



# Closure and Reclamation Plan for Solid Waste Disposal Facility – Legacy Wastes, Norman Wells, NT



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**Town of Norman Wells, Northwest Territories**

Plan prepared for Sahtu Land and Water Board Review

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## ACRONYMS

Depolluting	Processes to remove waste fluids, freon, mercury switches, PCBS, or hazardous materials from appliances, vehicles and equipment
ENR	Department of Environment and Natural Resources
GNWT	Government of Northwest Territories
CRP	Closure and Reclamation Plan
IC&I	Industrial, Commercial and Institutional
Legacy Wastes	Hazardous wastes, scrap vehicles and equipment that have been deposited at the Town’s landfill by industries, commercial and institutional generators over the last 30 years
Licence	SLWB issued Water Licence S186L – 003 (dated November 19,2021)
MACA	Department of Municipal and Community Affairs
MVLWB	Mackenzie Valley Land and Water Board
NT	Northwest Territories
Town	Town of Norman Wells
Sahtu Regional Project	ICIP Sahtu Regional Solid Waste Diversion & Improvement Project
SLWB	Sahtu Land and Water Board
SNP	Surveillance Network Program
SWDF	Solid Waste Disposal Facility

## 1.0 INTRODUCTION

### 1.1 General

The Town of Norman Wells operates a Solid Waste Disposal Facility (SWDF) under a Shatu Land and Water Board licence issued as a renewal in November 2018.

The SWDF at its current location has been in operation since 1997 and is located approximately 6.6 kilometres from the Town centre (Figure 1.)

The existing SWDF capacity is expected to reach its waste capacity limit by the end of 2024. For the Town to continue to provide waste management and disposal services to the community an expansion of the existing landfill will be required. An expansion into phases four(4) and five(5) will provide for an additional 14 years (2038) of service life.

Prior to approving the expansion of the SWDF into Phase 4 and 5, the SLWB requires the Town to submit a separate closure and reclamation plan for the removal of legacy wastes. The plan is to include hazardous wastes, scrap vehicles and other recyclable metals that residents, businesses and industries have brought to the landfill site over the last 30 years.

### 1.2 Scope of Work

The GNWT Municipal and Community Affairs Infrastructure Branch has established and will coordinate a Shatu Regional Solid Waste Diversion & Improvement Project that will include the Town of Norman Wells. The Shatu Regional Project is a partnership with the five (5) Shatu communities for the removal of existing stockpiles of hazardous waste / scrap metals and the development of a comprehensive strategy to manage, store, handle, transport and dispose of hazardous waste in the future on a regional scale.

The Sahtu Regional Project project's scope of work includes the following aspects;

- Inventory and segregation of hazardous waste by type and for different types of scrap metal vehicles and equipment.
- Depollution of scrap metal vehicles, equipment and appliances
- Securing of hazardous waste into proper containers

- Processing depolluted scrap metal materials, I preparation for transportation
- Loading and transport (barge, winter roads) of materials to appropriately approved (licenced) receiving facilities
- Landfill improvements to provide for the secure storage and ongoing management of household hazardous waste

The Closure and Reclamation Plan (CRP) has been prepared in conformance with the conditions of the Water Licence and other applicable standards pertaining to the handling and disposal of hazardous wastes. The Closure and Reclamation Plan will be submitted to the SLWB for review and available to members of the Norman Wells community for information and comment.

The CRP will include the following sections:

- **Introduction, Background and Facility Status** —The introduction and background will provide highlights of the site ownership, location, approved area and capacity; design principles of the site, and a brief summary of the facility operation, including the types of waste received and other solid waste management operations carried out at the site.
- **Site Closure and Reclamation Works**—This section describes activities to remove and reclaim the areas of the existing SWDF that have legacy wastes stored or stockpiled on the site.
- **Post Closure Reporting and Maintenance**—Discussion of the proposed reporting the Town will conduct and provided to the SLWB following the completion of the legacy waste closure and reclamation works. Description of the procedures and site supervision / maintenance practices to control and prevent future disposal of IC&I hazardous and scrap metal wastes at the Town of Norman Wells SWDF.
- **Schedule** – outline of the proposed timelines for the Town of Norman Wells and the GNWT Sahtu Regional Backhaul activities and completion dates.

### 1.3 Regulations, Standards and Guidelines

For the preparation of the CRP similar applicable guidelines and standards from other jurisdictions were used for reference.

