December 2016

Study of NWT Waste Management Systems

COMMUNITY WASTE MANAGEMENT PROFILES AND SITE INSPECTIONS

VOLUME I

Submitted to:
Department of Environment and Natural Resources
Government of the Northwest Territories
P.O. Box 1320
Yellowknife, NT X1A 2L9



Report Number: 14-1188-0001

Prepared By:

Golder Associates Ltd.
9, 4905 – 48 Street
Yellowknife, North West Territories, X1A 3S3
(867) 873-6319
www.golder.com

Golder Associates

Disclaimer

This report was prepared for information only for the Department of Environment and Natural Resources in December 2016. Information used in this report is current to 2015, however observations from field visits to a number of community landfills were made in 2014.

Government of the Northwest Territories
Department of Environment and Natural Resources
P.O. Box. 1320
Yellowknife, NT X1A 2L9

Attention: Diep Duong, P.Eng.

RE: STUDY OF NWT WASTE MANAGEMENT SYSTEMS
VOLUME 1 Community Waste Management Profiles and Site Inspections

Golder Associates Ltd. is pleased to provide the Northwest Territories (NWT) Government this final report "**Study of NWT Waste Management Systems, Volume 1: Community Waste Management Profiles and Site Inspections**", dated December, 2016. This report should be read in conjunction with "**Study of NWT Waste Management Systems Volume 2: Landfill Site Risk Factors, Waste Generation & Management Costs in the NWT"**, dated December, 2016.

This report provides details of the state of the Community solid waste facilities in the NWT in 2014 and 2015, based on site inspections carried out by Golder and information gathered from regulatory authorities and communities to the end of 2015. The report represents the culmination of input and collaboration of a number of individual community, government and Golder staff to provide an up-to-date and consistent set of baseline information and data intended to be used in future waste management and operational decisions and planning in the Territory.

We trust that the report herein satisfies the requirements of this project. Please do not hesitate to contact the undersigned if there are any questions or comments.

Golder Associates Ltd.

Kevin Rattray P. Eng.
Environmental Engineer

Paul Dewaele P. Eng.
Principal

Table of Contents

1.0 INTRODUCTION 1

2.0 OBJECTIVES 5

3.0 DATABASE OF COMMUNITY PROFILES 6

4.0 REPORT STRUCTURE 8

5.0 NWT WASTE MANAGEMENT REGULATORY FRAMEWORK 9

5.1 Federal Acts and Regulations 9

5.2 Territorial Acts and Regulations 11

5.3 Federal and Territorial Waste Management Guidelines 13

5.4 Regulation of Waste Management including Landfill Sites 15

6.0 NWT PHYSIOGRAPHY, GEOLOGY, HYDROLOGY AND CLIMATE 17

6.1 NWT Physiography 17

6.2 NWT Geology and Geomorphology 18

6.3 NWT Hydrology 21

6.4 NWT Climate and Permafrost Distribution 24

7.0 COMMUNITY WASTE MANAGEMENT PROFILES 29

7.1 Aklavik 30

7.2 Behchokǫ̀ 36

7.3 Colville Lake 43

7.4 Déljnę 47

7.5 Dettah 52

7.6 Enterprise 57

7.7 Fort Good Hope 62

7.8 Fort Liard 67

7.9 Fort McPherson 72

7.10 Fort Providence 78

7.11 Fort Resolution 83

7.12 Fort Simpson 88

7.13 Fort Smith 97

7.14 Gamètì ... 103
7.15 Hay River ... 107
7.16 Inuvik ... 113
7.17 Jean Marie River ... 118
7.18 Kakisa ... 123
7.19 Lutsel K'e ... 127
7.20 Nahanni Butte ... 131
7.21 Norman Wells ... 135
7.22 Paulatuk ... 140
7.23 Sachs Harbour ... 146
7.24 Trout Lake (Sambaa Ke) ... 151
7.25 Tsiigehtchic ... 155
7.26 Tuktoyaktuk ... 161
7.27 Tulita ... 166
7.28 Ulukhaktok ... 170
7.29 Wekweètì ... 178
7.30 Whatì ... 182
7.31 Wrigley ... 186
7.32 Yellowknife ... 190

8.0 COMPARISON OF SELECT WASTE MANAGEMENT INFORMATION IN NWT ... 195

9.0 COMMUNITY COMPARISON ... 198

9.1 Landfill Users ... 198
9.2 Waste Collection and Disposal ... 199
9.3 Water Licence Requirements ... 201
9.4 Landfill Management Training ... 203
9.5 Hazardous Waste Management Practices ... 203
9.6 Sewage Sludge Management ... 206
9.7 Opportunities for Waste Diversion ... 207

10.0 REFERENCES ... 209

TABLES

Table 1-1: Location, Population and Applicable Land and Water Board for NWT Communities 4
Table 3-1: Database Coding 7
Table 5-1: Federal Acts and Regulations – Waste Management 9
Table 5-2: Territorial Acts and Regulations – Waste Management 12
Table 5-3: Guidelines Relating to Waste Management in the NWT 14
Table 7-1: Tipping Fees 92
Table 8-1: Community Waste Management System Information (Part 1) 195
Table 8-2: Community Waste System Information (Part 2) 197

FIGURES

Figure 1-1: Map of NWT Community Access 2
Figure 1-2: Administrative Regions of the NWT and Their Communities 3
Figure 3-1: Screenshot of the Database Flat File 6
Figure 6-1: Map of Relief of NWT 17
Figure 6-2: Surficial Materials Map of the NWT 19
Figure 6-3: Surficial Materials Legend 20
Figure 6-4: Principal Lakes and Rivers in the NWT 21
Figure 6-5: Watersheds in the NWT 23
Figure 6-6: Mean Annual Temperature in the NWT 25
Figure 6-7: Mean Potential Evapotranspiration in July in the NWT 26
Figure 6-8: Mean Annual Total Precipitation in the NWT 26
Figure 6-9: Permafrost Distribution in the NWT 28
Figure 7-1: Aerial Location of the Community of Aklavik and the Community Landfill 35
Figure 7-2: Behchokǫ̀ Active Landfill, Historic Landfill and Sewage Lagoon 42
Figure 7-3: Aerial Photograph of the Colville Lake Active Landfill and Sewage Lagoon 46
Figure 7-4: Aerial Location of Délı̨nę Landfill 51
Figure 7-5: Aerial Location of Dettah Landfill 56
Figure 7-6: Aerial Location of Enterprise Landfill 61
Figure 7-7: Aerial Location of Fort Good Hope Landfill 66
Figure 7-8: Aerial Location of the Fort Liard Active Landfill, Historic Landfill and Sewage Lagoon 71
Figure 7-9: Aerial Location of Fort McPherson Landfill 77
Figure 7-10: Aerial Location of Fort Providence Landfill 82
Figure 7-11: Aerial Location of Fort Resolution Landfill 87
Figure 7-12: Aerial Location of Fort Simpson Landfill 95

Figure 7-13: Fort Simpson Landfill Layout, 2014 96
Figure 7-14: Aerial Location of the Fort Smith Landfill 102
Figure 7-15: Aerial Location of the Gamètì Landfill 106
Figure 7-16: Aerial Location of the Hay River Landfill 112
Figure 7-17: Aerial Location of the Inuvik Landfill 117
Figure 7-18: Aerial Location of the Jean Marie River Landfill 122
Figure 7-19: Aerial Photograph of the Kakisa Active Landfill and Sewage Lagoon 126
Figure 7-20: Aerial Photograph of Lutsel K'e Landfill (left) and Bulky Waste Storage Area (right). 130
Figure 7-21: Aerial Photograph of the Nahanni Butte Landfill and Sewage Lagoon 134
Figure 7-22: Aerial Location of the Norman Wells Landfill 139
Figure 7-23: Aerial Location of the Paulatuk Landfill 145
Figure 7-24: Aerial Location of the Sachs Harbour Landfill 150
Figure 7-25: Aerial Location of the Trout Lake Landfill 154
Figure 7-26: Aerial Location of the Tsiigehtchic Landfill 160
Figure 7-27: Aerial Location of the Tuktoyaktuk Landfill 166
Figure 7-28: Aerial Photograph of the Tulita Active Landfill and Sewage Lagoon 170
Figure 7-29: Aerial Location of the Uluhaktok Landfill 176
Figure 7-30: Ulukhaktok Landfill in Foreground and Jack's Bay in Background 177
Figure 7-31: Aerial Location of the Wekweètì Landfill 181
Figure 7-32: Aerial Location of the Whatì Landfill 185
Figure 7-33: Aerial Location of the Wrigley Landfill 189
Figure 7-34: City of Yellowknife Landfill 194
Figure 9-1: Uncovered Waste, Aklavik Landfill Site 200
Figure 9-2: CRD (right) and MSW (left) cells at the Behchokǫ̀ Landfill Site 201
Figure 9-3: Hazardous Waste, Fort McPherson Landfill Site 204
Figure 9-4: Lined Hazardous Waste Disposal Area 205
Figure 9-5: Hazardous Waste Storage Containers, Yellowknife Landfill 206
Figure 9-6: Sewage Lagoon and Chute, Aklavik 207

APPENDICES

APPENDIX A
Site Inspection Forms and Photos

APPENDIX B
Community Waste Management Survey Results

LIST OF ACRONYMS

Acronym	Definition
AANDC	Aboriginal Affairs and Northern Development Canada
ATV	All-Terrain Vehicles
BCP	Beverage Container Program
CEAA	*Canadian Environmental Assessment Act*
CEPA	*Canadian Environmental Protection Act*
CRD	Construction, Renovation and Demolition (waste)
EA	Environmental Assessment
ELV	End-of-Life Vehicles
ENR	Department of Environment and Natural Resources
EPA	*Environmental Protection Act*
EPR	Extended Producer Responsibility
GIS	Geographic Information System
GNWT	Government of the Northwest Territories
GLWB	Gwich'in Land and Water Board
HHW	Household Hazardous Waste
ICI	Institutional, Commercial and Industrial
IFO	Industry Funding Organization
INAC	Indigenous and Northern Affairs Canada (formerly Indian and Northern Affairs Canada)
ISP	Industry Stewardship Plans
IWB	Inuvialuit Water Board
MACA	Department of Municipal and Community Affairs
MOLO	Manager of Landfill Operations
MSW	Municipal Solid Waste
MVRMA	Mackenzie Valley Resource Management Act
MVLWB	Mackenzie Valley Land and Water Board
NAPS	National Air Pollution Surveillance Network
NWT	Northwest Territories
NWTWB	Northwest Territories Water Board (now Inuvialuit Water Board)
PCB	Polychlorinated Biphenyls
SAO	Senior Administrative Officer
SLWB	Sahtu Land and Water Board
SNP	Surveillance Network Program
SWANA	Solid Waste Association of North America
WLWB	Wek'èezhìi Land and Water Board

1.0 INTRODUCTION

Waste management in the Northwest Territories (NWT) is regulated by federal, territorial, and municipal acts, regulations, standards, and guidelines. Through the process of devolution (i.e., the shifting of responsibilities from the federal to the territorial government), increasing onus has been placed on territorial and municipal governments to manage their municipal solid waste (MSW) and household hazardous waste (HHW) streams.

The NWT faces unique challenges related to waste management and diversion compared to other jurisdictions in Canada. Chief amongst these is that the total population of 43,623 as of 2014 (Northwest Territories Bureau of Statistics, 2015) is spread over an area of approximately 1.3 million square kilometres (km^2). A number of NWT communities have limited seasonal or no road access (see Figure 1-1), which limits their options for accessing external waste management resources.

Several other factors contribute to the difficulty in managing waste in the predominantly small and remote communities of the NWT. These factors include:

- Distance between communities;
- Low waste generation rates and resultant lack of economies of scale to manage the materials;
- Lack of community-based waste management expertise;
- Limitations to waste management technologies posed by cold and long winters;
- Education and training; and,
- High turnover of community staff responsible for waste management.

The Department of Environment and Natural Resources (ENR) of the Government of the Northwest Territories (GNWT) contracted Golder Associates Ltd. (Golder) to conduct a study to support the NWT Waste Resource Management Strategy (Waste Strategy) currently being developed by the GNWT. This Waste Resource Management Strategy will provide a framework for the management of waste in the NWT, and will be the foundation for the development of waste management programs and policies. The purpose of this project is to highlight which areas of the existing waste management framework require prioritization of funding by ENR and the Department of Municipal and Community Affairs (MACA).

This report provides a description of the current state of waste management based on data collected to the end of 2015 in 32 of the 33 communities in the NWT. N'dilo has been omitted from the community landfill summary in this report as this community accesses solid waste management facilities in Yellowknife. The presentation of the information in this report is a summary of a larger data collection exercise, delivered to ENR and MACA as a discrete dataset through earlier work, which included community waste management surveys conducted by Golder.

Figure 1-1 illustrates the location of NWT communities. These communities are grouped into five major administrative divisions/regions – Dehcho, Inuvik, North Slave, Sahtu, and South Slave. Figure 1-2 illustrates these broader regional divisions. Table 1-1 provides a list of the NWT communities included in this study, along with their UTM coordinates and land and water board affiliations. Populations for the communities are from the 2011 census (Statistics Canada, 2012). According to Statistics Canada (2012), the total population of the NWT in 2011 was 41,462 persons, which is slightly lower than that stated by the Northwest Territories Bureau of Statistics in 2015 (43,501).

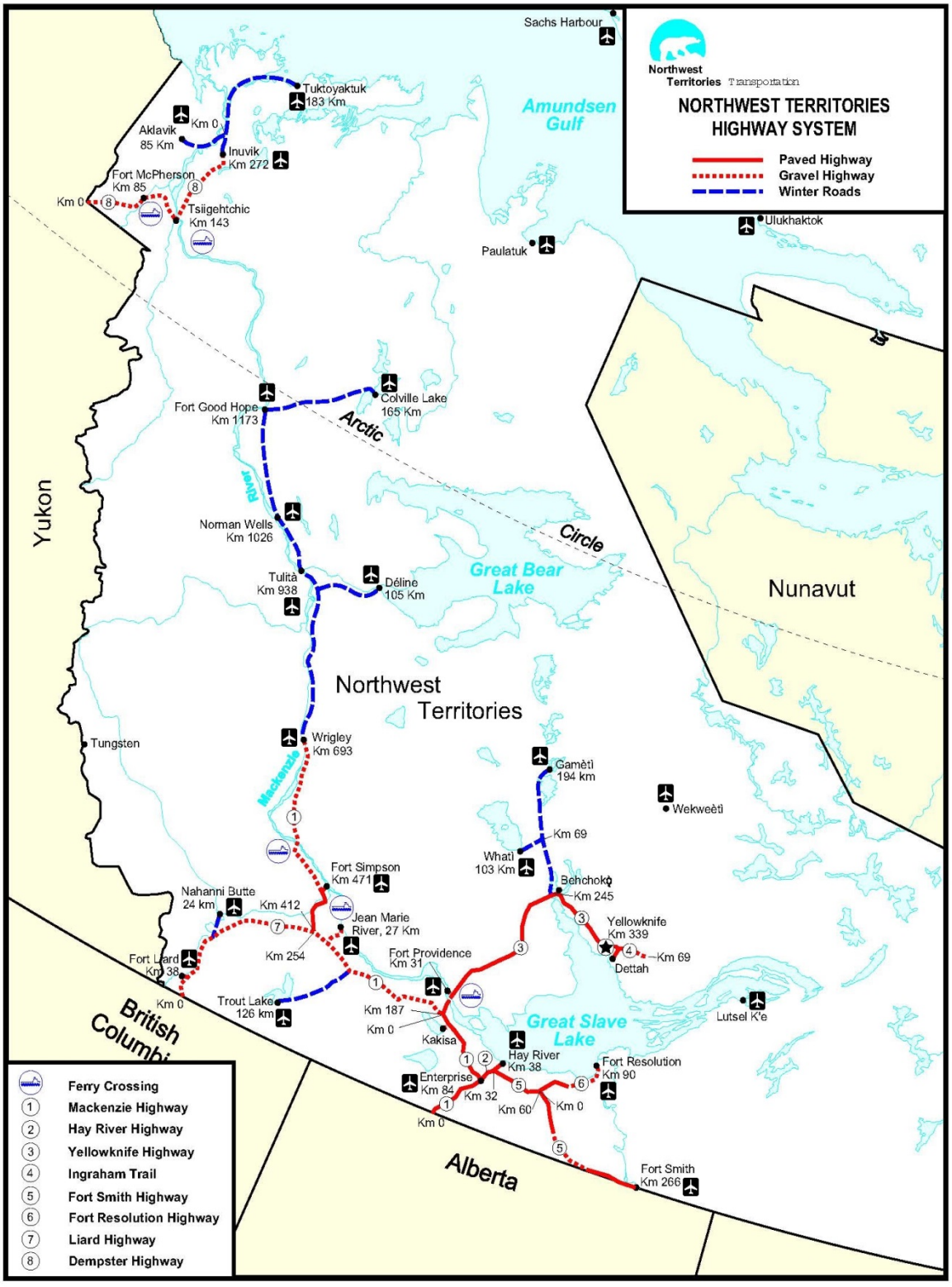


Figure 1-1: Map of NWT Community Access



Figure 1-2: Administrative Regions of the NWT and Their Communities

The land and water board affiliations are as follows:

- GLWB – Gwich'in Land and Water Board
- MVLWB – Mackenzie Valley Land and Water Board
- IWB – Inuvialuit Water Board (formerly Northwest Territories Water Board)
- WLWB - Wek'èezhìi Land and Water Board
- SLWB – Sahtu Land and Water Board

Table 1-1: Location, Population and Applicable Land and Water Board for NWT Communities

Community Name	Population	UTM Coordinates	Land and Water Board Region
Inuvik Region			
Aklavik	633	68°13′08″N, 135°00′31″W	IWB
Fort McPherson	792	67°26′07″N 134°52′55″W	GLWB
Inuvik	3,463	68°21′42″N 133°43′50″W	GLWB
Paulatuk	313	69°21′05″N 124°04′10″W	IWB
Sachs Harbour	112	71°59′08″N 125°14′53″W	IWB
Tsiigehtchic	143	67°26′26″N 133°44′43″W	GLWB
Tuktoyaktuk	854	69°26′34″N 133°01′52″W	IWB
Ulukhaktok	402	70°44′11″N 117°46′05″W	IWB
Sahtu Region			
Colville Lake	149	67°02′18″N 126°05′32″W	SLWB
Déljnę	472	65°11′12″N 123°25′18″W	SLWB
Fort Good Hope	515	66°15′31″N 128°37′43″W	SLWB
Norman Wells	727	65°16′59″N 126°50′58″W	SLWB
Tulita	478	64°54′01″N 125°34′39″W	SLWB
Dehcho Region			
Fort Liard	536	60°14′27″N 123°28′11″W	MVLWB
Fort Simpson	1,238	61°51′47″N 121°21′18″W	MVLWB
Jean Marie River	64	61°31′33″N 120°37′38″W	MVLWB
Nahanni Butte	102	61°02′02″N 123°22′50″W	MVLWB
Trout Lake	92	60°26′33″N 121°14′43″W	MVLWB
Wrigley	133	63°13′41″N 123°28′12″W	MVLWB
North Slave Region			
Behchokǫ̀	1,926	62°48′09″N 116°02′47″W	WLWB
Dettah	210	62°24′41″N 114°18′27″W	MVLWB
Gamètì	253	64°06′44″N 117°21′13″W	WLWB
Lutsel K’e	295	62°24′19″N 110°44′22″W	MVLWB
N’dilo	200	62°28'29"N 114°20'10"W	MVLWB
Wekweètì	141	64°11′25″N 114°10′58″W	WLWB
Whatì	492	63°08′40″N 117°16′22″W	WLWB
Yellowknife	19,234	62°26’32”N 114°23’51”W	MVLWB
South Slave Region			
Enterprise	87	60°33′24″N 116°08′34″W	MVLWB
Fort Providence	734	61°21′17″N 117°39′36″W	MVLWB
Fort Resolution	474	61°10′18″N 113°40′18″W	MVLWB
Fort Smith	2,093	60°00′19″N 111°53′26″W	MVLWB
Hay River / Reserve	3,898	60°49′59″N 115°46′40″W	MVLWB
Kakisa	45	60°56′24″N 117°24′51″W	MVLWB

2.0 OBJECTIVES

The objective of this report (Volume I - Community Waste Management Profiles) is to gather and organize information on current waste management systems in each of the 32 communities of the NWT that operate landfill sites. This information will be used to support the development of the NWT Waste Resource Strategy that is being prepared by the GNWT.

A long list of waste management system profile attributes were identified by ENR for each community. These attributes include (but were not limited to):

- General community information (i.e., population, climate, accessibility);
- Water license information;
- Landfill characteristics (i.e., location, physical size, waste composition, remaining lifespan, etc.);
- Landfill use by community (i.e., seasonal population use, industry use, etc.);
- Landfill management (i.e., existing facilities, operations and maintenance plans, best management practices, training, etc.);
- Hazardous waste management practices;
- Sewage sludge management;
- Historic waste disposal sites;
- Opportunities for waste diversion; and,
- Community-based reports, standards, guidelines, communication documents and/or educational materials related to waste.

Some of this information has been characterized in previous reports prepared for Environment Canada and the GNWT. Golder has reviewed these publications and updated and/or confirmed the information that is within the scope of this project. A list of resources used in the preparation of this report is provided in the List of References.

3.0 DATABASE OF COMMUNITY PROFILES

A database was created to organize and store information pertaining to the site attributes listed in Section 2.0. The database design was guided by the following considerations:

- Ability to incorporate site attributes with flexibility for update as necessary;
- Ease/efficiency of data entry;
- Minimization of potential user error;
- Avoidance of data redundancy;
- Allowance for variable data types (numeric, text, yes/no answers) and record sizes (for example single integer versus long text strings); and,
- The understanding that the database will eventually be incorporated into a more robust structural database or Geographic Information System (GIS).

A "flat file" database structure, implemented in Microsoft Excel™, was used to meet these objectives. A flat file consists of a single table where the records (rows) for each landfill site are described by fields (columns) that provide singular pieces of information about site history, characteristics, management etc. in accordance with items prescribed by ENR. The flat file format was chosen for its logical layout, minimal text or binary data restrictions, and flexibility and efficiency in terms of import and implementation to different software platforms. Microsoft Excel™ was chosen for its universality and its ability to easily predefine data entry variables via drop down menus ("forms").

	A	B	C	D	E	F	G
1		SITE_ID	AH_Active_or_Historic	CI_Community_Name	CI_Community_Leader	CI_Senior_Administrative_Officer	CI_Phone
2		PK_1	AH_1	CI_1	CI_2	CI_3	CI_4
3	Aklavik	1	Active	Aklavik	His Worship Mayor Arny Steinwand	Senior Administrative Officer Ms. Evelyn Storr	(867) 978-2351
4	Behchokö	2	Active	Behchokö	Chief Clifford Daniels	Senior Administrative Officer Ms. Violet Camsell-Blondin	(867) 392-6500
5	Colville Lake	3		Colville Lake	Chief Alvin Orlias	Band Manager Mr. Joseph Kochon	(867) 709-2200
6	Déljne	4	Active	Déljne	Chief Leonard Kenny	Acting Senior Administrative Officer Ms. Rosy Ann Tutcho	(867) 589-4800
7	Enterprise	5		Enterprise	His Worship Mayor Michael St. Amour	Senior Administrative Officer Mr. Terry Testart	(867) 984-3491
8	Fort Good Hope	6		Fort Good Hope	Chief Greg Laboucan	Senior Administrative Officer Mr. Gordon MacKeinzo	(867) 598-2231
9	Fort Liard	7	Active	Fort Liard	His Worship Mayor Morris McLeod	Senior Administrative Officer Mr. John McKee	(867) 770-4104
10	Fort McPherson	8	Active	Fort McPherson	Her Worship Mayor Hazel Nerysoo	Senior Administrative Officer Ms. Susan Blake	(867) 952-2428
11	Fort Providence	9	Active	Fort Providence	Mayor Tina Gargan	Senior Administrative Officer Ms. Susan Christie	(867) 699-3441
12	Fort Resolution	10	Active	Fort Resolution	His Worship Mayor Garry Bailey	Senior Administrative Officer Ms. Tausia Kaitu-Lal	(867) 394-4556
13	Fort Simpson	11	Active	Fort Simpson	His Worship Mayor Sean Whelly	Senior Administrative Officer Mr. Dean Pickering	(867) 695-2253
14	Fort Smith	12	Active	Fort Smith	His Worship Mayor Brad Brake	Senior Administrative Officer Mr. Jim Hood	(867) 872-8400
15	Gamèti	13	Active	Gamèti	Chief David Wedawin	Acting Senior Administrative Officer Ms. Louisa Wetrade	(867) 997-3441
16	Hay River	14		Hay River	His Worship Mayor Andrew Cassidy	Town Manager Mr. David Steele	(867) 874-6522
17	Inuvik	15		Inuvik	His Worship Floyd Roland	Senior Administrative Officer Mr. Grant Hood	(867) 777-8600
18	Jean Marie River	16	Active	Jean Marie River	Chief Stanley Sanguez	Senior Administrative Officer Ms. Tammy Neal	(867) 809-2000
19	Kakisa	17	Active	Kakisa	Chief Lloyd Chicot	Council Manager Ms. Ruby Landry	(867) 825-2000
20	Łutsel K'e	18		Łutsel K'e	Chief Dora Enzoe	Senior Administrative Officer Mr. Graeme Drew	(867) 370-7004
21	Nahanni Butte	19	Active	Nahanni Butte	Chief Mike Matou	Senior Administrative Officer Mr. Frank Moretti	(867) 602-2900
22	Norman Wells	20		Norman Wells	His Worship Mayor Gregor H. McGregor	Acting Town Manager Mr. Lindsey Blake	(867) 587-3700
23	Paulatuk	21	Active	Paulatuk	His Worship Mayor Ray Ruben Sr.	Senior Administrative Officer Mr. Greg Morash	(867) 580-3531
24	Sachs Harbour	22	Active	Sachs Harbour	Her Worship Mayor Betty Haogak	Senior Administrative Officer Mr. Stephen Wylie	(867) 690-4351
25	Trout Lake	23	Active	Trout Lake	Chief Dolphus Jumbo	Band Manager Ms. Ruby Jumbo	(867) 206-2800
26	Tsiigehtchic	24	Active	Tsiigehtchic	Chief Phillip Blake	Senior Administrative Officer Ms. Marjorie Dobson	(867) 953-3201
27	Tuktoyaktuk	25	Active	Tuktoyaktuk	His Worship Mayor Mervin Gruben	Acting Senior Administrative Officer Ms. Emma Wolki	(867) 977-2286
28	Tulita	26	Active	Tulita	His Worship Mayor Danny Yakeleya	Senior Administrative Officer Mr. Chris Chai	(867) 588-4471
29	Ulukhaktok	27	Active	Ulukhaktok	Her Worship Mayor Susan Kaodloak	Senior Administrative Officer Mr. Willian Bennett	(867) 396-8000

Figure 3-1: Screenshot of the Database Flat File

In total, 32 records, one for each of the communities with a landfill site, with 175 different descriptive fields were entered into the database. Where possible, field variables were standardized via a pre-selected list of options (for example, “Yes” or “No”, or an integer value), hence increasing data entry accuracy and efficiency.

A flat file typically has no structural relationships between records and fields except the table structure itself. However, for this particular project, it was considered advantageous to imply broad relational characteristics by preceding field names with an abbreviated code indicating a suggested group hierarchy. These codes are listed in Table 3-1. The data file is available in both Excel and delimited text file formats.

Table 3-1: Database Coding

Field Code Grouping	Description
PK	Primary Key (Unique Site ID)
AH	Active vs. Historic (Landfill)
CI	Community Information
WL	Water Licence
LC	Landfill Characteristics
LM	Landfill Management
HHW	Household Hazardous Waste
SSM	Sewage Sludge Management
HWD	Historic Waste Disposal
OWD	Opportunities for Waste Diversion
REP	Reports
LMC	Landfill Management Costs

Community waste management surveys were sent to all NWT communities profiled in this report, in order to obtain consistent and basic information. These surveys were typically completed by the SAO of the community. Following receipt of a limited number of written responses, telephone calls to the communities were completed by Golder staff, in order to collect as much information as possible; this information was entered into the same forms as used by communities who submitted forms. In cases where information was submitted by the communities, telephone calls were also undertaken to confirm the information. The information collected was transferred to the database (see Section 3) for use in evaluations completed as part of this current report, as well for future waste management assessments. A total of 22 surveys, out of the 32 communities with landfill sites, were completed. The completed community surveys are included in Appendix A.

Field visits were completed to 31 of the communities (Déljnę was not visited) and information collected during the site visit was updated in the database. The information collected during the site visits focused on the management and conditions at the landfill sites; however, where possible, details collected from the earlier community surveys and report reviews were confirmed. This included, for example, the status of the water licence and operation and maintenance reports.

A summary of the key information collected in the surveys and inspections is provided in Section 8 of this report. This summary is based directly on the information entered into the database.

4.0 REPORT STRUCTURE

Following finalization of the database framework, it was populated with information from community site visits, existing reports, information provided by ENR and MACA and information received during community surveys and interviews. The database structure was used as the basic framework of this report; both the database and the report may be understood independently of each other, but the information in this report mirrors the data provided to ENR in the database file.

Some of the data obtained during the course of this study was not in a format congruent with entry in a database (i.e., the information was highly descriptive, or qualitative, and could not be easily quantified). This information has been provided in this report on a community-by-community basis.

Information for each NWT community has been provided in a separate section of this report for ease of review and future use by communities. This framework mirrors how the data was presented in the accompanying database.

A community comparison was undertaken for a list of topics highlighted by ENR as having priority to their understanding of the state of waste management in NWT communities. These topics include:

- Use of the community landfill – seasonal trends of use, use of landfill by industry;
- How landfill facilities and management practices compare to water license requirements;
- Hazardous waste management practices;
- Sewage sludge management and removal; and,
- Opportunities for waste diversion.

Separate reports prepared as part of this study are included in Volume II and consist of:

- Landfill Site Risk Evaluation
- Waste Generation Rates
- Landfill Management Costs
- Planning for the Future

5.0 NWT WASTE MANAGEMENT REGULATORY FRAMEWORK

An overview of the regulatory framework (federal, territorial and local) for waste management is provided to inform the presentation of the current state of waste management in NWT communities. This overview is provided in three sub-sections – federal acts and regulations, territorial acts and regulations, and federal/territorial guidelines regarding waste management.

Waste management in the NWT is regulated by federal, territorial, and municipal acts and regulations. Municipal and territorial acts and regulations must adhere to federal legislation, but are often more specific to the practical movement and handling of waste materials at the local level.

During the course of preparation of this report, several pieces of legislation were changed due to devolution (the shift in power from the federal government to the territorial government). These changes have been highlighted in Table 5-2.

5.1 Federal Acts and Regulations

Table 5-1 provides a list of federal acts and regulations regarding waste management.

