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# Solid Waste Disposal Facility, Norman Wells, NT "OPERATIONS & MAINTENANCE MANUAL"



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## ACRONYMS

Bulky Items	Household waste that could include furniture, appliances and white goods
Designated Substances	Occupational Health & Safety Regulations (NWT Reg. 039-2015) identifies biological, chemical and physical agents that can be a risk to human health through inhalation, ingestion or skin contact
ENR	Environment and Natural Resources
E-Waste	Electronic equipment that can include computers, lap tops, printers, Cell phones, batteries, televisions and monitors
GNWT	Government of Northwest Territories
HAZMAT	A material (such as flammable or poisonous material) that would be a danger to life or the environment if released without precautions.
Hazardous Waste	A waste which because of its quantity, concentration, or characteristics, may be harmful to human health or the environment when improperly treated, stored, transported or disposed" (MVLWB 2011)
HHW	Household Hazardous Waste
IC&I	Institutional, Commercial & Industrial
Licence	SLWB issued Water Licence S18L3 – 003 (dated November 19,2018)
MACA	Department of Municipal Affairs and Community Affairs
MVLWB	Mackenzie Valley Land and Water Board
NT	Northwest Territories
Town	Town of Norman Wells
SLWB	Sahtu Land and Water Board
SNP	Surveillance Monitoring Program



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## ACRONYMS

SWDF	Solid Waste Disposal Facility
TDG	Transport of Dangerous Goods Legislation
THWCA	Temporary Hazardous Waste Containment Area

## DEFINITIONS

**Act** – the Waters Act

**Animal Carcasses** – means all forms of waste from dead animals including parts

**Animal Waste** – means excreted materials from live animals but does not include disposal diapers

**Appliances** – mean any large household appliance including, but not limited to, refrigerators, freezers, stoves, dishwashers, bathtub, air conditioners, washing machines, clothes dryers and hot water heaters

**Biomedical Waste** – means medical waste that requires special handling and disposal because of environmental, aesthetic, and health and safety concerns as well as risks to human health and includes: (a) human anatomical waste, (b) infectious human waste, (c) infectious animal carcasses and waste, (d) microbiological waste, (e) blood and body fluid waste, and (f) medical sharps such as needles, syringes, blades, or other clinical or laboratory materials capable of causing punctures or cuts

**Bulky Waste** – means all solid waste that exceeds the size or weight restrictions for regular collection process

**By-Law Enforcement Officer** – means a own employee with the authority to enforce any by-law adopted by Council

**Board** – the Sahtu Land and Water Board established under Part 3 of the Mackenzie Valley Resources Management Act

**Closure** – the permanent dismantling of one or more components of the Project with the intent of making the components incapable of its intended use. This includes the removal of associated equipment and structures used in the construction or maintenance of the Project.

**Commercial Waste** – means all solid waste generated by a commercial premise or operation except for special and unacceptable waste

**Construction** – any activity undertaken during any phase of the Project to construct or build any structure, facilities, or components of, associated with, the development of the Project.

**Construction Waste** – means any form of solid waste material including wood product, concrete, steel, iron, miscellaneous metals, gypsum product, clay product, non-contaminated soil or other granular fill, plastics and insulation that is generated at a construction or demolition site, but does not include hazardous waste

**Discharge** – any direct or indirect release of any Waters or Waste to the Receiving Environment.

**Fees** – mean the fees levied and collected by the Town of Norman Wells, for solid waste deposited at the Solid Waste Disposal Facility

**General Medical Waste** – means non-hazardous medical waste and includes soiled dressings, sponges, surgery drapes, lavage tubes, casts, catheters, disposable pads, disposable gloves, dressings, sponges, catheters, specimen containers, lab coats and aprons, tubing, filters, towels and disposable sheets, but does not include biomedical waste

**Generator** – means the owner or person in charge, management or control of a waste or a facility that generates waste

**Hazardous Waste** – means any solid waste presenting an actual or potential danger to human health and safety and to the environment including, but not limited to asbestos, batteries, antifreeze/glycol,



used oil, vehicles, waste fuel, drums, paint, compressed gas cylinders, mercury containing equipment, ozone depleting substances, and material requiring placards or labels as identified by Transport Canada under the Transportation of Dangerous Goods Regulations and as defined in the Government of the Northwest Territories "Guideline for Hazardous Waste" (October 2017)

**Household Waste** – means all solid waste generated by residential premises except for special waste

**Industrial Waste** – means all solid waste except for special and unacceptable waste generated by any enterprise involved with manufacturing, fabrication, processing including commercial or institutional operations

**Institutional Waste** – means all solid waste generated by an institutional premise including general medical waste but does not include special and unacceptable waste

**Inspector** – and inspector designated by the Minister under subsection 65(1) of the Act.

**Landfill Leachate** – is a liquid produced by rain or snowmelt passing through waste picking up chemicals that can be high in organic and inorganic pollutants

**Licensee** – the holder of the licence

**Modification** – in respect to a structure, means a change, other than an expansion, that does not alter the purpose or function of a structure.

**Municipal Solid Waste** – Also called garbage or trash, is nonhazardous disposable materials generated by households, institutions, and Industries. It is made up of waste, organics and recyclable materials with the municipality overseeing the disposal.

**Project** – the undertaking described in Part A, condition 1 ( SLWB Licence )

**Receiving Environment** – the natural environment that receives any deposit of Discharge of Waste or Water, including runoff, from the Project.

**Reclamation** – the activities which facilitate the return of areas affected by the Waste Disposal Facilities to a viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment, human activities, and surrounding environment.

**Recyclables** – means types of solid waste that can be processed and used again designated for disposal at a recycling depot or at designated areas of the Solid Waste Disposal Facility

**Regulations** – Regulations proclaimed pursuant to section 63 of the Act.

**Run-off** – the overland flow of water that occurs when excess precipitation, meltwater, or other Water is not absorbed by the earth's surface, and instead drains down slope towards a watercourse.

**Salvageable Waste** – means reusable solid waste that has been deposited at designated areas of the Solid Waste Disposal Facility

**Segregated Waste Disposal Areas** – defined areas identified within the Solid Waste Disposal Facility set apart for the deposit of specific bulky waste materials.

**Solid Waste Collection Contractor** – means the person who has an existing legal right granted by the Town of Norman Wells for the collection from designated bins and the transportation to the Solid Waste Disposal Facility as well as any other operations related to the solid waste collection as per contract

**Solid Waste Disposal Facility Contractor** – means the person who has an existing legal right granted by the Town of Norman Wells for the cover material supply and equipment supply at the Solid Waste Disposal Facility as well as any other operations related to the solid waste disposal as per contract

**Solid Waste Disposal Facility** – comprises the area and associated structures designated to contain solid wastes, that includes the municipal solid waste disposal areas and the bulky solid waste disposal areas.

**Solid waste Disposal Facility Operator** – means a person employed by the Town of Norman Wells and designated by the Public Works Manager to carry out specific duties at the Solid Waste Disposal Facility including but not limited to gate operations, scale operations, vehicle spotting and waste screening, site maintenance, drainage operations, equipment operations, regulatory compliance, administrative duties, safety measures

**Special Waste** – means : (a) animal carcasses except from wildlife; (b) animal waste; (c) appliances; (d) asbestos; (e) bulky waste; (f) construction waste; (g) furniture; (h) hazardous waste generated by individuals; (i) non-contaminated soil; (j) salvageable waste; (K) scrap steel and metal; (l) tree branches, stumps, roots and logs; (m) vehicles and vehicle parts including tires; (n) yard waste; and any other solid waste that requires special handling as designated by the Public Works Manager from time to time and/or the payment of specified tipping fees as set out in Schedule "A" of Solid Waste By-Law.

**Spill Contingency Plan** – a document, developed in accordance with the Aboriginal Affairs and Northern Development Canada's *Guidelines for Spill Contingency Planning*, that describes the set of procedures to be implemented to minimize the effects of a spill.

**Surveillance Network Program** – a monitoring program established to define environmental sampling, analysis and reporting requirements as details in Annex A of the SLWB Licence.

**Tag** – means the receipt provided by the Town of Norman Wells on the payment of the fees

**Temporary Hazardous Waste Containment Facility** – a bermed and lined area constructed and maintained for the temporary hazardous wastes.

**Traditional Knowledge** – the cumulative, collective body of knowledge, experience, and values built up by a group of people through generations of living close contact with nature. It builds upon the historic experiences of a people and adapts to social, economic, environmental, spiritual, and political change.

**Transfer Station** – means the designated bins at the front of the Solid Waste Disposal Facility.

**Unauthorized Discharge** – a release or Discharge of any Waters or Waste not authorized under the Licence.

**Unaccepted Waste** – means waste that is not accepted for disposal at the Solid Waste Facility: (a) biomedical waste; (b) hazardous waste generated by businesses and industries expect for asbestos and vehicles; (c) recyclables waste designated for disposal at a recycling depot; (d) contaminated soil; (e) animal carcasses from wildlife

**Vehicles** – shall include all registers or unregistered motorized vehicles and any type of water or aircraft whether or not they are capable of being operated either on a road or offroad, awter way or in the air.

**Waste(s)** – any substance defined as Waste by section 1 of the Act.

## 1. INTRODUCTION

### 1.1 Purpose

The purpose of this manual is to assist the Town of Norman Wells staff with the operation and maintenance of the Town’s Solid Waste Disposal Facility (SWDF). The development of the manual has been based on the guidelines provided in a number of documents;

- “Guideline for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories (Duong and Kent, 1996)
- Mackenzie Valley Land and Water Board (MVLWB) “ Operation and Maintenance Plan Templates for Municipal Water Licences: Solid Waste Facility”
- MVLWB “Municipal Water Licences : Roles and Responsibilities”
- MACA “ Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT (Ferguson Simek Clark, 2003)

The Town of Norman Wells is permitted to operate the SWDF under a Sahtu Land & Water Board licence that sets out specific conditions of operation and environmental monitoring. The conditions of operation are in place to ensure that the Town’s SWDF will not have an adverse impact on the natural environment (lands, waters, wildlife).

Refer to Appendix A for a copy of the current Licence and it’s conditions.

### 1.2 Site Location and Description

The Town of Norman Wells (Town) is located in the Mackenzie Valley and is part of the Inuvik Region of the Northwest Territories (NWT). Geographic coordinates of the SWDF are 85o17’ North Latitude, 126o52’ Longitude. The Town’s population is approximately 750.

The SWDF is located about 6.6 kilometres (drive distance) northeast of the Town centre and can be accessed from . The distance from the airport is approximately 3.5 kilometres. There is a Town quarry north-northeast of the SWDF that is used to provide cover material (limestone shale). Refer to Figure 1 – Site Location.

Topography of the landfill area can be described as a hill with an elevation of 140 to 160 metres above sea level. The elevation of the Town is about 60 metres above sea level. The Town has land tenure through a lease of the lands from the Northwest Territories Sahtu Region Lands. Figure 2 provides an aerial photograph of the SWDF taken in the winter of 2021.

The SWDF is surrounded by a chain link fence and an electric fence to deter wildlife access. There are two gated access points for either entry to the site or exit.

### 1.3 Service Area

The Town of Norman Wells SWDF is operated by Town personnel supervising the management of the operations and contracted services as required to complete construction works. The SWDF is permitted to receive municipal solid waste (MSW) from residential households, commercial, institutional, industrial (IC&I), construction and demolition wastes generated from within the Norman Wells community and surrounding areas.

### 1.4 Sahtu Land and Water Board Licence

To operate a solid waste disposal facility within the Sahtu Region a "Water Licence ( Type B ) " is required from the Sahtu Land and Water Board (SLWB). The SWDF operates under the conditions set out in Licence S18L3 – 003 (issued November 19, 2018) . The licence allows for the development, operation and environmental monitoring of the SWDF until its approved capacity is either filled, an expansion approval granted or until the date of November 18, 2038.

