



Waste Management Plan v.3

Checkpoint Landfarm and Former Highway
Maintenance Camp

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1 Revisions

Date of Revision	Title, Section Number, or Page Number of Revised Sections	Summary of Changes
September 2017		Version 2
November 2017	Update 2.0, Table 2.1 and 4.0 Sediment and Erosion Control	Version 2.1
June 2024	All sections updated to better reflect work occurring at the sites.	Version 3

2 Introduction

The Department of Environment and Climate Change (ECC), formerly the Department of Environment and Natural Resources (ENR), with the Government of the Northwest Territories (GNWT) has developed a Waste Management Plan (WMP) in support of the environmental site assessment, care and maintenance, remediation and monitoring of the Checkpoint former Highway Maintenance Camp (HMC) and Landfarm Facility (Landfarm).

The Checkpoint HMC was established by the Government of Canada in the 1970s and was operated by the federal Department of Public Works. The HMC was then leased and operated by Yukon Construction Co. between the years of 1977 and 1981. The HMC was then transferred to the GNWT in the 1980s through a block land transfer and remained a highway maintenance camp. The site was then leased and operated by Mackenzie Wood Products in 1996 for logging and milling operations. Due to operations at the site, it contained a dump, camp workings, maintenance area, residential areas, sawmill and various storage areas.

The Landfarm is an engineered facility able to receive hydrocarbon contaminated soil originating from the HMC site. The contaminants in the material entering the Landfarm are primarily benzene, ethylbenzene, toluene, xylene (BTEX), heating oil and gasoline. The Landfarm is active during the summer months when temperatures allow for soil treatment and monitoring activities.

Monitoring activities are being conducted at both the former HMC and Landfarm under the existing land use permit (MV2017X0020) and water licence (MV2017L8-0004).

2.1 Company Name, Site Name and Site Location

Company Name

Government of the Northwest Territories – Department of Environment and Climate Change.

Site Name and Location

Checkpoint former Highway Maintenance Camp and Landfarm is located approximately 1km southwest of Highway 7 and Highway 1, near Jean Marie River and Fort Simpson, Northwest Territories.

Coordinates

Former Checkpoint Highway Maintenance Camp: 61° 26' 30" N, 121° 14' 50" W
 Checkpoint Landfarm Treatment Facility: 61° 27' 59" N, 121° 16' 12" W

2.2 Effective Date of the Plan

This Waste Management Plan (WMP) and any subsequent revisions will be effective for the duration of the Checkpoint environmental site assessments, care and maintenance, remediation and monitoring activities at the site. This version of the WMP shall be in effect after the proper review and approvals. The WMP will be reviewed annually and updated as required.

2.3 Purpose and Scope of the Plan

The purpose of this WMP is to identify waste streams and outline management methods for wastes generated at the Landfarm and former HMC. Management of the site operations will be completed to ensure that activities comply with all licences, permits and applicable territorial and federal laws and regulations related to waste management specific to site operations.

2.4 Applicable Waste Management Regulations and Guidelines

The following table outlines the regulations, guidelines, criteria, and management plans that are applicable with regards to the waste type and water management at the Landfarm and HMC sites:

Table 1. Applicable Waste Management Regulations and Guidelines

Waste Type	Applicable Regulation and Guidelines
Hazardous Waste	Guideline for Hazardous Waste Management (GNWT, 2017)
Petroleum Hydrocarbon Contaminated Soil	Guideline for Petroleum Hydrocarbon-Contaminated Soil Treatment Facilities in the NWT (MVLWB/GNWT, 2020) GNWT Environmental Guideline for Contaminated Site Remediation (GNWT, 2003)
Groundwater	Action Levels within Groundwater Monitoring and Leachate Management Plan (KBL, 2020) Federal Interim Groundwater Quality Guidelines (FCSAP, 2016)
Surface Water	Effluent Quality Criteria (EQG) under Part F Section 17 of the Water Licence (MV2017L8-0004)

2.5 Site Description and Background

The HMC was used for various activities between 1970 to 2000. It was first established as a highway maintenance camp by the Government of Canada in the 1970s. It was then leased and operated by Yukon Construction Co. in the 1980s and remained as a highway maintenance camp until the mid-1990s. The site was then leased and operated by Mackenzie Wood Products in 1996 and was used for logging and milling operations. Logging and milling operations ended in 2000 due to the lack of timber supply. Due to the operations at the site, it contained a dump, camp workings, maintenance area, residential areas, sawmill, and various storage areas. The HMC is located near the junction of the Mackenzie Highway (Highway 1) and the Liard Highway (Highway 7), 63 km south of Fort Simpson, NT, adjacent to the Jean Marie River. Previous assessments identified concentrations of petroleum hydrocarbons (PHCs) and metals in soil and groundwater that did not meet the applicable guidelines. The HMC includes 14 groundwater monitoring wells and four existing surface water monitoring locations along the Jean Marie River. Surface water in the Jean Marie River has been monitored by the GNWT - ECC since October 2019 due to concerns raised by the Jean Marie River community that contamination from the HMC may be migrating into the Jean Marie River. ECC plans to continue to monitor the surface water as part of the project activities.