Table 5-1: Federal Acts and Regulations – Waste Management

	Name	Summary of Role Relating to Waste Management
Act	*Canadian Environmental Assessment Act (CEAA)*	Sets out the responsibilities and procedures for completion of an environmental assessment (EA) of a project that is located within federal jurisdiction. Large waste management projects located within federal jurisdiction with specific potential environmental impacts must undergo an EA prior to approval and implementation. Administered by Environment Canada.
Act	*Canadian Environmental Protection Act (CEPA)*	Authorizes regulations for environmentally toxic substances to ensure the protection of environmental and human health. Administered by Environment Canada.
Regulation	Export and Import of Hazardous Waste and Hazardous Recyclable Material	Regulates the export, import and transit of hazardous waste, the recycling of hazardous recyclable materials and the procedures for transportation of such materials including movement and disposal documentation, conditions, and applicable liability insurance. Pursuant to the *CEPA*.
Regulation	Interprovincial Movement of Hazardous Waste Regulations	Regulates the movement of hazardous waste between provinces and territories, and defines authorized carriers and manifest requirements. Pursuant to the *CEPA*.
Regulation	Federal Mobile PCB Treatment and Destruction Regulations	Regulates the treatment and destruction of polychlorinated biphenyls (PCBs) in mobile systems operated on federal lands, on Aboriginal land, or operated by or under contract with federal institutions. Pursuant to the *CEPA*.
Regulation	PCB Waste Export Regulations	No person shall export PCB waste to a country other than the United States of America, and for any purpose other than for disposal. Pursuant to the *CEPA*.
Regulation	PCB Regulations	Regulates the release of PCBs to the environment and activities involving PCB storage, labelling, reporting and recording requirements. Pursuant to the *CEPA*.

Table 5-1: Federal Acts and Regulations – Waste Management

	Name	Summary of Role Relating to Waste Management
Regulation	Ozone Depleting Substances Regulations	Regulates the manufacture, import and export, specific uses, and reporting on ozone depleting substances. Pursuant to the *CEPA*.
Regulation	Regulations for Disposal at Sea	Regulates the disposal of material at sea from land, ship, platform or aircraft and the associated reporting requirements. Categorizes substances as either low level or high level risk on the National Action List in responding to instances of disposal at sea. Includes areas which qualify as the sea, and testing and screening requirements for the waste. Outlines regulations for required permits. Pursuant to the *CEPA*.
Regulation	Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations	Regulates the storage tank systems for petroleum products and allied petroleum products on federal or Aboriginal land, including compliance requirements. Pursuant to the *CEPA*.
Act	*Indian Act*	Provides Canada with the ability to legislate in relation to Native peoples and their land. Administered by Indigenous and Northern Affairs Canada (INAC).
Regulation	Indian Reserve Waste Disposal Regulations	Regulates the creation and permitting of a waste disposal site on Reserves within Canada. Very little in the way of enforcement - $100 fine and/or 3 months jail time. Permission for a waste disposal site given/removed by the Minister of AANDC. Pursuant to the *Indian Act*.
Act	*Fisheries Act*	Prohibits the release of toxic substances into fish-bearing waters. Co-administered by Fisheries and Oceans Canada and Environment Canada.
Act	*Department of Environment Act*	Provides Environment Canada responsibility for environmental management and protection in Canada. Administered by Environment Canada.
Act	*Canada Water Act*	Prescribes the criteria and monitoring of the deposition of waste to water bodies, including sampling protocols and fines/levies, to preserve the quality of water in Canada. Administered by Environment Canada.
Act	*Arctic Waters Pollution Prevention Act*	An Act to prevent the pollution of Arctic waters. Closely related to *Canada Water Act* and the *Northwest Territories Waters Act*. Describes liability, enforcement, offences and punishment of offences to the *Act*. Jointly administered by Natural Resources Canada, Transport Canada and AANDC.
Act	*Environmental Enforcement Act*	Amends the *Canadian Environmental Protection Act, 1999*. Increases the fine scheme associated with environmental offences. Stages 1 and 2 are complete – bringing into force regulations designating which CEPA offences are subject to the higher fine range. Administered by Environment Canada.
Act	*Canadian National Parks Act*	Sets out the responsibilities and procedures respecting the national parks of Canada, including substances capable of degrading the natural environment. Administered by Parks Canada.
Regulation	National Parks of Canada Garbage Regulations	Regulates the storage and collection of garbage in national parks, including solid and liquid wastes. Pursuant to the *Canadian National Parks Act*.

Table 5-1: Federal Acts and Regulations – Waste Management

	Name	Summary of Role Relating to Waste Management
Regulation	National Parks of Canada Water and Sewer Regulations	Regulates water and sewer systems, building connections and water supply. Pursuant to the *Canadian National Parks Act*.
Act	*Transportation of Dangerous Goods Act*	Sets out the requirements for the transportation of hazardous and dangerous wastes. Administered by the Minister of Transport.
Regulation	Transportation of Dangerous Goods Regulations	Regulates the transportation of hazardous and dangerous goods, including waste. Pursuant to the *Transportation of Dangerous Goods Act*.
Act	*Fertilizers Act*	Sets out the responsibilities regarding the sale of compost products. Administered by the Canadian Food Inspection Agency.
Act	*Mackenzie Valley Resource Management Act*	Sets out an integrated system of land and water management in the Mackenzie Valley (excludes the Inuvialuit Settlement Region and National Parks) through the following boards : ■ MVLWB; ■ SLWB; ■ GLWB; and, ■ WLWB. Regulates all land and water use including the deposit of waste.
Regulation	Mackenzie Valley Land Use Regulations	Regulates the use and management of land in the Mackenzie Valley, pursuant to the *Mackenzie Valley Resource Management Act*. Outlines the information requirements to obtain a land use permit.
Regulation	Preliminary Screening Requirement Regulations	Requirement to conduct a preliminary screening for any application for a license, permit or other authorization to carry out a proposed development. Pursuant to the *Mackenzie Valley Resource Management Act.*
Regulation	Exemption List Regulations	Regulates proposed or existing developments situated in or outside a national park, national park reserve or national historic site for which preliminary screenings are not required by reason that their impact on the environment of the Mackenzie Valley is insignificant.
Act	Tłı̨chǫ *Land Claims Self-Government Act*	Gives four communities (Behchokǫ̀, Gamètì, Wekweètì and Whatì) their own legislative body, which may control industrial development (including waste).

5.2 Territorial Acts and Regulations

Pursuant to federal acts and regulations, Table 5-2 provides a list of territorial waste management acts and regulations. Community-specific/municipal bylaws, guidelines and standards will be provided in the Community Waste Management Profiles sections.

Table 5-2: Territorial Acts and Regulations – Waste Management

	Name	Summary
Act	*Waters Act*	Sets out the responsibilities and procedures respecting water resources in the NWT. Sets out the requirements for licensing and use of water and authorization to deposit waste in any waters or water management area. Mirrors the previously repealed Northwest Territories Waters Act.
Regulation	Northwest Territories Waters Regulations	Schedules 4, 5, and 6 outlined licensing criteria for industrial, mining, and municipal undertakings (including waste management) within the Mackenzie Valley. Mirrors the previously repealed Northwest Territories Waters Regulations.
Act	*Northwest Territories Intergovernmental Agreement on Lands and Resources Management Act* ***- NEW***	Provides the means for legislation to be created regarding the structure and duties of the Intergovernmental Council on Land and Resources Management , led by the Commissioner of the NWT. Other members of the Council include Gwich'in Tribal Council, Inuvialuit Regional Corporation, Northwest Territories Métis Nation, Sahtu Secretariat, Tłı̨chǫ Government, and any other government that becomes part of the *Act*.
Act	*Northwest Territories Lands Act* ***- NEW***	Substantially mirrors the *Territorial Lands Act (REPEALED IN 2014)*. Identifies land management zones and the regulations concerning those zones. Outlines administration and enforcement.
Act	*Environmental Protection Act*	Sets out the responsibilities for environmental management and protection in the NWT. Administered by ENR.
Regulation	Spill Contingency Planning and Reporting Regulations	Regulates the spill contingency planning and spill reporting requirements pursuant to the *Environmental Protection Act* (*EPA)*.
Regulation	Used Oil and Waste Fuel Management Regulations	Regulates the storage, handling and disposal of used oil and waste fuel to ensure safe management of these materials. Pursuant to the *EPA*.
Act	*Waste Reduction and Recovery Act*	Provides for the establishment of waste reduction, reuse and recycling programs through regulations, including the establishment of an environment fund for such programs. Administered by ENR.
Regulation	Beverage Container Regulations	Regulates the administration of the program and the Environment Fund, fees associated with beverage containers distributed or sold in the NWT and responsibilities of the Chief Environmental Protection Officer, distributors/manufacturers, processing centre operators and depot operators. Pursuant to the *Waste Reduction and Recovery Act*.
Regulation	Single-Use Retail Bag Regulations	Regulates the administration and Environment Fund fee for each single-use retail bag distributed or sold in the NWT, and the responsibilities of distributors and retailers. Pursuant to the *Waste Reduction and Recovery Act*.

Table 5-2: Territorial Acts and Regulations – Waste Management

	Name	Summary
Regulation	Electronics Recycling Regulation (February 1, 2016)	Regulates the administration the of the Electronics Recycling Program and the Environment Fund (as it relates to the program), fees associated with electronics distributed or sold in the NWT and responsibilities of the Chief Environmental Protection Officer, distributors, processing centre operators and depot operators. Pursuant to the Waste Reduction and Recovery Act.
Act	*Public Health Act*	Sets out the responsibility of the Commissioner of the NWT in regards to public health requirements, maintenance and operations relating to the location, design, construction and operation of sewage disposal systems, solid waste sites, landfills and other premises where waste is disposed of. Administered by the Department of Health and Social Services. The Commissioner is appointed by AANDC, and is the main link between the Government of Canada and the NWT, acting as Chief Executive Officer of the NWT.
Regulation	General Sanitation Regulations	Regulates general sanitation and public health regarding waste disposal grounds, and the disposal of garbage and other wastes, as well as the proximity to housing (450 m minimum setback). Pursuant to the *Public Health Act*.
Regulation	General Sanitation Exemption Regulations	Exemptions to the General Sanitation Regulations, highlighting areas where waste disposal sites are within 450 m of existing housing developments and the treatment of those buffer lands. Pursuant to the *Public Health Act*.
Act	*Wildlife Act*	Sets out the requirements for the management of attractants for wildlife (i.e., management of food waste and sorting refuse in a manner that is not likely to attract wildlife). Administered by ENR.
Act	*Forest Management Act*	Sets out the responsibilities for the management of forests and timber in the NWT, and the requirements for the disposal of waste timber. Administered by ENR.
Regulation	Forest Management Areas Regulations	Describes the forest management areas, pursuant to the *Forest Management Act*.
Regulation	Forest Management Regulations	Regulates the methods and techniques for debris and brush disposal in forest management areas. Pursuant to the *Forest Management Act*.
Act	*Pesticide Act*	Sets out the responsibilities for the management, production and disposal of pesticides or mixtures containing pesticides. Administered by ENR.
Regulation	Pesticide Regulations	Regulates the requirements for permit applications and management of pesticides, and the disposal of pesticides or mixtures. Pursuant to the *Pesticide Act*.
Act	*Environmental Rights Act*	Outlines the rights of people in the NWT to apply for investigation of issues or concerns relating to the environment. Administered by ENR.

5.3 Federal and Territorial Waste Management Guidelines

The following table provides information regarding guidelines relating to waste management in the NWT.

Table 5-3: Guidelines Relating to Waste Management in the NWT

	Name	Summary
Government of the Northwest Territories		
	Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories (MACA, 2003b)	Provides guidance for solid waste management in the NWT in terms of planning, design, operation and regulation of modified landfill facilities and to promote effective solid waste management.
	Guideline for Agricultural Waste Management (1999)	Provides guidance to establish consistent waste management standards for livestock and agriculture. Developed by ENR and the Territorial Farmers Association.
	Guideline for Ambient Air Quality Standards (2014)	A new guideline established under the GNWT *Environmental Protection Act* to set standards for the maximum concentrations of carbon monoxide, particulate matter, ozone, nitrogen dioxide, sulphur dioxide, and total suspended particulates to protect human health and the environment in the NWT. Note that air quality standards are used as objectives for industrial development, and benchmarks against which to compare the monitored air quality in the Communities.
	Guidelines for the Management of Biomedical Waste in the Northwest Territories (2005)	A guideline to provide uniform standards for the handling of biomedical waste in the NWT. Also provides guidance to the health care system on the opportunities for waste minimization and the reduction of air contamination from the incineration of biomedical waste.
	Guideline for Dust Suppression (2013)	Sets out the procedures that should be followed when applying dust suppressants in the NWT. Currently under review by ENR.
	Guideline for the General Management of Hazardous Waste (1998)	Provides guidance regarding the proper management of hazardous waste in the NWT, as well as “cradle to grave” monitoring of hazardous waste.
	Guideline for Industrial Waste Discharges (2004)	Sets standards for the discharge of effluent waste from industrial operations on Commissioner’s Land or lands administered by municipal governments in the NWT.
	Guideline for Contaminated Site Remediation (2003)	Advises of the steps required to address soil contamination, and sets guidelines for soil remediation on Commissioner’s Land, including private land within municipalities.
	Guideline for Ozone Depleting Substances and Halocarbon Alternatives (2007)	Provides guidance regarding the management of ozone depleting substances and halocarbon alternatives, and the proper handling of these waste materials.
	Guideline for the Management of Waste Antifreeze (1998)	Lists antifreeze as a hazardous waste and provides guidelines for the proper transportation, handling, storage, and disposal of this material.
	Guideline for the Management of Waste Asbestos (2004)	Lists asbestos as a hazardous waste and provides guidelines for the proper transportation, handling, storage, and disposal of this material.

Table 5-3: Guidelines Relating to Waste Management in the NWT

	Name	Summary
	Guideline for the Management of Waste Batteries (1998)	Lists waste batteries (both lead batteries and rechargeable batteries) as a hazardous waste and provides guidelines for the proper transportation, handling, storage, and disposal of this material. Excludes batteries from domestic products (i.e., AAA to D cells, 6 or 9 volt consumer batteries).
	Guideline for the Management of Waste Lead and Lead Paint (2004)	Lists lead and lead paint as hazardous wastes, and provides guidelines for the proper transportation, handling, storage, and disposal of this material.
	Guideline for the Management of Waste Paint (1998)	Lists waste paint as a hazardous waste and provides guidelines for the proper transportation, handling, storage, and disposal of this material.
	Guideline for the Management of Waste Solvents (1998)	Lists solvents as a hazardous waste and provides guidelines for the proper transportation, handling, storage, and disposal of this material.
	Alternative Energy Technologies Program Guidelines (2011)	Guidelines for the creation of an alternative-energy project in the NWT, including potential funding opportunities. Lists three levels of project: (1) Community Renewable Energy Fund, (2) Medium Renewable Energy Fund, and (3) Small Renewable Energy Fund.
Canadian Council of Ministers of the Environment (CCME)		
	The CCME is comprised of the environment ministers from the federal, provincial and territorial governments who set out national environmental priorities. Senior officials establish working groups to accomplish the goals set by the Council, and develop guidelines for the management of materials in Canada that could have a deleterious effect on the environment if not properly handled. Depending on the nature of the work, expertise from private industry may be solicited. A full list of publications prepared by the CCME is available at http://www.ccme.ca/publications/index.html.	

5.4 Regulation of Waste Management including Landfill Sites

Waste management regulations and guidelines described above are developed, implemented and enforced by the Environment and Natural Resources (ENR) department of the GNWT. Following devolution, inspection and enforcement activities at municipal disposal facilities continues to be undertaken by Water Resource Officers regarding water licence issues; Environmental Protection Officers deal with issues where a discharge of a contaminant may occur that is not covered by the water licence. Prior to devolution, this enforcement was completed by AANDC inspectors. The department of Municipal and Community Affairs (MACA) also plays a large role in waste management, providing funding and technical support to community governments that are managing waste at the community level. MACA works closely with ENR and the community government officials (e.g., Senior Administrative Officers (SAO).

The guidelines for waste management in the NWT are outlined in a MACA document entitled “Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories” (MACA, 2003b). This document provides the basic requirements for siting and operating a landfill, including basic waste site design and development, including compaction and covering. Management of some materials that are stored and disposed at landfill sites, including hazardous waste (largely used oil, waste fuel, antifreeze and lead-acid batteries) are regulated under the *Environmental Protection Act* regulations including the Used Oil and Waste Fuel Management Regulations and the Spill Contingency Planning and Reporting Regulations, which regulate the spill

contingency planning and spill reporting requirements. The General Sanitation Regulations cover general sanitation and public health regarding waste disposal grounds and the disposal of garbage and other wastes, as well as the proximity to housing, pursuant to the *Public Health Act*.

Permitting, including the siting, design and licencing of landfill sites is conducted through the four Land and Water Boards in the NWT. The *Mackenzie Valley Resource Management Act was established in 1998 and under this legislation, the various Land and Water Boards were established as land claims were settled.* These independent boards run the various stages in the environmental impact assessment and regulatory processes. The boards are co-managed, in that Aboriginal land claim organizations, the federal government and territorial government all nominate board members for each regional land and water board. The Inuvialuit (formerly Northwest Territories) Water Board was established in 1972 and holds authority under the *Waters Act* to issue water licences in that portion of the Inuvialuit Settlement Region. All applications for water licences are submitted to the land and water boards, who then consult with agencies, including ENR and MACA, as part of their review process. Typical water licence conditions for landfills include annual reporting requirements, an operation and maintenance (O&M) plan for the landfill site, as well as a spill contingency plan. Under the Mackenzie Valley Resource Management Act (MVRMA) and the Waters Act, municipalities are required to have a water licence for the use of water and the deposit of waste. Certain triggers for the requirements of either a type A or B licence are outlined in the Waters Regulations. The GNWT Waste Reduction and Recovery Act enables the establishment of waste reduction, reuse and recycling programs. There are Beverage Container Regulations, Single-Use Retail Bag Regulations and Electronics Recycling Regulations (February 1, 2016) under this *Act,*as further described in Table 5-2. Waste Reduction and Management Programs continue to promote waste reduction and diversion initiatives through the the ENR website under RethinkitNWT.ca.

6.0 NWT PHYSIOGRAPHY, GEOLOGY, HYDROLOGY AND CLIMATE

The NWT covers a land area of approximately 1,300,000 km^2, and therefore includes a wide variety of physiographic, climatic, geologic, and hydrologic characteristics. The following section provides a broad overview; where available, local features are described in Section 7.

6.1 NWT Physiography

Figure 6-1 illustrates the relief of the NWT in relation to its communities. From a physiographic perspective, the NWT can be broadly split into the Cordillera along the border with Yukon Territory, Interior Plains through much of the Mackenzie River and Great Slave/Great Bear Lakes areas, Shield and Arctic/Arctic Coast regions.



Figure 6-1: Map of Relief of NWT

6.2 NWT Geology and Geomorphology

As illustrated in Figure 6-2, a large portion of the NWT consists of till overlain by glaciolacustrine complexes deposited during the last glaciation as a result of the presence of proglacial Lake McConnell. A mix of coarse- and fine-grained glaciolacustrine sediments are present beneath the active layer in areas around Great Slave Lake, which in some areas were reworked as Lake McConnell receded. In the NWT interior, glaciolacustrine sediments comprise most surficial sediments. In areas of fine-grained glaciolacustrine deposits where the materials are poorly drained, areas of permafrost with high ground ice content exist. Surficially, these areas often display distinct periglacial features, such as patterned ground, pingos, and ice wedges.

Along the Mackenzie River and deposited in the Mackenzie Basin and delta region are more recent sediments deposited since the last glaciation, during the Holocene Period. These sediments are primarily composed of coarse- and fine-grained glaciolacustrine deposits.

Areas underlain by fine-grained glaciolacustrine sediments in discontinuous permafrost zones (i.e., southern NWT) are often overlain by fairly dense vegetation consisting of spruce, birch, willow, sedges, grasses and mosses. Thermokarst lakes (lakes formed by melting permafrost) produce networks of ponds, fens and bogs, the latter of which may be underlain by permafrost lenses. Peatlands are also quite extensive in the Mackenzie Valley region.

Areas underlain by continuous permafrost (i.e., northern NWT) do not host species of larger vegetation due to the harsh climatic conditions. Grasses, lichens, dwarf birch and small shrubs dominate this landscape.

Colluvial fines and sand underlie some coastal communities, such as Sachs Harbour. Vegetation in these areas is limited to grasses and lichens.

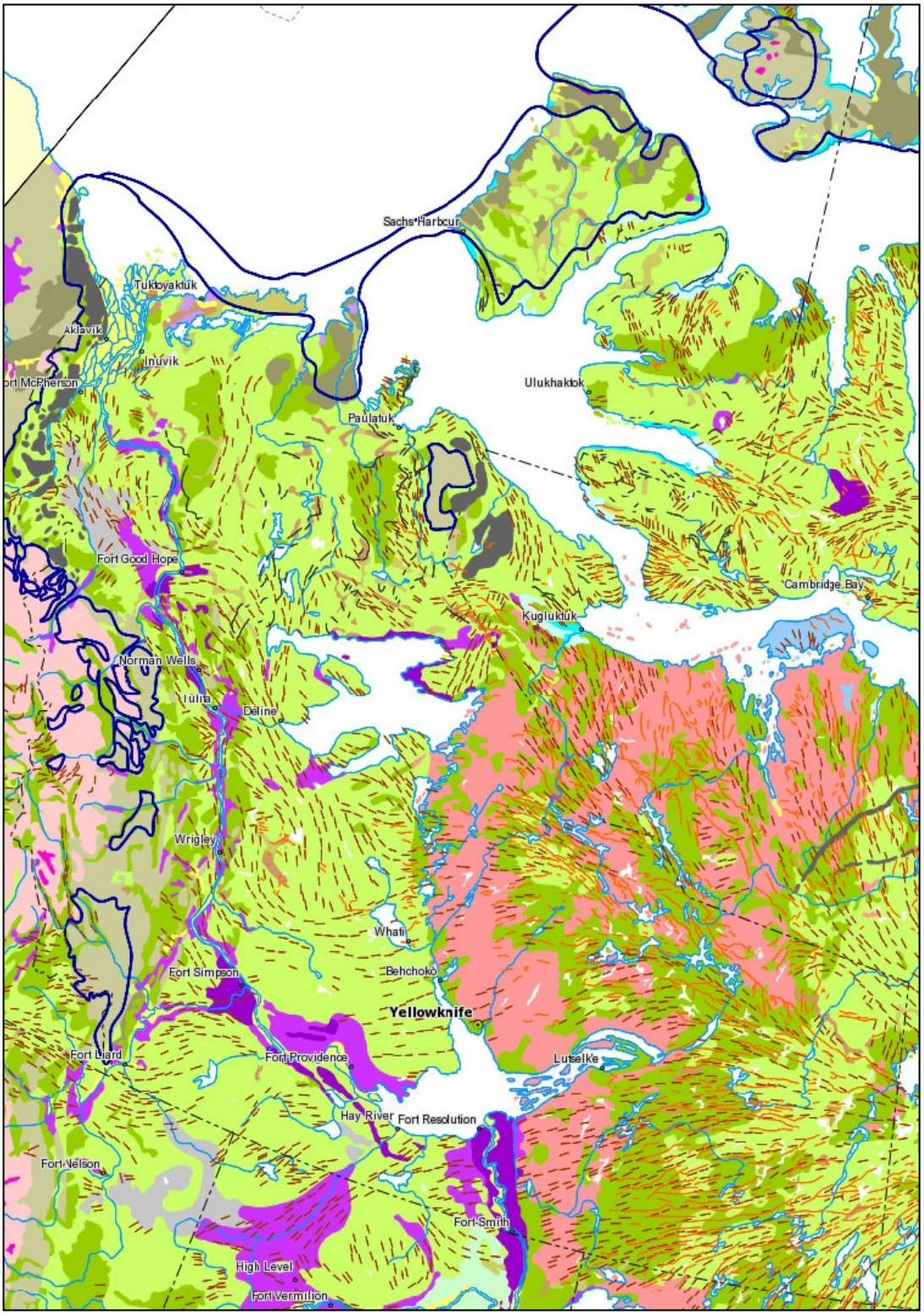


Figure 6-2: Surficial Materials Map of the NWT

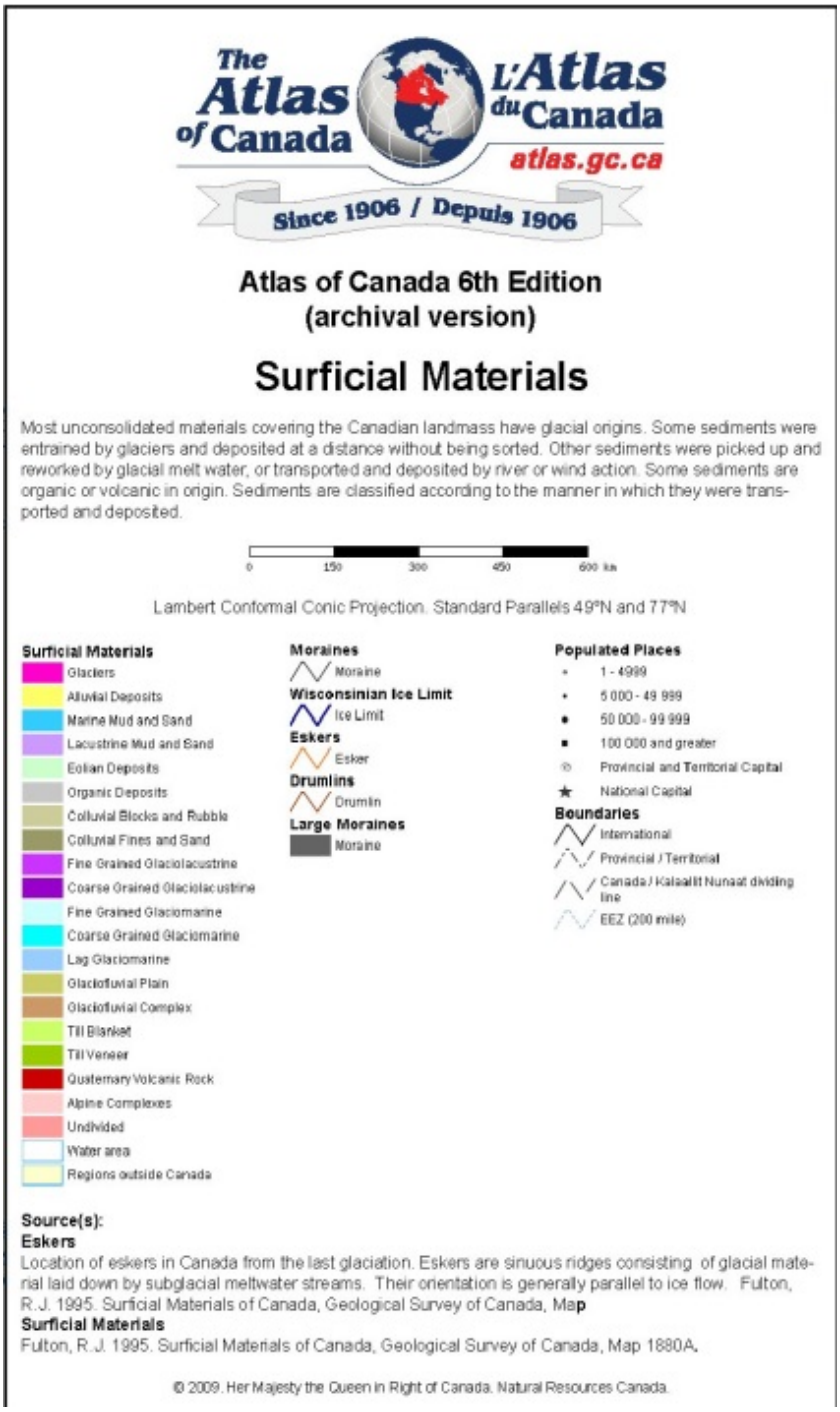
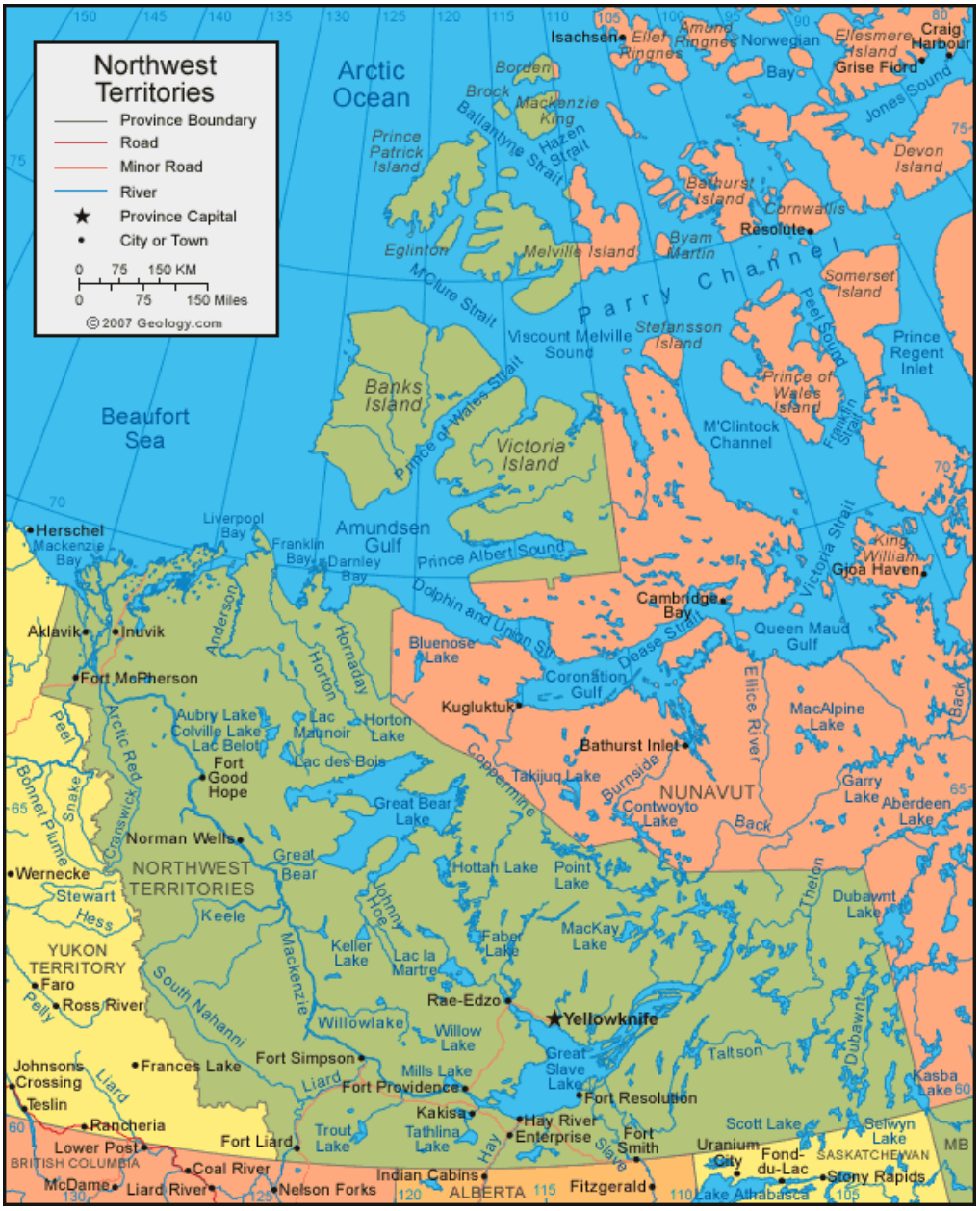


Figure 6-3: Surficial Materials Legend

6.3 NWT Hydrology

Approximately 163,000 km^2 (13.5%) of the NWT is covered by fresh water. The two largest lakes in NWT are Great Bear Lake (31,328 km^2) and Great Slave Lake (28,568 km^2). There are also several important river systems; the most notable being the Mackenzie River. The principal lakes and rivers in the NWT are shown in Figure 6-4.