The authority of the SLWB to issue the licence is in accordance with "Mackenzie Valley Resource Management Act "and the " Waters Act " .

The licence is issued subject to specific conditions that must be complied with. The operation of the SWDF under these conditions does not relieve the Town from also having to comply with the requirements of other applicable federal, territorial, Tliche, Deline, or municipal legislation.

For the successful and compliant operation of the Town SWDF specific conditions need to be met as set out in the Licence.

Highlighted below are conditions that are of particular mention in regard to environmental protection and SWDF operational focus:

## General Conditions (Licence Part B)

- In conducting its activities under this licence, the Licensee shall make every reasonable effort to consider and incorporate any scientific information and Traditional Knowledge that is made available to the Licensee.
- The Licensee shall comply with all plans and programs approved pursuant to the conditions of this licence, including such revisions made as per conditions of this licence, and as approved by the Board.
- The Licensee shall comply with the **Surveillance Network Program**, which annexed to and forms part of this Licence, and at any changes to the Surveillance Network Program as may be made by the Board.
- The Licensee shall erect and maintain signage identifying the locations of the Solid Waste Cells, the Segregated Waste Areas, and the Temporary Hazardous Waste Containment Areas. The signage will be located and maintained to the satisfaction of the Inspector of the Board.
- The Licensee shall erect and maintain, to the satisfaction of the inspector, fencing around the perimeter of the Solid Waste Disposal Facility that is capable to deterring wildlife and unauthorized personnel from entering the site.
- The Licensee shall develop an access control strategy for the Solid Waste Disposal Facility to minimize the risks of illegal dumping and/or wildlife access at all times.
- Beginning March 31, 2019 and no later than every March 31 thereafter, the licensee shall submit an **Annual Water Licence Report** to the Board. The Report shall be in accordance with Schedule 1, Condition 1.

## Solid Waste (Licence Part D)

- The Licensee shall dispose of all solid waste at the Solid Waste Disposal Facilities in accordance with The Licensee shall collect windblown litter in the Solid Waste Disposal Facility and surrounding lands. Once in the spring and again in the fall of every year for the duration of the licence.
- The Licensee shall act in accordance with the approved **Hazardous Waste Management Plan**, and shall annually review the plan and make any necessary revisions to reflect changes in design, operation, and maintenance, or as directed by the Board. The proposed updates shall be submitted to the Board for approval and shall include a summary of revisions in the introductory section of the plan. The plan shall include, but not be limited to the following:
  - a) Design of the disposal site, including designation of areas for segregated Waste.
  - b) Methods of implementing reuse of hazardous Waste.
  - c) Detailed amounts and sources of hazardous Waste that are or not accepted.
  - d) Hazardous waste acceptance criteria.
  - e) Methods of disposal of hazardous Waste (including contaminated soil).
  - f) Secondary containment methods.

- g) A hazardous Waste manifest identifying all hazardous Waste being stored in the Temporary Hazardous Waste Containment Area;
- h) Hazardous waste tracking methods; and
- i) Record Keeping and reporting.

#### Operations and Maintenance (Licence Part G)

- The Licensee shall act in accordance with the approved **Solid Waste Disposal Facilities Operations and Maintenance Plan** and shall annually review the plan and make necessary revisions to reflect changes in the design, operation, and maintenance, or as directed by the Board. The proposed updates shall be submitted to the Board for approval, and shall include a summary of revisions in the introductory section of the plan. The plan shall be developed in accordance with the MVWLB and GWNT Operation and Maintenance Plan Templates for Municipal Licenses: Solid Waste Disposal Facility and Schedule 2, condition 2.

#### Closure and Reclamation (Licence Part I)

- Every three years following the previous approval, or as directed by the Board, the licensee shall submit to the Board for approval, a revised Closure and Reclamation Plan.

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## 2. BACKGROUND

### 2.1 Site History

Based on current knowledge the landfill's timeframe for when it was first established is 1997 prior to the development of the 2003 GNWT "Guidelines for the Planning, Design, Operations, and Maintenance of Modified Solid Waste Sites in the Northwest Territories".

The landfill has operated on the depression landfill method where waste is disposed of over ground and follows the topography of the site. The landfill has no liner or leachate collection and treatment system.

The landfill development plan presented in the 2008 Master Plan (approved under SWLB Licence S07L3 – 002, August 2, 2008) shows the SWDF being developed in four (4) phases. The actual landfill development as determined by AECOM report and surveys ("Norman Wells Landfill Expansion – Master Plan – Final" dated May 25<sup>th</sup>, 2018) has been filled and developed with three (3) phases.

The AECOM report was prepared to identify the opportunity of expanding the SWDF with two (2) new cells immediately south of the existing landfill.

Refer to Figure 1 for the site's location within the Town.

### 2.2 Site and Facility Description

The Town of Norman Wells is located within the Norman Range low sub-arctic ecoregion of the Taiga Plains ecozone. The description (Ecological Classification Group 2009) of the ecoregion's geology consists of dolomite and limestone bedrock overlain by fine to medium textured tills.

Brunisolic and Luvisolic soils are found in the Norman Wells area. Vegetation found around the site and Town of Norman Wells consists of trembling aspen, paper birch and spruce. Norman Wells is located in a zone of extensive discontinuous permafrost with 50 to 90% ice content (Natural Resources Canada 1993). The active layer thickness ranges from 0.5 to 2 metres below surface (UMA Engineering Ltd. 2008).

The SWDF has been in use since 1997 with a conversion to a modified landfill in 2008 and operated using the depression method for landfill waste materials. The conversion was completed to meet GNWT legislation and guidelines (AECOM 2017). The area of the SWDF covers approximately 5.6 hectares and is south sloping (refer to Figure 2).

The SWDF is surrounded by a chain link fence with electrical fencing for wildlife deterrence. There are two main entrances on the north side that provide for site access (bring waste in) and for exiting the site.

The SWDF does not have an engineered liner or active leachate collection (AECOM 2017) and operates as a natural attenuation landfill. A surveillance monitoring program of groundwater wells and surface water monitoring stations that are sampled on an annual basis provide detection of any environmental protection impacts.

As outlined by AECOM (2017) the Town's natural attenuation landfill is acceptable as a modified landfill because of: Town's small population being below 1,000 residents, small projected quantity of waste produced (approximately 4,781 cubic metres per year), low annual precipitation (approximately 290 mm per year), and the low mean annual near-surface ground temperature(-5oC). With these environmental and climate conditions the biodegradation of waste is relatively slow.

For reference and viewing of SWDF plans refer to Appendix B.

As shown in Figure 2 the SWDF site is divided into various areas;

- Active landfill cells (three phases) for disposal of residential, IC&I and collected wastes
- Temporary Hazardous Waste Storage Area
- Transfer Station
- Reuse / Salvage Area
- Appliances / Tires Storage Area
- Scrap Metals (Legacy Wastes ) Area

### 2.3 Site Capacity

Based on the determinations completed in Stantec's "SWDF Operations and Maintenance "report of August 22, 2018 the landfill capacity (airspace) remaining in Phases I, II, and III (active cells) will provide for waste filling up to 2024.

A topographic survey completed in the month of June 2021 confirmed that the remaining air space capacity is cubic metres.

Using the waste generation data provided in the Stantec report (2018) the estimated daily per capita waste generation is 4.8 kg which leads to a total estimated generation of 1,430 tonnes per year (or 4,707 cubic metres).

The development of the Town's SWDF was planned for 41 years of capacity in five (V) phases. Phase I, II and III are currently being used to accept and landfill waste. Phase IV and V are planned to be developed in 2025 and provide Norman Wells with landfill disposal for an estimated 13 years (2024 – 2038).



The development of Phase IV and V will require an expansion of the of the SWDF south beyond the existing boundary (fence line).

Expansion of the SWDF will require an exemption from the federal Norman Wells Airport Zoning Regulations (SOR/82-296) which came into force in June 2009. The SWDF is located within the airport's "outer surface zone" of 4,000 metres (measured from airstrip centre). Within this zone activities such as landfilling (attract birds) are prohibited.

#### 2.4 Temporary Hazardous Waste, Scrap Metals and Appliance / Tires Storage Areas

Under the Licence the SWDF is permitted to receive from household hazardous wastes (HHW) at the site for temporary storage prior to removal and transport to an approved disposal facility. The type of HHW that is received includes the following categories;

- Batteries
- Waste Oils
- Waste Fuels
- Antifreeze
- Compressed Gas Cylinders
- Paints

Residents also bring to the SWDF waste materials not collected through the residential collection services that include the following;

- Scrap metals such as vehicles, snow mobiles and ATVs
- Appliances (stoves, washers, dryers)
- Freon Appliances (refrigerators, air conditioners, freezers)
- Tires

Prior to 2021 (implementation of Solid Waste By-Law) the Norman Well's SWDF received all types of waste materials from all generators including IC&I hazardous wastes and scrap equipment. The storage of these materials is shown on Figure 2 and is considered to be "legacy wastes" that are to be processed and removed from the SWDF in the future under a MACA Regional program (2023 – 2025).

For each of the waste materials that are either a HHW or a bulky wastes received at the site they will be segregated from household or IC&I waste and placed in designated storage areas. Each of these waste materials will be stored within the proper containers (skids, totes, wire baskets) and protected to ensure that no fluids or discharge onto the ground occurs. Refer to Appendix C for the plans detailing the designated areas.

The proper handling methods to be followed by SWDF staff are detailed in Section 4 (Waste Disposal Operations). Safe handling methods for receiving and storing hazardous wastes are detailed in Section 8 (Safety Procedures) with training measures provided in Section 11 (Staff Training).

## 2.5 Solid Waste By-Law

The Town of Norman Wells passed a Solid Waste Management By-Law (No. 20-06) on the \_\_\_\_\_ of 2021.  
As stated in the pre-amble of the By-Law;

***"Being a By-Law of the Municipal Corporation of the Town of Norman Wells in the Northwest Territories to provide for the management of the solid waste collection and disposal in the interests of the health, safety and welfare of the Norman Wells residents and pursuant to the provisions of the Cities, Towns & Villages Act, S.N.W.T. 2003, c.22***

***WHEREAS pursuant to section 58 of the Cities, Towns and Villages Act, a municipal corporation may, for a municipal purpose, establish, deliver, and operate services, public utilities and facilities and in doing so shall, in a by-law:***

- (a) set the terms and conditions applicable to users,***
- (b) set reasonable rates or amounts of deposits, fees and other charges,***
- (c) provide for charging and collecting deposits, fees, and other charges,***
- (d) provide criteria for when service will be discontinued or refused, and***
- (e) provide for a right of entry onto private property to determine compliance with the terms and conditions of use;***

***AND WHEREAS, pursuant to section 70 of the Cities, Towns and Villages Act, a council may, among other things:***

- (a) regulate or prohibit activities,***
- (b) deal with any activity or things in different ways, divide each of them into classes and deal with each class in different ways,***
- (c) provide for a system of licences, permits or approvals including any or all of the matters listed therein, and***
- (d) provide remedies for the contravention of a by-law;***

***AND WHEREAS, pursuant to section 90 of the Cities, Towns and Villages Act, a council may, in a by-law respecting a public utility, provide for the prohibition or regulation of the discharge of substances and liquids into a waste management system;***

***AND WHEREAS the Town of Norman Wells deems it desirable and in the public interest to establish, operate, maintain and levy fees for a solid waste management system in the Town of Norman Wells.***

Appendix D provides a complete copy of the Solid Waste Management By-Law.

## 2.6 Facility and Operational Improvements

The Town of Norman Wells (Council, Staff) have been active in engaging with community members (residents, IC&I) on the identification of opportunities for improving and implementing new sustainable waste management practices and operations to implement at the SWDF.