The following guidelines and were reviewed in the development of Norman Wells CRP:

- Guidelines for the Planning, Design, Operations, and Maintenance of Modified Solid Waste Sites in the NWT
- GWNT Guideline for the General Management of Hazardous Waste in NWT
- Federal Transport of Dangerous Goods Regulation

## 2.0 BACKGROUND

### 2.1 Town of Norman Wells

The Town is located in the Mackenzie Valley and is part of the Inuvik Region of the Northwest Territories. Geographic coordinates of the SWDF are 85°17' North Latitude, 126°52' Longitude. The population of the Town is approximately 750 with an estimated annual waste generation of 2,184 tonnes (AECOM 2017).

### 2.2 Solid Waste Disposal Facility Description

#### Site History

Based on current knowledge the landfill began operations in 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”.

#### Site and Facility Description

The topography of the landfill area can be described as a hill with elevations that range from 140 to 160 metres above sea level.

The SWDF site 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 operated by the Town 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). An additional 3 hectares is to be added to the southern portion of the SWDF to allow for an expansion of landfill capacity.

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) for the three (3) phases currently in operation. The expansion phases four (4) and five (5) will be constructed with a compacted clay liner (or equivalent liner). A surveillance monitoring program of groundwater wells was established in 2018. The two existing groundwater wells are sampled on an annual basis to provide detection of any environmental impacts.

For reference and viewing of SWDF design plans refer to Appendix A.

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 Household Hazardous Waste Storage Area
- Transfer Station
- Reuse / Salvage Area
- Appliances / Tires Storage Area
- Scrap Metals and Hazardous Waste Storage (Legacy Wastes) Area
- Proposed landfill expansion areas (Phases 4 and 5)

### 2.3 Solid Waste Disposal Facility Operations

The SWDF up until 2021 was an open and un-supervised waste disposal site. Residents and businesses from the Town had 24/7 access to the SWDF. The disposal and storage of all types of wastes generated by residents and businesses during this time period occurred. The site has various “legacy” waste materials on site ranging from scrap industrial tanks, equipment, and trucks to hazardous wastes such as gas cylinders, metal and plastic drums, waste oils and batteries.

In 2021 the Town undertook a number of initiatives to upgrade and improve the management of waste at the SWDF, including:

- Implementation of a municipal solid waste by-law
- Staffing the landfill with a Landfill Coordinator and Landfill Operator
- Ending the acceptance of industrial hazardous and scrap metal wastes
- Established operating hours
- Locked gates during non-operating hours and days
- Community awareness programs

Non-hazardous waste materials, household hazardous and scrap metal waste are accepted at the SWDF for landfilling and temporary storage. Waste received is inspected by SWDF staff and segregated into five main areas for either temporary storage or landfilling: bulky items (appliances), waste tires, household hazardous, scrap vehicles and landfill cells.

Asbestos waste from commercial contractors is also permitted but subject to specific handling procedures that include disposal (GNWT regulations) in specific and surveyed locations of the landfill.

Under the Town's waste by-law and SLWB Water Licence conditions the following waste materials are accepted for landfilling or temporary storage:

#### Non-hazardous Waste

- Construction, renovation and demolition waste
- Bulky items including furniture and appliances (ozone containing include)
- Tires
- Electronic waste
- Recyclables (cans, bottles)
- Reusable and salvageable items
- Animal carcasses
- Residential waste (collected from households)

#### Household Hazardous Waste (HHW)

HHW received at the SWDF is segregated from waste that is being landfilled. HHW is segregated and stored on a lined area of the SWDF site. Specific HHW materials are stored in appropriate containers to prevent leakage.

The types of HHW received at the SWDF include:

- Batteries
- Waste oil
- Fuel tanks
- Gas cylinders
- Paint
- Glycols
- Waste fuels

The storage of these waste materials is temporary and will be subject to periodic removal by a licenced contractor hired to transport these materials to an approved hazardous waste treatment or disposal facility.