Source: http://geology.com/canada/northwest-territories.shtml

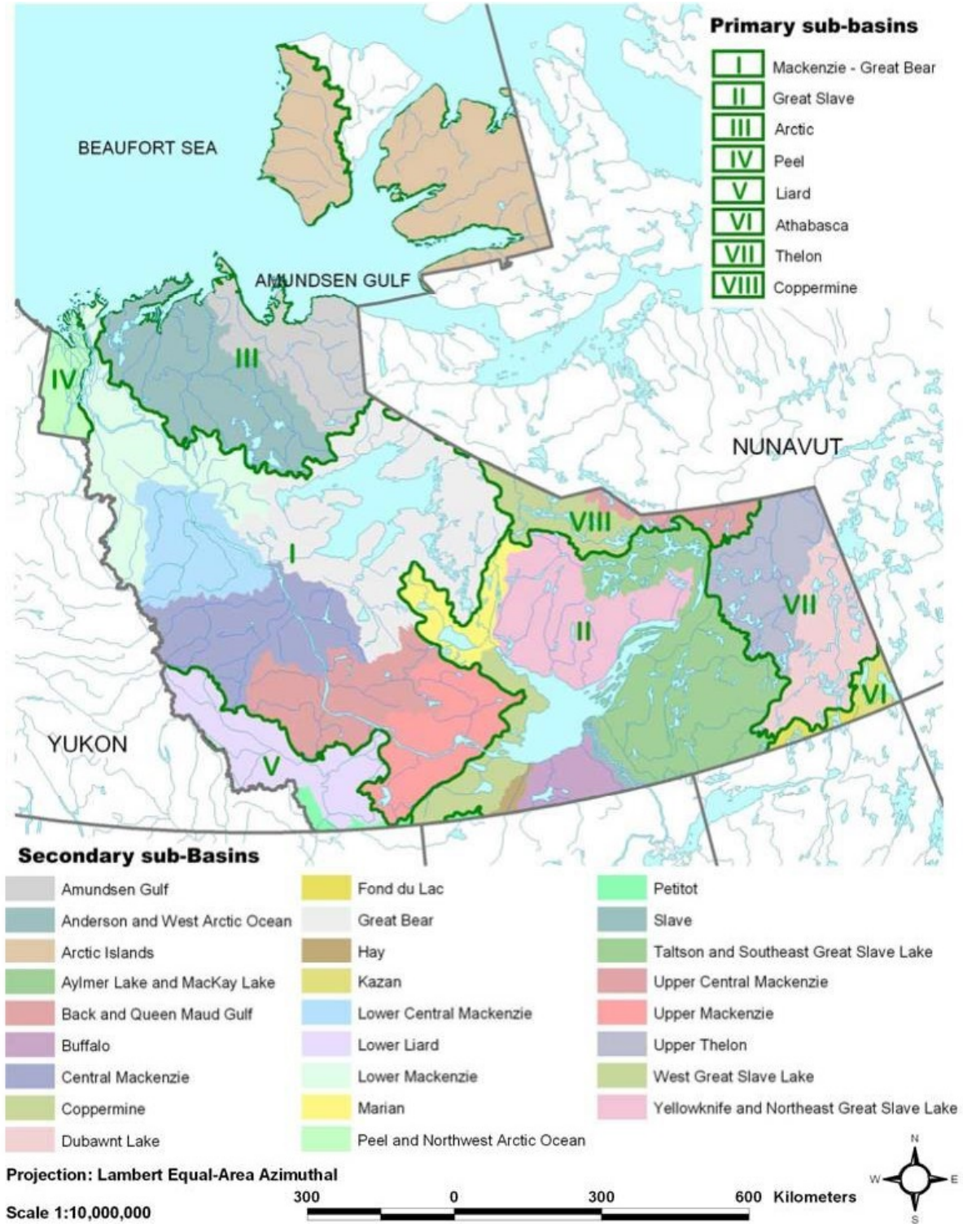
Figure 6-4: Principal Lakes and Rivers in the NWT

The predominant freshwater system in the NWT is the Mackenzie River Basin which covers nearly 75% of the territory. Drainage along the eastern border of the NWT is captured in the Coppermine River and Thelon River

watersheds that drain into Nunavut. To the north, a portion of the runoff flows directly into the Amundsen Gulf and Beaufort Sea through the West Arctic Basin. There are eight primary watersheds either completely within the NWT or trans-boundary in nature. Within these watersheds are 26 secondary sub-basins. The main features of these watersheds are described below. The principal drainage basins of the NWT and their respective secondary sub-basins are shown in Figure 6-5.

The Mackenzie-Great Bear sub-basin lies almost entirely in the NWT and covers 475,000 km^2 which drains north to the Beaufort Sea. Its primary components are the Mackenzie River and Great Bear Lake. The sub-basin also includes the Mackenzie Delta.

The Great Slave sub-basin includes the Slave River drainage from the Peace-Athabasca Delta and all other tributary inflows into Great Slave Lake, covering more than 379,000 km^2. The Great Slave sub-basin consists of fourteen major drainage systems. Major inflows to Great Slave Lake include the Taltson, Lockhart, and Hay Rivers.



Source: Atlas of Canada

Figure 6-5: Watersheds in the NWT

The Great Slave sub-basin straddles two distinct physiographic regions: the erosion-resistant Precambrian Shield to the east; and the Interior Plains to the west.

The Peel River sub-basin encompasses an area of 74,000 km^2 from its headwaters in the Yukon to its confluence with the Mackenzie River near Fort McPherson in the NWT.

The Liard River and its tributaries drain an area of approximately 275,000 km^2, making it Canada's ninth largest watershed. The Liard River begins its journey in the Pelly Mountains of southeastern Yukon, flows through northeastern British Columbia and then crosses into the NWT where it drains into the Mackenzie River.

The Athabasca River and Lake Athabasca together drain an area of about 269,000 km^2 in Alberta, Saskatchewan and a small portion of the NWT.

The drainage basin of the Thelon River encompasses some 142,400 km^2. Its source is Eyeberry Lake in the NWT, and it flows east to Baker Lake in Nunavut. The Thelon ultimately drains into Hudson Bay.

The Coppermine River Basin is a coastal watershed of the Arctic Ocean Basin. In total, the Coppermine River watershed is 50,800 km^2. The headwaters of the Coppermine River are in the Ursula Lake/Lac du Sauvage region.

6.4 NWT Climate and Permafrost Distribution

Climate in the NWT is affected by the latitude and physiographic characteristics across the territory, as well as by the established global weather patterns. The influences of elevation, ocean ice and water bodies will locally influence climate. According to Environment Canada (1989), the broad ecoclimatic regions in the NWT include arctic, sub-arctic and boreal. The arctic region is largely limited to the northern coast and islands, where the communities of Paulatuk, Sachs Harbour, Tuktoyaktuk and Ulukhaktok are located. The sub-arctic region incorporates much of the central part of the territory around Great Bear Lake, as well as the more elevated portions in the southwest, including the communities of Colville Lake, Délįnę, Norman Wells and Gamètì. The boreal region includes the most southerly part of the territory, extending from the north shores of Great Slave Lake to the southern limit of the territory, including the communities of Yellowknife, Hay River and Fort Smith.

Overall, the climate in the NWT can be generally characterized to be consistently colder and drier to north, and wetter and warmer to the south, most notably in the southwest. Summers in the northern part of the NWT are short and cool, with average daytime temperature highs ranging from the mid to high teens. Winter temperatures range from daytime highs near -25°C to lows of below -40°C. Summers in the southern region of the Northwest Territories are short but warm, with daytime temperatures occasionally reaching as high as 30°C. During the winter, daytime highs of -20°C and lows of -30°C are common. The chart below provides average monthly temperatures in degrees Celsius for four communities in the Northwest Territories (Environment Canada, 2014).

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
Yellowknife	-24	-20	-13	0	10	18	21	18	10	1	-11	-20
Inuvik	-24	-23	-18	-8	4	17	20	16	8	-5	-17	-21
Norman Wells	-24	-21	-13	-1	12	20	22	19	11	-2	-16	-22
Hay River	-20	-16	-10	-2	11	18	21	20	13	5	-18	-17

Climate information obtained from Environment Canada (2014) for the closest climate station to each community in the NWT is contained in the individual community summaries in Section 7.

Figure 6-6, Figure 6-7 and Figure 6-8, provide an illustration of the mean annual temperature, evapotranspiration (July) and mean annual total precipitation in the NWT and adjacent territories (Natural Resources Canada, 2012).

Temperatures are affected by latitude as well as elevation; in general, as illustrated in Figure 6-6, the mean annual temperature within the permanently inhabited parts of the territory range ranges from -5°C to 0°C in the south near Yellowknife, and from -15°C to -10°C on the arctic coast. Data from individual communities indicate that the average daily temperatures in the warmest month typically range from 6.6°C in Sachs Harbour, to approximately 17°C in Nahanni Butte; the average daily temperatures in the coldest month typically ranges from -28.8°C in Ulukhaktok to -21.8°C in Hay River.

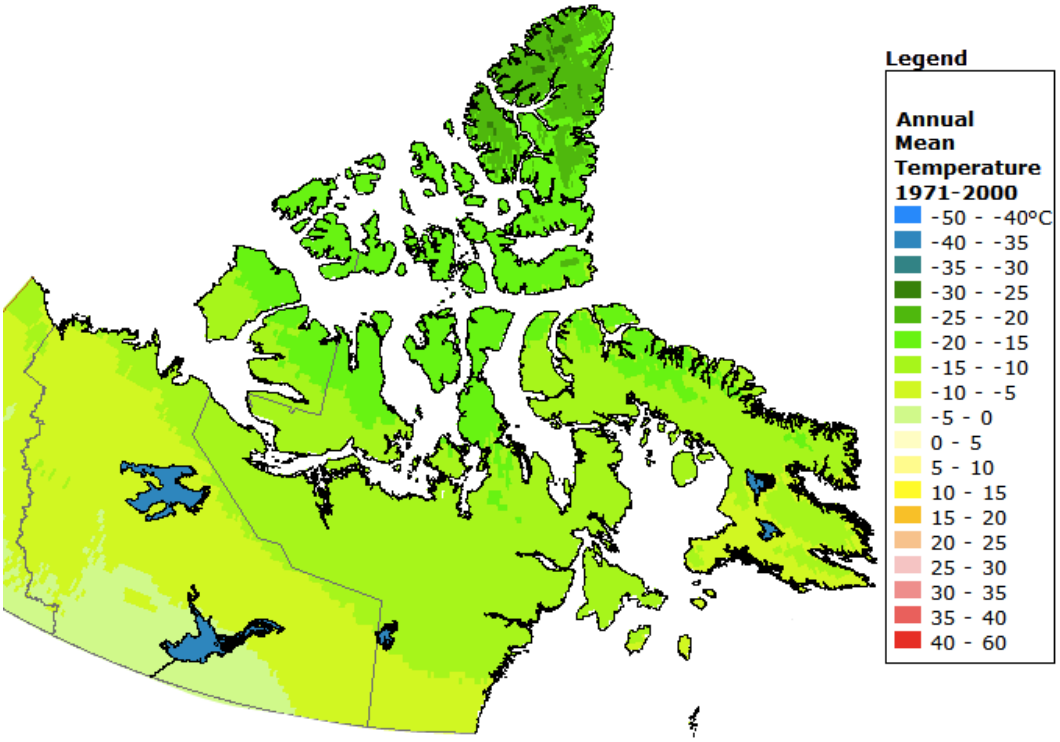


Figure 6-6: Mean Annual Temperature in the NWT

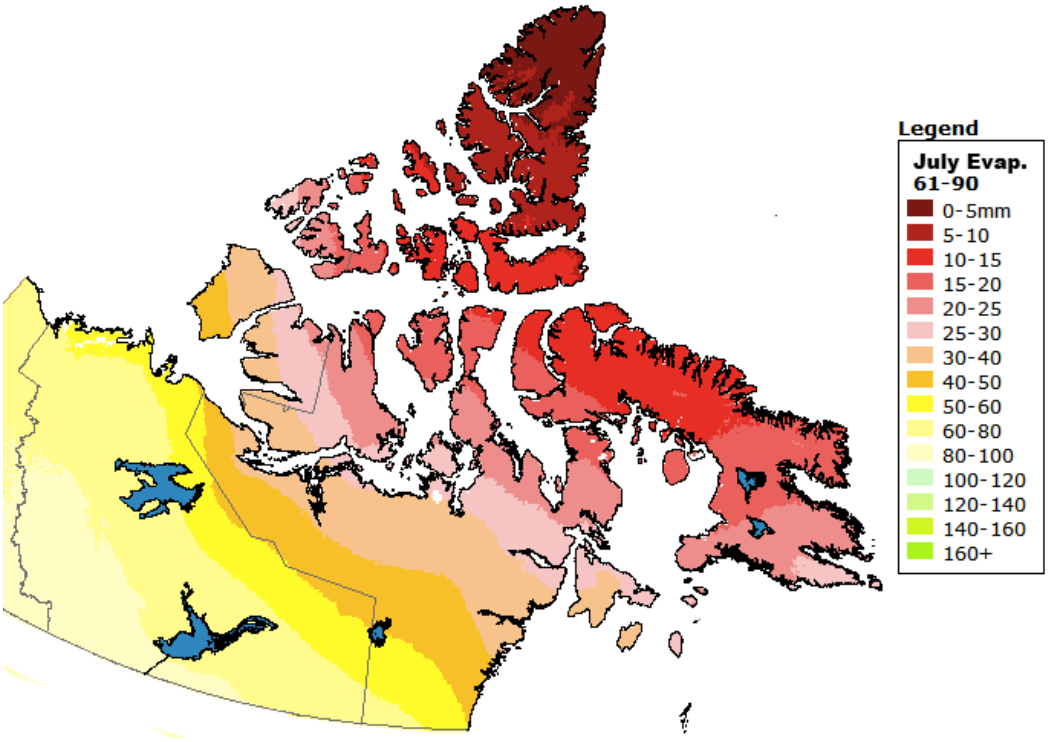


Figure 6-7: Mean Potential Evapotranspiration in July in the NWT

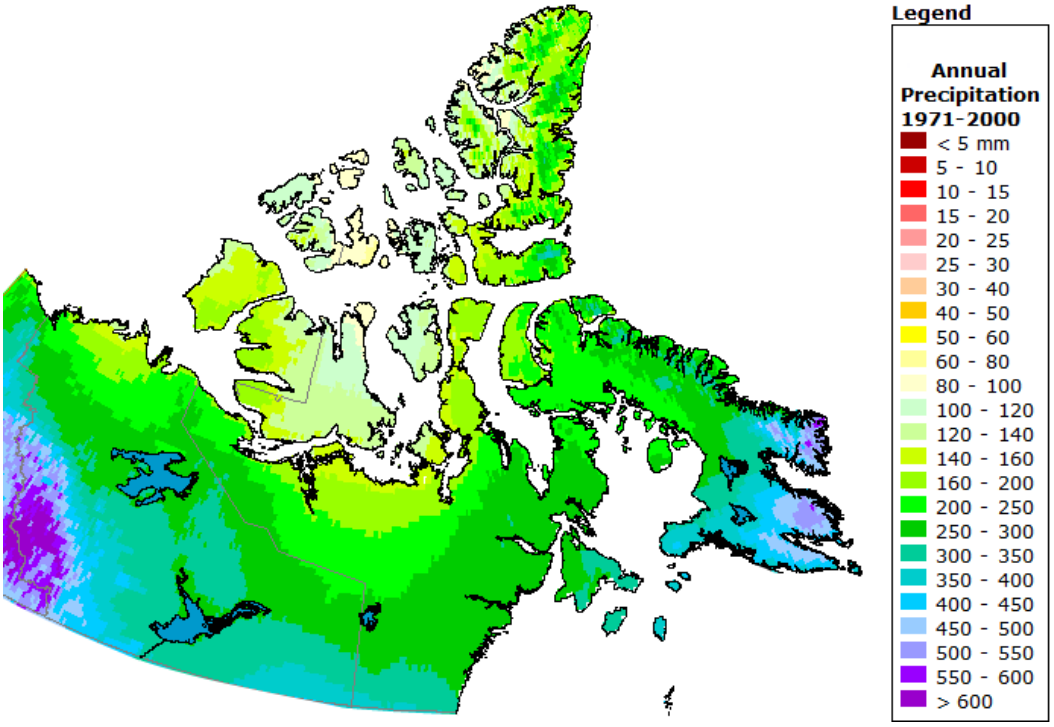


Figure 6-8: Mean Annual Total Precipitation in the NWT

Precipitation ranges from very dry in the Arctic (for example, less than 160 mm total in Ulukhaktok) which can be characterized as a “cold desert”, to dry (for example 459 mm in Fort Liard) at the eastern edge of the mountains in the southwest part of the NWT. Evapotranspiration is also higher in the southwest, and increases towards the northeast. The overall water surplus, which is the difference between precipitation and evapotranspiration, is relatively low across the NWT compared to many other parts of Canada.

Permafrost is found in much of the north and central parts of the NWT, and is generally defined as ground that has been continuously below the freezing point of water for two successive winters and the intervening summer. This definition is entirely temperature based, and it should be recognized that the distribution, thickness and characteristics of permafrost are also highly dependent on other factors including soil type, water content, salinity, presence of nearby water bodies and other factors, including vegetation and the presence of man-made structures. Above the permafrost, there is a seasonally frozen zone called the “active layer”, which is defined as the portion of the ground in a permafrost area that freezes in the winter and thaws in the summer.

Figure 6-9 illustrates the permafrost regions within Canada, as mapped in 1993 (Natural Resources Canada, 1993). The southernmost part of the NWT, from Fort Liard to south of Fort Simpson and extending east of Fort Smith, lies within the sporadic discontinuous permafrost zone, as depicted in green. This zone is characterized by having a distribution of 10 to 50% of the ground covered with discontinuous patches of permafrost. A large portion of central NWT, depicted in blue, is underlain by extensive patches of discontinuous permafrost, covering 50 to 90% of the land area. The most northerly part of the NWT, depicted in purple, is underlain by continuous (90-100%) permafrost. As noted above, local influences will affect the distribution and characteristics of permafrost within these areas.

The current extent of permafrost is expected to be less than that illustrated in Figure 6-9, in large part as a result of climate change. Increasing temperature and precipitation can decrease the amount of permafrost, and increase the depth of the active layer. In ice-rich zones, which are common in some areas of the northwestern NWT, increases in temperature and increased precipitation have increased the melting rate of ice-rich sediments, creating ground instability, as well as increased erosion in coastal areas. As noted above, the presence of large surface water bodies, built structures and ground disturbance (for example landfills and roads) result in localized changes to the depth and extent of permafrost.

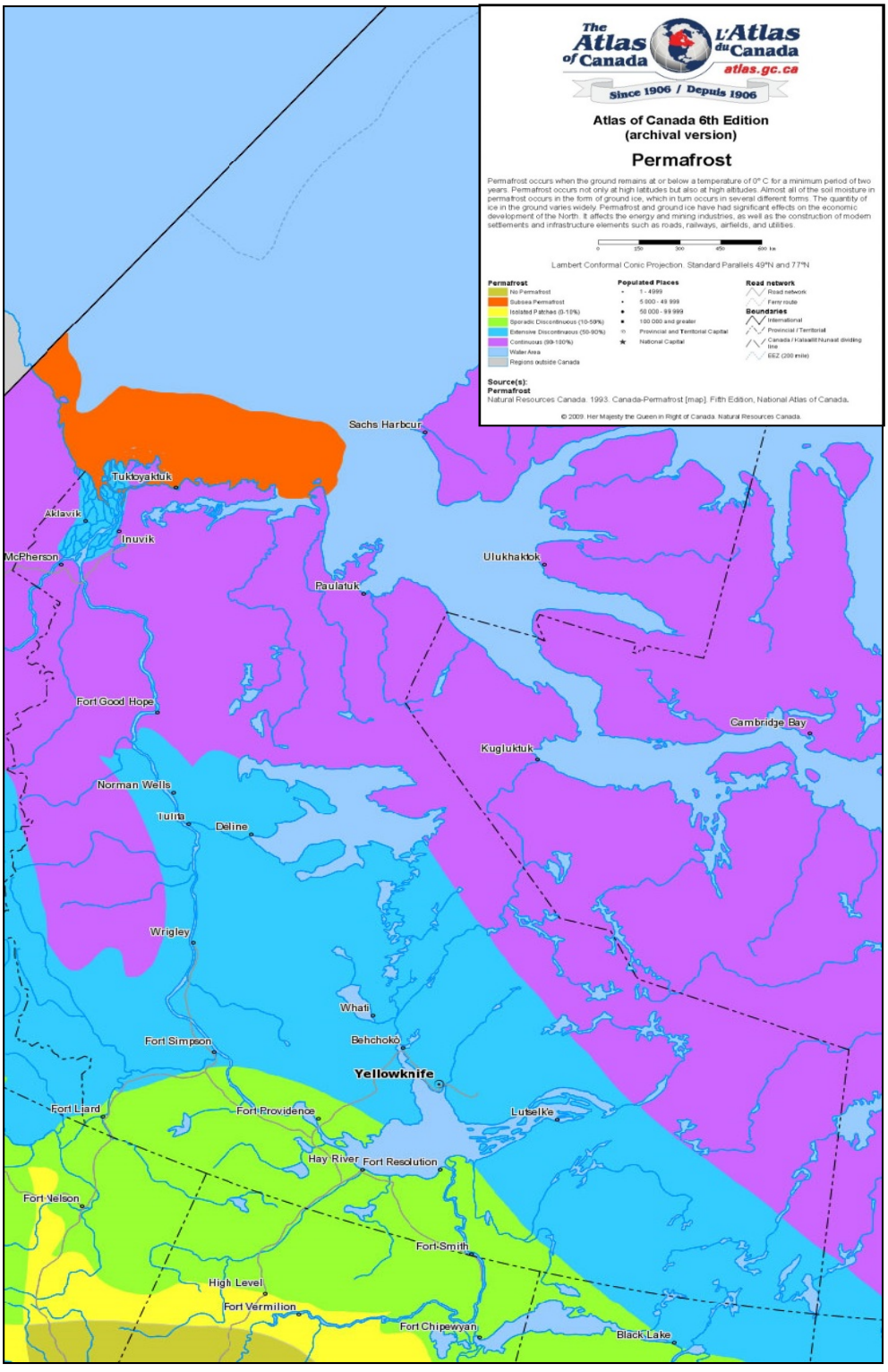


Figure 6-9: Permafrost Distribution in the NWT

7.0 COMMUNITY WASTE MANAGEMENT PROFILES

The following sections provide community-specific waste management system information. Community locations in their respective administrative zones are illustrated in Figure 1-1. In this document, communities have been organized alphabetically.

All population information was obtained from the 2011 census as reported on the Government of Canada Statistics Canada web site (Statistics Canada, 2012).

All climate data was obtained from the Government of Canada Canadian Climate Normals web site (Environment Canada, 2014).

Annual Water Licence Requirements

A Senior Administrative Officer (SAO) is responsible for operations in each community, including management of operations staff, water licence requirements and reporting. The territorial government has produced various guidelines to help support the SAO in each community to achieve compliance with their water license.

As noted above, the MACA (2003) document entitled “Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories” provides the following guidance to the community operators of landfill sites including:

1) preparation of the operation and maintenance (O&M) manual;

2) a checklist for the Land and Water Board when they review a community’s manual; and,

3) basic landfilling operations including compaction and covering.

Water license requirements, including specific annual reporting and operation and maintenance manual requirements, are set on an individual community basis by the land and water boards, based upon local environmental conditions, waste and sewage infrastructure, water licenses and operation and maintenance manuals.

Reporting of data under the “Surveillance Network Program” (SNP) is a requirement of all water licences. The SNP sites are designated locations where water or wastewater samples must be collected at a specified frequency and tested to ensure proper functioning of the wastewater treatment system and waste infrastructure and to provide early detection of contamination of the surrounding aquatic environment. Water licences often include effluent quality criteria for waste streams. Effluent quality criteria must be met prior to discharge of a waste stream to the receiving environment.

The majority of communities in the NWT are serviced by engineered water supply and wastewater disposal systems. With a few exceptions, water supplies are obtained from surface water, either pumped directly or trucked to the community from a local source. Most wastewater is trucked, or less frequently pumped, to sewage lagoons; one community (Fort Simpson) has a mechanical wastewater treatment plant. Some communities in the NWT continue to collect a small amount of sewage from honey bags / honey buckets, which are typically received from individual residences not connected to the communal sewage system and from cabins. These bags are collected or are dropped off by the public at either the sewage treatment plant or to a defined area at the solid waste (landfill) site.

Detailed information regarding water license requirements specific to each community is provided in the following sections.

7.1 Aklavik

Information Sources

A community waste management survey was completed for the Hamlet of Aklavik by the acting SAO on March 25, 2014. Information on the landfill was also obtained from the AECOM 2009 water licence application report and the AANDC 2011 inspection report (AANDC, 2011).

Golder completed a site visit to the community landfill on September 5, 2014 and interviewed community staff including the SAO (Fred Behrens) and an employee of a private contractor currently retained for the collection of MSW from the community and compaction of waste at the landfill.

The following key documents were obtained from the IWB and reviewed to assess waste management and landfill operations in the Hamlet of Aklavik:

- Aboriginal Affairs and Northern Development Canada, 2011. *Aklavik Municipal Water Licence Inspection Report (August 26, 2011*). Aboriginal Affairs and Northern Development Canada, Jan Davies (Inspector). September 29, 2011.
- AECOM, 2009. *Hamlet of* Aklavik *Background Report for Water Licence Renewal. Report No. 11270-03.* May 26, 2009.
- Aklavik, 2013. *Municipal Water License Annual Report*, Hamlet of Aklavik, Reporting Year 2012. March 31, 2013.

General Information

According to the 2011 census (Statistics Canada, 2012), the Hamlet of Aklavik (68°13'N, 135°00'W) has a population of approximately 633 persons and is located next to the Peel Channel of the Mackenzie River, approximately 55 km southwest of Inuvik. The hamlet is accessible by winter road, barge, water taxi and scheduled air service from Inuvik.

The water supply for the community is obtained from the Peel Channel upstream of the community. Details of the hydraulic connection of Clearing Lake, which is the sewage lagoon, to Peel Channel are not provided in the water licence report; however the outflow of the sewage lagoon appears to flow to the north, downstream of the community.

The mean annual precipitation as rainfall is 129.8 millimetres (mm) and as snowfall is 136.3 centimetres (cm). The daily average temperature during the warmest month is 13.9 degrees Celsius (°C), and during the coldest month is -26.3°C. (Environment Canada, 2014)

Landfill Location and Geographic Conditions

The landfill, referred to locally as the Clearing Lake Landfill, is located approximately 2 km northwest of the hamlet along an unnamed road that leads to the landfill and sewage lagoon (Figure 7-1). The landfill is approximately 2 hectare (ha) in size, based on review of figures in the most recent water licence report (AECOM, 2009).

The landfill was first established in 1975 and is located on community/municipal property immediately adjacent to Clearing Lake, used as a sewage lagoon. The landfill is located approximately 500 m west of Peel Channel.

The community is in the Mackenzie Delta which is characterized by alluvial deposits of fine sand and silt. Permafrost is discontinuous, with an active layer reported to be between 0.3 and 0.9 m thick (AECOM, 2009).

At the time of the site visit by Golder, the surficial soils at the landfill site were observed to consist of fine sands and silts. Surface water was noted in low lying areas of the site, notably adjacent to the white goods and in a trench excavated adjacent to the metals area. Hamlet staff indicated that the trench remains full of water throughout the summer, indicating that the water table is near surface at the landfill.

Regulatory Requirements

The Hamlet of Aklavik was granted a water licence (no. N3L3-0570) on December 1, 2014 for the disposal of MSW by the IWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on November 31, 2019. The local bylaws or guidelines that govern landfill management in Aklavik consist of a tipping fee bylaw, hours of operation as well as a no burning/no contaminated materials bylaw. In addition Water Licence G99L3-003 issued by the Gwich'in Land and Water Board regulates the community water supply.

A solid waste facility operation and maintenance manual is not available for the Aklavik landfill through the Land and Water Board registry. The most recent inspection report at the time of the Golder site visit (AANDC, 2011) commended the community on progress made since the previous inspection and listed a number of concerns including, but not limited to:

- A need for more segregation signage at each specific area;
- Windblown debris;
- Waste cell not being covered on a regular basis;
- A need to properly store and dispose of used oil containers; –A need to properly store hazardous waste in a bermed area;
- A need to update the operation and maintenance manual for the landfill; and,
- A need to segregate construction and demolition (CRD) waste materials.

According to results of the recent community waste management survey, there is no unauthorized waste disposal occurring in the community. As noted below, approval for some commercial use of the site for disposal /storage of materials has occasionally been granted.

Use of the Landfill

The landfill is used solely by the residents and institutional /commercial operations in Aklavik for the disposal of MSW, white goods and other large metal materials such as culverts and vehicles, tires, and CRD waste, including former housing units. Hazardous wastes are stored on-site.

The number of people that use the landfill fluctuates seasonally; the population increases between January and March due to the ice road connecting Aklavik to Inuvik.

According to the community waste management survey, the hamlet received a request from carpentry and construction industries to use the landfill. A request to dump 100 fuel tanks, batteries, wood waste and appliances was granted. The fuel tanks were visible at the time of the site visit.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operations was obtained primarily from the reports noted above and from Golder's site visit in September, 2014.

General Information and Landfill Access

The entrance to the active landfill is gated and located along an unnamed road to the north of the hamlet. The entrance gate was open at the time of the site visit. The SAO indicated that the gate is unused and access to the site is uncontrolled. The landfill covers an estimated 2 ha and is not fenced. The hours of operation are therefore not set.

Community Waste Collection

The landfill and collection services are operated and maintained by the community. Waste is placed by the residents in bags next to the road for collection. A private contractor collects waste three times per week using a pickup truck with vertical box extensions allowing for an approximate maximum load volume of 3.5 cubic metres (m^3). Based on a daily reported volume estimate of 4 daily loads, 3 days per week, the weekly waste volume (uncompacted) of residential waste is estimated to be 42 m^3.

It is reported by hamlet staff that the public generally segregates waste into appropriate areas at the landfill. No signage was visible on-site. The SAO noted that new signage is currently being painted and will be installed in the coming weeks.

Landfill Design

The landfill is separated into four main areas: bulk metals are stored to the northeast of the landfill, CRD waste to the northwest, MSW in the southwest and hazardous materials and white goods in the southeast.

The landfill is a ground-level site, with a low berm surrounding the area fill MSW landfill. The berm was originally constructed as a perimeter road around the waste cell. The elevation of the berm appears on par or below the level of the waste. A portion of the MSW has recently been covered with soils and wood waste. No cover has been used on the rest of the MSW area. It is reported by the SAO that no local source of capping material exists and that cover has previously been waste soils from road construction and drainage projects.

The most recent inspection report at the time of the Golder site visit recommended that a berm be constructed around the hazardous waste storage area. This had not been undertaken as of the time of the site visit in 2014.

Waste Receipt Procedures

There is currently no tracking of deposited waste or surveys of waste capacity.

Waste materials at the site were observed in the site visit to be generally separated as follows:

- MSW in a bermed cell;
- CRD waste;

- White goods;
- Tires;
- Fuel drums, oil/lubricant pails and discarded household oil tanks; and,
- Vehicles and large metal.