A review of past ENR inspections of the SWDF and their observations have also been considered for developing a facility and SWDF operational improvement program. The new practices and operational methods that are being implemented include;

- gates at the entrance and exit of the SWDF will be locked during non-operating times,
- two (2) staff will be on site to supervise the receiving, segregating and disposal of waste,
- design and construction of designated HHW storage areas including inventory and record keeping to facilitate the storage, removal and proper disposal of wastes,
- design and implementation of a supervised waste placement sequence and cover program,
- design and setup of signage to guide SWDF users,
- setup and operation of a reuse / salvage shelter (recyclables, e-waste, wood, furniture),
- design of a legacy (industrial hazardous waste, scrap equipment) depolluting and removal program,
- Litter control fencing repair and installation to prevent litter from travelling off-site.
- SWDF registered to receive asbestos waste in compliance with GNWT guidelines for the Management of Waste Asbestos (2002).

### 3. SITE PERSONNEL

#### 3.1 Duties and Responsibilities

The SWDF is staffed by two (2) full time positions under the supervision of a Public Works Foreman who reports to the Public Works Manager who has overall responsibilities for the SWDF.

In general the overall operation of the SWDF is overseen by the Public Works Manager with the Public Works Foreman responsible for directing and supervision of the Landfill Co-ordinator who is responsible for the daily operation and maintenance of the facility. A solid waste operator is responsible for performing the required day to day tasks assigned by the Landfill Co-ordinator.

The following section outlines the responsibilities for the various positions mentioned above.

#### Public Works Manager

The Manager is responsible for (SWDF):

- Liaison between the Town Manager, Council and SWDF staff.
- Maintain liaisons with private sector generators, contractors, government agencies and suppliers
- The Manager shall:
  1. Ensure that Public Works Foreman is supervising the SWDF operations in accordance with the SLWB Water Licence, SWDF Operations & Maintenance Manual, applicable engineering drawings, and health and safety protocols.
  2. Prepare facility operating budgets, hire staff and select contractors.
  3. Communicate as required with regulatory agencies.
  4. Ensure that site staff and contractors receive required training.

#### Public Works Foreman

The Foreman is responsible for (SWDF):

- Liaison between the Public Works Manager and landfill staff
- Ensure that landfill staff maintain and operate in a clean and safe manner at all times and in compliance with the Water Licence, GWNT environmental and waste regulations and Northwest Territories Safety Act and Regulation.
- Supervise the SWDF operations in accordance with the SLWB Water Licence, SWDF Operations & Maintenance Manual, applicable engineering drawings, and health and safety protocols.
- Coordinate the preparation of landfill areas for operation, and identify the requirement for establishment of surface water control measures.
- Work with the Public Works Manager to research and develop ways to increase and promote waste diversion initiatives in an effort to prolong the lifespan of the landfill cells.

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### Landfill Coordinator

The Landfill Coordinator is responsible for the site operation and maintenance requirements at the SWDF:

The Landfill Coordinator reports to the Public Works Foreman and is responsible for the following:

- Supervise the Landfill Operator and contractors,
- Deal with the public and businesses using the SWDF and respond to disposal requests,
- Perform operations at the SWDF in accordance with the SLWB Water Licence, operations and maintenance manual, applicable engineering drawings, and documents related to health and safety protocols and management plans,
- In consultations with the Foreman, ensure acceptable wastes are received at the SWDF for landfilling or segregation for temporary storage.
- Prepare regular scheduled reports on operations, project progress and planning,
- Provide overall direction for daily activities,
- Conduct work in accordance with the City's Occupational Health and Safety program and the Northwest Territories Safety Act and Regulations,
- Make recommendations to the Foreman for repair works required to site equipment and facilities,
- Ensure that the SWDF is maintained and operated in a clean and safe manner at all times including litter control and collection,
- Coordinate snow removal and general maintenance for the access roads within the site and others areas as necessary,
- Operate and maintain ground water monitoring and surface water control structures and other site infrastructure,
- Undertake site security checks and inspections, reporting any issues to the Foreman,
- Ensure adequate signage and traffic control devices are in place in coordination with the Foreman,
- Supervise all duties related to the identification and recording for incoming vehicles and inspection of incoming waste,
- Perform other duties as may be assigned by the Foreman.

### Landfill Operator

The SWDF operator is responsible for the tasks assigned to them by the Landfill Coordinator. This position typically address both the ongoing and periodic general site operation and maintenance requirements.

The landfill operator reports directly to the Landfill Coordinator and are responsible for the following:

The Landfill operator shall:

- Perform duties as assigned by the Landfill Coordinator,
- Accurately fill out work orders for tracking purposes,
- Conduct work in accordance with the procedures set out in the Operations and Maintenance Manual; and
- Conduct work in accordance with the Town's Occupational Health and Safety Program and the Northwest Territories Safety Act and Regulations

### 3.2 Personnel Training

The Town is responsible for the training of staff. SWDF staff are trained to perform his or her job in a safe and environmentally responsible manner, in accordance with all applicable health and safety and environmental protection regulations.

SWDF staff receive training through courses offered by MACA, Solid Waste Association of North America (SWANA North Lights Chapter) and consultants with experience in the operation of solid waste facilities.

Training courses offered by the SWANA include the Landfill Operator Course and Manager of Landfill Operations.

SWDF staff attend regular bi-weekly safety meetings at which any safety issues are brought up for discussion or urgent safety issues as required. All staff are to be familiar with and abide by the Town's Occupational Health and Safety Program and the Northwest Territories Safety Act and Regulations. All staff are required to complete Workplace Hazardous Materials Information System (WHMIS), Transportation of Dangerous Good (TDG), fire safety, asbestos training, and first aid training.

SWDF staff managing and/or handling accepted hazardous wastes are trained in the proper methods for managing the hazardous waste, as well as the use of speciality equipment or Personal Protective Equipment (PPE) required. Staff that will operate equipment (dozer, backhoe) will have received heavy equipment operation training including operation on waste material.

A review of the Operations and Maintenance Manual, and related procedures and plans, is a prerequisite for employee during the orientation periods provided at the beginning of work at the SWDF. Documentation and training to be reviewed will include but not be limited to the following:

- Hazardous Waste Management Plan
- Wildlife Management
- Landfill Fire Control and Risk Reduction
- Safe Work Practices
- Service Standards
- Spill Contingency

## 4. WASTE DISPOSAL OPERATIONS

The SWDF has been constructed and established to receive waste from the Town of Norman Wells and surrounding area and manage / dispose of it in a safe and environmentally sound manner. The following sections describe the types of waste/recyclables accepted and the corresponding disposal / storage methods, as well as what is done when unacceptable waste is encountered.

### 4.1 Acceptable Waste and Waste Screening

The Public Works Manager and Foreman supervise the SWDF operations to ensure that the facilities accept only the materials that it has been designed and licenced to handle and that all waste is deposited in the designated areas. Any exceptions being considered must be reviewed and approved by the appropriate GNWT regulatory agencies.

The following materials are accepted at the SWDF:

Waste:

- Household materials
- Bulky items (furniture, appliances, white goods)
- Scrap metal (vehicles, ATVs, snow mobiles)
- Tires
- Animal Carcasses (non-wildlife)
- IC&I wastes (construction & demolition, solid waste)

Recyclables / Salvageable:

- Bottles and Cans
- E-Waste
- Wood
- Vehicle Parts

Hazardous Goods (households):

- Antifreeze
- Used Oil
- Batteries
- Heating Oil Tanks
- Propane Cylinders
- Paint
- Appliances (Freon)
- Asbestos

#### Yard Waste including

- Tree Branches and Logs

The Following materials are NOT accepted at SWDF from IC&I Generators :

#### Hazardous Waste including:

- Scrap Equipment and Trucks
- Biomedical Waste / Medical Sharps
- Hazardous waste generated by the IC&I sector that could include;
  - Fuel oil drums and waste fuels
  - Antifreeze
  - Oily debris
  - Contaminated Soils / Snows / Water
  - Designated Substances (mercury lighting fixtures, PCBs ballasts, etc.)
  - Paints
  - Waste materials designated by GNWT Regulation requiring mandatory management and disposal requirements.
- Materials without proper documentation including:
  - Asbestos

#### 4.2 Disposal Methods

The SWDF has been designed to receive and handle the different waste materials to either landfill, store or salvage for reuse / recycling. Figure 2 shows the locations of waste storage and disposal areas.

##### 4.2.1 Household Hazardous Waste

The SWDF only accepts hazardous waste from households (HHW) as listed in Section 4.1 and in accordance with the "Hazardous Waste Management Plan" (refer to Appendix G). Hazardous waste have the potential to pose a health and / or environmental risk. Procedures to receive, handle and store HHW are outlined in the "Hazardous Waste Management Plan", applicable regulatory guidelines, WHMIS, and TDG legislations.

A hazardous waste storage facility is a specially designed area that helps to ensure the safe and secure storage of hazardous waste.

The following are general points to consider when establishing a storage facility:

The facility should meet all local and territorial siting and construction requirements and be readily accessible for fire fighting and other emergency responses. The local Fire Chief should be advised of the storage facility and its contents for emergency planning and response purposes.



The facility should be secure. Access should be limited where practical to employees who have been trained in safety and emergency procedures. These procedures should be documented and a copy made available to those employees who have access to the facility. Inspections of the facility and stored wastes should be performed and recorded on a regular basis.

Containers should be placed so that each can readily and easily be inspected for signs of leakage, corrosion or deterioration. Leaking, corroded or deteriorated containers should immediately be removed and their contents transferred to a sound container.

Records should be maintained indicating the type and quantity of waste being stored along with the date, type and quantity of hazardous waste brought into or removed from the facility. Drainage into and from the storage facility site should be controlled to prevent spills or leaks from leaving the site and to prevent run-off from entering the site.

All waste should be stored on a firm working surface that is impervious to leaks ( note: SWDF has a lined storage area). Incompatible waste must be stored in a manner that contact in the event of a spill or accidental release is not possible. Emergency response plans have been developed in cooperation with Fire Chief and emergency response equipment are available at the SWDF in the event of a spill, fire or other emergency situation.

Refer to the Hazardous Waste Management Plan for details on accepted wastes and disposal methods (Appendix G).

#### 4.2.2 General Household Waste

A private haul is contracted by the Town to collect household waste from storage containers that are located in designated spots within neighbourhoods. The waste picked up by the contractor should not contain HHW or bulky items. The collected household waste picked up by the contractor and transported to the SWDF is disposed in a designated area identified by landfill staff. Collected waste and waste delivered to the landfill by residents is spread in a thin layer and compacted using a dozer.

Section 4.4 "Waste Placement and Fill Sequence" provides details on the methods and procedures for the placement of waste.

#### 4.2.3 Recyclables / Salvageable

As required under the GNWT's "Waste Reduction and Recovery Act" beverage containers are recovered for recycling through the use of "Recycling Depots" operated under contract by operators that receive and pay a refund for each can or bottle they receive. Under the GNWTs "ReThinkIt" beverage collection program residents and business are asked to bring use beverage containers to the Town's depot that is located at 47 Mackenzie Drive and operated by JD Ditchers.

For a number of reasons beverage containers are being disposed in regular household waste or brought by residents to the SWDF and dumped. It has been a practice for some residents to "scavenge" for containers at the landfill to take to the depot for refund payment. In recognition that some residents will not use the depot, to

divert containers, and to have a safe scavenging method the SWDF has established a "Recycling / Scavenging" shelter.

As part of the waste receiving procedures staff at the site greet residents at the entrance to view and require the segregation of materials including beverage containers for placement in the "Recycling / Scavenging" shelter for storage in bins prior to removal by landfill staff to take to the depot.