## Scrap Metal

- Cars and SUVs
- Snowmobiles and ATVs
- White goods

The SWDF will manage waste during its operating life in a manner that minimizes the potential environmental impacts that can occur during the post closure period. Operating practices will include:

- Separation of household hazardous waste from regular waste being landfilled
- Removal of fluids and mercury switches from vehicles prior to removal as scrap metals
- Storage of HHW materials in proper containers prior to their removal from the SWDF
- Operation of HHW and asbestos waste in accordance with GNWT regulations and guidelines, specifically:
  - GWNT Guideline for the General Management of Hazardous Waste in NWT
  - Federal Transport of Dangerous Goods Regulation
  - GNWT Guideline for the Management of Lead and Lead paints
  - GNWT Guideline for the Management of Waste Batteries
  - GNWT Guideline for the Management of Waste Antifreeze
  - GNWT Guideline to Recycle Mercury – Containing Lamps
  - GNWT Used Oil and Waste Fuel Management Regulation

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## 3.0 SOLID WASTE DISPOSAL FACILITY STATUS

### 3.1 Solid Waste Disposal Facility Capacity

Based on the determinations completed in Stantec’s “SWDF Operations and Maintenance” report of August 22, 2018, the landfill capacity (airspace) remaining in the approved phases I, II, and III will provide for waste filling capacity up to the end of 2024.

A topographic survey completed in the month of June 2021 confirmed that the remaining air space capacity is                      cubic metres providing landfill capacity to the end of 2024.

### 3.2 Inspection and Monitoring

#### Inspections

SWDF staff conduct regular inspections to assess the condition of site facilities and undertake maintenance and repairs as required. The objective is to properly maintain the storage areas including the legacy waste and scrap metals areas to prevent spills or contamination, monitor surface water drainage systems and groundwater wells so that all required systems are in a good state at the time of closure and are operational for the post closure care time period. Inspections, monitoring, and maintenance work are conducted for the legacy waste storage areas and will continue during the reclamation work to be completed by 2025.

## 4.0 CLOSURE AND RECLAMATION PROGRAM

The Town of Norman Wells CRP program is based on a partnership between the Town and MACA to implement the Shatu Regional Project's depollution, processing, and removal of legacy hazardous and scrap metal wastes. Refer to Appendix B for the project's objectives and for the specific activities that will be undertaken by the contractor hired to undertake the Shatu Regional Project works.

The closure and reclamation plan describes the activities and work required to process, store and transport off-site the legacy waste currently on the SWDF lands in a safe and environmentally sound manner, and to restore and establish a compliant ongoing management facility for household hazardous and scrap metal wastes generated in the future (2021 – 2038).

### 4.1 Management and Segregation of Legacy Wastes

The most recent inventory of legacy waste conducted by MACA for the Town of Norman Wells SWDF includes the following waste categories and estimated quantities:

- Hazardous Waste volume of 150 tonnes

Note: this volume is made up of drums and pails (waste oils, fuels, paints, and antifreeze) and batteries

- Scrap Metal Appliances volume of 63 tonnes

Note: this volume is made up of stoves, dryers, washers, freezers, and air conditioners (contain freon)

- Scrap Metals volume of 460 tonnes

Note: this volume includes large trucks, cars, snow mobiles, fuel tanks and gas cylinders

#### Hazardous Waste Management

Legacy waste materials stored at the SWDF will be characterized and segregated according to hazardous properties including; corrosive, flammable, or toxic. Unknown drums or pails that cannot be identified or classified will be subject to field or laboratory analysis to characterize the waste type and determine the appropriate management methods. With the segregation of waste materials, the contractor retained for the project will consolidate empty pails or containers of fluid into larger totes or bulk containers for secure storage prior to transport off-site to appropriately registered receiving facilities. Segregated wastes in storage containers will be labelled to provide the information needed to comply with Transport of Dangerous Goods Regulations Act (maritime shipments will be governed under International Maritime Dangerous Goods Code).

Labelling will include proper shipping name, UN or PIN number and hazard class.

Once waste materials have been identified and segregated (by waste type) materials will be stored in drums, totes or meshed cages and sealed to prevent leakage.

### Scrap Metals

Legacy scrap metal wastes on site consist of cars, trucks, fuel tanks, cylinders, trailers, and appliances. Scrap metals will be segregated according to “types” and the depollution process that needs to be carried out to ready the “scrap metal” for processing and shipment off-site.

Scrap Metal segregation will be according to:

Vehicles – Heavy duty trucks, equipment (loaders, backhoes), trucks, cars, snow mobiles and quads

Appliances – fridges, freezers, stoves, and water heaters

Scrap Metals – pipes, beams, tanks, drums and non-ferrous (aluminum, copper, lead)

## 4.2 Depollution, Processing and Removal of Hazardous Waste and Scrap Metals

The Town in collaboration with MACA will inventory, plan and issue tenders for the removal of household hazardous waste stored on site and the depollution (fluid removals) of vehicles and scrap equipment prior to shipment to recycling markets.