Landfill Management and Waste Handling

Municipal waste is dropped off by the collection vehicle and residents in a central MSW area where it is subsequently pushed up by hamlet staff with a loader after each collection day during the summer season. Compaction of household waste occurs in the summer months using a bulldozer. It is reported, and observed in the site visit, that no regular cover is placed over the waste. There was no identified borrow source for cover within the community. The only quarry is accessible via winter road towards the mountains to the west.

With the exception of the partial berms, this is a natural attenuation site and there is no containment or collection of leachate. Surface and groundwater monitoring is not carried out. As noted above, the most recent inspection report at the time of the Golder site visit recommended improved cover to limit the observed litter.

Waste in the southwestern portion of the landfill has recently been covered using soil removed from the hamlet as part of a ditching project and by brush. It is reported by hamlet staff that the waste materials under the covered area are largely CRD waste from local housing. The remaining area, consisting of MSW, is uncovered. A berm was evident north and east of the active MSW cell. Access for Golder's inspection to the active MSW cell was restricted to the northern edge due to the reported presence and evidence of a grizzly bear in the area.

Special Concerns, Environmental Risks and Future Planned Activities

There were no special concerns identified through completion of the community waste management survey. Environmental risks associated with the landfill include the presence of bears (AANDC, 2011), which was confirmed during the site visit. Also, there are water-related environmental risks associated with the landfill, due to seasonal flooding of the Mackenzie River and the flood water impacting the landfill access road. It was reported by the SAO during the site visit that the community will begin working on a plan for a new landfill once a road is built to a quarry located west of the town near the mountains.

Estimated Remaining Lifespan of Landfill

There is no official estimated closure date for the landfill identified in the available reports. The respondent to the community waste management survey estimated that there is only one year of capacity remaining. Based on observations at the time of the site visit, the existing cell does not have significant remaining capacity. At the time of the site visit, the SAO indicated that a more suitable site can likely be found along the road towards the quarry, however this road is seasonal.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of municipal staff. A private contractor is responsible for collecting and trucking MSW to the landfill. Collection occurs three times per week. On each collection day hamlet staff use a loader to push up freshly collected waste. This operation is less frequent in winter months, however exact records were not provided by the hamlet nor reported in the information on the Land and Water Board registry.

Based on feedback received through the community waste management survey and discussions during the site visit, the landfill operator in Aklavik has not completed any waste management or waste handling training.

Hazardous Waste Management Practices Summary

The landfill does not have a hazardous waste management plan. The hazardous waste generated in the community is handled by municipal staff. Hazardous waste such as oil, fuel, batteries and drums are accepted at the landfill and a significant quantity was observed at the time of the site visit. As noted above, there is no containment berm or liner in the area of hazardous waste storage. Hazardous waste was located with the fuel drums and consisted of approximately 50 five gallon pails of lubricants and used oil in addition to various jerry cans and fuel drums containing product. No batteries were noted on-site. No controls are in place to separate the hazardous waste or to contain spills. Evidence of significant staining or spills of hydrocarbons was not observed on-site, however the drums and pails of liquid waste were not securely stored.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at both the landfill site and the community works yard (KBL, 2013a). At the time of the inventory, a total of 311 drums (205L), and 46 pails (20L) of hazardous waste was present, along with batteries, heating oil tanks and vehicles.

Sewage Sludge Management

Sewage collected from the individual residences is disposed of by haul truck in Clearing Lake, located adjacent to the landfill. There is no pre-treatment of the waste pumped from the residential holding tanks.

Historic Waste Disposal Sites

A former CRD waste site is reportedly covered on the west edge of the site adjacent to the current MSW cell. Through completion of the community waste management survey it was determined that a historic landfill is located west of the community, and was closed and covered in the early 1980s. It contains MSW and bulky items. In addition, during the site visit a historical waste area was visited with an approximate latitude/longitude of 68.230°,-135.020°. Waste materials, including scrap metals and plastics, were visible. The majority of the area was vegetated with grasses and willows. Ponded water was present throughout.

Opportunities for Waste Diversion

There are periodic satellite beverage container collection events held in Aklavik. In addition, an independent contractor from Inuvik travels to Aklavik via water taxi or winter road on a seasonal basis. It is reported by hamlet staff that beverage containers for recycling are occasionally transported by this contractor.



Figure 7-1: Aerial Location of the Community of Aklavik and the Community Landfill

7.2 Behchokǫ̀

Information Sources

A community waste management survey was completed for the Community of Behchokǫ̀ by the SAO on March 20, 2014. Information on the landfill was primarily obtained from the 2010 Operations and Maintenance Plan, 2010 water licence application to build the cells currently in use, as well as the 2013 water licence report.

Golder completed a site visit to both the operating and closed landfills on July 22, 2014 with representatives from GNWT-ENR, community government staff including the SAO (Ms. Violet Camsell-Blondin) and the landfill supervisor to review current landfill operations. The SAO indicated that an application for a new water licence was underway, which includes the design of a new landfill located immediately east of the closed landfill. The operating and closed landfills at the time of the site inspection in 2014 are discussed herein.

The following key documents were obtained from the WLWB and reviewed to assess waste management and landfill operations in Behchokǫ̀ relative to the current landfill operations:

- Aboriginal Affairs and Northern Development Canada, 2013. Behchokǫ̀ *Municipal Water Licence Inspection Report.*
- Aboriginal Engineering Limited, 2010. *Drawing EX-20110-14-01*. May 7, 2010.
- AECOM, 2010. *Operation and Maintenance Manual Rae Sewage Lagoon.* March 2010 (Community Government of Behchokǫ̀ – December 17, 2010).
- Community Government of Behchokǫ̀, 2013. *Municipal Water Licence Annual Report, Licence # MV2003L3-0010.*
- Community Government of Behchokǫ̀, 2011. *Closure and Reclamation Plan.* January 2011.
- Community Government of Behchokǫ̀, 2010a. *Water Licence Application Package.* May 2010 (Email Lands to WLWB, June 1, 2010).
- Community Government of Behchokǫ̀, 2010b. *Operations and Maintenance Plan for the Solid Waste Disposal Facility.* November 5, 2010.
- FSC, 2003a. *Rae-Edzo MSW Site Planning Phase 2 Final Draft Report #2*.
- Ollerhead & Associates, 2010. *Volume Survey of Landfill Berm, Behchokǫ̀*.
- Wek'eezhii Land and Water Board, 2011. *Water Licence Issuance of Type "B" Water Licence Amendment, Behchokǫ̀*. August 11, 2011.

The community of Behchokǫ̀ (62°49'N, 116°02'W) has a population of approximately 1,926 (Statistics Canada, 2012) and is located on the northwest tip of Great Slave Lake, approximately 96 km northwest of Yellowknife. Behchokǫ̀ was formerly known as Rae-Edzo, and is comprised of two separate communities, Rae and Edzo. The community is accessible by an all-weather road. Rae is located on the southeastern shore of Marian Lake; Edzo is located near the north arm of Great Slave Lake. Frank Channel connects Marian Lake to Great Slave Lake.

The mean annual precipitation as rainfall is 170.7 mm; annual snowfall is 157.6 cm. The daily average temperature during the warmest month is 17°C, and during the coldest month is -25.6°C (Environment Canada, 2014).

The community water supply for Rae and Edzo is obtained from Marian Lake and the West Channel, respectively.

Landfill Location and Geographic Conditions

The landfill site is located approximately 2 km east of the community of Rae, and is accessed from Donda Tili road, off the Mackenzie Highway. The landfill is located on community/municipal land, and was first established in 1980 (MACA, 2014). The sewage lagoon is located immediately north of the landfill site on the opposite side of the road. There are two access roads into the landfill site, leading to the closed (east) and active (west) landfills.

Where observed during the site visit, the surficial soils at the landfill site consisted of fine grained clayey silt. Bedrock was observed to the immediate west of the site in the vicinity of the white goods storage area. Surface water was present in the vicinity of the access roads, as well as in the base of the excavation in the most northerly cell.

The landfill is located approximately 100 metres (m) north of a pond; Marian Lake is located approximately 900 m south of the landfill site. Smaller ponds are observed to the immediate north of the landfill, adjacent to the road.

Regulatory Requirements

The community of Behchokǫ̀ is the largest of four communities managed by the Tłı̨chǫ Government through the Tłı̨chǫ *Land Claims Self Government Act*. Under this Act, the Tłı̨chǫ government may create their own regulations to govern waste management. The requirement of the broader *Northwest Territories Intergovernmental Agreement on Lands and Resources Management Act* that has been signed by the Tłı̨chǫ government takes precedence.

At the time of the site visit, the SAO indicated that the community was in the process of submitting a new Type A water license application. It was reported by the SAO that information on a new landfill will be included in the application. A new water licence W2014L3-0002, since approved subsequent to the 2014 site visit and summary summarized herein is not further discussed herein or included in the database.

A solid waste facility operation and maintenance manual has been completed for the landfill (Community Government of Behchokǫ̀, 2010b). In addition, a Closure and Reclamation Plan (Community Government of Behchokǫ̀, 2011) has been completed, outlining closure activities for the eastern area where waste was placed prior to construction of the landfill expansion and plans for remediation of the land farm area.

The most recent annual report at the time of the site visit for the community, was completed in 2013. The report (AANDC, 2013) identified a number of ongoing issues at the landfill site, including but not limited to:

- Lack of appropriate signage;
- Improper storage and handling of paint cans;
- A lack of as-built drawings for the landfarm and the expanded Solid Waste Disposal Facility;
- The need for a revised Closure and Reclamation Plan (version 1.1) for the old landfill;
- The need for an updated (version 2.1) of the Operation & Maintenance Manual; and,
- A lack of a final approved contingency plan addressing all unauthorized discharges from the solid waste facility, sewage lagoon and associated operational facilities.

The community waste management survey listed unauthorized disposal of variable waste types in the town on the land and next to the landfill as an issue.

Use of the Landfill

The landfill is used by the residents and institutional/commercial operations of the community of Behchokǫ̀ (i.e., the communities of Rae and Edzo) for MSW, white goods and other large metal materials as well CRD waste, including former housing units. Hazardous waste is collected at the community works building (see below). The number of people that use the landfill does not fluctuate seasonally.

As noted below, metal waste is stored both in the current operating area of the active expansion portion of the facility (largely white goods), whereas vehicles, former heating oil tanks and larger metal items are stored at the closed landfill. A contaminated soil land farm operation is present at the location of the closed landfill, near the entrance. Remediation of the soil is discussed in the current water licence.

According to the community waste management survey and discussions with the SAO while on-site, requests from private industries outside of the community to use the landfill have not commonly been received. A recent request to dispose of asbestos from CRD activities was rejected.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operations was obtained primarily from the 2010 Operations and Maintenance Plan for the landfill, the 2010 water licence application and the most recent (2013) water licence report. Observations from the recent site visit (July 22, 2014) are provided below.

General Information and Landfill Access

The current (active) landfill is an expansion on the west side of the existing landfill site and consists of four cells in an overall area of approximately 0.7 ha (Community Government of Behchokǫ̀, 2010b). The former landfill is located immediately east of the active landfill. Figure 7-2 illustrates the location of these landfills.

The entrance to the expanded (active) area of the landfill site is marked by signage at Donda Tili Road. The entrance road to the closed part of the landfill located to the east is not marked. There was no gate or fencing observed at entrance road to the active area; an old wood fence on the north side of the closed landfill site largely serves as a visual barrier and is in poor repair.

It is reported that access to the site is not controlled, but that community staff regularly visit the site to observe waste disposal and manage waste placement and separation. The landfill is not fenced. Hours of operation are reported to be 8 AM to 5 PM, however in discussions with community staff, waste may be dropped off at any time, as access to the landfill is not restricted.

Community Waste Collection

The landfill and collection services are operated and maintained by the community. A private contractor collects waste twice per week. Waste is placed by the residents in bags next to the road for collection.

Landfill Design

The design of the active landfill consists of three cells covering an area of approximately 4,000 square metres (m^2) (80 m by 50 m) and a volume of approximately 8,000 m^3. This design is outlined on a map of the berm construction prepared by Ollerhead and Associates (November 16, 2010). The initial design was based on the trench filling

method. According to a cross section, two m high berms would be constructed for surface water control and waste placed into excavations three m below grade (Community Government of Behchokǫ̀, 2010b).

The landfill cells have been constructed and filled on the basis of the 'area method', consisting of bermed and partially excavated bases. The berms were observed to be approximately two m in height and consist of fine grained clayey silt soils. The berms between the cells are approximately nine m in width with 2:1 side-slopes. The southernmost and central cells are in use for MSW and CRD, respectively; the northernmost cell has been excavated and water is observed at the base of this excavation. Each cell is approximately 80 m long (E-W). The cell widths (top of berm) were observed to be approximately 30 m (south cell), 30 m (central cell) and 15 m in width. The overall observed size of the fill area is approximately 80 m by 75 m.

Waste Receipt Procedures

Waste materials at the site were observed to be generally separated as follows:

- MSW in a separate bermed cell;
- CRD waste in a separate bermed cell;
- White goods;
- Mattresses;
- Tires;
- Fuel drums;
- Vehicles (at closed landfill);
- Discarded household oil tanks and larger fuel storage tanks (at closed landfill);
- Large metal (at closed landfill); and,
- Soil remediation in the closed portion of the landfill.

Hazardous waste was not observed at the site, with the exception of a small pile of drums. This material (batteries, oil, fuel drums) is generally managed off-site at the community works operation building in a partially covered storage shed. Evidence of significant staining or spills of hydrocarbons was not observed on-site.

Landfill Management and Waste Handling

Waste is dropped off in an access area on the west side of the cells, which is transferred to the cells by community staff using a loader. Waste is compacted using a bulldozer (observed at the time of inspection to be a D-7) on an approximately weekly basis. Compaction was described to consist of pushing the waste across the cell and completing four to five passes to compact the material in approximately 0.6 m lifts. In some areas, the waste has been placed even with or slightly higher than the berm. There was no soil cover on either of the active cells. Ponded water was evident in the waste drop off-area within the berm; however, there was no evidence of impacted surface water in the areas observed outside of the landfill berm. Significant litter was present in the wooded areas outside of the landfill reflecting the lack of cover; it was noted that summer students were scheduled to complete litter picking later in the summer.

The landfill was reported to be covered with sand during the summer months, but not during the winter. With the exception of the partial berms, this is a natural attenuation site and therefore there is no collection or control of leachate at this site. Sampling of standing surface water is undertaken during the spring and summer months.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern for this landfill is contaminated soil. This concern is related to the emergency dumping of contaminated soil from fuel spills.

It was reported by the SAO that the community is currently completing assessments and community consultation for a Class A water licence renewal, which will include a new landfill. Information of the status and details of the community consultation and supporting documentation are available on the WLWB website.

Estimated Remaining Lifespan of Landfill

The lifespan of the expanded landfill area was estimated to be three years from 2011 (Community Government of Behchokǫ̀, 2010b). Based on the planned design and the observed filling of the first two cells, it appears that the lifespan of the current landfill will extend to approximately 2015.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government staff. A private contractor is responsible for collecting and trucking MSW to the landfill. As reported in the community waste management survey, the landfill operator performs their duties on a part-time basis (approximately one hour per day). This time commitment is reported to change seasonally. Based on discussions with community staff, the operator attends to the site when not completing other duties, which includes road maintenance and construction work.

The landfill operator in the community of Behchokǫ̀ has completed the NWT School of Community Government's *Water and Waste Management* program.

Hazardous Waste Management Practices

The landfill has a hazardous waste management plan that details which hazardous materials are accepted, as well as the proper storage and handling guidelines. Hazardous waste in the community is managed at the public works garage in a partly covered wooden container shed. Material dropped off at the landfill is transferred to the garage.

Sewage Sludge Management

Currently, sewage sludge is removed once per year and placed in a bermed pit area adjacent to the sewage lagoons; sewage sludge has not historically been placed in the landfill. As the sewage lagoons near capacity, the community is discussing the possible expansion of the sewage lagoons, or if additional capacity will be achieved through dredging.

Historic Waste Disposal Sites

The former (historical) landfill is located immediately east of the existing expanded landfill (see Figure 7-2). It is presumed that this site has been in operation since the 1980's. The area of the former landfill is estimated to be approximately one hectare based on mapping included on the Land and Water Board website (Aboriginal Engineering, 2010). The historical landfill was designed using the modified trench method of waste disposal within

a 120 m by 60 m area surrounded by a berm. Waste is reported to have been deposited in three lifts within a 3 m deep trench; each layer is compacted and covered with soil. It is reported that the cell was capped with excavated material consisting primarily of clayey soils. A separate trench is used for CRD material (Community Government of Behchokǫ̀, 2010).

The closed landfill area has been capped and vegetation consisting predominantly of grasses has grown over the capped area. There is minor exposed waste, but overall the condition of the top of the cap was good and there was no evidence of significant settling or ponding. Inspection of the east side of the closed landfill next to a small pond indicated uncovered waste including metals, and evident discoloration of the seeps next to the pond as well as some waste in the pond itself.

Opportunities for Waste Diversion

The community of Behchokǫ̀ currently recycles beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These containers may be returned to the bottle depot, at which point the bags or bales of containers are brought to the Yellowknife regional processing centre. The bottle depot in Behchokǫ̀ is operated by FC Services located within the community.

The community has indicated that it is interested in participating in other waste diversion programs.



Figure 7-2: Behchokǫ̀ Active Landfill, Historic Landfill and Sewage Lagoon

7.3 Colville Lake

Information Sources

A community waste management survey was not completed for the community of Colville Lake. Information on the landfill was obtained largely from water and sanitation studies and planning reports. Golder completed a site visit to the community landfill on July 22, 2015 and interviewed the shop foreman/operator (Karl Yakeleya).

The following documents were obtained from the SLWB and reviewed to assess waste management and landfill operations in Colville Lake:

- Dillon Consulting Limited, 2004. *Colville Lake Water and Sanitation Study Stage 1 Report.* April 27, 2004.
- Dillon Consulting Limited, 2002. *Colville Lake Planning Study, Colville Lake, NT.* February 7, 2002.

General Information

The community of Colville Lake (67°02'N, 126°05'W) has a population of approximately 149 (Statistics Canada, 2012) and is located on Colville Lake, 755 km northwest of Yellowknife and 354 km southeast of Inuvik. The community is accessible by winter road and scheduled air service.

The mean annual precipitation as rainfall is 144.9 mm and as snowfall is 151.2 cm. The daily average temperature during the warmest month is 16.7°C, and during the coldest month is -27.8°C (Environment Canada, 2014).

The water source for the community is Colville Lake. The pumping station is located within the community on the shore of Colville Lake.

Landfill Location and Geographic Conditions

The landfill is located approximately 2.8 km south of the community. In 2013, MACA produced a figure of the landfill depicted during construction. This figure has been included as Figure 7-3 of this report. The landfill is located on Commissioner's land, and was first established in 1985 (MACA, 2014).

The community lies at the southern range of the continuous permafrost zone, and is characterized by high amounts of ground ice. The landfill is located on an esker and surficial soils in the area of the landfill largely consist of sand and gravel. The active layer is between 0.5 m and 2.0 m.

Regulatory Requirements

There is no water licence listed on the SLWB site and therefore it is unknown if the community of Colville Lake has been granted a water licence for the disposal of municipal solid waste. As noted above, a water licence application was submitted in 2007 and an industrial water licence granted for the development of the community pump by the GNWT Department of Public Works and Services. The local bylaws or guidelines that govern landfill management in Colville Lake consist of Resolution 2006-29 Chapter 4-13, which determines the fines for violations related to solid waste storage and disposal. It is unknown if these bylaws are enforced.

A solid waste facility operation and maintenance manual is not available for the landfill through the Land and Water Board registry. Community staff contacted during the site visit did not have a copy of a manual.

There was no inspection report (i.e. from AANDC) available for review.

Use of the Landfill

The landfill is used solely by residents and institutional/commercial operations in Colville Lake for disposal of all waste generated in the community. There is no segregation of waste to divert materials such as wood, electronics, etc. Bulky metals including empty tanks, white goods and end-of-life vehicles (ELV) are stored on the perimeter of the site, and at a second area located approximately 1 km east of the community.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill is located off an unnamed road leading south of the community. The cell design is a trench landfill, covering an area of approximately 0.2 ha. Access to the landfill is unrestricted. There is no fencing or gate and no controls in place to restrict access to wildlife.

A sewage disposal trench is located to the west of the landfill cell.

Community Waste Collection

The community hires a local community member each month to carry out the collection. Collection is carried out using a truck or all-terrain vehicle (ATV), based on what is available to the individual in charge of collection for the month. The collection schedule is not fixed and varies each month.

Landfill Design

The landfill is an open trench, approximately 0.2 ha in area. The original depth of the trench is unknown.

Landfill Management and Waste Handling

There is no organized management of the landfill. There was no evidence of regular compaction or covering. It is reported that a front end loader is used annually to push waste into the pit; however, based on the amount of waste and evident compaction of a small part of the fill area, it appears that there may be occasional compaction and covering.

Waste materials at the site were observed to be generally separated as follows:

- MSW; and,
- Bulky metals;

Bulky metals are stored to the east of the active waste trench. It does not appear that these materials have been segregated, and no signage was present at the site to direct segregation. As noted above, additional bulky items including vehicles and tanks are dumped at a separate location.

Special Concerns, Environmental Risks and Future Planned Activities

Special concerns identified by the community include windblown waste, lack of an engineered design and lack of active management of the landfill.

Estimated Remaining Lifespan of Landfill

Community staff estimated that the current landfill has an additional 5 to 10 years capacity based on their interpretation of the filling rate of the current cell and the available area. As indicated by the site airphoto and the site visit, the clearing where the landfill is located has room for expansion.

Human Resources

There are no staff members regularly assigned to landfill operation. As noted above, it is reported that various community residents are hired to collect and dispose of waste at the landfill site, and change on a monthly basis.

Hazardous Waste Management Practices

The community does not have a hazardous waste management plan. Based on the mixture of materials and the evident absence of a separated area of hazardous waste, it is likely that hazardous wastes are not segregated from other wastes at the landfill. It is reported that batteries are accepted and segregated at the landfill (Arktis, 2012), however during the Golder 2015 site visit, there were no batteries observed to be segregated at the landfill.

A waste inventory and labelling program was completed for Ecology North in 2013, at which time it was noted that hazardous waste was present at the landfill in the general refuse area with minimal segregation occurring (KBL, 2013b). At the time of the inventory, a total of 376 drums (205 L) of which 250 were empty and two pallets of lead acid batteries were observed.

Sewage Sludge Management

A sewage trench/lagoon is located adjacent to the landfill. Infiltration of the sewage is rapid. Honey bags are used in the community and are deposited in the trench. A new above ground (bermed) engineered lagoon is currently being constructed by community staff. Honey bags are disposed of in the trench to the west of the landfill cell. This waste was dumped on the slopes of the trench and do not appear to have been recently covered.

Historic Waste Disposal Sites

One historical landfill site was visited. The approximate location is 67° 2'21.61"N, 126° 4'1.57"W. Waste vehicles including ATV and snow machines were noted at this location. It could not be determined if waste is also buried at this location.

Opportunities for Waste Diversion

Colville Lake currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the bottle depot, at which point the bags or bales of containers are brought to the Inuvik regional processing centre. At the time of writing this report, the depot in Colville Lake was reported to be located at and operated by the Colville Lake School.

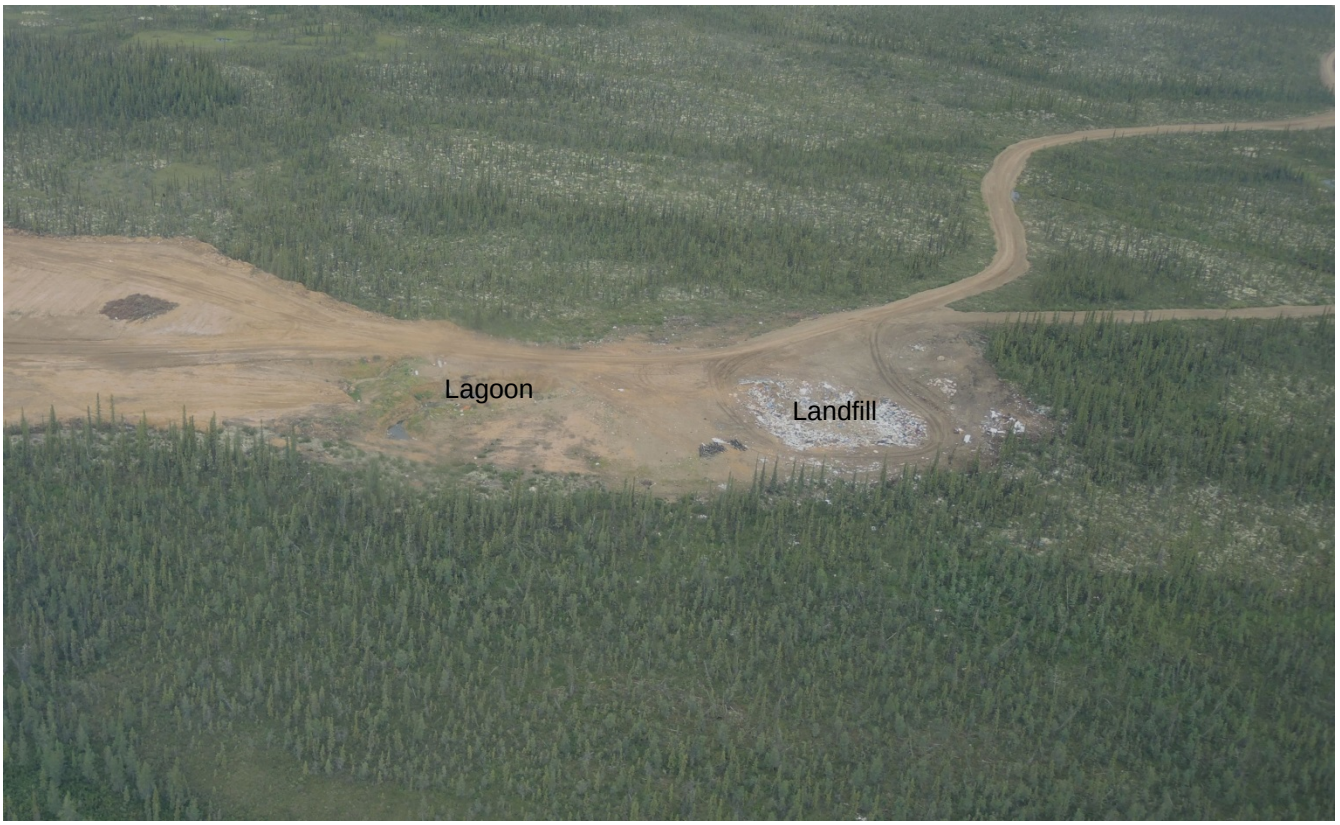


Figure 7-3: Aerial Photograph of the Colville Lake Active Landfill and Sewage Lagoon

7.4 Déljnę

Information Sources

A community waste management survey was completed for the charter community of Déljnę through an interview with the SAO. This information has been incorporated into the community waste system profile. Information on the landfill was obtained primarily from the most recently available inspection report (AANDC, 2011), the 2008 Solid Waste Operation and Maintenance Manual for a planned new landfill, the 2013 Sewage Operation and Maintenance Manual, the 2013 draft Closure and Reclamation Plan, and the Spill Contingency Plan. Information was also obtained from the amended water licence application (2012) and approved water license (2013).

The following documents were obtained from the SLWB and pertain to the review of waste management and landfill operations in Déljnę:

- Aboriginal Affairs and Northern Development Canada, 2011. *Charter Community of Déljnę Water Licence S00L3-002 Inspection Form.* September 14, 2015.
- Délįne Sahtu Land and Water Board, 2013. *Amended Water Licence # S12L3-006 Amendment (July 19, 2013).*
- Dillon Consulting Limited, 2008. *Déljnę, NWT Solid Waste Facility Operation and Maintenance Manual.* July 8, 2008.
- Lee, Olivia, 2015. Personal communication from Olivia Lee, GNWT to Golder on September 14, 2015.
- Ripley, Shannon, 2014. Personal communication from Shannon Ripley, GNWT to Golder.
- Stantec, 2012. *Spill Contingency Plan for the Charter Community of Deliné.* August 27, 2012.
- Stantec, 2013a. *Closure and Reclamation Plan for Solid Waste Facility, Deliné, Northwest Territories. Version 1.0.* March 8, 2013.
- Stantec, 2013b. *Sewage Lagoon Operation & Maintenance Manual, Charter Community of Deliné, NT.* November 18, 2013.

General Information

The charter community of Déljnę (65°11'N, 123°25'W) has a population of approximately 472 persons (Statistics Canada, 2012) and is located on the western shore of Great Bear Lake, 540 km northwest of Yellowknife and 110 km northeast of Norman Wells. The community is accessible by winter road and scheduled air service.

The mean annual precipitation as rainfall is 162.3 mm and as snowfall is 150 cm. The daily average temperature during the warmest month is 13.3°C, and during the coldest month is -25°C (Environment Canada, 2014).

The water source for the community is Great Bear Lake, from an intake located on the east side of the community.

Landfill Location and Geographic Conditions

The current landfill is located 1.5 km north of the community and south of the airport (Figure 7-4). The landfill is located on community/municipal land, and was first established in 1989 (MACA, 2014). The size of the landfill is approximately 2,500 m^2 (Stantec, 2013a). A new solid waste disposal facility located approximately 2 km north of

the airport (Stantec, 2013a; Dillon, 2008). The site has been constructed; however, as of 2015 it was not yet in operation.

Déljnę is located within the Norman Range ecoregion, which extends from Fort Good Hope on the east side of the Mackenzie River to Willowlake River south of Great Bear Lake. The surface of this ecoregion is covered with steeply sloping to undulating glacial drift, colluvium and organic deposits in the form of polygonal peat plateaus. The community lies within extensive and discontinuous permafrost, has low to moderate amounts of ground ice and is characterized by sparse ice wedges (Stantec, 2013a).

The closest body of water to the landfill is a small lake located approximately 1.2 km to the south. This lake flows into Great Bear Lake via a 200 m channel.

Regulatory Requirements

The Community of Déljnę was granted a water licence (no. S12L3-006) on December 5, 2012 (last amended July 19, 2013) for the disposal of MSW by the SLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on December 4, 2017. There are no local bylaws or guidelines that govern waste management in Déljnę.

The water licence requires that an annual report be filed with the Land and Water Board. No annual reports for Deliné were available for review during the preparation of this report.

A solid waste facility operation and maintenance manual was prepared and is available for review through the SLWB public registry (Dillon, 2008). There is also a Sewage Lagoon Operation and Maintenance Manual (Stantec, 2013) and a Closure and Reclamation Plan for the current Solid Waste Facility (Stantec, 2013a). A Spill Contingency Plan was prepared for the solid waste site (Stantec, 2012).

The most recent inspection report available through the Land and Water Board (AANDC, 2011) at the time of the Golder site visit identified a number of ongoing problems at the landfill including but not limited to:

- Unorganized municipal waste area;
- Excessive waste in the current landfill cell;
- Windblown litter due to insufficient fencing;
- Lack of updated signage;
- Permanent storage of hazardous waste (as opposed to temporary storage); and,
- Lack of a liner in the hazardous waste area to prevent groundwater contamination.

It is understood that a new landfill will be in use in 2015.

Use of the Landfill

The landfill is used by the residents of Déljnę. The number of people that use the landfill does not fluctuate seasonally.