Payments received will be deposited into a Town account.

There are materials received at the SWDF that are being salvaged by residents that see a reuse opportunity versus it being landfilled. Such materials include lumber, furniture, car and ATV parts. To encourage reuse and divert from landfill salvageable materials will be separated and stored for removal. The items within the shelter will be made available for residents to access and to remove items for their use.

#### 4.2.4 E-Waste

Under the GNWTs "Waste Reduction and Recovery Act" electronic waste (E-Wastes) are regulated under the "Electronics Recycling Regulation" for the collection of environmental fees at the point of sale with the funds to be used to financing the recovery and recycling programs. For residents of NWT the recovery of E-Waste is either through drop-off depots or community collections events organized by the ENR and Municipalities.

E-Waste can include laptops, computers (keyboard, cables, server), printers, copiers, TVs and monitors, batteries and cell phones. There is currently no dedicated depot to receive E-Waste. The Town in partnership with ENR is developing a program for the collection, storage and recovery of E-Waste.

#### 4.2.5 Construction & Demolition

Delivery of construction and demolition (C&D) waste to the SWDF is by contractors operating in the Town or surrounding area. This type of waste typically consists of wood, drywall, roofing material, metals and insulation. Of concern with C&D waste is the potential for hazardous wastes (asbestos, fuel tanks) and designated substances (asbestos, PCB ballasts, mercury switches, lead pipes) being within the waste loads being delivered to the SWDF. Hazardous waste and designated substances pose a health and safety risk to SWDF staff and residents using the site and have the potential to cause an environmental harm with leachate contamination of water sources or wildlife poisoning.

SWDF staff will inspect contractor loads to identify unacceptable waste materials including hazardous and designated substances. If unacceptable wastes are identified the contractor will be required to remove the waste from the SWDF for proper disposal. Staff will record the incident and contact the ENR about the occurrence for their follow up with the contractor to assist them with meeting requirements of GWNT environmental regulations.

The Town's planning by-law (Zoning By-Law 21-08) requires construction, demolition and property cleanup projects to obtain a "Permit". The permit process requires the project developer to identify hazardous waste and designated substances and provide a plan for its disposal at a licenced treatment facility.

#### 4.2.6 White Goods ( Appliances )

White goods are household appliances including fridges, freezers, stoves, washer, dryers and hot water heaters. These items are placed in a designated area so that stored white goods can be processed and removed as scrap metal. Freon gas contained in white goods will be removed by a qualified contractor according to the "Hazardous Waste Management Plan". Once the freon has been removed and the appliance will be properly marked to allow it to be shipped off-site as a scrap metal.

#### 4.2.7 Tires

Tires are not considered to be hazardous waste and are stored in a designated area of the SWDF. Tires can pose a fire risk and will produce toxic smoke when they are burning. Tire piles can also store stagnant water creating conditions for mosquito breeding. The tire storage area will be managed to control the tire pile height / area, provide for separation distances between piles, and allow for access to and around piles to minimize the size of a fire and also allow for good fire suppression in the event of a tire pile fire.

Stored tires will be removed and shipped to licenced tire recycling facilities. Options for re-use such as erosion control and bank stability projects will be investigated to allow for a local reuse and cost savings.

#### 4.2.8 Asbestos

The GWNT has developed a " Guideline for the Management of Waste Asbestos " (refer to appendix B). This guideline provides general information on the proper management of waste asbestos. Waste asbestos is a contaminant under the *Environmental Protection Act* (EPA) of the NWT and must be managed as a hazardous waste. The following paragraphs are taken from the Guideline:

***"Asbestos is a cancer causing substance. The public, workers, and the environment must be protected from any air-borne exposure to this material.***

***This guideline is specific to the management of waste asbestos and should be read in conjunction with the Guideline for the General Management of Hazardous Waste In the NWT. Section 2.2 of the EPA gives the Minister of Resources, Wildlife and Economic Development the authority to develop, coordinate and administer these guidelines.***

***The fibrous nature of asbestos is a health concern. Friable asbestos readily floats in air and is easily inhaled. Environmental and occupational exposure to asbestos is primarily from air-borne sources.***

***Worker protection from air-borne asbestos particles is regulated by the Prevention Services Division, Workers` Compensation Board. The Asbestos Safety Regulations, under the NWT Safety Act, require that employee exposure to hazardous air-borne asbestos be maintained below specified levels. The exposure levels correspond to the type of asbestos and the friability of the material.***

***Waste asbestos is a hazardous waste. The owner (generator) of the asbestos is responsible for ensuring the waste asbestos is properly managed from the time it is generated to final disposal. Waste asbestos must be safely removed, handled, packaged, stored, transported, treated and/or disposed in accordance with this guideline and all applicable Acts and regulations.***

***Contractors can manage waste asbestos on behalf of a generator. However, the generator is responsible for insuring that the waste management method complies with this guideline, the General Guideline and the requirements of other legislative authorities. (Including the Asbestos Safety Regulations under the Safety Act and the Transportation of Dangerous Goods Act and Regulations (TDGR) or other transport authority)."***

The SWDF is permitted under the Water Licence to receive and dispose of asbestos waste generated from projects in the Town and area. For the complaint disposal of asbestos in accordance with regulations the SWDF will have in place the following procedure :

- Project contractor is required to obtain prior approval from the Public Works Manager before the shipment (double bagged, labelled) of asbestos waste to the SWDF can occur. Approval will include the date and time of shipment. Acceptance of the asbestos materials by the Public Works Manager must be confirmed to ENR by telephone or in writing. This ensures that the municipality is registered as a receiver of waste asbestos.
- In preparation for the receipt of asbestos the SWDF will prepare a disposal "hole" surrounded by the cover material to be used to bury the asbestos.
- Waste asbestos received at the site (on the approved designated date) shall be immediately buried and covered with one half meter of cover material (two feet). Cover materials can be locally available soils, refuse or other materials provided the asbestos containment is not ruptured. The covering of the asbestos should not allow the dozer to track directly over the bagged asbestos to prevent the breaking of bags.
- The asbestos waste should be buried where it will not be disturbed in the future.
- The location of the asbestos should be maintained on a map or diagram of the property for reference and to prevent disturbance in the future.

#### 4.2.9 Vehicles & Scrap Metals

The SWDF can receive vehicles and metals from Town and area residents. Vehicles include cars, pickups/SUVs, ATVs and snow mobiles. IC&I vehicles or equipment (construction, transport) are not permitted and must be stored and removed from the Town as per GNWT regulations.

Scrap metals received from residents could include fuel oil tanks, propane cylinders and white goods (freon containing) that will have hazardous waste residue. The receiving and handling of these materials will follow the procedures provide for in the "Hazardous Waste Management Plan".

Vehicles and scrap metals received will be inspected by SWDF staff and assigned to designated storage areas on site. Staff will assign the specific storage location according to the waste material type received.

The Town is investigating the establishment of a permanent depolluting facility that will be available to remove vehicle fluids, mercury switches and air bags for proper disposal at a licenced facility. With the removal of these materials and fluids the vehicle can be shipped as a scrap metal for recycling.

Vehicles stored on the SWDF site require the removal of fuel, oil, coolant, washer fluids, mercury switches (electrical) and air bags (explosive) before shipment to a scrap metal.

Storage tanks that have had fuel or gas in them require cleaning before the tank or cylinder can be received for recycling.

Stored vehicles and scrap metals on site including the legacy wastes (1997 – present) will be depolluted and removed through a "Sahtu Regional Backhaul Project" lead by MACA and will be completed over the next four (4) years (2021 – 2025).

#### 4.2.10 Institutional, Commercial & Industrial (IC&I)

The SWDF receives waste materials generated by institutions (medical clinic, schools), commercial (retail, restaurant, grocery, contractors) and industries (oil and gas) operating in the Town of Norman Wells and area. The waste materials from IC&I generators is limit to solid non-hazardous waste (asbestos included).

Liquid, scrap equipment / vehicles or hazardous waste as defined in GNWT Environmental Protection Act (EPA) are not permitted at the SWDF. Generators of non-residential hazardous waste are required to register as a "generator" with the ENR Environment Division. A IC&I generator of hazardous waste is responsible for complying with the EPA and retaining a registered carrier to transport their waste to a licence (registered) recycling, treatment or disposal facility. The registration and record system administered by the ENR allows for the tracking of hazardous waste generation (types, volumes) and auditing to make sure hazardous waste is disposed of in an environmentally sound manner.

#### 4.3 Waste Inspection and Monitoring

The inspection by staff of waste materials being delivered to the SWDF is important to ensure the safe and compliant operation of the facilities. With proper screening the likelihood of unacceptable waste being landfilled is minimized. Unacceptable wastes if buried at the SWDF can pose a risk of contaminating the environment, create a safety hazard and harm wildlife.

As a vehicle enters the SWDF a staff person (Landfill Operator or Landfill Coordinator) will greet the vehicle , ask the driver about his materials, identify any "unacceptable" wastes and what materials need to segregated as a HW or recyclable / salvageable waste. Staff can also view the materials in the trunk of a car, trailer or back of a pickup truck.

For waste collection trucks (household waste pickup) operate by the Town contractor the waste being delivered cannot be visually inspected since the waste is contained. Visual inspection of waste contents can be done when the load is being dumped at the landfill cell.

The landfill operator and landfill coordinator will view waste dumping to identify suspicious waste using visual or olfactory characteristics, namely:

- Liquids
- Powders or dust
- Sludge
- Drums
- Smoke
- Chemical odours

Staff will also confirm that the vehicle has the proper documentation, including:

- Tag for residential wastes
- Weigh Scale ticket for IC&I wastes
- Clearance letter for contractor demolition or property cleanup projects

Acceptable non-hazardous waste received at the SWDF include:

- Household waste collected by contractor
- Household waste delivered to the SWDF by residents
- IC&I waste that is a household type material (food wastes, papers, cardboards)
- Construction, renovation and demolition waste (wood, drywall, roofing materials)
- Reusable goods and recyclables (bottles, cans)
- E-Waste
- Appliances
- Tires
- Scrap metal (households)
- Animal carcasses (non-wildlife)
- Clean wood and trimmings

Note: Wildlife carcass disposal at the SWDF requires approval from the Public Works Manager.

The SWDF can accept contaminated soil to use as a cover material if the conditions as detailed in the GNWT "Guidelines for Hazardous Waste Management" (revised October 2017) have been met and approval has been received from the ENR Director (or Designate).

Hazardous Waste Accepted for Temporary Storage (Bermed Lined Area) at the SWDF include:

Households Only

- Vehicles
- Batteries
- Waste anti-freeze / glycols
- Used oil and oily debris
- Paint
- Drums
- Propane cylinders
- Waste fuel
- Residue fuel tanks

IC&I Hazardous Waste for landfilling:

- Asbestos

#### 4.4

#### Waste Placement and Fill Sequence

For the acceptable waste materials received from residents and IC&I generators that is not segregated for either reuse, recycling or stored as a household hazardous waste will be disposed of through landfilling. Landfill solid waste will be deposited into active landfill cells by residents, collection contractor, public works and private contractors. Separate areas will be assigned to each of these waste sources.

Resident wastes will be deposited on areas of phases I and II . With IC&I and collection contractor waste being deposited on phases III and phases IV and V (expected to start in 2022).

Waste being unloaded into piles will be spread in layers of approximately 1 metre using the SWDF dozer.

The filling sequence will follow the procedure illustrated in Figure 3.

#### 4.5 Fill Placement Controls

The placement of waste ( areas , heights , slope dimensions ) will conform to the approved Water Licence landfill plans ( refer to Appendix C – Site Plans ). To provide landfill operators with guidance on the fill limits regular surveying (bi-annual) and placement of grade sticks will be implemented.