### Depollution Processes for Scrap Metals (Appliances, Vehicles, Equipment)

**Appliances:** refrigerators, air conditioners and freezers contain ozone depleting gas such as freon that must be removed prior to their processing for scrap metal markets. A certified technician will be retained to remove freon, mercury switches, compressor oils and capacitors (potential PCBs) from appliances.

**Vehicles and Equipment:** vehicles and equipment contain batteries, refrigerants, fluids (antifreeze, motor oil, transmission, gasoline/diesel, steering, brake), mercury switches that will be removed prior to processing. The contractor hired will provide the equipment needed to remove these materials into the proper storage containers for shipment to appropriate receiving facilities.

**Home Heating Oil Tanks, Residue Drums, and Old Fuel Tanks:** may contain residue fuel, sludge or flammable vapours that will be removed into secure storage containers for shipment off-site.

**Gas Cylinders:** cylinders will be inspected for the presence of residual gas and identified according to the type of gas product. Licenced technicians will remove and decommission the cylinders for processing.

## Processing for Scrap Metals

Vehicles, Equipment, Appliances and Tanks: once fluids and freon have been removed metal wastes will be processed using drum crushers and metal baler to compress bulky metal wastes into compacted bales for loading into shipping containers ready for transport off-site by either barge or winter road truck hauling.

### 4.3 Post Clean-up Inspections and Investigations

Following the removal of legacy wastes (2025) the reclaimed areas of the SWDF that were once covered with stored scrap metal and hazardous wastes will be inspected by a qualified environmental consultant. The inspections will start with visual inspections of areas for signs of staining or evidence of ground contamination. On the advice of the consultant or ENR Officer soil sampling maybe undertaken to identify potential environmental impacts and potential remediation measures that can be taken to prevent off-site (i.e. surface and groundwater impacts).

A survey of ground elevations will be completed to determine the contours of the cleared areas (phases 1,2 and 3 of existing SWDF site ) that contained legacy wastes. Survey results will be compared to the approved final contours to determine if (1) final cover and vegetation is needed (2) area can be used for temporary storage or (3) additional waste can be landfilled prior to closure and final cover placement.

## 5.0 POST RECLAMATION REPORTING

Following the completion of the legacy waste reclamation at the Town of Norman Wells SWDF a report will be prepared for submission to the SLWB. The report will provide verification that the reclamation works were completed and will include details on the following issues;

- Actual legacy waste types and volumes depolluted, processed, and removed from the SWDF
- List of licenced disposal facilities used for final disposal
- Summary of any incidents encountered during works and mitigation measures taken
- Results of post reclamation inspections and investigations, including recommendations for remedial works if required.
- Recommendations for the “cleanup” areas future use(s) such as waste placement (to final grades), temporary storage or placement of final cover/ restoration.

## 6.0 IMPLEMENTATION SCHEDULE

Based on current project schedule set by MACA the Regional Backhaul initiative's timeline for specific work tasks related to the legacy wastes at the Norman Well's SWDF is as follows;

### Hazardous Wastes

- Inventory, Segregation, and labelling for transport (2022)
- Transport (2023 – 2024)

### Scrap Metal Wastes

- Segregate (2022)
- Depollute (2023)
- Process and Remove (2025)

### Inspection, Investigations, and Reporting (Post Reclamation)

- 2025 – 26

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## 7.0 CLOSURE AND RECLAMATION COSTS AND FINANCING

The reclamation and removal of legacy wastes from the SWDF will entail costs for various activities, processing, transport, and disposal works. Estimation of these costs' items will occur as part of MACA's tender process with waste management contractors that will be retained to complete the Regional Backhaul works in the five (5) Sahtu communities including Norman Wells.

The financing of the closure and reclamation works will be established, and the cost shared between MACA and the Town.



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## 8.0 REFERENCES



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## **LIST OF FIGURES**

Figure 1. Site Location

Figure 2. Solid Waste Disposal Facility Aerial Photograph



## APPENDIX A

# SITE PHOTO'S OF CURRENT LEGACY WASTE STORAGE CONDITIONS



# APPENDIX B

  

## PROPOSAL – REGIONAL BACKHAUL PROJECT