Requests from private industries outside of the community to use the landfill have not been received.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

Access to the landfill is not restricted although some fencing is in place. The current landfill is unfenced and therefore wildlife can access the waste, which was identified as a concern in the community waste management survey. Improved fencing was identified as a method that could be used to prevent wildlife access.

Hours of operation are from 9 am to 5 pm Monday through Friday; however, the site is not secured outside of operating hours.

Community Waste Collection

The landfill and collection services are operated and maintained by the community government staff. Community government staff members reported in June 2014 that MSW was collected from homes in Déljnę three times per week using a garbage truck. Waste is placed in bags by the residents and placed next to the road for collection.

Landfill Design

The landfill was designed as a natural attenuation landfill. Some metal waste is stored within the MSW disposal area. The bulk metal storage area is located to the east of the MSW disposal area along the road leading to the quarry. The bulk metal storage area is unlined and any contamination resulting from spills or leaks can enter the surrounding environment. Stantec (2013a) reports that the current landfill will be covered with 0.6 m of coarse grained soil and graded to promote runoff, following closure and that the landfill impact is expected to be minimized once the mass of the waste is frozen, following capping.

A new landfill has been sited approximately 2.2 km directly north of the airfield. Since 2011, a road to the new site and the waste pad have been prepared, however the community is not allowed to commence operations until final approval is received from the SLWB (Personal Communication, Shannon Ripley, 2014). The site is reached by driving north of Deliné along Ridge Road, then west approximately 3 km along the new access road.

The new landfill has been designed using the trench method, and material taken from clearing the site will be used to cover the trenches once they have been filled.

Waste Receipt Procedures

Waste received at the site is reported to be poorly managed (AANDC, 2011). At the new landfill, waste will be segregated into four separate disposal areas for general waste, bulky waste, hazardous waste, and a burn pit for clean wood.

Landfill Management and Waste Handling

Compaction of household waste is conducted sporadically, and is less frequent in the spring when more gulls are present. Waste is regularly covered with granular material, however the frequency of cover has not been specified.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern for this landfill is the ability of wildlife to access the landfill. The community would like to have a more secure enclosure to prevent wildlife from accessing the landfill.

Estimated Remaining Lifespan of Landfill

When the current landfill was constructed in 1989, and subsequently expanded in 1996, the estimated closure date was in 2006. As of the spring of 2014 a small area of the current landfill was still being used, most of the current landfill had been reclaimed, and a new landfill had been constructed to replace the existing landfill once it closes. Each of eight general waste cells at the new landfill has an expected life of 12 to 15 months. Therefore, the expected initial site life of the new landfill is approximately 10 years.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government staff. In the community waste management survey, it is reported that the landfill operator performs their duties on a full-time basis but is only actively involved in landfill management 14 hours per week.

The landfill operator in Déljnę has received some local waste management training; this training has not been provided through MACA or Solid Waste Association of North America (SWANA).

It was noted in the inspection report that training in regards to emergency procedures related to spills management, fire and bear safety should be completed by the landfill operator.

Hazardous Waste Management Practices

The landfill does not have a separate hazardous waste management plan. Section 3.5 of the Operation and Maintenance Manual (Dillon, 2008) provides some direction regarding the handling of hazardous waste at the landfill site. Additionally, the Spill Contingency Plan (Stantec, 2012) provides information related to the handling of hazardous waste at the landfill, specific to spilled hazardous waste. The hazardous waste in the community is handled by municipal staff.

Hazardous wastes such as liquid waste, pathological waste, radioactive waste, hazardous waste, asbestos, batteries, and used oil are not accepted at the landfill for disposal. These wastes are stockpiled at the landfill to reduce the risk of contaminating soil. Hazardous wastes from commercial/industrial sectors are managed by the waste generator in accordance with GNWT Waste Guidelines, and are not accepted at the landfill for temporary storage.

In 2014, a Phase II/III assessment and cost estimate for removal of stockpiled hazardous and bulky waste was completed (Personal Communication, Olivia Lee, 2015).

Sewage Sludge Management

Sewage sludge from the lagoon has never been dredged. The estimated closure date for the sewage sludge lagoon is the summer of 2014. A new sewage lagoon has been constructed next to the new landfill, however it is not yet operational.

Historic Waste Disposal Sites

There are no reported historic waste disposal sites in the community.

Opportunities for Waste Diversion

Déljnę currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. Residents return the

empty beverage containers to the bottle depot, at which point the bags or bales of containers are brought to the regional processing centre. The depot in Dél̨nę is located at, and operated by the Ehtseo Ayha School.

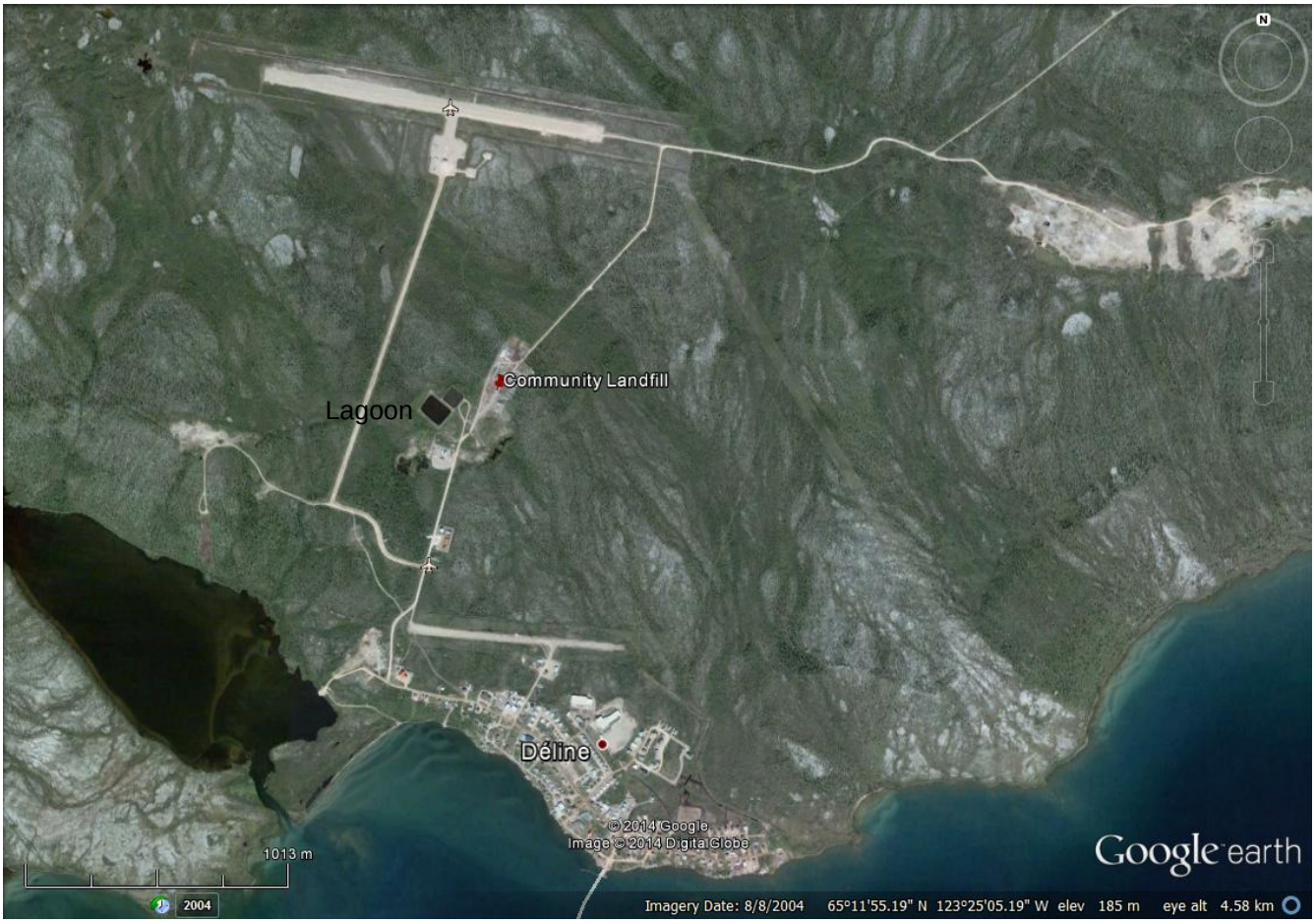


Figure 7-4: Aerial Location of Dél̨nę Landfill

7.5 Dettah

Information Sources

A community waste management survey was completed for the community of Dettah by Stephan Folkers, of the Yellowknife's Dene First Nation. Information on the landfill was also obtained from the 2010 Operations and Maintenance Plan and the 2010 inspection report.

Golder completed a site visit to the community landfill on July 21, 2014 with representatives from GNWT-ENR to review current landfill operations.

The following key documents were obtained from the MVLWB and reviewed to assess waste management and landfill operations in Dettah:

- Aboriginal Affairs and Northern Development Canada, 2010. *Community of Dettah Water Licence Inspection Report*.
- FSC Architects & Engineers, 2010a. *Operation and Maintenance Plan for the Yellowknife's Dene First Nation of Canada (Dettah) February 2010.* Email GNWT to MVLWB, April 12, 2010.
- FSC Architects & Engineers, 2010b. *Interim Closure and Reclamation Plan for the Yellowknife's Dene First Nation of Canada (Dettah),* February 2010. (Email GNWT to MVLWB, April 12, 2010).
- FSC Architects & Engineers, 2009. *Community of Dettah Water Licence Application.* December 7, 2009.
- Indian and Northern Affairs Canada, 2010. *Municipal Water Use Inspection Form.* October 4, 2010.

General Information

The community of Dettah (62°24'N, 114°18'W) has a population of approximately 210 (Statistics Canada, 2012) and is located on the eastern shore of Great Slave Lake, just south of Yellowknife. The community is accessible by an all-weather road from Yellowknife or via a shorter winter road across Yellowknife Bay.

The mean annual precipitation as rainfall is 170.7 mm and as snowfall is 157.6 cm. The daily average temperature during the warmest month is 17°C, and during the coldest month is -25.6°C (Environment Canada, 2014).

The community water supply is obtained from the City of Yellowknife, which obtains its water from the Yellowknife River. The water is trucked to Dettah.

Landfill Location and Geographic Conditions

The landfill is located approximately 1.5 km north of the community along an unnamed road towards the Ingraham Trail (Figure 7-6). The landfill is located on Commissioner's land, and was first established in 1982. It covers an area of approximately 1 ha, based on measurements from existing maps and airphotos. No information related to the history of the landfill prior to the water licence application is known. An automobile storage site is located 8 km north of the community.

The landfill is located approximately 100 m from the shore of Great Slave Lake. A wetland was observed to the west of the landfill during the site visit, at which an SNP sampling location was marked.

The hydrogeological conditions of the landfill are unknown. Sandy soil comprised of glacial till was observed during the site investigation. Bedrock at surface forms the northern extent of the site. The surrounding terrain slopes towards the west with the highest point on the site in the north.

Regulatory Requirements

The community of Dettah was granted a water licence (no. MV2009L3-0028) on March 4, 2010 for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on March 3, 2020. There are no local bylaws or guidelines that govern waste management in Dettah.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2013 annual report. A solid waste facility operation and maintenance manual is available for the landfill (FSC, 2010a). The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2010) lists a lack of fill material to properly cover and bury household waste, windblown garbage, and a need for signage to help with waste segregation as ongoing issues.

It is reported that unauthorized dumping of bulky wastes has been occurring next to the landfill.

Use of the Landfill

The landfill is used solely by the residents and institutional/commercial operations in Dettah for disposal of MSW. A hazardous waste transfer area was constructed in the summer of 2014.

The number of people that use the landfill does not fluctuate seasonally. Only residential mixed solid waste is accepted at the landfill.

Waste from outside the community is not accepted at the landfill. The community has received requests from camps to use the landfill to deposit steel waste. This request was not authorized by the community. As noted above, automobiles are not accepted at the landfill, but are stored at a separate site which is gated and access is restricted.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2010 Operations and Maintenance Plan (FSC, 2010b) and Golder's site visit in July, 2014.

General Information and Landfill Access

Access to the landfill is restricted by a fence and a front gate that is kept locked when there are no staff present. Community members wishing to deposit waste must request the key from staff in order to access the site. It was indicated in the community waste management survey that there is an issue of community members depositing waste outside the landfill entrance when the gate is locked.

A gate in the fence near the wetlands permits access to the SNP sampling location. The fence restricts windblown litter and unauthorized vehicle access. The fence does not limit wildlife as there are multiple instances where the fence does not touch the ground and game trails are present under the fence.

Community Waste Collection

The landfill and collection services are operated and maintained by a private contractor. Waste is collected once per week. Waste is placed in bags by the residents and placed next to the road for collection. Waste can also be dropped off by individuals at the landfill but community staff indicated that they must first obtain a key for entry.

Landfill Design

The landfill was designed using the modified trench method of waste disposal (FSC, 2010a); however, during the August 2014 site visit it appeared that the site is being operated using the area fill method.

Waste Receipt Procedures

Waste is primarily delivered to site via the contractor's waste collection vehicle. Waste brought to site is poorly segregated as no signage is present.

Landfill Management and Waste Handling

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- White goods;
- Fuel drums; and,
- Wood waste;

Waste materials at the site were observed to be segregated in three main areas. Directly adjacent to the entrance gate are white goods and some drums and fuel tanks. Mixed solid waste is present to the rear of the site and a small assortment of wood waste, primarily furniture, is located opposite the white goods. There is no perimeter berm around the solid waste and cover appears not to have been used in quite some time. Windblown litter has accumulated to the south and east of the site. Cover has been previously used at the site in thin layers as waste is evident near the surface. Grasses and fireweed are the primary vegetation on the cover material.

Compaction of household waste is conducted twice per year by a private contractor. The landfill is covered on a sporadic basis with gravel from a nearby quarry, but is not covered during the winter. With the exception of the partial berms, this is a natural attenuation site and therefore there is no containment or collection of leachate. Surface and groundwater monitoring is carried out twice per year as required by the water licence.

Special Concerns, Environmental Risks and Future Planned Activities

Air related environmental risks were identified through the community waste management survey, including windblown litter. Windblown litter was noted predominately to the south and east of the site. The construction of hazardous waste segregation and recycling area took place in 2014.

It is recommended that the sampling results from the wetlands to the west of the site be reviewed to assess the environmental risk posed by the landfill, notably to Great Slave Lake.

Estimated Remaining Lifespan of Landfill

The 2010 inspection report suggests the landfill is reaching capacity, however, the 2010 Operations and Maintenance Plan reports a closure date of 2020. Based on the site visit, a closure date of 2020 appears to be reasonable.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of the community government staff. A contractor is hired a minimum of twice per year to compact and cover the waste. The landfill operator performs their duties on an occasional basis of approximately 5 hours per week. In addition, two to three people are employed by the private contractor to operate the waste collection vehicle.

The landfill operator in Dettah has completed the NWT School of Community Government's *Water and Waste Management* program.

Hazardous Waste Management Practices

The landfill has a hazardous waste management plan which details what materials are accepted, as well as the proper storage and handling guidelines. In 2014, the Yellowknife's Dene First Nation set up a household hazardous waste collection area for items such as used oil, batteries, paint and other items. This HHW collection area is located at the entrance to the Dettah landfill, and includes some secondary containment bins. The HHW is periodically removed and transported to KBL Environmental in Yellowknife for safe recycling and disposal.

Sewage Sludge Management

The sewage lagoon is 1 km northeast of the landfill. Sewage sludge has never been removed from the sewage sludge lagoon. The estimated closure date for the sewage lagoon is unknown.

Historic Waste Disposal Sites

It is reported that there is a historic landfill site located along the Dettah access road. It is reported to contain MSW but the exact location, size, and years of operation are unknown.

Opportunities for Waste Diversion

Dettah residents participate in the BCP by returning their beverage containers to the nearby Yellowknife bottle depot. In 2014, the Yellowknife's Dene First Nation designed and installed a community recycling station within Dettah that accepts all materials that are recycled in the City of Yellowknife recycling program: mixed paper and boxboard, corrugated cardboard, glass, tin cans and #2,3,5 and 7 plastics. This community recycling station is regularly emptied by community government staff and taken to the recycling bins at the City of Yellowknife Solid Waste Facility, through an established agreement with the City of Yellowknife.

The community indicated that they are interested in participating in further waste diversion programs.



Figure 7-5: Aerial Location of Dettah Landfill

7.6 Enterprise

Information Sources

A community waste management survey was not completed for the Hamlet of Enterprise. Information on the landfill was obtained largely from the 2010 Operation and Maintenance Manual (FSC, 2010), the 2013 inspection report (AANDC, 2013), the 2013 annual report, and the 2010 Closure and Reclamation Plan (FSC, 2010), in addition to a site visit and interview with the interim SAO, John Mckee, completed by Golder on July 23, 2014.

The following key documents were obtained from the MVLWB website and reviewed to assess waste management and landfill operations in the Hamlet of Enterprise:

- Aboriginal Affairs and Northern Development Canada, 2013. *Enterprise Municipal water licence inspection report.* March 6, 2013.
- FSC Architects & Engineers, 2010a. *Hamlet of Enterprise Solid Waste Site Planning Study, version 1.2.* April 2010.
- FSC Architects & Engineers, 2010b. *Interim Closure and Reclamation Plan for the Hamlet of Enterprise. Draft Version 1.2*. April 2010.
- FSC Architects & Engineers, 2010c. *Operation and Maintenance Plan for Hamlet of Enterprise. Draft Version 1.3.* April 2010.
- FSC Architects & Engineers, 2009. *Spill Contingency Plan for the Hamlet of Enterprise. Version 1.0, July 2009; Letter.* July 10, 2009.
- Ferguson Simek Clark Engineers & Architects, 2002. Final Report Enterprise Sewage / Solid Waste Site Planning Study. FSC Project No: 2002-0040, September 23, 2002.
- Hamlet of Enterprise, 2013. *Water Licence Annual report. April 2, 2014.*
- Mackenzie Valley Land and Water Board, 2009. *Hamlet of Enterprise water licence #MV2008L3-0004.* Effective date August 27, 2009.

General Information

The Hamlet of Enterprise (60°33'N, 116°08'W) has a population of approximately 87 (Statistics Canada, 2012) and is located on the Mackenzie Highway, 230 km southwest of Yellowknife. The hamlet is accessible by an all-weather road.

The mean annual precipitation as rainfall is 217.4 mm and as snowfall is 138.9 cm. The daily average temperature during the warmest month is 16.1°C, and during the coldest month is -21.8°C (Environment Canada, 2014).

The hamlet is located adjacent to Hay River, which flows in a northerly direction in the area. Potable water is trucked to Enterprise from the Town of Hay River water supply, obtained from the Hay River.

Landfill Location and Geographic Conditions

The Enterprise landfill and sewage lagoon are located approximately 4.6 km northeast of the hamlet along Highway 2, approximately 350 m from Hay River, downstream of the community of Enterprise (Figure 7-6). The

landfill is located on community/municipal land, and was first established in 1986 (MACA, 2014). The size of the landfill site is approximately 3 ha; the area of the waste cells is approximately 0.4 ha (FSC, 2010c). Information related to the history of the landfill is provided in various reports prepared for the community from 2009 to 2010 (see references above).

The Hamlet of Enterprise is located within the discontinuous permafrost zone. Surficial materials are generally less than 2 m thick consisting of sand with gravel lenses overlying 3 m of lacustrine clay or basal clay till. The bedrock below the lacustrine and basal deposits consists of Upper Devonian interbedded shale and limestone of the Hay River Formation. The formation is in excess of 150 m thick, underlain by Middle Devonian limestone and dolomite. The bedrock stratum is exposed along the banks of Hay River below Enterprise (FSC, 2010c).

The surficial soils observed at the site consist primarily of poorly drained medium to fine-grained sand, silt and clay, overlying bedrock. Ponded water is present in the active landfill trench; no other water was noted on-site. The water table is observed to be perched on bedrock in the nearby exposed Hay River valley. The surrounding terrain is relatively flat. Surface water and inferred groundwater flow is towards the Hay River.

Regulatory Requirements

The Hamlet of Enterprise was granted a water licence (no. MV2008L3-0004) on August 27, 2009 for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act*. The license expired on August 26, 2014. The SAO noted that an application to renew the water license is currently in progress. A new water licence MV20145L3-0007 was approved for the community subsequent to the site visit and summary by Golder, and is not further discussed herein or included in the database. There are no local bylaws or guidelines that govern landfill management in Enterprise.

The water licence requires that an annual report be filed with the MVLWB. The most recent annual report available at the time of preparing this report was the 2013 annual report.

A solid waste facility operation and maintenance manual is available for the landfill (FSC, 2010c). The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2013) noted the only concern was a small amount of hydrocarbon contaminated soil found at the used oil storage area. AANDC recommended cleaning up the soil and hauling it to an authorized disposal site during the summer.

Use of the Landfill

The landfill is used solely by the residents and commercial operations of Enterprise for disposal of MSW, CRD waste and small quantities of used oil and hazardous waste. Unauthorized dumping of waste by users of the nearby highway and of culverts during highway construction projects is reported to occur (community staff). The landfill is not set up to manage industrial waste and therefore does not accept requests from private industry to use the landfill.

The number of people that use the landfill does not appreciably change seasonally.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2010 Operations and Maintenance Plan (FSC, 2010c) and Golder's site visit in August, 2014.

General Information and Landfill Access

The entrance to the landfill is off Highway 2, north of Enterprise. The entrance to the landfill is visible from the highway. Access to the landfill is restricted using a front gate, and the hours of operation are Tuesdays and Fridays from 8:30 am to 6 pm (FSC, 2010c). Partial fencing is present along the southern and western edges of the site. No wildlife fencing is present.

The solid waste site area covers an area of approximately 3 ha (300 m by 100 m) based on maps provided in recent reporting.

Community Waste Collection

Waste collection services are operated and maintained by the community; large maintenance duties are contracted out (FSC, 2010c) and waste is reported to be collected once per week by community staff.

Landfill Design

The landfill was designed using a modified trench method of waste disposal as defined in “Guidelines for the Planning, Design, Operation and Maintenance of Solid Waste Modified Landfill Sites” prepared by MACA (FSC, 2010c). The area of active solid waste disposal is approximately 140 m by 30 m. This is a natural attenuation site and therefore there is no control or collection of leachate. When the trench has been filled to capacity, a final cover of 0.6 m of native soil is used to prevent the dispersion of litter and encourage the shedding of water (FSC, 2010c).

Based on the Golder site visit, one trench was recently covered with a cap placed slightly above the level of the surrounding grade and a second trench is now being used as the active MSW dumping area. Ponded water is present in the active trench. Overburden has been removed from the waste area and used to form a berm on the eastern perimeter of the site. Native soils are used as cover.

Runoff is able to enter the trench as no diversion berm is present to restrict water movement down the ramp into the trench. The SAO indicated that construction of a surface water diversion berm will be completed in the coming weeks to limit runoff into the trench.

CRD waste appears to be placed in an area fill configuration in the north part of the site. The waste has been recently compacted and covered. A berm has not been constructed around the CRD waste.

Waste Receipt Procedures

Waste is primarily delivered to site by the community waste truck. During the hours of operation, dumping is not regulated but signs are in place to aid in the segregation of waste (FSC, 2010b).

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Fuel drums;
- E-waste;
- Propane tanks;

- Bulk metals;
- Vehicles;
- Used oil; and,
- Hazardous waste.

Landfill Management and Waste Handling

FSC (2010c) reported that approximately 600 m^3 of waste per year is deposited at the landfill. Compaction of household waste is conducted on a periodic basis. As weather permits, the compacted layer is covered with native soil. Windblown litter does not appear to be an issue at the site as MSW is contained within the trenches.

Waste is transported to site via the weekly collection by community staff, where it is placed in the active MSW trench. An International Series B bulldozer is on-site and used for the compaction and movement of waste. The bulldozer is used as needed during the summer to push and compact the waste.

Special Concerns, Environmental Risks and Future Planned Activities

Special concerns noted by the SAO include the ponding of water within the MSW trench as well as hydrocarbon staining adjacent to the used oils. In addition the SAO noted that unauthorized dumping of culverts and house trailers is a significant issue as the community does not have the resources to manage these types of waste.

Estimated Remaining Lifespan of Landfill

A waste site planning study (FSC, 2010b) reports that the landfill site could be operational until 2030.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government/municipal staff. The SAO is responsible for the overall operation of the landfill facility. Waste pick up occurs once per week and is undertaken by community staff.

Hazardous Waste Management Practices

The landfill accepts hazardous waste, including used oil, paints and batteries. A large tank is present on-site to consolidate used oils prior to disposal. No containment is present in the used oil area and soil staining was observed.

Sewage Sludge Management

The Enterprise sewage lagoon is located 400 m north of the active landfill area and is accessed via the landfill. The 2013 annual report states that sludge was not removed from the sewage lagoon (Hamlet of Enterprise, 2014).

Historic Waste Disposal Sites

Two historic landfills are reported: (i) located approximately one kilometre (km) north of the community (FSC, 2009) and (ii) west of the sewage disposal facility (FSC, 2002). These landfills were not observed at the time of the 2014 site visit.

Opportunities for Waste Diversion

Enterprise currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers are returned to a depot located in the community, and ultimately delivered to the Hay River regional processing centre. The depot in Enterprise is currently located at 237 Robin Road, operated by Armella Mercredi.

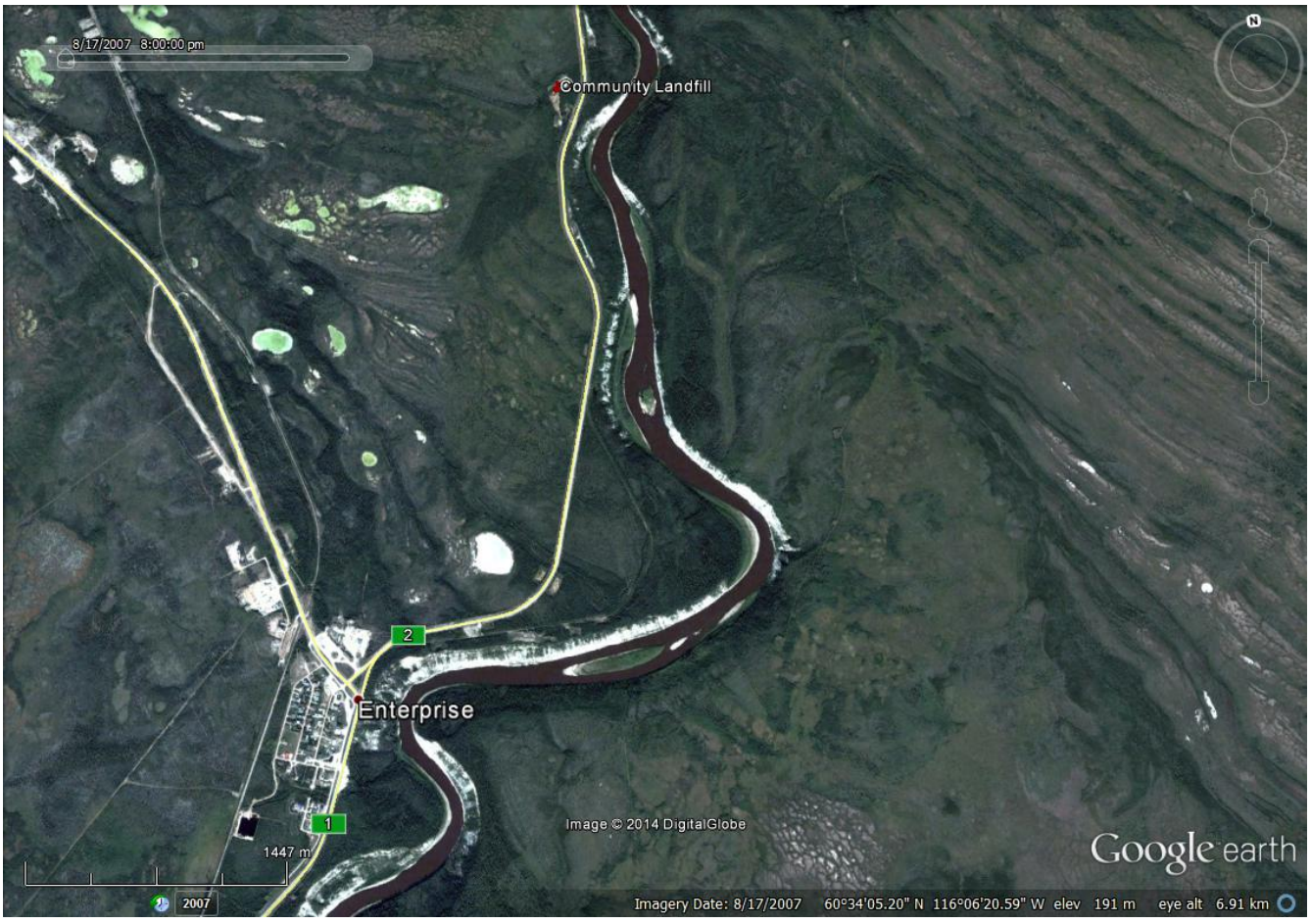


Figure 7-6: Aerial Location of Enterprise Landfill

7.7 Fort Good Hope

Information Sources

A community waste management survey was not completed for the charter community of Fort Good Hope. Information on the landfill was obtained primarily from the 2010 water licence application submitted to the SLWB and a 2000 Sewage and Solid Waste Assessment Report.

Golder completed a site visit to the community landfill on July 22, 2015 and interviewed the SAO (Julie Monaghan) and the shop foreman/operator.

The following documents were obtained from the SLWB website and pertain to the review of waste management and landfill operations in Fort Good Hope:

- Aboriginal Affairs and Northern Development Canada, 2011. *Fort Good Hope Municipal water licence inspection report*.
- Dillon Consulting Limited, 2010. *Community Water Licence Submission to SLWB Fort Good Hope NT*. August 24, 2010.
- FSC Architects & Engineers, 2000. *Appendix 5 Final Report – Architectural/Engineering Services Sewage and Solid Waste Assessment – prepared for the community of Fort Good Hope*.

General Information

The charter community of Fort Good Hope (66°15'N, 128°37'W) has a population of approximately 515 persons (Statistics Canada, 2012) and is located on the east bank of the Mackenzie River, 805 km northwest of Yellowknife and 320 km southeast of Inuvik. The community is accessible by winter road, barge and regular air service.

The mean annual precipitation as rainfall is 144.9 mm and as snowfall is 151.2 cm. The daily average temperature during the warmest month is 16.7°C, and during the coldest month is -27.8°C (Environment Canada, 2014).

The community is located on a peninsula between Jackfish Creek and the east bank of the Mackenzie River. The landfill lies approximately 750 m east of the bank of the Mackenzie River. The main water supply for the community is the Mackenzie River, upstream of the waste site and sewage lagoon.

Landfill Location and Geographic Conditions

The landfill is located approximately 3.5 km north of the community, along an unnamed road (Figure 7-7). The landfill is located on Commissioner's land, and was first established in 1980 (MACA, 2014).

The community lies within the continuous permafrost zone. The active layer ranges in thickness from 0.5 m to 1.2 m. Underlying the area are glacial and fluvial deposits that cover Devonian shale and limestone. The terrain includes tree-covered areas, muskeg and swamp (Dillon, 2010).

Based on observations during the 2015 site visit, the surficial soils at the site consist of coarse grained sand and gravel.