Grade sticks will provide limits to where fill can be placed, elevation limits and slope profile

#### 4.6 Handling Unacceptable Waste

If unacceptable waste is identified the handling process detailed below is to be followed;

- If unacceptable waste is present in a waste load being delivered to the site, the resident or business person(s) bringing the waste will be advise that the waste cannot be accepted. Instructions (flyer) will be provided to the vehicle operator on the proper disposal method.
- If the waste has been dumped and the vehicle that brought the waste can be identified it will be reload for removal.
- SWDF staff will notify the Public Works Manager of the incident. An "Occurrence Report" ( see forms in appendix E ) will be completed that will contain the following information:
  - Vehicle licence number
  - Date and time of incident
  - Material dumped and rejected
  - Name of person if possible
- The occurrence report will be provided to the ENR Water Resources Officer



- If the unacceptable waste is found but the source cannot be identified SWDF staff will remove from the landfill cell (not bury) and store in the SWDF designated "suspect waste" area if it needs to be identified or
- with the appropriate household hazardous waste types (ie. oil, batteries) if the quantity is not a large amount. Staff will place waste in a secure container if required to prevent leakage. Staff will notify the Public Works Manager and complete a record of the occurrence including :
  - Type of unacceptable waste
  - Date and time the unacceptable waste was discovered
  - Location the waste was found
  - Procedures for handling and storage

#### 4.7 Cover Systems

The covering of waste at various stages of the landfilling operation are important to achieve a number of benefits:

- Contain waste materials
- Minimize water infiltration
- Reduce windblown litter
- Reduce odours
- Reduce the risk of fire ignition / spread
- Deter scavenging from wildlife
- Minimize presence of disease vectors

When the landfill operation reaches the final design waste elevation the cells are typically capped and no additional waste will be placed.

Final cover and capping is done to:

- Cover waste and provide acceptable aesthetics
- Control the infiltration of precipitation and surface water run-off getting into the waste mound in order to limit leachate production.
- Prevent wind and water erosion
- 

##### 4.7.1 Weekly Cover

On the last day of week's operations ( Saturday ) and as the last site activity carried out by SWDF staff a layer of cover material ( from stockpile ) will be spread over the waste that was received. The type of cover material used will be locally sourced shale. The layer of daily cover will be approximately 150 mm or 6 inch in thickness.

#### 4.7.2 Intermediate Cover

Intermediate cover is used in areas of the landfill cells that will not receive waste for periods of up to 3 – 4 months. Approximately 300 mm ( 12 inches ) of shale will be placed. When the area is to receive waste again the cover material can be “peeled “back and stockpile for reuse as either weekly or intermediate cover.

#### 4.7.3 Final Cover

Final cover material is used to seal and prevent exposure of waste in the event of settlement that can occur over time. Final cover thicknesses are typically 1 metre (3 feet ).

Information related to the final cover process is covered in the Interim Closure and Reclamation Plan (Appendix K).

## 5. MAINTENANCE PROCEDURES

Regular maintenance of SWDF structures and equipment is important to ensure efficient operations. Maintenance work will be carried out in a safe manner and will follow all applicable Town policies and standards. Records of work will be completed and kept on file with the Public Works Department. Once a month SWDF staff will conduct an inspection and complete a checklist record ( refer to Appendix E for form ). Different Maintenance activities will be carried out for:

### 5.1 Storage Maintenance (Transfer Station, Temporary Household Hazardous Waste Storage)

The transfer station facility located at the outside of the SWDF gates is for use by residents for waste drop-off during non-operating hours (gates are closed). The transfer stations consists of a number of storage bins for various waste materials including bagged household waste, household hazardous waste, and bulky items.

Storage bins will consist of:

Haul all container(s) for household waste  
Pad for bulky items  
Wire basket cage(s) for household hazardous wastes

SWDF staff ( collection contractor) will on a daily basis or on days the site is operating remove waste materials from the transfer station and dispose of either as landfill waste or temporary storage.

Storage bins and containers will be inspected, repaired or replaced as required. Any spillage or litter will be collected to maintain a clean and safe transfer station area.

A surveillance camera installed at the entrance will be viewed in the event non-acceptable waste was deposited off to identify potential sources for enforcement actions.

The temporary household hazardous waste storage area provides for the storage of household hazardous waste materials delivered to the SWDF by Town residents. Each of the waste material types are assigned to designated locations and stored in specific containers that will be used for transport to an off-site disposal facility. Containers will include skids, totes and wire cage baskets. The type of container will depend on the waste material. Specifics on the operation of the temporary hazardous waste storage facility is provided in Appendix G – Hazardous Waste Management Plan.

Maintenance activities conducted by SWDF staff will include:

- Inspection, repair or replacement of storage containers
- Inspection and cleanup of spillage
- Inspection and reporting of liner damage (Manager to determine repair program)
- Repair or replacement of signage

## 5.2 Equipment Maintenance

Regular maintenance will be performed on Town owned or rental of SWDF equipment that includes dozer, pickup and backhoe. Maintenance will follow original manufacturers suggested specifications and Town service standards. This will include but not be limited to regular:

- Cleaning
- Oil changes
- Fluid changes
- Greasing
- Checking of tire pressure and dozer tracks
- Brake pad replacement
- Preventive maintenance

Appendix E - Solid Waste facility Forms and Checklists contains the checklists for light and heavy equipment used at the SWDF and operated by staff.

## 5.3 Facility Maintenance

### 5.3.1 Gate House and Reuse Shelter

The SWDF has two (2) buildings – site trailer (gate house ) and reuse shelter (E-Waste, reusable materials). These buildings will be inspected monthly by the Landfill Coordinator to observe signs of damage that require repairs. Any problems will be report to the Public Works Foreman for further investigation and appropriate repair or replacement measures.

### 5.3.2 Waste Disposal Areas Maintenance

The SWDF landfills household waste collected by a Town contractor, household bulky items and waste not picked up, commercial and construction waste in designated areas. Landfilled wastes are kept separate from the reuse, recycling and temporary household hazardous waste storage areas.

Maintenance activities will be required for onsite haul roads, tipping pads, barriers and signage. Signs are in place to direct landfill users to areas for un-loading and barriers to prevent disposal in areas that cannot receive waste. Roads may require grading and reapplication of shale material to provide for a level travelling surface. During winter months snow clearing will be done to allow site user access to disposal and storage areas.

### 5.3.3 Berms, Groundwater Wells and Stormwater Controls

The SWDF's design and construction requires the establishment and maintenance of perimeter berms, onsite berms (lined temporary hazardous waste storage), groundwater monitoring wells (for sampling) and stormwater ditching (perimeter).

Berms – the SWDF has constructed berms surrounding the landfilled areas on eastern, southern and western perimeters just inside of the fencing to act as a barrier directing the site's surface water run-off into the perimeter ditches (refer to Appendix C – Site Plans).

Internal onsite berms have been constructed around the lined temporary hazardous waste area to contain any spillage that could occur if a liquid waste container were to break and leak.

Inspections will be completed on a regular schedule by the Landfill Coordinator to identify any maintenance or re-construction requirements needed to maintain the berm functions. Repairs undertaken will be recorded.

Groundwater Wells – The SLWB Water Licence requires the establishment of a surveillance network program that includes groundwater and surface water monitoring to detect any landfill leachate impacts. Three (3) groundwater monitoring wells have been installed and are being sampled annually to determine background groundwater conditions (upgradient ) and downgradient conditions to identify if the landfilling operations are impacting groundwater quality.

Inspections by the Landfill Coordinator will be carried out on a regular schedule to identify any damage to the wells. Conditions of the well cap ( secure ), casings have not settled or fallen over and that access to the well for sampling purposes is still in place.

Stormwater Controls – the SWDF stormwater controls consist of ditches on the eastern, southern and western perimeters of the landfill fill areas that convey surface water run-off or snowmelt off the site into a natural drainage area flowing south towards the Mackenzie River (3.4 km ). The elevations of the site (160 m above sea level ) in the north end to 140 m ASL in the south end. The surface water management method at the SWDF is positive drainage towards the south.

Inspections will be conducted on a regular schedule by the Landfill Coordinator to identify any signs of sediment buildup, bank collapse or leachate breakout (discolored water coming out of fill slopes).

If inspections find any of these issues it will be record and reported to the Public Works Foreman and Manager to organize and complete repairs or ditching reconstruction.

If required a qualified Engineer will be retained to inspect (berms, wells, stormwater controls) and prepare a report on the stability, function of structures and recommendations on any actions required. The report will be provided to the SLWB in accordance with the Water Licence Conditions.

## 5.4 Fencing Maintenance

The SWDF site is enclosed on its boundaries by a chain link fence. There are two main gates on the north side that allow for an entrance and exit. An alternate gate is placed at the south corner that is locked and only used for maintenance works.

The gates at the north side are locked during the week days and hours that the SWDF is not in operation. A sign at the entrance advises residents and businesses of the operating hours when access to the SWDF is open and staff are on site to supervise operations.

As part of the Landfill Coordinator's responsibilities regular inspections of the perimeter fencing and its condition will be completed. The site's gates will also be inspected. If any damage to the fencing and gate material or posts is observed a repair or replacement will be completed within a reasonable time period.

### 5.4.1 Wildlife Fencing Maintenance

The chain link fencing that surrounds the landfill includes an electrified wire that is powered by a solar / battery system. Its operation is to act to deter wildlife (causes a mild shock) from trying to enter the SWDF to find food.

Landfill operations staff will regularly check on the electric fence to see that it is operational. Waste or debris on or around the fencing will also be cleaned on a regular basis.

## 5.5 Road Maintenance

### 5.5.1 Access Road Maintenance

The access road is made of crushed shale rock. Basic road maintenance is conducted as follows;

- On a regular basis the road to the SWDF will be maintained to fill in potholes and levelling of the road surface to provide for a smooth vehicle travelling surface.
- At least once a year the road is graded smooth
- During the winter season snow is cleared to allow for access to the site during operating hours.
- Any waste that has fallen off vehicles coming to the site should be picked up
- In dry summer periods the access may be water or treated for dust control

### 5.5.2 Site Roads Maintenance

There are a number of roads on site that access temporary storage areas and the landfilling cells that require regular maintenance to allow passable travel for both landfill staff and SWDF users. Maintenance works include clearing any fallen debris, smoothing and crowning (drainage) the road surfaces, adding crushed shale to level surfaces and removal of snow during the winter season.

## 5.6 Erosion and Sediment Control

The landfill Coordinator will conduct daily observations of site conditions including signs of erosion from exposed ground surfaces (ie. sloped areas of SWDF). Areas of significant erosion will be repaired by applying crush shale to remediate and eliminate the run-off of sediment into the drainage system.

## 5.7 Nuisance Control

The SWDF operations can create a number of nuisances that include litter, odours, dust, noise, and attraction of wildlife (bears) and birds. Control measures to minimize nuisance impacts are described in the following sections. If there are persistent issues with these nuisances alternative controls will be investigated.

The SWDF is relatively isolated and distant (over 2-3 km) from sensitive receptors such as homes or institutions such as medical clinics or a school.

### 5.7.1 Litter Control

Litter can be a significant problem at SWDFs. Typical waste materials that are prone to being blown about are light plastics such as plastic shopping bags and foam materials. Sources and areas where blowing litter is generated are incoming vehicles that aren't tarped or with unsecure loads, and at the tipping areas of the landfill cells when waste is being dumped and exposed to blowing winds that pick up loose plastic films and foam materials. An important objective for SWDF staff is to maintain a clean, litter free appearance of the SWDF for the benefits of positive public relations, safe and efficient operations. Litter control is accomplished through a combination of proper programs and measures that include:

- Observation and education of SWDF users to secure loads delivered to prevent litter from being blown onto roads
- Setup and maintenance of portable litter fencing perpendicular to the prevailing winds and on either side of the tipping face to create a "sheltered" area that will trap and contain litter in a limited area.
- Regular compacting and covering of waste
- A litter collection and monitoring schedule set by the Landfill Coordinator to pick up litter on fencing, on site roads, in stormwater ditches and adjacent properties.

