted with the annual report.

Table 1: Licence Requirements Related to O&M of the SWDF

Requirements	Reported
The Licensee shall sample at Monitoring Program Stations GRI-2 and GRI-4, according to the frequency established under Part H, Item 1, during periods of observed flow.	Reported in Annual Report

Table 2: Monitoring Program Station Description and Locations

Station	Description	Latitude	Longitude
GRI-2	Effluent discharge from the Final Discharge Point at the Solid Waste Facility	76°25'31.66"N	82°55'7.70"W

8.0 Surface Water Management

At some point, for a variety of reasons, impacted water may accumulate in the landfill, hazardous waste storage area, or the bulky metals area. The water may or may not be impacted by leachate, hazardous wastes, or contaminants from land farmed soil. In the event this occurs, the following procedures will be followed:

- Collect samples from the water licence monitoring program at stations as outlined in the Environmental Monitoring Program and QA/QC Plan. It is recognized that it may take some time for results to be received from the accredited laboratory.
- Analyze samples for parameters of concern and compare the results to the relevant Canadian Water Quality Guidelines.
- Water should be inspected for odours, stain, or signs of visible impact (sheens, floating scum).
- Consult with the GN-TIN municipal engineer and CIRNAC on discharge options.

9.0 Modifications and Upgrades

Planned modifications or upgrades:

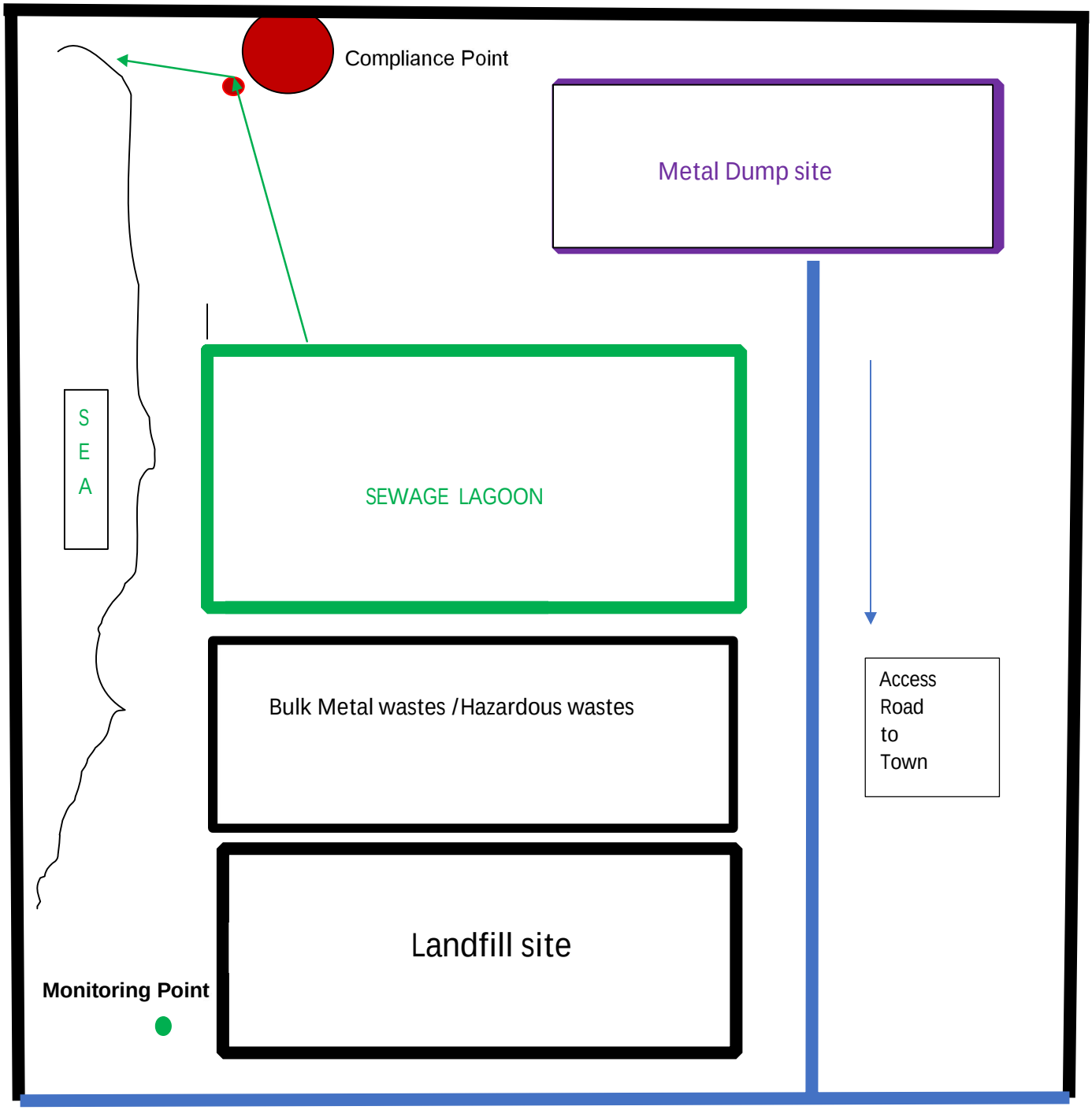
Upgrades to expand the SWDF are planned.

10.0 Previous Reports

- Solidwaste Operation and Maintenance Plan, Unknown, 2020

Appendix A

Site Plan Drawings


Compliance Point
Metal Dump site
S
E
A
SEWAGE LAGOON
Bulk Metal wastes /Hazardous wastes
Access
Road
to
Town
Landfill site
Monitoring Point