Regulatory Requirements

The charter community of Fort Good Hope was granted a water licence (no. S09L3-002) on October 28, 2010 for the disposal of MSW by the SLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on October 27, 2015. A new water licence S15L3-002 was approved for the community subsequent to the site visit and summary by Golder, and is not further discussed herein or included in the database. There are no local bylaws or guidelines that govern waste and sewage management in Fort Good Hope.

The water licence requires that an annual report be filed with the Land and Water Board. The community received a letter from the SLWB on March 24, 2014 requesting that an annual report be prepared and submitted. The 2014 annual report was submitted in September 2015.

A solid waste facility operation and maintenance manual is available for the landfill. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) noted a lack of a measuring device in place to view the depth of sewage, something that had been requested through previous inspections. Previous inspection reports had noted that hazardous waste was not managed in accordance with the method approved in the Operation and Maintenance Manual.

The community SAO reports that a new water licence application and design for a new landfill site are underway.

Use of the Landfill

The landfill is used solely by residents and institutional/commercial operations in Fort Good Hope for disposal of MSW, institutional and commercial solid waste, CRD waste and storage of hazardous waste. The landfill is only used by the residents of Fort Good Hope. The landfill is not shared with any other communities, and use does not fluctuate seasonally.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

Access to the landfill is restricted using a front gate and a large sign at the entrance to the landfill discouraging unauthorized dumping. The gate is left open. An electric bear fence surrounds the site, however it has not been operational for quite some time.

The combined size of the landfill and sewage lagoon is approximately 9 ha. The active cell is approximately 50 m by 30 m (1.5 ha), based on the most recent aerial imagery (September, 2015) from the GNWT Atlas site.

Community Waste Collection

Waste collection services and landfill operations are maintained by community/municipal staff. Waste is placed in bags by the residents and placed next to the road for collection (Dillon, 2010). During Golder's site visit, the community staff noted that waste is collected twice a week (Monday and Friday) using a compactor truck with a maximum volume of 11 m^3. Based on a maximum of 12 loads weekly, and assuming trucks are not completely filled it is estimated that up to 120 m^3 of waste is collected weekly.

Landfill Design

The landfill was designed using a trench / cell disposal method. Cells are excavated into the earth to a depth of approximately 2 m; the excavated soil is stockpiled near the site. When the waste placement in each cell is complete, the stockpiled soil is mounded up over the full cell (Dillon, 2010). The current trench is over capacity and an expansion is required in order to site a new trench cell. This is a natural attenuation site and therefore there is no control or collection of leachate.

Waste segregation at the landfill is largely limited to white goods, vehicles, empty drums and tires. There are no signs delineating areas for these materials, and as a result there is some mixing of the piles.

Landfill Management and Waste Handling

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks;
- Tires;
- Vehicles; and,
- Hazardous waste including waste fuel, batteries, contaminated soils and paints.

According to community staff in 2015, a front end loader is used to consolidate the waste twice weekly on waste collection days. Compaction of the waste is reported to be conducted “multiple times” in the summer, which was interpreted to be approximately monthly. It is reported that covering of the waste occurs at the end of the season, however no covering on an interim (i.e., weekly or monthly) basis is undertaken as the cell is already full.

Honey bags are generated from some residences in the community and deposited at the site in a separate trench next to the active cell.

It is reported that clean wood waste is burned as required. A pile of such material was observed at the time of the site visit.

Special Concerns, Environmental Risks and Future Planned Activities

The community is currently working on an annual report and is planning an expansion of the site.

Estimated Remaining Lifespan of Landfill

The remaining lifespan of the landfill was estimated to be approximately 10 years from 2010 (i.e., 2020) based on the total volume of the remaining cells (10,300 m^3) and the estimated annual generation rate of 3,300 m^3/y combined with a compaction factor of 3:1. The current cell is full, and therefore design of a new cell is required to dispose of waste beyond 2015. It was suggested that improvements to waste placement and compaction may result in an additional 5 years of lifespan. A comprehensive assessment of the existing site has been

recommended to determine its lifespan (Dillon, 2010). Based on the 2015 site visit by Golder and discussion with the SAO, the current MSW cell is at capacity and expansion is required to site a new cell.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government/municipal staff. The SAO is responsible for the overall operation of the landfill facility. A loader is used twice each week on collection days and a D6 bulldozer is used “a few times” each summer to compact the waste.

Hazardous Waste Management Practices

Segregation of hazardous waste has recently taken place and inventories of this material have been prepared. The SAO indicated that transport of the material out of the community has not yet been arranged; however, the community is in the process of organizing the removal of some hazardous materials.

A waste inventory and labelling program was completed for Ecology North in 2013, at which time it was noted that hazardous waste was present at the landfill site (KBL, 2013b). At the time of the inventory, a total of 276 drums (205L) of hazardous waste was present, along with batteries, propane cylinders and heating oil tanks.

Sewage Sludge Management

Sewage sludge from the lagoon is visually monitored on an annual basis. If sludge does become a problem or affects operation, it will be excavated and deposited in the landfill, where it will be backfilled, treated (covered) with lime, mounded up to promote water runoff and covered with a semi-impermeable layer of silt/clay like material (Dillon, 2010).

Historic Waste Disposal Sites

One historic landfill site was acknowledged to exist at “Old Baldy” (FSC, 2000). This location is approximately 1.3 km south of the existing landfill, and is shown in Dillon (2010).

Opportunities for Waste Diversion

Fort Good Hope currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to a specified depot, at which point the bags or bales of containers are brought to a regional processing centre. The depot in Fort Good Hope is located at the Chief T’Seleie School, operated by Harry McNeil.

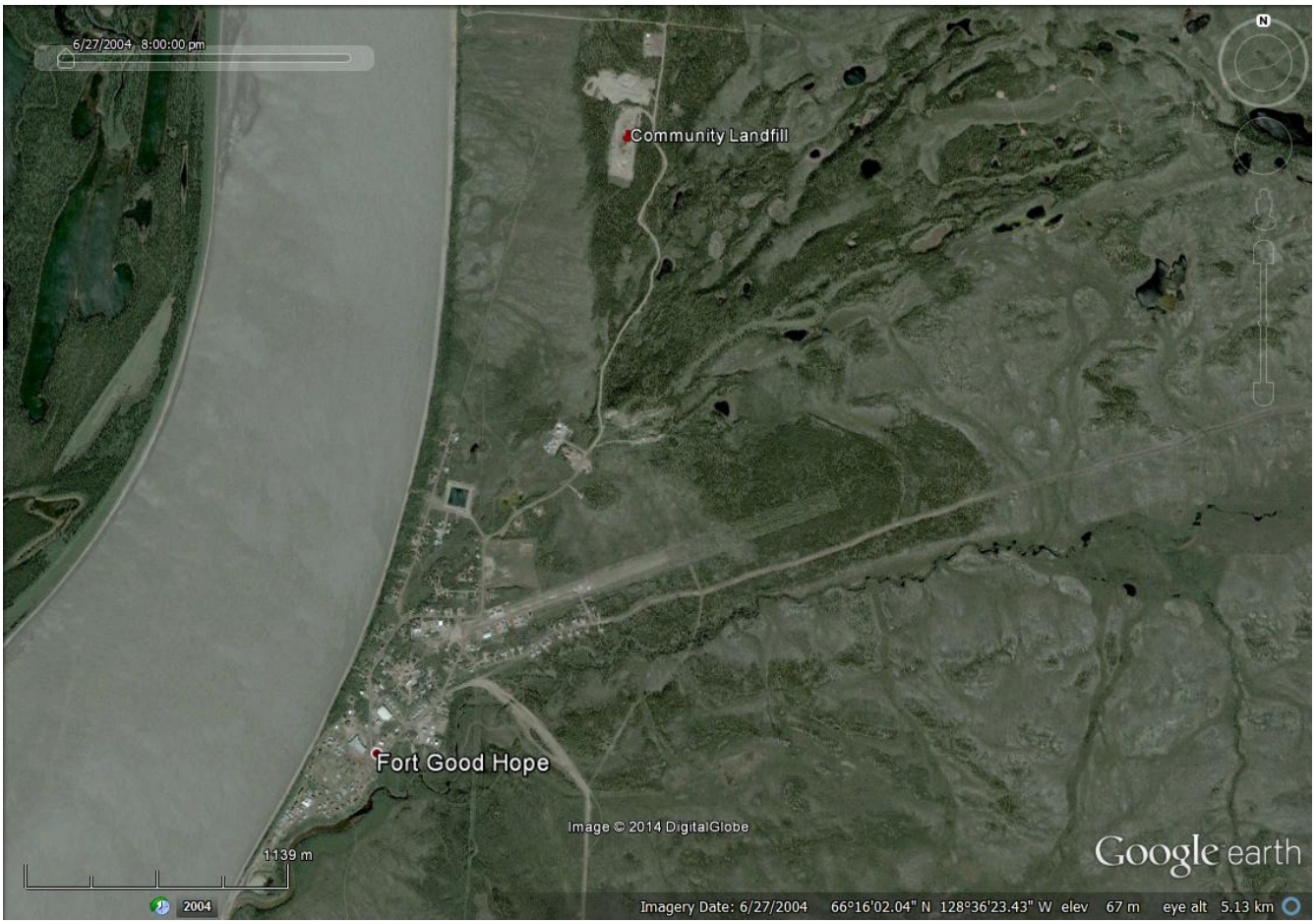


Figure 7-7: Aerial Location of Fort Good Hope Landfill

7.8 Fort Liard

Information Sources

A community waste management survey was completed for the Hamlet of Fort Liard and this information has been incorporated into the community waste system profile. Information on the landfill was also obtained primarily from the water licence application submitted to the MVLWB in 2009 and the annual report submitted by the community in 2013.

Golder completed a site visit to the hamlet landfill on June 8, 2015 and interviewed hamlet staff including the SAO (Mark Misquitta) and the Manager of Community Operations (Alan Harris).

The following documents were obtained from the MVLWB website and pertain to the review of waste management and landfill operations in Fort Liard:

- Dillon Consulting Limited, 2010. *Hamlet of Fort Liard water licence Amendment Application, Revision 1.* July 12, 2010.
- Dillon Consulting Limited, 2009. *Hamlet of Fort Liard Water Licence Renewal Application.* October 20, 2009.
- Hamlet of Fort Liard, 2013. *Hamlet of Fort Liard Water Licence Annual Report 2013.* March 11, 2014.
- Mackenzie Valley Land and Water Board, 2010a. *Fort Liard Water Licence Approval.* February 5, 2010.
- Mackenzie Valley Land and Water Board, 2010b. *Fort Liard Water Licence Amendment Approval.* August 19, 2010.

General Information

The Hamlet of Fort Liard (60°14'N, 123°28'W) has a population of approximately 536 (Statistics Canada, 2012) and is located at the confluence of the Petitot and Liard Rivers, 540 km southwest of Yellowknife, 25 km north of the border with British Columbia and 35 km east of the border with the Yukon Territory. The hamlet is accessible by an all-weather road. The hamlet also has an airstrip, but there is no scheduled service.

The mean annual precipitation as rainfall is 294.1 mm and as snowfall is 165.4 cm. The daily average temperature during the warmest month is 17.3°C, and during the coldest month is -21.8°C (Environment Canada, 2014).

Fort Liard is located on the east bank of the Liard River. The landfill and sewage lagoon are located approximately 15 km southeast of the community along the Liard Highway, approximately 2.7 km northeast of the Petitot River.

Fort Liard draws its water from two groundwater wells located adjacent to the river at the south end of the community.

Landfill Location and Geographic Conditions

The landfill is located approximately 15 km southeast of the community along the Liard Highway, approximately 2.7 km northeast of the Petitot River (Figure 7-9). The new landfill is on Commissioner's land, and was established in 2011. The landfill was constructed adjacent to the previous landfill between 2010 and 2011, as the existing landfill had reached capacity (Hamlet of Fort Liard, 2013).

The hamlet lies within a zone of sporadic permafrost, where the permafrost occurs mainly in peatlands and underlies 10% to 50% of the land area. The hamlet is located on an alluvial river terrace; alluvial silt, sand and gravel overburden is underlain by bedrock (Dillon, 2009). A geologic description of the landfill site area was not provided in the available reports. Based on observations of the locally derived cover soil present on-site at the time of the 2015 site visit, shallow soils include stony loam. Based on evidence of standing water in some areas, the loam contains a fine grained portion resulting in moderate infiltration rates.

Regulatory Requirements

The Hamlet of Fort Liard was granted a water licence (no. MV2009L3-0025) on March 1, 2010 (amended August 19, 2010) for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on February 29, 2020. Local bylaws that govern waste management in Fort Liard are the Waste Disposal Site Bylaw 212 which provides for the establishment, operation, maintenance and alteration of the sewage and solid waste disposal system and Bylaw 229 which provides the municipal service rates. These bylaws are actively enforced.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was for the 2013 reporting year.

A solid waste facility operation and maintenance manual is not available for the landfill through the Land and Water Board registry. The 2010 water licence amendment application contains a draft Operation and Maintenance Manual, and states that it is in the process of being updated and reviewed; however an updated manual has not been posted to the Land and Water Board registry and was not available at the time of the site visit. The 2013 annual report indicates that no changes had been made in solid waste site operations; repairs had been made to temporary wind (litter) fencing surrounding the waste trench and municipal bulk waste appeared to be appropriately sorted. Whereas construction of a new disposal trench area was planned for 2014, the original trench constructed in 2010/11 is still in use and it is reported by community staff that the construction of the new cell is planned for 2016.

According to the community waste management survey, unauthorized dumping of variable materials (cans, bags, bottles, diapers etc.) has been occurring in the community, on the land and next to the landfill.

Use of the Landfill

The landfill is used by the residents of Fort Liard and is not shared with any nearby communities. The number of people that use the landfill fluctuates with the seasons, with an increase seen from May through October due to construction crews and some tourism.

The landfill has received requests from highway construction crews and camps to use the landfill to deposit contaminated soil, sewage and bulk garbage. These requests were not authorized as the landfill only accepts waste from within the community. The signage at the landfill clearly prohibits the acceptance of industrial waste.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill is accessed off of the north side of the Liard Highway, approximately 15 km southeast of the community. Access to the landfill is restricted using a front gate, however it is reported by staff that the gate is not always closed and locked as it also provides access to the sewage lagoon and residents were leaving waste at

the gate when closed. The stated hours of operation of the landfill are Monday to Friday, 9 AM to 4 PM. Wildlife can currently access the landfill as fencing is inadequate to stop them from doing so. One black bear was noted at the landfill during the 2015 Golder site visit.

The solid waste facility covers an area of approximately 2.8 ha and is comprised of four distinct waste management areas:

- General MSW waste;
- Bulky waste;
- Scrap vehicle parts; and,
- Hazardous waste (lined bermed cell).

Community Waste Collection

Waste is placed in bags by the residents and placed next to the road and can also be dropped off by individuals at the landfill. The SAO indicated that in 2014, a total of 1,266 m^3 of waste was estimated to be collected. Community staff report that the collection vehicle capacity is 10 m^3, and that waste is collected two days per week.

Landfill Design

The landfill was designed using the trench / cell method of waste disposal. Each of six household waste cells is approximately 45 m long, 20 m wide, and 2.5 m deep with a total volume of 2,250 m^3each. As noted above the second cell has not yet been excavated.

Waste Receipt Procedures

No screening or manifesting of incoming waste occurs. Signage is present within the site to identify where waste is to be deposited.

Landfill Management and Waste Handling

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- White goods;
- Tires;
- Bulk metals; and,
- Hazardous waste including waste fuel, batteries.

It was noted by staff that the public does not adhere well to dropping off materials in the specified areas.

It is reported that a loader is used on-site once per week to consolidate the waste in the active drop-off area. Compaction is carried out on a yearly basis using a contracted service (D-7 or D-8 bulldozer) and covered at the same time.

Special Concerns, Environmental Risks and Future Planned Activities

The community did not identify any special concerns related to the landfill. The previous landfill is partially covered with surface water which represents an environmental concern. Maintenance of the cap is required to address this issue.

Estimated Remaining Lifespan of Landfill

It is reported (Dillon, 2010) that the new landfill has a 40 year estimated lifespan (i.e., approximately 2051).

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government/municipal staff. The SAO is responsible for the overall operation of the landfill facility.

Select hamlet employees are trained in the Transportation of Dangerous Goods Act and Regulations (Dillon, 2009). The landfill operator in Fort Liard has completed the NWT School of Community Government's *Water and Waste Management* program.

It is reported that hamlet staff are at the landfill on a weekly basis.

Hazardous Waste Management Practices

The community does not have a Hazardous Waste Management Plan. Hazardous waste in the community is handled by municipal staff, some of whom have received training in the Transportation of Dangerous Goods Act and Regulations. Hazardous waste such as waste paint, oils, batteries, and other hazardous waste materials generated within the community are accepted at the landfill. These materials are temporarily stockpiled at the landfill on a pad in a bermed and lined area to contain spills. It was noted by the Manager of Municipal Operations that waste batteries are regularly removed from the landfill and transported south by an individual who is not a resident of the community. For this reason there are few waste batteries at the landfill.

No inventory of hazardous materials has taken place. According to the Hazardous Materials Spill Database maintained by the Environmental Protection Service of the NWT, 26 spills occurred between 2001 and 2009. The majority of these spills were fuel spills (aviation fuel, diesel, gasoline), with four oil spills, one wastewater spill, one drilling fluid spill, one coolant spill and one antifreeze spill.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage sludge lagoons. Effluent from the lagoons is discharged into an adjacent forested region. The material flows through ephemeral streams eventually discharging into the Petitot River approximately 1 km downstream. The estimated closure date for the sewage sludge lagoon is 2028 (Dillon, 2009).

Historic Waste Disposal Sites

A historic landfill is located near the community. It is reported to be located 2 km to the east of the community on the access road leading to Liard Highway. The exact location of this landfill could not be confirmed during the 2015 Golder site visit.

The most recent closed landfill is located in the same area as the current landfill, adjacent to the active sewage lagoons.

Opportunities for Waste Diversion

Fort Liard currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers are returned to the community depot, at which point the bags or bales of containers are brought to the Hay River regional processing centre. The depot in Fort Liard is located behind the fuel centre, and is operated by the Fort Liard Fuel Centre. As noted above, staff indicated that batteries are currently picked up from the landfill site by an unknown individual.



Figure 7-8: Aerial Location of the Fort Liard Active Landfill, Historic Landfill and Sewage Lagoon

7.9 Fort McPherson

Information Sources

A community waste management survey was completed for the Hamlet of Fort McPherson by the hamlet foreman (Mr. Bill Buckle) on March 18, 2014. Information on the landfill was also obtained from a report (EarthTech, 2007) prepared for the 2007 water license renewal application.

Golder completed a site visit to the hamlet landfill on September 11, 2014 and was accompanied to the landfill by the hamlet foreman.

The following documents pertain to the review of waste management and landfill operations in Fort McPherson:

- EarthTech, 2007. *Fort McPherson Water Licence Background Report.*
- Gwich'in Land and Water Board, 2007. *Water Licence No. G03L3-001.*

General Information

The Hamlet of Fort McPherson (67°26'N, 134°52'W) has a population of approximately 792 (Statistics Canada, 2012) and approximately 316 household units, according to the hamlet foreman. Fort McPherson is located on the east bank of the Peel River, 1,106 km northwest of Yellowknife and 113 km southwest of Inuvik. The hamlet is accessible by an all-weather road, via ferry service in the summer and ice road in the winter. During the spring/fall when the ferry and ice road are not in operation, a seasonal scheduled air service is implemented.

The mean annual precipitation as rainfall is 145.9 mm and as snowfall is 152.5 cm. The daily average temperature during the warmest month is 15.2°C, and during the coldest month is -27.5°C (Environment Canada, 2014).

The hamlet obtains its potable water from Deep Water Lake, located approximately 17 km east of the landfill and the sewage lagoon sites, in a separate drainage area.

Landfill Location and Geographic Conditions

The landfill is located adjacent to the sewage lagoon, approximately 4.1 km northeast of the community along the Dempster Highway (Figure 7-10) on community/municipal land, and was first established in 1980 (MACA, 2014).

The community lies within the continuous permafrost zone, and contains massive ice lensing. The bedrock underlying the community is relatively soft Cretaceous shale. The upper soil stratum is composed of organic materials and ranges from 0 m to 3.5 m thick (EarthTech, 2007). The surficial soils at the site were observed to be predominantly shale, which are being actively quarried. Organic material is present in varying thicknesses in undisturbed areas of the landfill.

The landfill is situated on high ground relative to the surrounding area. Surface water from outside the active area generally does not run into or through the landfill. The amount of surface water runoff leaving the site is small and drains into the sewage lagoon (EarthTech, 2007). A wetland directly adjacent to site receives additional runoff from the site; this wetland is connected to a 2 km long lake and ultimately the Peel River via a system of small creaks. The Peel River is 2.7 km to the west of the landfill. The inferred groundwater flow is west, towards the Peel River.

Regulatory Requirements

The Hamlet of Fort McPherson was granted a water licence (no. G03L3-001) on September 1, 2007 for the disposal of MSW by the GLWB, in accordance with the *Northwest Territories Waters Act*. The license expired on August 31, 2013, however the hamlet foreman indicated that the community has obtained an updated water licence that expires in 2020. Water licence G03L3-001 was granted to the hamlet on March 2, 2014 and was uploaded to the GNWT registry until August of 2015. This updated licence is not further discussed herein or included in the database.

The local bylaws that govern landfill management in Fort McPherson sets the tipping fees associated with the landfill.

The water licence requires that an annual report be filed with the Land and Water Board. No annual reports were available through the Land and Water Board registry for the community.

A solid waste facility operation and maintenance manual was not available for the landfill through the GLWB public registry, however through community interviews it was determined that a 1997 plan is scheduled to be updated.

According to information obtained through the community waste management survey, unauthorized dumping of variable materials has been occurring in and next to the landfill.

Use of the Landfill

The landfill is used by the residents of Fort McPherson and is not shared with any nearby communities. Since the hamlet is accessible by road and access is uncontrolled, other communities and industries outside of the hamlet are likely using the landfill, according to hamlet staff. The number of people that use the landfill fluctuates seasonally, increasing in the summer months due to tourism/recreational users and mixed waste from industrial activity.

No requests from private industry to use the landfill have been received; however, during the site visit the hamlet foreman noted marine hardware from the ferry and numerous vehicles from outside of the hamlet. The ferry operator has been invoiced for dumping of marine hardware, which was not approved by the hamlet.

Landfill Facilities and Management Practices Summary

Information for the design and operation of the landfill is largely from the 2007 EarthTech report and from Golder's site visit in September, 2014.

General Information and Landfill Access

The entrance to the landfill is off of Highway 8 (Dempster Highway) approximately 4 km from the hamlet. The landfill occupies a quarry to which there is no gate and all areas of the landfill are fully accessible. Hamlet staff are regularly on-site excavating material from the quarry; however, the landfill is not staffed by an attendant.

The landfill site is approximately 6 ha in size, based on measurements of site mapping and airphotos. A large sign on the access road to the landfill indicates the various solid waste areas within the landfill. The landfill has no set hours of operation. Wildlife can access the landfill as it is not fully fenced; partial fencing has been installed to control windblown litter.

It is reported that the landfill was essentially full in 2007. The community reports that it is currently expanding the landfill under the Building Canada Plan, but noted a lack of resources within the community to contract the work of doing the expansion. At the present time, surface water and drainage issues with the new site are limiting factors affecting completion of the expansion project. Design drawings have been completed at the time of preparing this report (by AECOM), but were not available for review. Preparations for the installation of a fence along the southern and eastern edges of the site in addition to an entrance gate were being undertaken at the time of the site visit.

Community Waste Collection

The landfill and collection services are operated and maintained by the community government and hamlet staff. Waste is collected three days per week using cube truck (Ford F350) with an estimated maximum capacity of 8 m^3.

Landfill Design

The landfill occupies an active quarry that was originally developed for the construction of the Dempster Highway. The waste disposal area is arranged around a trucked sewage lagoon and is organized so that portions of the quarry are still available to extract fill for community use (including landfill cover). There are separate areas for MSW, bulky waste, CRD waste, contaminated soils, used oils, white goods, and honey bags. A burn pit located near the used oil and MSW is used for the incineration of clean wood and animal carcasses.

The MSW area is located on the hillside above the sewage lagoon. The waste is disposed using the area method, but is not contained within a berm. There is evidence that a portion of the MSW pile has slumped into the sewage. This is a natural attenuation site and therefore there is no containment or collection of leachate.

CRD waste is located adjacent to the active quarry area and was observed to have been recently compacted. The CRD waste area is being filled based on the area method. The north and east sides abut a natural berm formed by the quarry wall. A berm is present on the south and west sides of the pile.

There are three decommissioned disposal areas within the landfill, (i) a decommissioned disposal area immediately south of the active area, (ii) a decommissioned bulky waste area at the southwest corner and (iii) a decommissioned honey bag area at the northeast corner. It is unknown if this is the same honey bag area observed being covered during the site visit (EarthTech, 2007).

Waste Receipt Procedures

There is no supervision of the site and no records kept of the quantities and types of waste that are being received at the landfill.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Tires;
- Contaminated soils;

- Unsorted bulk items;
- Vehicles;
- Honey bags;
- Burnable material; and,
- Used oils.

Landfill Management and Waste Handling

The landfill operator carries out a controlled burning of paper, cardboard and clean wood materials on an approximately weekly basis. Following each burn, the ash is mixed with dirt/gravel and used to cover the MSW landfill, which is then compacted by a bulldozer twice per summer. At the time of the site visit the MSW area had not been recently covered. The hamlet foreman indicated that a lack of manpower limits time spent completing landfill operations and maintenance.

Surface water sampling occurs at the decant structure from the sewage lagoon. Leachate and groundwater monitoring are not carried out.

Large items and miscellaneous bulk wastes are often left for salvaging near the landfill operator's shack. The hamlet foreman indicated this area requires sorting by hamlet staff, but has not been recently completed due to staff limitations.

Used oil is present in large quantities in the western corner of the site adjacent to the burn pit and the MSW pile. No containment (i.e., berm and/or liner) is present in the used oil storage area. Numerous totes, (most partially full) in addition to a large fuel tank (located within a steel box for secondary containment) appear to have been used for consolidation of used oils. The secondary containment of the large fuel tank is open to the atmosphere and appears to be full of a mix of used oil and water. Soil staining is present throughout the area where used oils are stored.

A sign is present detailing the location for honey bag disposal adjacent to the lagoon, however the area has recently been graded and covered with remnants of a few visible honey bags.

CRD waste is located in an active area of the quarry and has recently been compacted and partially covered.

A contractor from Inuvik has previously been brought in to prepare white goods for on-site disposal through the removal of coolant and mercury switches. White goods are separated into two piles based on if they have been prepared for disposal by the contractor.

A contaminated soil area is present near the tire pile. A liner is visible, however the area appears not to have been used in many years and the condition of the liner is not evident.

Special Concerns, Environmental Risks and Future Planned Activities

Several concerns regarding waste management were raised by the community SAO in the community survey. The removal of hazardous waste and the related cost is an issue that was raised, as well as landfill security (fencing and gating). There is concern that environmental regulations are not being met due to the lack of control at the landfill. The landfill is accessible to wildlife, including bears, which present risks to those working at or bringing waste to the site. Contaminated soil was also identified as a risk. A fence to control windblown litter is part of a

current expansion plan, as is a berm for water holding and management. The concern regarding contaminated soils is due to a lack of a lined and bermed area to contain the contaminants.

Estimated Remaining Lifespan of Landfill

The MSW area of the landfill is near capacity and should be bermed and capped prior to it reaching capacity. It is likely that some waste from the MSW area will need to be relocated to the new landfill in order to place cover on the cell. As noted above, there is no current estimate as to when the new landfill site will be finished due to water and drainage issues.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of hamlet staff. The hamlet foreman is charged with the overall operation of the landfill facility. Collection occurs three times per week and is undertaken by hamlet staff. It is reported by the community staff that waste is collected three half-days per week, by one person. A heavy equipment operator is on-site on an occasional basis, to move, compact and cover waste.

The landfill operator in Fort McPherson has not completed any waste management training.

Hazardous Waste Management Practices

The hazardous wastes in the community are handled by hamlet staff. Hazardous waste such as waste paint, oils, batteries, treated wood and other hazardous waste materials are stockpiled at the landfill but are unprotected from the elements and are poorly segregated. Hazardous wastes from commercial/industrial sectors are managed by the waste generator in accordance with GNWT Guideline for the General Management of Hazardous Waste. The hamlet foreman indicated that the community would like to ship batteries south to recyclers, but noted that a lack of local expertise is preventing them from doing so.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at the landfill site (KBL, 2013a). At the time of the inventory, a total of 73 drums (205 L) and 60 pails (20L) of hazardous waste was present, along with multiple totes and large fuel tanks containing used oil.

Sewage Sludge Management

Sewage sludge from the lagoon has never been dredged through the lifespan of the lagoon. This is reported to be due to the perceived safety issues related to losing equipment during dredging operations. The hamlet foreman indicated that the depth of the sewage lagoon is unknown.

Historic Waste Disposal Sites

A potential historic landfill site was identified through the community waste management survey, however the location, size and types of waste in this site are unknown.

Opportunities for Waste Diversion

Fort McPherson currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community depot, at which point the bags or bales of containers are brought to the Inuvik regional processing centre. At the time of writing this report, the depot in Fort McPherson was located at the Fort McPherson Tourist and Information Centre, operated by the Tetlit Gwich'in Recycling Depot. It was also

acknowledged that the recycling of beverage containers occurs at the local school. There are currently no other diversion programs in the community.



Figure 7-9: Aerial Location of Fort McPherson Landfill

7.10 Fort Providence

Information Sources

A community waste management survey was completed for the Hamlet of Fort Providence by the SAO on March 22, 2014. Information on the landfill was also obtained from the Solid Waste Facility Operation and Maintenance Manual (Dillon, 2013a) and the most recent annual report (Dillon, 2013b).

Golder completed a site visit to the community landfill on October 15, 2014 and was accompanied by the hamlet landfill operator (Mr. Dale Vandell).

The following key documents were obtained from the MVLWB and reviewed to assess waste management and landfill operations in Fort Providence:

- Aboriginal Affairs and Northern Development Canada, 2011. *Municipal Water Licence MV2006L3-0002 Municipal Water Licence Inspection Report*. October 21, 2011
- Dillon Consulting Limited, 2013a. *Hamlet of Fort Providence Operation and Maintenance Manual – Sewage and Solid Waste Facilities*.
- Dillon Consulting Limited, 2013b. *Hamlet of Fort Providence 2011/2012 Annual Water Licence MV2006L3-002 Report*.
- Dillon Consulting Limited, 2011. *Solid Waste Site Preliminary Evaluation Report*.
- Dillon Consulting Limited, 2006. *Hamlet of Fort Providence Water Licence Renewal Application*.

General Information

The Hamlet of Fort Providence (61°21'N, 117°39'W) has a population of approximately 734 (Statistics Canada, 2012) and is located on the east bank of the Mackenzie River, 209 km southwest of Yellowknife. The hamlet is accessible by an all-weather road. The hamlet also has an airstrip but there is no scheduled air service.

The mean annual precipitation as rainfall is 217.4 mm and as snowfall is 138.9 cm. The daily average temperature during the warmest month is 16.1°C, and during the coldest month is -21.8°C (Environment Canada, 2014).

The community water supply is obtained from the Mackenzie River. The landfill and sewage lagoons are located adjacent to a series of wetlands that eventually outflow to the Mackenzie River, approximately 1.5 km to the southeast of the landfill. The water intake pipe is located approximately 1 km upstream of the wetland connection to the Mackenzie River.