### 5.7.2 Dust Control

Dust can be a health hazard to staff and users of the SWDF. Dust can be generated at the SWDF through a number of sites and operations including traffic dust from roads, waste unloading (fine grained waste) and blowing soil / stone fines from stockpiles.

Control measures that can be used include reduced vehicle speeds, covering stockpiles and watering shale roads during hot summer seasons.

### 5.7.3 Noise Control

The SWDF is located in an isolated area with its closest off-site neighbor being the Town's quarry operation (heavy equipment and crushers). Noise generation from SWDF activities is limited to construction equipment that includes a dozer and backhoe.

To protect against hearing impacts staff are encouraged to wear ear protection when operating equipment.

### 5.7.4 Odour Control

Odours will be controlled at the facility by implementation of the following measures:

- Cover material will be spread on waste in active fill areas on a regular schedule
- Routine inspections to identify and eliminate surface water ponding or leachate seeps

### 5.7.5 Bird Control

The SWDF is within the Norman Wells airport regulation zone (4,000 metres). The attraction of birds to food waste can be of concern if bird flying to and away from the landfill areas create a hazard to aircraft take-offs and landings. To minimize the numbers of birds attracted to the SWDF measures to control and discourage birds will include:

- Regular covering of waste to limit waste exposure and access
- Maintain regular contact with Airport staff to identify concerns
- Investigate control measures that could include "scaring" (bangers) or wire lines on poles (disrupt bird flight)

## 5.8 Illegal Dumping

Illegal dumping is a risk when residents or business are unwilling to pay for disposal or when they want to dispose of waste during times when the SWDF is not operating and the gates are closed.

To address illegal dumping SWDF staff will monitor activity to identify locations where waste is deposited and days of the week for assessment on whether additional days / times need to be added to the SWDF operation or if there is a need to offer "free disposal" events.

Staff will also try to identify the illegal dumpers from what is within the waste (ie. letters with addresses) or from surveillance camera photographs if unacceptable waste was dumped outside of SWDF gates.



## 5.9 Fire Prevention and Maintenance

Fires at a SWDF are an ever present risk due to the materials received and potential ignition from a number of sources. The Infrastructure department of the NWT MACA provided the Town with a presentation that highlights the factors and conditions that can lead to a landfill fires and the prevention measures needed to minimize the risk and scale of a fire if it occurs.

### Potential Ignition Sources

- Embers in a hot load (barbeque coals, camp fire ashes)
- Careless smoking
- Reactive substances ( flammable chemicals that combined or mixed with water or air can ignite)  
Examples: Nitric acid or benzoyl peroxide
- Methane flash (methane gas from decomposing waste) from equipment spark
- Arson
- Spontaneous combustion

### Types of Landfill Fires

The most common types of fires occur at the surface, where fuel and oxygen are abundant. These fires can burn between the surface and one foot below ground. The other type smolders below ground and can extend down to 40 feet.

#### Surface Landfill Fires

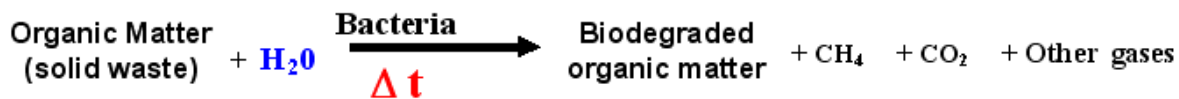
A surface fire can start if the facility accepts hot objects (for example, barbeque coals or other ashes). Also arson, spontaneous combustion, or a discarded cigarette can start fires. To keep fires small and manageable, immediate action is necessary. Actions may include using heavy equipment to remove the burning material to a safe area, the application of soil to suffocate the fire, or the use of suppression agent and firefighting activities.

#### Subsurface Landfill Fires

A subsurface fire typically starts from spontaneous combustion. These fires are more likely to burn slowly without visible flame or large quantities of smoke and are characterized by rapid oxidation of an organic waste. The waste mass tends to oxidize around a surface feature ( ie. open waste slope ) that allows oxygen in. At times, underground combustion/oxidation will go undetected until a sinkhole or smoke appears. Normally you will never see an actual flame during this type of fire unless the subsurface fire is excavated and exposed to the atmosphere.

## How Spontaneous Combustion Occurs

In spontaneous combustion, waste material is heated by chemical oxidation and biological decomposition. The resulting heat causes the material to reach the point of ignition. This type of rapid oxidation in a municipal or construction/wood waste facility is directly related to the amount of moisture present in the fill. The bacteria-- both aerobic and anaerobic--present in organic matter require water to biologically breakdown organic matter. As shown in the equation below, as organic material is biodegraded, heat is produced along with other constituents.



In the presence of bacteria, organic matter (solid waste) and water react to produce increased heat (delta t), methane (CH<sub>4</sub>) gas and carbon dioxide (CO<sub>2</sub>) gas as well as other gases and degraded organic material.

## Detecting Subsurface Fires

To determine if a subsurface fire exists look for visual confirmation or other conditions present. Generally a subsurface fire can be confirmed by:

- Substantial settlement over a short period of time
- Smoke or smoldering odor emanating from the landfill
- Increase in gas temperature (above 140° Fahrenheit)
- Temperatures in excess of 170° Fahrenheit.

## Employee Health and Safety Risks

Subsurface landfill fire can create many types of life threatening conditions. These conditions must be communicated to all site personnel and anyone who is involved in the project. Site hazards may include slips, trips, and falls; confined space issues; carbon monoxide and toxic gas exposures; possible cave-ins

due to the void spaces; and burn issues from the elevated temperatures. Safety protocols and considerations related to subsurface landfill fires should be implemented for site workers.

## Suppression Methods

Landfill fires can be extinguished by smothering with soil, using heavy equipment and a suppressant agent. No one method will work for all conditions. Each suppression plan will be unique due to site-specific conditions. At times, only an interim cap will prevent the extension of the fire, while other times the use of heavy equipment and foam is preferable.



## Suppression Agents

Although there are many types of foam and wetting agents, it is best to use a class A foam or wetting agent. These chemicals include a surfactant that reduces surface tension and improves penetration depth. Class B foams are ineffective because it is impossible to separate the oxygen from the fuel as it is done with flammable liquids. Class B foams are a two dimensional product, while class A and wetting agents work on three dimensional fires such as landfill and tire fires.

## Water

The application of large amounts of water without a suppression agent is not recommend. Large amounts of water may actually acerbate the fire potential by increasing the amount of biodegraded matter and heat. The excess water will also increase contaminated runoff and leachate.

## Fire Prevention

SWDF will have established no-smoking zones that will require staff and users to refrain from smoking in those zones ( all areas of SWDF ).

Equipment operators (Staff, Contractor) will periodically inspect on-site equipment for fluid leaks, electrical short circuits, and build up of flammable debris on machine tracks, gears or undercarriage during dry summer periods.

Staff will limit pile height and total solid waste pile size to minimize spontaneous combustion and fire.

Staff can establish "self-haul" areas to conduct load checks on waste from users who may not be aware of disposal prohibitions on flammable hazardous waste or hot ashes.

Staff and Fire Chief will conduct periodic facility tours to discuss the fire prevention plan and review adequacy of access gates, water sources, and other site-specific factors.

The Town Fire department staff will conduct prevention planning sessions for SWDF staff.

## Lesson Learned from Landfill Fires (Recommendations)

- Common link to major fires is poor inert soil / stone fire breaks. Recommendations are that waste placed in cells not exceed 10,000 cubic metres without being encapsulated fully with soil or stone cover materials.
- Waste slopes be graded and the open face be covered to prevent oxygen intrusion
- Temporary trenches between "cells" to provide for fire breaks
- Regular covering of waste

Daily operational practices that will be followed by SWDF staff will involve:

- Load checking program to prevent the dumping of hot ashes or combustible chemicals
- Look out for the dumping of ash barrels
- Maintain a stockpile of crushed shale or soil material close to the active working face for use in the event of fire
- Site inspection with regard to any sign of smoke coming off landfill areas

## 6. SURVEILLANCE MONITORING PROGRAM (SNP)

The SWDF operates under a SLWB Water Licence that requires environmental monitoring for groundwater conditions to determine whether the landfilling of waste is impacting the environment and if so remedial works maybe need to be undertaken.

Two SNP groundwater monitoring stations (S07L3-002-4 and S0&L3-002-5) were constructed in the winter of 2018 (GWNT – MACA installed and samples). Samples are taken semi-annually following spring freshet and before freeze up.

The SNP monitoring stations

SNP Station	Description	Location
S07L3-002-4	Groundwater monitoring Well – southern face	65.294976oN , - 126.731991oW
S07L3-002-5	Groundwater monitoring	65.295353oN , - 126.731991oW

Sampling Parameters – pH, suspended solids, conductivity, calcium, magnesium, potassium, sodium, sulphate, Total Phosphorus, chloride, Total Phenols, Oil and Grease, Total Metals = silver (Ag), arsenic (As), cadmium (Cd), copper (Cu), chromium (Cr), iron (Fe), mercury (Hg), nickel (Ni), lead (Pb), thallium (Tl) and zinc (Zn)

There are no effluent quality criteria for the parameters identified above. Results of the SNP monitoring are provided to the SLWB in the Water Licence Annual Report (as per Part B, Item 1d of the Water Licence).

With an expansion of the SWDF into phases four (4) and five (5) for landfilling waste it is proposed that a new groundwater monitoring well be installed for sampling upgradient of the SWDF. An upgradient well will provide background water quality conditions for comparison purposes to identify any water quality changes that could be the result of landfill leachate impacts.

## 7. SITE RECORDS

Copies of records pertaining to the operation and maintenance of the SWDF are to be kept at the Public Works Manager's office. Information in these records will include;

- Estimated and weighed volumes of waste received and the generators of the waste (Town contract, Residents, IC&I) both monthly and on an annual basis.
- Details on any maintenance and repairs undertaken at the site
- Inspections
- Visits by regulatory agencies
- As-built plans and drawings
- Copies of annual reports
- Copies of all manuals pertaining to the operations and maintenance of the SWDF including the SWDF Operation and Maintenance Manual, Hazardous Waste Management Plan, Landfill Fire Control and Risk Reduction Plan, Wildlife Management Plan, Safe Works Practices, and Spill Contingency Plan
- Copies of spill reports and related regulations
- Copies of the sampling and analysis reports for groundwater monitoring
- Copies of correspondence with the SLWB and information provided to the Board as per the Water Licence conditions (submission of revised plans, notifications of repair or modifications, revised closure and reclamation plans)

Copies of all records describe above should also be kept at the Town Office and available to the public on request.

## 8. SAFETY PROCEDURES

Safety procedures need to be followed in order to minimize risks to health for personnel and users of the SWDF. Basic procedures and equipment apply:

- Keep equipment clean (prevent slips or falls)
- Wear appropriate personnel protective equipment (PPE) such as gloves, safety glasses / goggles, coveralls, high visibility vests, jackets or coats and safety boots. Specialty PPE may be required and provided to complete specific tasks or handling specific waste materials. In those cases, staff will receive appropriate training related to the management and use of speciality PPE. An example of this would involve the receiving and disposal of asbestos waste (risks of bags breaking) were staff would be provided with disposable coveralls, face shields and dust mask.
- Work clothes should be kept in a designated change room and staff encouraged to change into them when they arrive to work.

- Eye wash station, first aid kits (gate house trailer, pickups, dozer, backhoe) and fire extinguishers available on site
- Hand washing before eating, breaks or when leaving work
- Staff should receive appropriate vaccinations that are kept up-to-date.