The Landfarm is a soil treatment facility that includes: one cell for receipt, storage, and treatment of petroleum hydrocarbon contaminated soil, one water retention pond and one overflow cell. The Landfarm formerly contained approximately 5,900 cubic metres (m³) of soil that was transported from the HMC to the Landfarm in 2010 (KBL, 2021b). In October 2019, 4,860 m³ of treated soil were removed from the Landfarm and returned to the HMC to be temporarily stockpiled (KBL, 2021b). Non-soil debris found in the loading and transfer process were separated and removed in October 2019 to refuse stockpiles at the HMC (KBL, 2021b). In March and July of 2020, 1,371 m³ of soil were excavated from the HMC and transported to the Landfarm for treatment (KBL, 2021b). In August 2021, approximately 1,371 m³ of soil was treated at the Landfarm using an Allu™ bucket attached to a backhoe (Stantec, 2022). Confirmatory samples collected from the treated soil indicated that concentrations of contaminants of concern (COCs) had been remediated to acceptable levels.

GNWT – ECC will continue the care and maintenance and, monitoring activities at the Checkpoint Landfarm and former HMC. The LUP and the WL outline the requirements for sampling of soil undergoing remediation, Surveillance Network Program (SNP) groundwater sampling, sampling of the Retention Pond and Overflow Cell SNPs, along with requirements for decanting the Retention Pond and Overflow Cells. The purpose of this remediation and monitoring project is to mitigate environmental and human health risk associated with the former Highway Maintenance Camp and to effectively treat hydrocarbon impacted soil at the Checkpoint Landfarm. The treated soil will be used on site as backfill material for the excavations.

2.6 Proposed Location for Waste Management Activities

Waste management activities are to occur onsite at the locations noted in Section 2.1 of this WMP.

2.7 Site Characteristics

The HMC is in a cleared area of undulating plains region with mixed woods and less than 1% easterly slope towards the Jean Marie River. The Jean Marie River forms the east boundary of the HMC, and the river embankment grades 3 m to 7 m down over 30 m (10% to 20%) to the river level (KBL,2021b). The surficial geology of the HMC and surrounding area is influenced by the historical flooding of the glacial Lake McConnell. The region is generally comprised of level to gently undulating fine-textured lacustrine plains (ECG, 2007).

The Landfarm is primarily flat, sloping slightly west towards an area previously used as a quarry. Surface water discharge drains towards the low-lying area of the quarry situated below the level of the surrounding forest (KBL, 2021a). Based on local topography, regional surface drainage is inferred to be west to a muskeg area and then southeast towards the Jean Marie River, approximately 2.7 km from the Site. An unnamed lake is also located nearby, approximately 1.5 km north of the Site.

3 Waste Types

3.1 Waste Streams, Source of Generation and Characteristics

Materials received at the Landfarm for treatment include hydrocarbon contaminated soil from the former HMC site. All materials are sampled and analyzed prior to receipt to ensure that they meet the acceptance criteria as outlined in the Soil Criteria, Sampling and Handling located in the Operation and Maintenance Plan v.2 (KBL, 2017). The criteria are based on the acceptance criteria from the water licence. Materials not meeting acceptance criteria will not be received into the Landfarm and will be directed to a facility approved to receive the material. Petroleum hydrocarbon contaminated soil undergoes treatment via bioremediation. To support effective and efficient treatment, the soil is mechanically mixed and amendments such as water and surfactants may be added to modify pH, moisture content and enhance bioavailability of contaminants. Once the bioremediation process has been given adequate time, soil is sampled to confirm it meets the soil re-use criteria.

The Supplemental Phase III Environmental Assessment Report (BluMetric, 2017) notes that if any soil is found to contain arsenic above 12 mg/kg arsenic, that soil will be stockpiled and shipped off-site to an approved disposal facility. It should be noted that naturally occurring arsenic background levels have been found to be greater than 12 mg/kg throughout the Northwest Territories. Should significant amounts of the treated soil be found to contain greater than 12 mg/kg arsenic, ECC will work with the MVLWB to determine if this is due to contamination or if it is naturally occurring and determine the appropriate management of the material.

Precipitation, snowmelt, and soil treatment pad leachate are managed by collection of leachates into the retention pond and overflow cell in the Landfarm. Where authorized by the Regional Inspector, water meeting discharge criteria may be released to the environment at the designated location. Water not meeting discharge criteria shall be transferred off site for disposal at a registered and/or approved receiving facility. Potential environmental effects arising from waste management on-site are considered negligible: only treated water meeting the proposed discharge criteria will be released to the environment in accordance with the facility’s water licence. Results of the water to be discharged will be shared with the GNWT-ECC Regional Office for review and approval prior to completing the discharge event. Activities occurring at the Landfarm are limited to those associated with operation and maintenance of the soil treatment pad. No vehicles are stored or maintained onsite. The field lead will be onsite during the monitoring program; any domestic waste brought to site will be removed daily.