Landfill Location and Geographic Conditions

The landfill is located approximately 1.4 km east of the community along an unnamed road (Figure 7-10). The landfill is located on commissioner's land, and was first established in 1980 (MACA, 2014).

The community lies within the discontinuous permafrost zone. The community is surrounded by muskeg, flat swamp and rocky outcrops and sits above a clay and sand terrace (Dillon, 2006). Based on a review of an investigation completed at the landfill (Dillon, 2011), the soils in the area of this facility appear to be sandy near surface, underlain by sandy clay. The surficial soils observed during the site visit consisted of sandy materials. Muskeg is predominant to the northeast of the site.

Drainage from the landfill appears to be to the northeast towards the sewage lagoon and ultimately a series of wetlands towards the Mackenzie River.

Regulatory Requirements

The Hamlet of Fort Providence was granted a water licence (no. MV2006L3-0002) on July 10, 2006 for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on July 9, 2016. The local bylaw that governs waste management in Fort Providence consists of a tipping fee bylaw, which is actively enforced.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report on file was prepared for 2011 to 2012, and submitted to the Land and Water Board in 2013.

A solid waste facility operation and maintenance manual is available (Dillon, 2013a). The most recent annual report available through the Land and Water Board (Dillon, 2013b) details the community's efforts to update/revise the Operations and Maintenance Manual to include a Hazardous Waste Management Plan. It also identified that the operation of the sewage lagoon and solid waste site operations have not recently changed, however planning and design for the expansion and/or modification to the solid waste site will begin in the near future.

According to information obtained through the community waste management survey, unauthorized dumping of variable waste occurs in the community, on the land, next to the landfill and in the old fire break.

Use of the Landfill

The landfill is used solely by the residents and institutional/commercial operations of Fort Providence and is not shared with any nearby communities. The number of people that use the landfill does not fluctuate appreciably with the seasons. As noted below, the site is separated into three MSW cells, a CRD waste area, a contaminated soils area and a segregated waste area that includes hazardous wastes in addition to bulk metals, tires and waste vehicles. The community government has received and authorized requests from highway construction crews and camps to dispose of mixed camp waste at the landfill.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2011 and 2013 Dillon reports and from Golder's site visit in October, 2014.

General Information and Landfill Access

The entrance to the landfill site is via an unnamed road on the eastern edge of the hamlet. A sign at the entrance to the site indicates the hours of operation and to contact the hamlet office for access.

Access to the landfill is restricted using a front gate which requires a key from the hamlet office during hours of operation (Monday to Friday, 9 am to 5 pm). The gate is rarely locked during the week and therefore unauthorized access may occur. Fencing is present east of the landfill cells in an effort to reduce windblown litter.

Community Waste Collection

The landfill and collection services are operated and maintained by community/municipal staff. Waste is collected twice per week (Mondays and Thursdays) using a modified Ford (F450) vehicle with an estimated 7 m^3 capacity. Waste is placed in bags by the residents and placed next to the road for collection.

Landfill Design

The landfill was originally designed using the trench method, however the area method of waste disposal is now employed in order to provide space for landfilling until a new site can be approved and constructed. There are separate areas for MSW, bulk metals, segregated wastes, hazardous waste and CRD waste (Dillon, 2013). Currently there are three active MSW cells. The MSW disposal area covers an area of approximately 140 m by 120 m. One cell is full and requires final cover, whereas the other two cells are partially filled.

Waste Receipt Procedures

No waste receipt procedures exist for the landfill as there is no landfill attendant. Waste is delivered to the site primarily by the community waste truck. Some signage is present, however not all segregation piles have signage.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Fuel drums;
- Discarded house fuel oil tanks;
- Tires;
- Used oil and paint;
- Vehicles;
- Bulk metals;
- Contaminated soils; and,
- Brush.

Landfill Management and Waste Handling

Compaction of household waste is conducted on a bi-annual basis. According to staff, cover is placed once a year using remediated (i.e., formerly) contaminated soil and/or local sandy clay soil borrow material. The landfill visit occurred in October and no evidence of cover was apparent. With the exception of the trenches formerly used and partial berms, this is a natural attenuation site and no surface or groundwater quality monitoring takes place.

A large pile of contaminated soil is reported to be placed near the landfill, and was deposited at the site from the clean-up of a contaminated site in the community. There is no liner under the soil. The landfill operator indicated that sampling of the material has been undertaken with the assistance of ENR and that it was suitable to use as cover material.

Three adjoining MSW cells are currently in use. Each cell is an estimated 0.15 ha in area and bermed on 3 sides with an estimated berm height of 2 m. Waste is above the berm in one of the three cells and should be compacted and covered. The adjoining two MSW cells are both in use and contain uncovered waste.

The landfill operator indicated that a large quantity of cardboard is collected each week and landfilled in the MSW cells as there is no burning of waste at the landfill. The landfill operator indicated that a loader is mobilized to site each week to push MSW up, however compaction occurs less regularly.

The 2011 inspection report (AANDC, 2011) noted that the community planned to ship 300 to 350 vehicles and white metals (appliances) out of the community to provide additional space for landfilling cells until a new landfill can be constructed.

Special Concerns, Environmental Risks and Future Planned Activities

Water and contaminated soil environmental risks were identified in the community waste management survey. The risk of long-term groundwater contamination was identified as a concern, as the acceptance of contaminated soil at the site without any engineering controls has occurred in the past. The landfill operator indicated that ENR recently tested the contaminated soil managed at the site and indicated it was safe to use as landfill cover.

Regarding future planned activities for the landfill, it was noted that the current landfill is nearing the end of its useful life, therefore a closure plan and a plan for a new site will need to be developed within the next 5 years, if not sooner.

Estimated Remaining Lifespan of Landfill

The estimated closure date of the current landfill is reported to be 2019 (Fort Providence community waste management survey, 2014). As reported in the annual Report (Dillon, 2013b), planning for future waste management is under consideration.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community staff. The hamlet foreman is responsible for the overall operation of the landfill facility. The landfill operator in Fort Providence has completed the waste management course offered through MACA.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. Hazardous wastes in the community are handled by municipal staff. Hazardous waste such as paint cans, used oils and waste automobile batteries and other hazardous waste materials are accepted at the landfill for storage. These wastes are stockpiled in a designated area at the solid waste site (Dillon, 2013a). Hazardous waste observed during the site visit included used oil and drums as well as paint. The hazardous waste area is not delineated and no controls (i.e., berms or liners) were observed. E-waste is stored in town at the hamlet garage and shipped to Hay River on a regular basis**.** In 2015, the hamlet applied for funding through ENR's *Waste Reduction and Recycling Initiative* and committed some of its own funding and resources to remove and safely recycle / dispose of a large quantity of hazardous waste that has been stockpiled at the landfill (Shannon Ripley, personal communication, 2015).

Sewage Sludge Management

Sewage sludge was removed from the lagoon in 2012, though the volume removed was not reported. It was reported that the sludge was placed within a bermed area in front of the sewage lagoon (Dillon, 2013).

Historic Waste Disposal Sites

There is a historic landfill site located near the current landfill, though its size and the types of waste contained within it are unknown. The exact location of the site was not evident during the 2014 site visit.

Opportunities for Waste Diversion

Fort Providence currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community depot, at which point the bags or bales of containers are brought to the Hay River regional processing centre. Fort Providence is also participating in the ENR electronics recycling pilot project, but few electronic items have been accepted to date at the recycling depot. The recycling depot in Fort Providence is currently located at and operated by the Deh Gah Secondary School.

The hamlet has indicated that it would participate in additional recycling and composting programs.



Figure 7-10: Aerial Location of Fort Providence Landfill

7.11 Fort Resolution

Information Sources

A community waste management survey was completed for the Hamlet of Fort Resolution by the SAO on April 2, 2014. Information on the landfill was also obtained from the report prepared for the water licence application (Stantec, 2014a) and the Solid Waste Operations and Maintenance Manual (Stantec, 2014b).

Golder completed a site visit to the hamlet landfill on October 16, 2014 and interviewed the SAO (Tausai Lal) and was accompanied to the landfill by the hamlet operator.

The following key documents were obtained from the MVLWB registry and reviewed to assess waste management and landfill operations in Fort Resolution:

- Stantec, 2014a. *Hamlet of Fort Resolution New water licence Application form*.
- Stantec, 2014b. *Hamlet of Fort Resolution Solid Waste Disposal Facility Operation and Maintenance Plan*.
- AECOM, 2011. *Fort Resolution – Deninoo Community Council Waste Management Assessment Report*.
- AECOM, 2008. *Settlement of Fort Resolution, NT Waste Management Planning Study*.

General Information

The Hamlet of Fort Resolution (61°10'N, 113°40'W) has a population of approximately 474 (Statistics Canada, 2012) and is located on the shore of Great Slave Lake, 147 km south of Yellowknife (Figure 7-11). The hamlet is accessible by an all-weather road. The hamlet also has an airstrip but there is no scheduled air service. The mean annual precipitation as rainfall is 217.4 mm and as snowfall is 138.9 cm. The daily average temperature during the warmest month is 16.1°C, and during the coldest month is -21.8°C (Environment Canada, 2014).

The community draws its municipal water from Great Slave Lake at a location immediately adjacent to the community.

Landfill Location and Geographic Conditions

The landfill site is located approximately 1.6 km north of the community and occupies two separate filling areas, one for MSW and one site for construction/demolition and other bulky waste. The landfill is located on community/municipal land. The current landfill was established in approximately 1979 (AECOM, 2008).

Surficial soils in the area are reported to be predominantly loose sand (AECOM, 2011). This was confirmed during Golder's site visit.

Regulatory Requirements

The community of Fort Resolution does not have a current water licence; an application (Stantec, 2014a) was submitted and received by the MVLWB on May 23, 2014. As of October, 2015, a draft water license had been issued by the MVLWB, and the MVLWB and the Hamlet of Fort Resolution were in the process of finalizing the terms of the license. A new water licence MV2014L3-0008 was approved for the community subsequent to the site visit and summary by Golder, and is not further discussed herein or included in the database. There are no local bylaws or guidelines related to solid waste management or the operation of the landfill.

A Maintenance and Operations Manual (Stantec, 2014b) has been prepared for the landfill.

It was reported in the community waste management survey that that there is no unauthorized waste disposal occurring in the community.

Use of the Landfill

The landfill is used solely by the residents and institutional/commercial operations in Fort Resolution for the disposal of MSW, institutional and commercial solid waste and CRD waste. The SAO identified that there are three institutional buildings in town, and the remainder are residential. The number of people that use the landfill fluctuates with the seasons; approximately 50 additional people reside in the community during the summer months as indicated by the SAO during the community waste management survey.

The SAO indicated that shingles are not accepted at the landfill; however they did not indicate how community members dispose of shingles.

The landfill has received, but did not authorize, requests from highway construction crews to use the landfill to dispose of culverts.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2008 AECOM Report and the 2014 Stantec Reports and from Golder's 2014 site visit.

General Information and Landfill Access

The entrance to the landfill is off an unnamed road north of the community beyond an old bison farm. Signage indicates the location of the MSW site, and the CRD and bulky materials site. The two sites are approximately 200 m apart. The sewage lagoon is directly adjacent to the MSW area. A recent burn scar is evident along the southern edge of the MSW landfill and adjacent trees are burned.

No gates are present at either of the two sites; fencing is present along the access road to reduce windblown litter and guide the public to the active dumping areas. Access to the landfill is not restricted. There are no set hours of operation. Wildlife can access the landfill as it is not fully fenced.

Community Waste Collection

Waste is collected from the community twice per week by a contractor.

Landfill Design

The landfill covers an area approximately 5,000 m^2 (Stantec, 2014b). The landfill was originally designed as a trench fill and subsequently operated as an area fill (AECOM, 2011). The visible perimeter berm of the active cell is composed of compacted and covered MSW.

The CRD waste and bulky materials area was designed to allow segregation of hazardous wastes, fuel tanks and drums using fencing to delineate the areas for dumping (AECOM, 2011). Segregation of waste materials as per the design is not adhered to by the public, and therefore the CRD waste and bulky materials area contains a single pile of unsegregated waste.

Hazardous waste is received at the hamlet garage.

Waste Receipt Procedures

There are no waste receipt procedures for the landfill as there is no landfill attendant. The CRD and bulky waste landfill site receives all bulky waste, whereas the MSW landfill site receives only MSW.

Landfill Management and Waste Handling

In the community waste survey, it is reported that compaction of household waste is carried out on an “as required” basis and soil cover is applied. There was no evidence of interim cover having been used on the MSW landfill in 2014.

With the exception of the partial berms, this is a natural attenuation site and therefore there is no containment or collection of leachate and surface and groundwater monitoring is not carried out.

Waste materials at the sites were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Tires;
- Hazardous waste
- Bulky metals including tanks
- Vehicles; and,
- Dead animals.

A historical metals dump is located in the southeast corner of the MSW landfill and two covered historical MSW cells are present. Recently compacted and covered MSW cells are present on either side of the current MSW cell. Compacted waste is visible as the faces are not covered. “No Dumping” signs guide users away from the closed cells. A Komatsu bulldozer was parked at the MSW site at the time of the site visit. The Komatsu is similar in size to a D38.

The CRD and bulky waste area is located 200 m from the MSW landfill. A historical waste area containing vehicles and bulk metals is evident adjacent to this area. In the CRD waste area, various bags of MSW, animal carcasses including dogs, household fuel tanks, mattresses, white goods, vehicles, e-waste, tires, brush and cardboard were observed during the site visit, This area was unorganized.

Special Concerns, Environmental Risks and Future Planned Activities

The SAO and the landfill operator both indicated that the CRD and bulky waste area of the landfill requires hamlet manpower to segregate waste and set up waste segregation areas as well as signage.

With regards to future planned activities, the community is currently considering new locations for a future landfill site and has submitted a water license application for the current site.

Estimated Remaining Lifespan of Landfill

The estimated remaining lifespan of the landfill is 10 years from 2014 (closing in 2024) (Stantec, 2014a). The community is currently in the process of developing a closure plan, but it is not yet complete.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government/municipal staff. The SAO is responsible for the overall operation of the landfill facility. The landfill operator divides his time between other hamlet projects and the landfill. The landfill operator has not completed any training, however it is understood that the community has contacted MACA for training/assistance.

Hazardous Waste Management Practices

Hazardous wastes in the community are handled by public works staff at the hamlet garage, although some materials are present on site.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage sludge lagoon and the estimated closure date for the sewage sludge lagoon is unknown.

Historic Waste Disposal Sites

There is a historic landfill site located 1 km west of the current landfill. It was closed in 1999 and vegetation currently covers the area. This historic landfill is reported to contain MSW, bulky items and hazardous waste.

Opportunities for Waste Diversion

Fort Resolution currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community bottle depot, at which point the containers are brought to the Hay River regional processing centre. The depot in Fort Resolution is currently located at Frank Lafferty's house and operated by Frank Lafferty.

The community has indicated that they would be interested in participating in additional waste diversion programs.



Figure 7-11: Aerial Location of Fort Resolution Landfill

7.12 Fort Simpson

Information Sources

A community waste management survey was completed for the Village of Fort Simpson by the SAO on March 20, 2014. Information on the landfill was obtained from the 2015 Operation and Maintenance Manual (Golder 2015b), the 2014 landfill capacity and closure report (Golder, 2014) and the 2014 annual report (Golder, 2015a).

Golder completed a site visit to the community landfill on August 21, 2014 and interviewed the SAO (Dean Pickering) and the landfill attendant (Robert Bellefontaine).

The following documents were obtained from the MVLWB registry and pertain to the review of waste management and landfill operations in the Village of Fort Simpson:

- Indian and Northern Affairs Canada, 2011. *Village of Fort Simpson Water Licence MV2003L3-0011 Inspection Report*. Completed January 26, 2011 by Michael Martin. February 14, 2011.
- Mackenzie Valley Land and Water Board. 2015. *(Draft) Water Licence No. MV2015L3-0011*. June 5, 2015.
- Golder Associates Limited, 2015a. *Village of Fort Simpson 2014 Annual Report*. March, 2015.
- Golder Associates Limited, 2015b. *Fort Simpson NWT Solid Waste Facility Operations and Maintenance Manual*. March, 2015.
- Golder Associates Limited, 2014. *Village of Fort Simpson Landfill Capacity and Closure Cost Report*. December, 2014.
- Village of Fort Simpson, 2010. *Village of Fort Simpson 2009 Annual Report. Water Licence # MV200313-0011*. April 21. 2010.

General Information

The Village of Fort Simpson is located at the confluence of the Mackenzie and Liard Rivers in the Dehcho Region of the NWT. The village is situated on an island and mainland (separated by the Snye River) on the left (south) bank of the Mackenzie River, approximately 375 km west of Yellowknife and 200 km north of the British Columbia border. It is accessible by an all-weather road with seasonal ferry/ice crossing, barge, and scheduled air service.

The population of the village is approximately 1,238 (Statistics Canada, 2012). Recent census data indicates the population is relatively steady, although declining slightly in recent years.

The village obtains its water supply from the Mackenzie River. The inlet pipe is located on the southeast end of the island, approximately 800 m offshore. The wastewater treatment plant is located on the northwest end of the island and discharges to the Mackenzie River.

The mean annual precipitation as rainfall is 238.6 mm and as snowfall is 187 cm. The daily average temperature during the warmest month is 17.4°C, and during the coldest month is -24.2°C (Environment Canada, 2014).

Landfill Location and Geographic Conditions

The landfill is located approximately 3 km west of the community, along the Mackenzie Highway (Highway 1 towards Wrigley) (Figure 7-12). The landfill is located on Commissioner's (GNWT) land, and was first established

in 1980 (MACA, 2014). The landfill occupies an area of 5 ha. Based on information contained in the 2009 annual report (Village of Fort Simpson, 2010), areas downslope of the solid waste site consist of a wetland with high infiltration rates and which is usually dry, thus preventing the landfill operator from effectively completing the sampling requirements as requested in the water licence.

The community lies within the discontinuous permafrost zone, and has moderate amounts of ground ice. The landfill is located approximately 2.5 km southwest of the main channel of the Mackenzie River and approximately 750 m southwest of the nearest stream. The Mackenzie River flows to the northwest in this area; the streams draining the lands in the vicinity of the landfill flow generally northeast.

The soils in the regional area where the landfill is located are reported to be poorly drained, resulting in a high water table and dense organic cover, consistent with the local small water bodies present in the area of the landfill site. The shallow soils in the immediate area of the landfill site are identified to consist of parabolic dunes less than 15 m thick, within an undifferentiated peatland/wetland complex. These more permeable sands presumably overlie the less permeable (poorly drained) soils. Surficial materials into which the landfill cells have been excavated consist of fine to medium sand, consistent with the geological mapping information. The depth to groundwater at the site is on the order of 3 to 4 m from local grades in the area of the waste fill.

Based on the geology, topography and drainage evident on available mapping, it is anticipated that infiltration from the landfill area disperses to the peatland/fenland complex including the nearest water body to the southwest of the landfill, and then flows generally north-easterly towards the nearest streams and ultimately the Mackenzie River.

Regulatory Requirements

The Village of Fort Simpson was granted a water licence (no. MV2015L3-0011) on July 2, 2015 for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act* with an expiry of July 1, 2025. The local bylaws or guidelines that govern landfill management in Fort Simpson include both a landfill bylaw and an Operation Guidelines Policy; however, these are not actively enforced.

A solid waste facility operation and maintenance manual is available for the landfill (Golder, 2015b). The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available through the Land and Water Board (Golder, 2015a) provides a summary of the documents prepared to address requests by MVLWB to complete a landfill capacity and closure cost liability study (i.e., Golder, 2014). Based on the most recent population of Fort Simpson, the waste volume calculation results in an annual total uncompacted waste volume estimate of approximately 8,600 m^3. The estimated airspace usage for residential waste in 2014 is approximately 2,900 m^3.

The landfill was last inspected on January 26, 2011, and at this time the landfill was operating in accordance with the water licence. Recommendations were made in the 2011 inspection report (AANDC, 2011) regarding handling and storage of sewage sludge at the landfill to achieve more efficient digestion of the organics. As noted below, changes to the wastewater plant have resulted in changes to the sludge brought to the landfill, which is now dewatered.

Use of the Landfill

The landfill is used by the residents and by institutional/commercial operations in Fort Simpson for disposal of MSW, institutional and commercial solid waste and CRD waste. The community waste management survey

indicated that the number of people that use the landfill fluctuates seasonally. This is likely due to the increased tourism in the summer and an increase in construction and maintenance projects in the summer. The community has received requests from the following private industries and Territorial departments to use the landfill:

- Oil exploration;
- Gas exploration;
- Mines and mining exploration;
- Highway construction; and,
- Schools and residential housing.

The community, in part through acceptance by the private contractor operating the landfill, has authorized the disposal of industrial and commercial waste at the landfill.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operations was largely obtained from Golder (2014), which summarizes earlier information, as well as from the updated operations and maintenance manual (Golder, 2015b) and from Golder's site visit in August, 2014.

Segregation of incoming waste was observed to be taking place at the site. The significant size and overall condition of some of the piles indicates that the segregated materials have not been removed from the site for a number of years. It is understood that the village plans on removing a significant quantity of the bulk metals, appliances, drums and vehicles within the next two years, pending a review of quoted costs for this removal. Separate piles/areas were identified for bulk metals, tires, empty drums, appliances, end-of-life vehicles and empty paint cans.

Based on our review of the available mapping, airphotos and reports, and an interview with staff, it is expected that waste has been placed in trenches under many parts of the site, notably to the north and west. The areas extending into the bush to the north since 2010 include the current CRD fill area in the centre and a capped area to the west, where demolition waste from a school building was placed.

The landfill site is not fenced, and as a result of this and the lack of cover, bears regularly are present at the landfill. At the time of the inspection there were up to nine bears present, which limited the extent of the site survey and inspection. It is recommended that the village implement changes to operations to reduce the presence of bears on the site. This should include increased covering and consideration of bear fencing of the fill area, or if possible, the site.

General Information and Landfill Access

The total area of the landfill property is approximately 30 ha, whereas the currently cleared area (excluding the access road) is approximately 5 ha (Figure 7-13). The active MSW fill area is located on the western side of the site and covers an area of approximately 6,700 m^2 (including the berm). This area has been partly filled, and it is estimated that a remaining capacity of approximately 3,000 m^3 is available for filling to the top of the current berms. It is noted that the berms to the north and east are lower than that adjacent to the west fill limit.

A wooden building with a wood stove is located at the landfill site to accommodate the attendant. Access to the landfill is restricted using a gate and a large sign at the entrance to the landfill posts the hours of operation (10 am to 6 pm, Tuesday to Saturday). The village staff report that the current operator allows after hours dumping for commercial purposes. There are evening hours in the spring and fall to accommodate daylight hours and the growing season.

The landfill site is not fenced, and as a result of this and the lack of cover, bears regularly are present at the landfill. At the time of the inspection there were up to nine bears present in the MSW area.

Community Waste Collection

The collection of waste is currently (2015) contracted to P.R. Contracting Ltd. Commencing in 2015, the village operates the landfill and retains P. R. Contracting Ltd. for maintenance activities requiring heavy equipment. Waste is placed in bags by the residents and placed next to the road for collection. Community staff report that the collection vehicle has a volume of 15 m^3 and makes five trips to the landfill weekly, resulting in an estimated weekly collection rate of 75 m^3.

Landfill Design

Information on the landfill design was summarized from Golder (2014). The solid waste disposal facility historically used the trench method for disposing of waste and is now using the area method. Waste fill was placed using the trench fill method in the east/northeast in 2003, and in the north (possibly near the tire pile) in 2006. The current waste filling undertaken using the area method within the current bermed area, commenced in approximately 2007.

The current area of the CRD waste portion of the landfill is approximately 1,000 m^2. The previous area of CRD disposal, reportedly largely consisting of a demolished school, covers an area of 1,500 m^2.

Waste Receipt Procedures

The landfill site is supervised during regular hours of operation. The operator checks the load and records the load, tipping fee charged, date, time, type of vehicle and contact. All waste material is sorted and the operator directs the user to the dumping location. Separate areas are provided for disposal of CRD waste and storage of bulky metal, tires, vehicles, etc.

The solid waste disposal facility is organized into the following disposal areas in which designated waste is to be disposed of or stored in an approved manner:

- MSW;
- CRD waste;
- Tires;
- Sewage sludge pit;
- Burn area;
- Vehicles;
- Bulk metals;

- Appliances;
- Vehicle batteries;
- Barrels/drums; and,
- Paint

Tipping fees are charged for approved construction materials and non-resident customers. Current (2014) tipping fees are as follows:

Table 7-1: Tipping Fees

Bin/truck size	Fee
30 yard construction bin	$100
1 ton truck	$20
2 ton truck	$25
5 ton truck	$30
Tandem dump	$50
End dump	$60

Landfill Management and Waste Handling

Compaction of household waste is conducted on a sporadic basis. Controlled burning of paper, cardboard, and clean wood materials is undertaken on a monthly basis by the landfill operator. It is reported by staff that unauthorized and uncontrolled burning of household waste by community residents also occurs regularly, although increased security and monitoring at the site has resulted in a reduction of this practice.

The landfill was designed using the trench method; however the last trench was recently covered and a berm placed on the western edge of the site to accommodate an area fill. There is no cover on most of the waste within the MSW cell defined by the berms. In addition, there is significant windblown litter and waste sloughing onto the berm and into the adjacent wetland. Compaction was not evident at the time of the site visit and the placement of cover is reported to occur seasonally in the spring and fall.

The landfill is covered on an occasional basis with sand, sourced locally within the site. With the exception of the berms, and where trenches were used, this is a natural attenuation site and therefore there is no containment or collection of leachate. Surface and groundwater monitoring is not carried out. The location for surface water sampling downgradient of the landfill area is within the swamp adjacent to landfill. It is reported by staff that there is rarely enough standing water to obtain a surface water sample.

Special Concerns, Environmental Risks and Future Planned Activities

The number of bears present at the site is of special concern. During the time of the site visit, as noted previously, up to nine black bears were observed at one time.

As noted in Golder (2014), it is expected that leachate generated within the landfill site will infiltrate to the relatively permeable underlying soils. Construction and sampling of groundwater monitoring wells has been recommended.

Estimated Remaining Lifespan of Landfill

Based on our review of the available information, and the 2014 site visit and survey, there is likely sufficient area available at the site for expansion. The capacity depends on the planned and executed design of the fill areas and on the annual capacity consumption (i.e., the fill rate). There are no available records of actual capacity consumption or sufficient survey details to estimate capacity used over the period the landfill has been operated, and therefore capacity consumption for the community of Fort Simpson is based on the estimates provided using the method outlined in MACA (2003b).

The present cell contained within the berm has a remaining capacity of approximately 3,000 m^3, which represents one year of capacity. This cell could be vertically expanded for approximately 4.5 years of total capacity. Preliminary design of a further cell expansion indicates that an area of approximately 7,600 m^2, corresponding to a volume of approximately 24,500 m^3, could be constructed, which would provide an additional 8.5 years of capacity.

Human Resources

The village SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of a private contractor. A landfill attendant is on-site during hours of operation in addition to collection staff who deliver waste four days per week. In addition, a heavy equipment operator is on-site as required to compact and cover waste.

The landfill operator in Fort Simpson has completed the NWT School of Community Government's *Water and Waste Management* program.

It has been recommended that Health and Safety training pursuant to the Village of Fort Simpson Occupation Health and Safety Program and the NWT *Safety Act* and Regulations should be undertaken. Training in regards to emergency procedures related to spills management, fire and bear safety is also recommended (Dillon, 2006).

Hazardous Waste Management Practices

Hazardous wastes stored at the site include vehicle batteries, used oils, propane cylinders, paints and solvents. Batteries are stored on pallets and shipped off-site on a regular basis. At the time of the site visit, the batteries were located on a pallet adjacent to the operator's shack, as well as within the paint can pile.

The village has a hazardous waste management plan described and referenced within Golder (2015b), which details which materials are accepted, as well as the proper storage and handling guidelines. The hazardous wastes in the community are handled by both public works staff and the private contractor. It is unknown when hazardous waste was last shipped off-site.

Whereas household hazardous waste is accepted at the landfill, commercial hazardous waste (e.g., used oil and antifreeze, etc.) are no longer accepted at the landfill. Hazardous waste observed at the site includes vehicle batteries, used oil, propane cylinders, paints and solvents. Paint cans (empty and full) were located beneath the paint cans and containers sign. In addition, used oil was present in this location. Minor staining of the ground was apparent in this area.

An additional bermed area in the southeast corner of the site was once used to contain hydrocarbon contaminated soils. This area is the current storage location for drums, some of which are noted to contain product. The drums

are not labeled; however, it is assumed that the majority of the material in these drums consists of used oil, antifreeze and fuel.

Sewage Sludge Management

Municipal sewage is treated at the wastewater treatment plant. Sludge from the plant is collected each day and stored at the landfill while it undergoes a dehydrating process. Following this process and testing of the quality of this material, it is applied as cover at the MSW landfill. The sludge pit is no longer used following changes to the wastewater treatment plant design.

Historic Waste Disposal Sites

The location of historic waste disposal cells at the current landfill site is not entirely known, however it is known that some of the waste fill was placed using the trench fill method in the east/northeast in 2003, and in the north (possibly near the tire pile) in 2006. Numerous historical landfills and dumping sites outside of the current site were noted by the SAO. The most recently used landfill was located at 61.822°N, -121.320°W. Three historic waste dumping sites were identified on the island. One at the northern most tip of the island near 61.875°N,-121.391°W, one on the golf course near 61.856°N,-121.350°W and one beneath some residences near 61.860°N,-121.350°W. The latter was reported to contain mostly tin cans and glass.

Opportunities for Waste Diversion

Fort Simpson currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community bottle depot, at which point the bags or bales of containers are brought to the Hay River regional processing centre. The depot in Fort Simpson is located at the Past Midnight Petroleum bulk plant and operated by Rowes Recycling.

The community has indicated that it is working on developing both a recycling and composting program within the community, which they hope to launch in 2015.