Section 11. Staff Training details the training staff will receive for specific waste materials such as hazardous waste handling and equipment operation.

Additional safety procedures are covered in Town of Norman Wells Safe Work Practices policies and standards.

### 8.1 Equipment Operation

SWDF staff will be trained and supervised on the safe operation of facility equipment including but not limited to dozer, backhoe, pickup trucks, drum crusher, and power tools such as mowers and brush trimmers. Operation of equipment will follow safe work practice standards set by the Town.

#### Safety Considerations for equipment operations

Landfill areas can be unstable and prone to collapse and settlement. Heavy equipment such as dozers can tip over especially on sloped areas of the waste landfill. Equipment operator needs to be aware and observing waste stability conditions and adjusting dozer speeds while pushing waste. Operator will maintain safe distances from the top of slopes to avoid slope collapse.

Dozer operators must use caution when driving on landfill slopes. Rather than driving up or down the face, they should drive across to prevent tipping. The fill should also be compacted regularly to avoid building loosely-packed mounds that can collapse.

Dozer operators will be looking at all times in the direction they are travelling ( forward or reverse ) at what is in their travel path. If other SWDF staff must stand in the vicinity of moving equipment , it is vital that they be wearing safety orange in addition to the regulatory safety boots, gloves and hard hats. Operators when exiting or getting onto the equipment should be on the look out for sharp materials (glass, sharp metal pieces) that could be lodged or stuck on dozer tracks, backhoe wheels or stairs. Sharp objects can be a puncture risk.

## 8.2 Household Hazardous Waste Handling

Hazardous waste can pose a number of risks to human health depending on the type of waste material and its form (solid, liquid, gas). Household hazardous waste (HHW) can be toxic or poisonous, caustic, explosive or flammable, and infectious.

The proper handling of HHW requires special methods to prevent harm to SWDF staff, facility users and the environment.

SWDF staff will be trained to identify types of HHW, Transport of Dangerous Goods Regulation (TDGR), GWNT Hazardous Waste regulations, and the Workplace Hazardous Materials Information System (WHMIS 2015).

### General Requirements

- SWDF staff will receive HHW wearing the proper PPE (safety glasses, rubber gloves, work coveralls) and have access (ie. pickup truck) to spills cleanup kit and an eye wash station.
- Hazardous waste received should be in their original containers and must be sound, sealable and not leaking.
- Clearly labeled to identify the type of HHW
- HHW waste will be segregated according to the type of material:
  - Waste oil
  - Glycols
  - Ozone depleting substances
  - Batteries
  - Paint
  - Residue fuel tanks / drums
  - Compressed gas (propane)

The only hazardous waste that can be received from IC&I sources is asbestos.

Each HHW material is discussed in detail in the following sections. Hazardous wastes will not be mixed or diluted with any other substance.

### Asbestos

Asbestos health risk is through inhalation of airborne particles. Since it is a fine mineral it does not dissolve and is not excreted from the body with the fibres remaining in the lungs.

Any person carrying out construction, alteration or demolition of a property that generates asbestos is responsible for removal, packaging and transporting asbestos waste in accordance with the "Guideline for the Management of Hazardous Waste" (Government of NWT, 2004) and the "Guideline for the General Management of Hazardous Waste in NWT set out by the GNWT ENR.

Before the SWDF will receive asbestos for disposal the generator of the asbestos must contact the Public Works Manager (notify ENR Officer) for approval that includes the date and time to weigh the material prior to delivery to the SWDF.

The method of disposal will be to have a disposal excavation made with waste or soil material surrounding the "disposal hole". The load of properly bagged asbestos will be dumped directly into the "hole". As this is being done SWDF staff will ensure no other users are in close proximity and will be observing for any broken bags from a safe distance. During this operation SWDF staff will have PPE available including half face respirators with appropriate HEPA partial filters.

Once all of the bagged asbestos has been dumped the dozer operator will push waste or soil onto the asbestos ensuring that the dozer does not travel directly on bags (tracks can break open bagged asbestos). The location of the asbestos will be recorded and filed on site to prevent future excavation and exposure to buried asbestos.

If the Public Works Manager is aware of demolition projects that will generate asbestos in a summer season it is advised that an isolated and dedicated area of the landfill be set aside for asbestos if this is possible.

### Batteries

The management and storage of batteries (lead acid, rechargeable) is to be managed in accordance with the "Guideline for the Management of Waste Batteries" (GNWT 1998).

If batteries are handled improperly they can cause a spill of corrosive liquids that could cause chemical burns to exposed skin or damage to equipment.

When receiving batteries from residents SWDF staff will observe that the battery containers are secure (caps are on) and not leaking. If they are leaking the battery should be put into a plastic container that can hold it. Lead acid and rechargeable batteries will be stacked upright on a pallet. Once a pallet is full it will be secured with plastic wrap.

### Glycols (Antifreeze)

The management and handling of glycol fluids will be in accordance with the "Guideline for the Management of Waste antifreeze (GNWT 1998). Antifreeze is toxic if ingested and mildly toxic by skin contact. Propylene glycol is combustible and can react with other chemical. Avoid eye contact by SWDF wearing eye protection when handling. Glycol received should be in its original container, not leaking and with a secure cap. Containers of glycol will be placed upright in wire mesh cage or transferred by SWDF staff into a 1000 litre cube shipping container (clearly labelled in accordance with WMIS, the Safety Act and TDGR requirements). Either storage method should be approved by the hazardous waste contractor that will be contracted to transport and dispose of the glycol off-site.

### Heating Tanks

Only clean tanks cut in half should be accepted. Cleaned tanks are acceptable as a scrap metal and can be transported to a metal recycling facility. Potential safety risks with intact and uncleaned fuel tanks is the risk of ignition causing an explosion.



## Mercury Containing Equipment

The management of mercury containing equipment will be in accordance with the "Guideline to Recycle Mercury – Containing Lamps" (GNWT 2012). Mercury is considered a toxic material that can cause neurological, heart, and organ impacts.

To prevent exposure to humans and the environment fluorescent tubes will be received from residents and store in dry conditions (sheltered bin) and outside to allow for good ventilation.

For treatment the SWDF will have on site a "bulb eater" that will be used when collected quantities warrant to crush and contain (sealed) materials including the mercury.

Crush materials will be stored in an approved "bin" recommended by the Town's hazardous waste disposal contractor.

## Ozone Depleting Substances (ODS)

The management of ODS which could include refrigerators, freezers and air conditioners will be in accordance with the "Environmental Guideline for Ozone Depleting Substances and Halocarbon Alternatives" (Government of NWT, 2007).

The SWDF will receive ODS and other white good type appliances for storage in designated areas were ODS will be segregated.

When a sufficient number are in storage a qualified contractor licenced to remove freon will be hired to properly remove and dispose of the freon. Once removed the contractor will label the ODS appliances to indicate that it no longer contains ODS. The emptied appliances can then be processed as a scrap metal for removal from the SWDF.

## Paints

The management of paints will be in accordance with "Guideline for the Management of Waste Paint" (GNWT, 1998) and the "Guideline for the Management of Waste Lead and Lead Paint" (GNWT, 2017).

Paints can contain oils, solvents and lead can be toxic with the potential to contaminate water and be toxic to plants and wildlife. Vapours from alkyd paints can be flammable and toxic to humans if high concentrations are inhaled over a long period of time.

Speciality coatings can also be flammable, reactive or corrosive. For safe handling exposure through inhalation, ingestion and skin absorption needs to be avoided.

Paints received in from residents should be in their original can, be sealed and not leaking.

SWDF staff should be wearing PPE when inspecting and directing users on the proper placement of paints.

Paints storage will be in wire mesh cages (suitable to contractor) in a clearly marked area.

## Compressed Gas Tanks

Pressurized gas tanks or cylinders can be an explosive hazard. There should be no smoking or ignition sources within the receiving and storage area. Tanks or cylinders should be stored on a hard surface in an upright position.

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## Residue Fuel and Oil Drums

The SWDF accepts clean drums that can be classified as a scrap metal. Processing of drums before shipping off-site will involve the use of a drum crusher.

## Used Oils

The management of used oils at the SWDF will be in accordance with "Used Oil and Waste Fuel Management Regulations – R-064-2003" (GNWT, 2004)

Waste oils if spilled onto the ground can create a toxic leachate that will contaminate water and harm wildlife.

Waste oil containers need to be secure and not leaking. Containers of oil received will be separated from other waste materials in a clearly signed area and stored within a wire mesh cage that is acceptable to the contractor hired to remove waste oils from the SWDF.

## Scrap Vehicles

The SWDF accepts from Town residents vehicles that could include cars, pickups, SUVs, snowmobiles, and ATVs. Vehicles brought to the SWDF will be stored in a designated area of the SWDF that is clearly signed. SWDF staff will inspect vehicles being delivered to the site for disposal.

Before the scrap vehicles can be processed (shredded or baled) for shipment to metal recycling facilities various materials and fluids will need to be removed by a qualified contractor. Materials can include;

- Gasoline / Diesel fuels
- Air Bags
- Engine Oil
- Batteries
- Mercury switches
- Antifreeze

## 8.3 Landfill Users

The SWDF will establish site rules for users to follow for their safety when on site and delivering waste materials. Users (residents, contractors) will be educated on the "rules". To assist users a number of measures will be in place to assist. They include signage with clear descriptions (ie. "no smoking", "no children or animals outside of vehicles") on where to go with waste materials being delivered, where to dump and how to use the facilities.

Once on site the residents and contractors will be required to follow slow travel speeds, no smoking, that children or pets remain in the vehicle, and know that there be no "wandering" on the SWDF areas.

The Town will provide to its residents and businesses regular awareness and educational programs to inform on safe practices, acceptable waste materials and SWDF operations for both waste disposal and hazardous waste segregation / storage.

## 8.4 Bear Safety

The SWDF is attractive to bears as a potentially reliable food source. The facility is surrounded by a bear fence that should discourage bears from coming onto the site. It is however important to ensure that all SWDF staff and users are aware of the bear risks and that they be educated and trained (SWDF staff) in bear safety.

### **What is the hazard?**

Animal attacks are extremely rare, but will usually result in serious injury or even death when they happen.

### **How can I prevent bear encounters?**

- Work in groups — bears are unlikely to attack a group.
- Allow the animal to pick up your scent by keeping the wind at your back. Use extreme caution in strong wind. Make noise to alert bears of your presence.
- Watch for signs that an animal is in the area.
- Never approach bear cubs.

Appendix E - Bear Safety publication provides more details on bear recognition and behaviours (BC Parks).

## 9. SITE ACCESS CONTROL

Access to the SWDF and control is by way of lockable gates. The entire site is surrounded by a chain linked fence to prevent unauthorized dumping of wastes. The SWDF is available for use by residents and IC&I businesses and contractors during regular operating hours:

### Residents

Summer Hours (approx. May to Sept.)

Winter Hours (approx. Oct. to April)

Wednesday – Friday

Wednesday – Friday

Saturday

Saturday

Statutory Holidays – Closed

Statutory Holidays – Closed

### Contractors

The SWDF is open to contractors with accounts and must be weighed in / out of the SWDF at the Town's weigh scales. The operating hours of the weigh scale:

Summer Hours

Winter Hours

#### 9.1 Signage

To provide for clear direction on the proper use and operation of the SWDF signage will be installed at various locations to assist the public. Refer to Appendix E for a complete list of the signs that are in use at the SWDF. With operating experience and recommendations from users new signs maybe added to improve the safe operation of SWDF.

The SWDF main sign is at the entrance to the site to inform the public of the location of the SWDF. The entrance sign details the following:

- SWDF Licence
- Materials/wastes accepted for landfill and temporary storage
- Hours of Operations
- Fees
- Emergency contact information

Signs will be placed in appropriate locations to identify segregated waste material storage areas for specific waste materials. Staff will maintain and replace damaged signs.