In addition to contaminated soil, snow and water, additional waste streams at the HMC site may include scrap metal generated through remediation activities as well as any spent spill response material that may be generated in the event of an accidental release of fuel, or other mechanical fluids during the operation of heavy equipment within the Site.

Potential wastes that may be generated on-site are presented in Table 2.

Table 2: Potential Wastes to be Generated On-site.

Waste Types	Description of Waste Generated	Management
Contaminated Soil	Hydrocarbon and metal impacted soil identified during the assessment and remediation activities	To be addressed during the remediation program. Hydrocarbon contaminated soil to be placed in the Landfarm for treatment and metal impacted soil will be disposed of in a proper facility chosen by the contractor
Surface Water	Surface water requiring discharge from main excavation at the maintenance camp, and retention pond and overflow cell at the Landfarm	Surface water to be collected and analyzed with results sent to the inspector for approval to discharge to the approved discharge locations
Groundwater	Purged groundwater collected during the	Groundwater will be collected in pails/buckets to

	groundwater monitoring program	be disposed of at an appropriate facility
Scrap Metal	Non-hazardous scrap metal waste collected during the remediation activities	To be disposed of at an approved facility chosen by the contractor
Garbage	Miscellaneous garbage such as cardboard, paper, food waste, etc.	There will be no disposal of garbage onsite. Garbage will be hauled off-site and disposed of in a designated area.
Spent Spill Response Material	Materials used to address accidental release of fuel, mechanical fluids	Materials used in response for accidental spills will be disposed of in an approved facility chosen by the hired contractor

4 Waste Management

Waste management will center on the basic principles of waste management; principles of reuse, recycle, treatment, release, and disposal. Accordingly, waste at the Checkpoint Site will be managed through:

- Soil biotreatment;
- On-site re-use;
- Off-site re-use;
- Effluent discharge; and
- Off-site disposal.

The environmental impacts associated with soil biotreatment, and authorized effluent discharge, as described below, are anticipated to be negligible based on facility design, implementation of mitigation measures, and adherence to monitoring plans. Existing site conditions, mitigation measures, and monitoring programs are presented in the application for the Type B Water Licence for the Landfarm.

4.1 Soil Treatment

The Landfarm is designed to treat petroleum hydrocarbons.. Prior to acceptance of material at the Landfarm, contaminated soil will be tested to ensure that it meets acceptance criteria. Soil meeting acceptance criteria as outlined in the Operations and Maintenance Plan v.2 (KBL, 2017), will be

deposited into a designated area within engineered cell for biotreatment. The design, operation, and maintenance of the Landfarm is described in the Operations and Maintenance Plan. The Operations and Maintenance Plan is available via the following link:

<https://registry.mvlwb.ca/Documents/MV2017L8-0004/MV2017X0020%20MV2017L8-0004-%20GNWT-ENR%20-%20Landfarm%20Operations%20and%20Maintenance%20Manual%20V2.PDF>

4.2 Water Treatment

A retention pond/overflow cell is utilized to contain Landfarm run-off and subsequent snowmelt. Water from the pond may be utilized for application within the Landfarm for the provision of moisture to the soil. Moisture is an integral part of promoting microbial activity responsible for the degradation of petroleum hydrocarbons. Water application for bioremediation is permissible provided the water is not hazardous as defined by the Guideline for the General Management of Hazardous Waste in the NWT (GNWT, 2017).

4.3 Re-use Disposal

Once the contaminant composition of the bioremediated soil is confirmed through laboratory analyses, the soil is classified as either meeting re-use criteria, requiring additional bioremediation, or requiring off-site disposal at a designated facility. It is planned that soil material meeting re-use criteria will be used as backfill material for excavations at the HMC during remedial activities.

Water meeting discharge criteria may be discharged into the environment at the approved discharge location. Please refer to the Operation and Maintenance Plan (KBL, 2017) for the discharge location. The effluent will be batch discharged to ground surface through a dedicated hose into the discharge location designed to control erosion. It is expected that discharge from the Landfarm will occur between July and October. Discharge volumes will not exceed 1000 m³/day; however, typical discharge volumes are expected to be much less.

5 Sediment and Erosion Control

The Landfarm is approximately 2.7 km from the Jean Marie River. Based on the approved discharge location, run-off from the Landfarm cannot access the Jean Marie River. Please refer to the Operation and Maintenance Plan for further information on how run-off will be prevented from entering the Jean Marie River.

6 References

- BluMetric. (2017). Supplemental Phase III Environmental Site Assessment Report at Checkpoint Highway Maintenance Site, Fort Simpson, Northwest Territories.
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- FCSAP. (2016). Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites.
- GNWT. (2003). GNWT Environmental Guideline for Contaminated Site Remediation
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- KBL. (2017). Operations and Maintenance Plan, Checkpoint Highway Maintenance Camp, Mackenzie Valley Land and Water Board, Class B Licence Application
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- MVLWB/GNWT. (2020). Guideline for Petroleum Hydrocarbon-Contaminated Soil Treatment Facilities in the NWT.
- Stantec. (2022). 2021 Annual Monitoring Report - Checkpoint Landfarm