## 9.2 Contact Numbers

Contacts for staff responsible for the operation and maintenance of the SWDF are as follows:

Public Works Manager ..... 867-445-3885

Public Works Foreman ..... 867-688-0682

Landfill Coordinator ..... 867-445-9334

## 10. EMERGENCY RESPONSE

Staff working at the SWDF will be able to respond effectively and safely to emergencies that may occur with the operation of the SWDF. Emergencies could include fuel and chemical spills, fires or medical.

SWDF staff will receive training on emergency preparedness plans. Plans will be kept at the SWDF gate house and a sign posted at the entrance area with emergency contact numbers.

For medical emergencies staff will call 9-1-1 to activate ambulance and police services. Depending on the type of medical incident staff will render first aid to the best of their abilities and available first aid kits.

### 10.1 Emergency Contact Numbers

The following is a list of contact numbers in the case of an emergency :

Emergency ..... 9-1-1

Fire Department ..... (867) 587 - 2222

RCMP Detachment ..... (867) 587 - 1111

24 Hour Spill Response Line ..... (867) 920 – 8130

ENR Officer ..... (867) 587 – 3500

## 10.2 Spill Contingency Plan

A Spill Contingency Plan has been developed for activities associated with the Town's operations including the water treatment plant, sewage treatment and SWDF. A copy is located at the SWDF gate house for reference and the SLWB water licence registry. SWDF staff will be trained and knowledgeable about the requirements and procedures of the plan.

A copy of the Town of Norman Wells Spill Contingency Plan is provided in Appendix I.

## 10.3 Fire Response Plan

The SWDF operations have the potential for fires starting in a number of site areas, landfill and temporary storage areas / zones that contain flammable materials that include :

- Waste tires
- Household Hazardous Wastes
- Landfill wastes
- Landfill gas ( within the waste and venting to atmosphere )

Depending on the materials that are ignited a fire could be considered to be "HAZMAT" in nature.

### Staff Training

SWDF staff will be trained in fire detection and emergency response appropriate for their roles in an emergency by the Town Fire Department. Refresher training and fire response drills will be undertaken on an annual basis and include the response to the type of fire in each of the zones of the SWDF.

### Emergency Response Team

Roles shall be assumed depending on the personnel on site in the following priority order:

#### Fire Emergency Co-ordinator

- Public Works Manager
- Public Works Foreman
- Landfill Coordinator
- Landfill Operator

Role of the coordinator will be to account for all staff and persons on site being located and to collect all to either leave the site (members of the public) and muster staff at gatehouse / entrance.

For all types of fires the following procedures will be followed:

- Call 9-1-1 and advise of fire on site and if known provide details on location, estimated size, hazards ( ie. waste fuels on fire ) and any injuries.
- Ensure that all persons are accounted for or "rescue" any persons involved that cannot help themselves
- Have staff person at the entrance to prevent any entry while waiting for fire and emergency personnel. All operations will stop
- If the emergency coordinator on site is not the Public Works Manager or Foreman they will be called and advised of the fire incident. ( Town Manager will also be contacted )
- Once Fire personnel are on site the Fire Chief or designate will assume control of the SWDF and direct the fire suppression activities.
- SWDF Emergency coordinator will assist the Fire Chief as directed which could include assembling contractor equipment to assist in the fire fighting efforts.

#### Extinguishing Methods and Management of Specific Fire Types

The method used will depend on the type, location, access and the size and intensity of the fire.

## 11. STAFF TRAINING

Since the SWDF operates under a Water Licence, GNWT environmental and safety regulations and to ensure compliance with the procedures and practices set out in this manual there is a need for SWDF staff to have the

knowledge, skills, and abilities to perform their work in accordance with operating and maintenance standards. One of the best ways to provide knowledge and skills is through training. SWDF staff will be provided with relevant and consistent training to assist them in their work.

Support and assistance with the development and provision of training programs will be obtained from organizations that include:

- GNWT Department of Municipal and Community Affairs ( Infrastructure Group )
- GNWT Department of Environment and Natural Resources
- Sahtu Land and Water Board
- Solid Waste Association of North America (Northern Lights Chapter)
- Qualified Training Consultants

### 11.1 Environmental Regulations and Permits

All staff including those that join will receive an orientation and presentation for general awareness of the applicable regulations that apply to the operation of the SWDF. In addition staff will have access to guidance documents on the handling of waste material for review at the gate house office.

Regulations that apply and will be reviewed as part of training sessions include;

- SLWB Water Licence (SWDF)
  - Mackenzie Valley Resource Management Act
  - Waters Act
- SLWB Reference Documents
  - Solid Waste Management for Northern and Remote Communities (Planning and Technical Guidance Document)
  - MVLWB Operation and Maintenance Plan Templates for Municipal Water Licences: Solid Waste
  - Guidelines for Developing a Waste Management Plan
  - NT- Nu Spill report Form
- GNWT Environmental Protection Act and applicable regulations (including amendments);





- Guideline for Hazardous Waste Management
- Household Hazardous Wastes
- Drum Disposal Protocol for Municipal Landfill
- Municipal Solid Wastes Suitable for Open Burning
- Guide to Recycling Mercury-Containing Lamps
- Guideline for the Management of Waste Antifreeze
- Guidelines for the Management of Waste Asbestos
- Guideline for the Management of Waste Batteries
- Guideline for the Management of Waste Lead and Lead Paint
- Used Oil and Waste Fuel Management Regulations – Plain Language Guide
- Environmental Guideline for Ozone Depleting Substances (ODSs) and Halocarbon Alternatives

#### 11.2 Ozone Depleting Substances

SWDF staff will be provided with an awareness session on the GNWT Environmental Guideline for Ozone Depleting Substances (ODS) and Halocarbon Alternatives. Staff will be knowledgeable on the types of products and appliances that contain ODS, the requirement for handling, and the removal and disposal process for ODS appliances

#### 11.3 Hazardous Waste Handling, Operations and Emergency Response

Household wastes received for temporary storage at the SWDF have the potential to be harmful to the health of staff and to the environment if not handled in a safe manner. Staff will receive awareness training that will include a review of the "Hazardous Waste Management Plan" (Appendix G)

With training staff will be able to:

- Identify the purpose of a waste management program
- Define the categories of hazardous wastes
- Identify the purpose for regulating hazardous waste and which regulatory standards apply to hazardous waste management at the SWDF
- Identify the container, labelling, and storage requirements for household hazardous waste
- Identify the requirements for developing and implementing an inspection program for hazardous waste
- Identify transportation and disposal requirements for hazardous waste
- Identify the requirements for emergency preparedness and contingency planning
- Recognize the requirements for training personnel, reporting, and recordkeeping
- Identify examples of typical hazardous wastes, universal wastes, and potentially hazardous wastes
- Identify proper management and disposal procedures for hazardous wastes received at the SWDF

#### 11.4 Transport of Dangerous Goods (TDG)

The temporary storage of household hazardous wastes will be operated in a manner that minimizes the requirements of a licenced hazardous waste contractor to load, transport and dispose of waste materials at a licenced treatment or disposal facility. For HW materials to be transport off the SWDF site waste materials that have been received, stored and packaged for transport will need to be properly labelled and inventoried to comply with the TDG legislation.

SWDF staff will be oriented on the TDG legislation so that a they have a general understanding of the requirements. The orientation sessions will be provided by the Town's HW contractor to ensure that practices followed by staff during the receipt of HW, storage, packaging and labelling meets their requirement for either barge or winter road removal.

#### 11.5 First Aid

SWDF staff will be included in the Public Works Departments first aid training program.

### 12. CLOSURE AND RECLAMATION PLAN

When the SWDF reaches capacity it is a requirement of the Water Licence to close, restore the site and continue monitoring environmental conditions to ensure that adverse impacts will not occur into the future. A closure plan provides details on how the SWDF will be shut down and designed to prevent impacts to the environment. A typical closure plan includes final cover over the filled areas to minimize water from infiltrating into the waste mound and generating leachate, diverting surface water away from the SWDF, revegetating the landfill cover and removing any buildings or structures. The plan will also provide a long-term groundwater monitoring program to verify the closure plans design is protecting the environment (groundwater, surface water, wildlife).

A final plan will be submitted for review by the Sahtu Land and Water Board a minimum of six months prior to carrying out the closure works.

An **Interim Closure and Reclamation (ICAR)** plan (Appendix H) has been completed for the SWDF to meet the Water licence condition to provide an updated ICAR plan for November 2021 and every 3 years following this date till closure when a final ICAT plan will be submitted 6 months before the closure works are performed.



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### 13. CERTIFICATION PAGE

Prepared By :  
Martin Zimmer, P.Eng

Permit Holder :  
Earth Concerns Environmental  
Contracting Inc.

## 14. REFERENCES

Mackenzie Valley Resource Management Act

Waters Act and Regulation

Mackenzie Valley Land Use Regulation

MVLWB Guide to the Water Licensing Process (2020)

MVLWB Guide to the Land Use Permitting Process

MVLWB Guidelines for Developing a Waste Management Plan (2011)

MVLWB Document Submission Standards (2019)

MVLWB / GNWT Operation and Maintenance Plan Template for Municipal Water Licences – Solid Waste Disposal Facilities (2018)

GNWT Safety Act and Regulations

Town of Norman Wells Occupational Health and Safety Program  
GNWT. 2017. Guidelines for Hazardous Waste Management

Government of Canada. 2002. Interprovincial Movement of Hazardous Waste Regulation

Government of Canada. 2001. Transportation of Dangerous Goods Regulation

Government of Canada. 2015. Workplace Hazardous Materials Information System (WMHIS 2015)

GNWT. 2004. Guidelines for the Management of Waste Asbestos

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GNWT. 2012. Guide to Recycling Mercury – Containing Lamps

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GNWT. 1998. Guideline for the Management of Waste Paint

GNWT. 2017. Guideline for the Management of Waste Lead Paint and Lead Paint

GNWT. 2004. Use Oil and Waste Fuel Management Regulations – R-064-2003

City of Yellowknife – Solid Waste Facility Operations & Maintenance Manual (June 2020)

Town of Norman Wells Hazardous Waste Management Plan ( Stantec Consulting Ltd., 2018 )

AECOM Canada Ltd. (July 28, 2009). Norman Wells Municipal Landfill Operations and Maintenance Plan, The Town of Norman Wells

Ferguson Simek Clark (2003). Guidelines for the Planning, Design, Operations, and Maintenance of Modified Solid Waste Sites in the North Territories FSC

Norman Wells Landfill Expansion – Master Plan – Final . Town of Norman Wells (AECOM, May 25 2017)



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- Figure 1. Solid Waste Facility Location
- Figure 2. Solid Waste Disposal Facility – Aerial Photograph (Summer 2021 )
- Figure 3. Solid Waste Facility Layout
- Figure 4. Waste Placement and Fill Sequence



# APPENDIX A

## SAHTU LAND & WATER BOARD LICENCE



# APPENDIX B

## GNWT WASTE MANAGEMENT GUIDELINE DOCUMENTS





# APPENDIX C SITE PLANS



# APPENDIX D

## TOWN OF NORMAN WELLS SOLID WASTE BY-LAW



# APPENDIX E

## SOLID WASTE FACILITY FORMS, CHECKLISTS AND SIGNAGE



# APPENDIX F LIST OF SAFE WORK PRACTICES



# APPENDIX G HAZARDOUS WASTE MANAGEMENT PLAN



# APPENDIX H BEAR SAFETY



# APPENDIX I

## TOWN OF NORMAN

### WELLS SPILL CONTINGENCY PLAN



# APPENDIX K INTERIM CLOSURE AND RECLAMATION PLAN