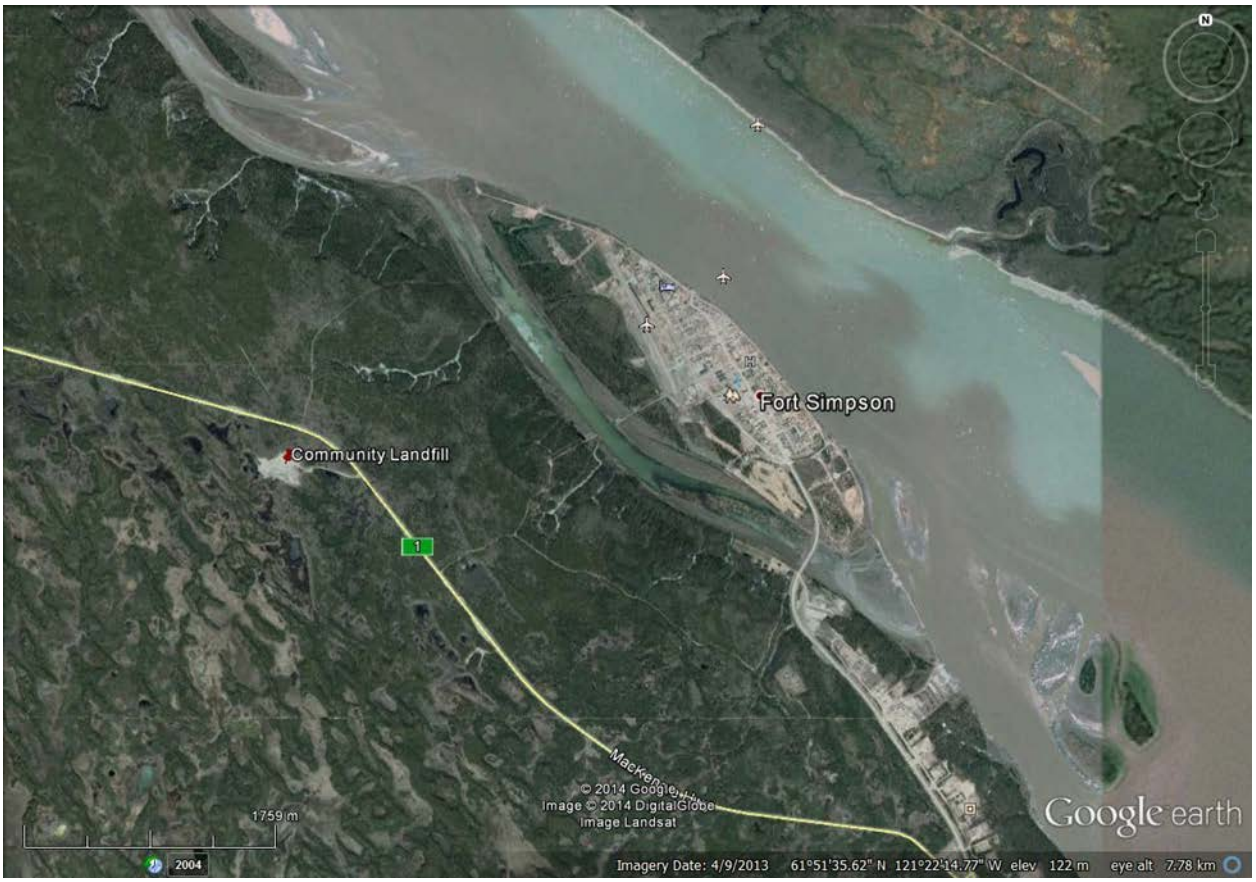


Figure 7-12: Aerial Location of Fort Simpson Landfill

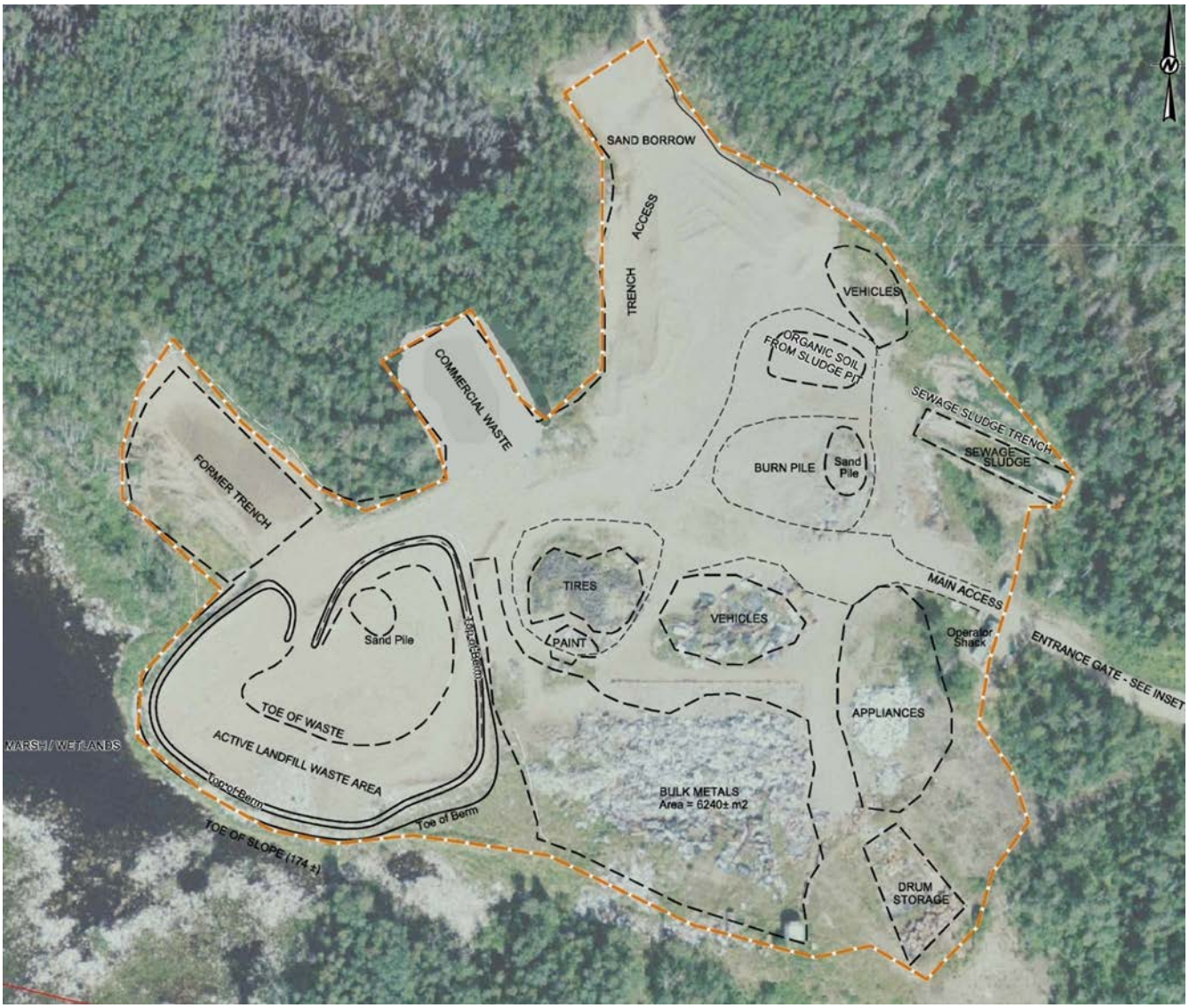


Figure 7-13: Fort Simpson Landfill Layout, 2014

7.13 Fort Smith

Information Sources

A community waste management survey was completed for the Town of Fort Smith by the SAO on April 2, 2014. Information on the landfill was also obtained from the 2004 Operations and Maintenance Plan and the 2011 water licence renewal application.

Golder completed a site visit to the town landfill on October 17, 2014 and interviewed community staff including the landfill operators.

The following documents were obtained from the MVLWB registry and pertain to the review of waste management and landfill operations in Fort Smith:

- Aboriginal Affairs and Northern Development Canada, 2012. *Municipal Water Licence Inspection Report for Fort Smith.*
- AECOM, 2011. *Water Licence Renewal Background Report Volume 1.*
- EarthTech, 2004. *Solid Waste Management Facilities Operation and Maintenance Plan.*
- IEG Consultants, *2011. 2010 Solid Waste Disposal Facility – Surveillance Network Monitoring Report.*
- Mackenzie Valley Land and Water Board, 2011. *Transcript for Technical Session for Town of Fort Smith Type A Water Licence Renewal.* June 15, 2011.

General Information

The Town of Fort Smith (60°00'N, 111°53'W) has a population of approximately 2,093 (Statistics Canada, 2012) and is located on the southern shore of Slave River, 302 km southeast of Yellowknife near the border of the NWT and Alberta. The hamlet is accessible by an all-weather road and scheduled air service.

The mean annual precipitation as rainfall is 244.3 mm and as snowfall is 150.2 cm. The daily average temperature during the warmest month is 17.0°C, and during the coldest month is -22.4°C (Environment Canada, 2014).

Landfill Location and Geographic Conditions

The landfill is located approximately 9 km west of the community, next to the Fort Smith Highway (Figure 7-14). The landfill is located on Commissioner's land, and was first established in 1970 (MACA, 2014). It covers an area of approximately 30 ha (IEG Consultants, 2011).

Fort Smith obtains its water supply from the Slave River upstream of the rapids (Rapids of the Drowned) near the community. The landfill is located approximately 750 m from the south shore of the river, approximately 10 km downstream of the community and the water intake.

The hydrogeological conditions at the landfill consist of near surface silty sand (IEG Consultants, 2011). A series of groundwater monitoring wells constructed in the landfill area are sampled annually. The surficial soils at the site consist of silty sand. The surrounding area slopes northward towards the Slave River.

No surface water was noted at the time of the site visit.

Regulatory Requirements

The Town of Fort Smith was granted a water licence (no. MV2011L3-0001) on November 1, 2011 for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on October 31, 2026. There are two local bylaws that govern landfill management in Fort Smith: Garbage By-law No. 659 which provides direction for the collection, removal and disposal of garbage trash and refuse, and Solid Waste Levy By-law No. 817 which raises revenue to offset the costs of solid waste collection and disposal operations.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was prepared in 2012.

A solid waste facility operation and maintenance manual from EarthTech (2004) is available for the landfill. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2012) noted that the solid waste landfill site was being well managed with waste separated by type and white metals recently had been sent for recycling.

Use of the Landfill

The landfill is used solely by the residents and institutional/commercial operations in Fort Smith for disposal of MSW, institutional and commercial solid waste and CRD waste. The number of people that use the landfill does not fluctuate seasonally.

Hazardous waste is accepted and stored at the landfill prior to shipping to a disposal facility. Asbestos waste from residents or municipal buildings is also accepted. Historical radioactive waste has been buried on-site. This area is cordoned off with chain link fencing and signage.

The town has not received any requests from private industry outside of the town to use the landfill.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2011 AECOM report and from Golder's site visit in October, 2014.

General Information and Landfill Access

The landfill site occupies a cleared area approximately 30 ha in size (AECOM, 2011). A site attendant trailer is located at the entrance and landfill staff is on-site during hours of operation. Access to the landfill is restricted using a fence and a front gate. During the summer months the hours of operation are 10 am to 6 pm and during the winter months the hours of operation are from 10 am to 4 pm. Wildlife cannot access the MSW portion of the landfill as it is fully surrounded by an electric fence.

Community Waste Collection

The landfill and collection services are operated and maintained by community/municipal staff. The collection staff collect waste twice per week (total of 3.5 loads per week), using a compaction truck with a maximum capacity of approximately 19 m^3, resulting in an estimate of 65 m^3 weekly. Waste is placed in bags by the residents and placed next to the road for collection. During the spring and fall, for a two week period, the town will pick-up bulky residential garbage on a call-out basis.

Landfill Design

The area of the MSW disposal cells is shown as 4.3 ha plus a future area of 1.9 ha (AECOM, 2011). The landfill was designed using an area fill method including the filling in of a valley adjacent to the landfill.

The landfill cell is constructed using the area fill method. No berms were observed, however natural topography contains the waste on three fronts. Waste is deposited in the central area of the cell, where it is then compacted and covered. Heavy equipment is mobilized from the town as required to complete this task. A portion of the landfill has been cleared and is used to segregate wastes including vehicles, bulk metals, fire extinguishers, white goods, barbeques, bicycles and brush. This area is well marked with signage.

A burn pit is centrally located to accommodate the burning of clean wood material.

Waste Receipt Procedures

All vehicles entering the landfill must report to the office before proceeding to the municipal landfill (AECOM, 2011). The landfill attendant records the size of the vehicle and the types of waste being deposited. Full time landfill staff are present during hours of operation at the landfill.

Landfill Management and Waste Handling

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- Asbestos burial;
- Hazardous waste;
- Radioactive waste burial;
- Tires;
- Bicycles;
- Vehicles;
- E-waste;
- Lawnmowers;
- A burn pit;
- Fire extinguishers; and,
- Brush.

Landfill staff report that salvaging is not permitted at the landfill.

CRD waste is deposited in the northwest corner of the site. A fire break was constructed around the construction waste; however, recent compaction efforts have pushed the construction waste beyond the fire break. The landfill operator indicated that a new fire break would need to be cut.

A burn pit is located in the central area of the site, where residents can deposit clean wood waste for burning. The landfill operator ensures that waste is burned on a regular basis and that ash is removed from the burn pit.

A large waste segregation area is present to the southeast. A large brush pile present in this area will be burned once conditions allow this to be conducted safely.

Municipal waste is compacted two to three times a year and covered with soil on a regular basis during the summer months. Cover is not placed in the winter. With the exception of the berms, this is a natural attenuation site and therefore there is no containment or collection of leachate. Surface and groundwater quality is monitored according to the conditions of the water licence.

Special Concerns, Environmental Risks and Future Planned Activities

A report by AMEC (Sept 2005) entitled “2004 Radiological Surveys Bell Rock to Fort Fitzgerald” submitted to the Low-Level Radioactive Waste Management Office (LLRMWO), Canadian Nuclear Laboratories (formally Atomic Energy of Canada Limited) indicates as follows: “A small snow-fenced area within the Fort Smith Nuisance Grounds delineates a temporary storage mound created by the LLRMWO for the management of uranium contaminated wastes generated by two previous LLRWMO cleanup efforts in Fort Smith. The site comprises a covered mound containing approximately 200 cubic metres of historic wastes from Fort Smith. The site is inspected on an annual basis by the LLRWMO”. In additons, an ongoing concern is that groundwater monitoring results have indicated that leachate is moving off-site from the landfill and impacting groundwater (MVLWB, 2011).

With regards to future plans, the community is developing an Operations Plan as well as a Closure Plan.

Estimated Remaining Lifespan of Landfill

Based upon the historical expansion rate of the landfill, it is expected that the site will have sufficient capacity until 2031 and possibly beyond (AECOM, 2011). An estimated closure date of 2031 was also provided through the community waste management survey, however it is not known how this was determined.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of community government/municipal staff. A full time site attendant is present at the landfill site, as well as a second part time staff member, to assist the site attendant, resulting in an average total staff time of 50 hours per week. The site attendant has completed training through the SWANA, including the Manager of Landfill Operations (MOLO) certification as well as additional course(s).

Hazardous Waste Management Practices

Hazardous waste such as batteries, house paint, paint containers, etc. are segregated and stored at the landfill in a bermed and lined area, for future disposal and/or recycling. The lined area is graded to provide a sump for collection of spills. Waste is deposited up slope of the sump. Monitoring wells were noted adjacent to the lined area.

The landfill has a hazardous waste management plan which details what materials are accepted, as well as the proper storage and handling guidelines. The town has previously received assistance from ENR in the handling of hazardous wastes. Hazardous wastes are managed by the town staff and the landfill attendants. E-waste is now

accepted at the beverage recycling depot in the community, for inclusion in the ENR electronics recycling pilot project.

Sewage Sludge Management

The community survey indicated that sludge is removed annually, however it is reported (MVLWB, 2011) that the sludge is removed every 5 and placed into a drying bed, following which it is donated for use at the local golf course.

Historic Waste Disposal Sites

There were no historic landfill sites identified in a review of the available documents, with the exception of the radioactive material burial site noted above.

Opportunities for Waste Diversion

Fort Smith currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community bottle depot, at which point the bags or bales of containers are brought to the Hay River regional processing centre. Waste electronics are also accepted at the recycling depot. The depot in Fort Smith is located at RTL Recycling at Highway #5 and York Crescent, next to the dog pound, operated by RTL Recycling.

The community indicated that they would be interested in participating in additional waste diversion programs.



Figure 7-14: Aerial Location of the Fort Smith Landfill

7.14 Gamètì

Information Sources

A community waste management survey was completed for the community of Gamètì and this information has been incorporated into the community waste system profile. Information on the landfill was also obtained from the 2008 water licence background report, a 2005 Sewage and Solid Waste Predesign report and the 2014 AANDC inspection report.

Golder completed a site visit to the community landfill on July 24, 2015 and interviewed community staff including the SAO (Judal Dominicata).

The following documents were obtained from the WLWB registry and pertain to the review of waste management and landfill operations in Gamètì:

- Aboriginal Affairs and Northern Development Canada, 2014. *Water Licence Inspection Report for Gamètì.*
- Dillon Consulting Limited, 2005. *Sewage and Solid Waste Sites, Rae Lakes (Gamèti) – Draft pre-Design Report. October, 2005.*
- Dillon Consulting Limited, 2008. *Water Licence Background Report, Water Supply, Sewage and Solid Waste Sites.*

General Information

The community of Gamètì (64°07'8.33"N, 117°17'45.24"W) has a population of approximately 253 (Statistics Canada, 2012) and is located next to Rae Lake, 240 km northwest of Yellowknife. The community is accessible by a winter road and scheduled air service.

Gamètì is one of four communities that are part of the *Tłı̨chǫ Land Claims Self Government Act*. Under this Act, the Tłı̨chǫ government may create their own regulations to govern waste management. However, the requirements of the broader *Northwest Territories Intergovernmental Agreement on Lands and Resources Management Act* that has been signed by the Tłı̨chǫ government take precedence.

The mean annual precipitation as rainfall is 215.5 mm and as snowfall is 124.7 cm. The daily average temperature during the warmest month is 16.9°C, and during the coldest month is -25.4°C (Environment Canada, 2014).

The community obtains their water supply from Rae Lake at a location approximately 1.5 km east of the community. The landfill is located approximately 500 m from Rae Lake, at a location approximately 600 m from the water intake. A new landfill has been constructed; however, it has not been commissioned. The new landfill is located approximately 4 km east of the community, 2.5 km from the water intake.

Landfill Location and Geographic Conditions

The current landfill is located approximately 2.7 km east of the community. The landfill will be closed following the commissioning of the new landfill.

The geology and terrain in the area is typified by sandy till soil with some boulders overlying Precambrian rock. There are also areas of rocky outcrops in the community (Dillon, 2008). Based on observations at the time of the

site visit, surficial soils in the area of the active landfill include stony sand and gravel, consistent with the descriptions in the reports.

Regulatory Requirements

The community of Gamètì was granted a water licence (no. W2008L3-0003) on December 23, 2008 for the disposal of MSW by the WLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on December 22, 2018. The local bylaw that governs waste management in Gamètì is bylaw 013-14, the waste management bylaw. This bylaw is actively enforced.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2013 annual report.

A solid waste facility operation and maintenance manual for the landfill was not available. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2014) noted that the Operation and Maintenance Plan, the Spill Contingency Plan and the Design Plans for the new solid waste and sewage disposal facilities remain outstanding. The inspection report also noted that white goods, domestic waste and hazardous waste were being appropriately segregated. It was noted during the Golder site visit, that used oil identified in a previous inspection report and other hazardous materials were still present (stockpiled near the community garage). It is understood from the SAO that the community is planning on partnering with neighbouring communities to facilitate the removal of hazardous waste out of the community, including used oil and batteries.

Information provided in the community waste management survey noted that there is no unauthorized waste disposal occurring in the community.

Use of the Landfill

The landfill is not shared with any nearby communities. The number of people that use the landfill does not fluctuate seasonally. The community has not received any requests from private industry to use the landfill.

Hazardous waste is accepted and stored at the community works garage.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2008 Dillon Report, the 2014 AANDC inspection report and from Golder's site visit in July, 2015.

General Information and Landfill Access

The current landfill is not gated or fenced and covers an area of 2 ha in size. Access to the newly constructed landfill is restricted via a berm placed in the entrance. The new landfill covers an approximate area of 0.5 ha and is fenced.

Community Waste Collection

The landfill and collection services are operated and maintained by community/municipal staff. Waste is placed in bags by the residents and placed next to the road for collection. Waste is collected Monday, Wednesday Friday using an 11 m^3 collection vehicle. Based on the estimated 18 loads per week, and recognizing the truck may not always be full, a maximum weekly waste generation of 180 m^3 is estimated.

Landfill Design

The landfill is currently being operated as an area fill as the original trench designed landfill has reached capacity. The new landfill will be operated using the trench method.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation at the landfill is limited and was observed to be separated as follows:

- MSW;
- CRD materials;
- White goods; and,
- Vehicles (at new landfill).

There are no signs delineating areas for these materials, and as a result there is some mixing of the piles at the active site.

Landfill Management and Waste Handling

The active area of the landfill is within a low area of the site, which requires additional waste to be placed prior to grading and closing the landfill. Compaction of waste is performed on a weekly basis and cover is placed after each collection day in an effort to reduce windblown litter.

All wood waste is left on-site for use by the residents. It is reported that there is no burning of wood, paper or cardboard.

Special Concerns, Environmental Risks and Future Planned Activities

Air, water and contaminated soil environmental risks were all identified through the community waste management survey. These relate to windblown litter that can blow into the water, as well as runoff from the landfill.

Estimated Remaining Lifespan of Landfill

The estimated closure date of the active landfill is 2016. A closure plan is currently being developed by the community.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on a part-time basis or 16 hours per week. The landfill operator in Gamètì has completed the NWT School of Community Government's *Water and Waste Management* program.

Hazardous Waste Management Practices

The landfill is currently proposing a hazardous waste management plan which will detail the materials that are accepted, as well as the proper storage and handling guidelines. The hazardous wastes in the community are handled by public works staff. As noted above, hazardous waste including used oil and batteries are accepted at the community works garage and are stored in containers which limit the potential for spills.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage lagoon located at the active landfill. This lagoon is no longer operational as a new three cell lagoon is now in operation and located adjacent to the new landfill.

Historic Waste Disposal Sites

No historic landfills were noted.

Opportunities for Waste Diversion

Gamètì is considered a satellite depot through the BCP, therefore a permanent depot is not available in the community. Periodic beverage container collection events are held in the community. The *I Care NWT* depot location website instructs those interested to contact the ENR head office for disposal of beverage containers. A new composting program is currently awaiting approval by council; once in place white paper and cardboard will be composted.

The community has also indicated that it would be interested in participating in additional waste diversion programs.



Figure 7-15: Aerial Location of the Gamètì Landfill

7.15 Hay River

Information Sources

A community waste management survey was completed for the community of Hay River by the town's waste manager (Mr. Dustin Dewar). Information on the landfill was also obtained from the Solid Waste Management Facility Operations Plan (EBA, 2010), the Interim Closure Plan (Dillon, 2013) and the AANDC 2013 inspection report.

Golder completed a site visit to the community landfill on July 23, 2014 and interviewed community staff including the waste manager for the Town of Hay River.

The following key documents were obtained from the MVLWB registry and reviewed to assess waste management and landfill operations in Hay River:

- EBA Engineering Consultants Ltd., 2010. *Town of Hay River Solid Waste Management Facility Operations Plan.*
- Dillon Consulting Limited, 2013. *Interim Closure and Reclamation Plan.*
- FSC Architects & Engineers, 2009. *Operation and Maintenance Plan for the Town of Hay River Waste Facilities. Version 1.1.*
- Stantec, 2012. *2011 MVLWB Annual Report For the Town of Hay River.*

General Information

The town of Hay River (60°49'N, 115°46'W) has a population of approximately 3,606 (Statistics Canada, 2012). The Hay River Reserve (K'atl'odeeche First Nation) is located adjacent to Hay River, on the south shore of the Hay River, and has a population of 292 people (Statistics Canada, 2012). Waste materials from the Hay River Reserve are handled at the Hay River landfill, and therefore the combined total population using this landfill is 3,898. These communities sit on the south shore of Great Slave Lake, 195 km southwest of Yellowknife. The communities are accessible by an all-weather road, barge and scheduled air service.

The mean annual precipitation as rainfall is 217.4 mm and as snowfall is 138.9 cm. The daily average temperature during the warmest month is 16.1°C, and during the coldest month is -21.8°C (Environment Canada, 2014).

The community of Hay River is located along the Hay River at the point where it enters Great Slave Lake. The community water supply is obtained from Great Slave Lake. The landfill is located approximately 100 m from the Hay River, 8 km upstream of the community.

Landfill Location and Geographic Conditions

The landfill is located approximately 8 km south of the community of Hay River along Highway 5 (Figure 7-16). The landfill is located on municipal land, and was first established in 1973 (EBA, 2010). The landfill covers an area of approximately 6 ha (Dillon, 2013).

As reported in Dillon (2013) and EBA (2011), which include summaries of geological information from earlier reports, the surface geology of the Hay River area near the site consists of deltaic deposits 3 m to 10 m thick overlying glacial till 10 m to 20 m thick overlying bedrock. The deltaic deposits are composed mainly of silts and

clays with discontinuous sand stringers. The underlying glacial deposits are composed of silty-sandy tills overlying clay tills with discontinuous sand lenses found in both. The bedrock has been identified as calcareous shale of the Hay River Formation (Sourced from the EBA 2011 Conceptual Site Model report which references the Geological Survey of Canada, 1974). Based on the 2011 EBA report, it is known that bedrock is deeper than 6m to 8m, but there is no further information to support knowledge of bedrock conditions beneath the site.

At the time of Golder's site visit, cover material was being excavated from the shallow borrow source in the south corner of the site and placed on the MSW cell to cover waste. This cover material consists of clayey soil, which when properly compacted, will promote runoff and limit infiltration to the waste.

Regulatory Requirements

The Town of Hay River was granted a water license (no. MV2009L3-0005) on May 31, 2010 for the disposal of MSW by the MVLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on May 30, 2020. The local bylaws that govern landfill management in Hay River include Garbage Collection Bylaw No. 619 and dump tipping fee Bylaw No. 1516.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available is the 2011 annual report.

A solid waste facility operation and maintenance manual is available for the landfill (EBA, 2010). The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2013) notes that the town has completed a significant amount of work to improve the landfill site. It was reported that the landfill site was found to be operating in a normal manner and no environmental concerns were noted.

Use of the Landfill

The landfill is shared with the K'atl'odeeche First Nation (Hay River Reserve), which has a population of 292 persons (Statistics Canada, 2012). The landfill is used for the disposal of MSW, institutional and commercial solid waste and CRD waste from the town and the reserve. Hazardous waste is accepted at the landfill and stored in a fenced area near the entrance. A contaminated soils land farm is operated by a private contractor with a lined sump is located at the landfill site. It is reported by the landfill staff that the contractor may cease operations in the near future.

Tires are stored on-site. Town staff have indicated that they are interested in shredded the tires on-site. Industrial hazardous waste is not accepted at the landfill. Requests have been made from private industry to use the landfill; these requests were granted for construction waste (approximately 100 m^3), but denied for tires.

A substantial amount of metal is present at the site including culverts from highway construction projects and materials evidently associated with industries that use large capacity piping.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the EBA 2010 report and from Golder's site visit in July, 2014.

General Information and Landfill Access

The landfill is approximately 6 ha in size. A small trailer building is located near the site entrance where the site attendant is housed during hours of operation. Access to the landfill is restricted using a front gate and a large sign

at the entrance to the landfill posts the hours of operation, closure dates, and information regarding illegal dumping and liability for personal injury on the site. The hours of operation are 10 am to 6 pm Monday to Sunday. Information provided in the community waste management survey states that wildlife cannot currently access the landfill as a bear fence has been erected; however, maintenance issues limit the effectiveness of the fence. In May 2015, the contracted landfill attendant reported that he thinks some bears may spend much of the year on-site at the landfill. ENR staff observed a black bear inside the landfill bear fence during a site visit in May 2015.

Dumping of waste is reported to occur in the community. Specific mention was made in the community waste management survey that some fridges and televisions are dumped in gravel pits surrounding the town.

Community Waste Collection

The landfill and collection services are operated and maintained by a private contractor. The contractor collects waste two days per week using a fleet of waste collection trucks. Waste is placed in bags by the residents and placed next to the road for collection.

Community staff indicate that tipping fees are in place to accommodate commercial use of the landfill. It is also noted, however, that tipping fee income goes to the private contractor, with no benefit to the local municipality.

Landfill Design

The landfill is currently filled using the area method occupying an area of approximately 1.6 ha. Based on observations of site topography during the site visit, it is estimated that the waste is up to 6 m thick. A borrow pit for cover material is located in the southern corner of the site. The northeastern edge of the MSW has not been bermed and therefore waste remains exposed.

A fire in the MSW cell in the summer of 2014 resulted in the excavation of a portion of the cell in the north part of the landfill. At the time of the site visit, re-covering of the excavated MSW had not yet been completed.

Waste Receipt Procedures

The site attendant monitors site traffic and directs residents and haulers to the appropriate disposal area as necessary.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- Hazardous waste;
- White goods;
- E-waste;
- Scrap metal;
- Vehicles;
- Tires; and,
- Contaminated soils.

Landfill Management and Waste Handling

Waste is partially segregated at the landfill site. White goods, tires, metal, vehicles, hazardous waste and waste paint are all deposited in separate areas. It was reported in the community waste management survey that the community does not adhere to depositing their waste in these discrete areas.

Waste is dropped off in the central part of the landfill cell and spread using a loader prior to being compacted. A loader with sheepsfoot wheels was stationed at the landfill and reported to be used for compaction.

White goods and tires were noted to be segregated. Town staff indicated that the tires would be shredded in the near future. Bulk metals and waste vehicles are also segregated, and located in the southeastern corner of the landfill. It was noted that there was a significant quantity of bulk metals at the site.

According to the operations and maintenance plan, compaction of household waste should occur once per week. Additionally, once per month, any uncovered compacted waste should be covered by at least 0.15 m of compacted soil as an intermediate cover to create a waste cell, but may need to be covered more frequently if circumstances warrant (EBA, 2010). However, site visits by Golder and ENR staff indicate that compaction and cover practices do not occur this frequently. Information provided in the community waste management survey states that cover is placed on the landfill sporadically using remediated soil.

This is a natural attenuation site and therefore there is no containment or collection of leachate. Groundwater quality sampling is conducted during the summer months.

Special Concerns, Environmental Risks and Future Planned Activities

Three environmental risks were noted by the community regarding the operation of the landfill: (i) windblown litter, (iii) surface water or groundwater quality impacts, and (iii) contaminated soil. Additionally, concerns have been raised about the management of tires and cardboard.

Bears often frequent the site, which is of special concern. A wildlife fence surrounds the entire landfill facility; however when the fence is not adequately maintained, as occurs with some frequency, it ceases to keep bears from entering the site (ENR staff observation; landfill attendant observation, 2015).

Future plans for the landfill include the construction of a transfer station to more effectively manage waste.

Estimated Remaining Lifespan of Landfill

The 2013 Interim Closure Plan (Dillon, 2013) indicates that the landfill lifespan is 10 years from 2011 (i.e., 2021); community staff interviewed during the Golder site visit indicated an anticipated closure date of 2021.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of a private contractor. The private contractor operates the landfill on a full-time basis during the summer months, and on a part-time basis during the winter months. No waste management training has been undertaken, although the landfill operator has been trained in WHMIS and First Aid.

Hazardous Waste Management Practices

Hay River does not have a Hazardous Waste Management Plan. The hazardous waste in the community is managed by town staff. Hazardous waste including used oil, batteries and paint were observed in a fenced area

near the entrance of the landfill. Town staff indicated that hazardous materials are shipped out on a regular basis. A sign indicated that batteries, dangerous goods and paint are accepted.

A lined pond was observed to the southwest of the landfill. The pond receives surface water from the contaminated soils land farm area operated by a private contractor. Bear paw prints were observed on the pond liner. A site visit by ENR staff in May 2015 (Shannon Ripley, personal communication, May 2015) found that the lined pond was not fully operational, given that excessive amounts of contaminated soil had been stockpiled at the contaminated soil site, limiting the ability of the pond to receive surface water. Surface ponding of contaminated water at the contaminated soil site was observed within the contaminated soil treatment area.

Sewage Sludge Management

As required, the cells of the sewage lagoon are closed, drained and the sludge removed. When required (approximately every 5 years), the accumulated dry sludge is added to the outside edge of the lagoon cells to add to the soil biomass (FSC, 2009). The closure date of the sewage lagoon is unknown.

Historic Waste Disposal Sites

A historic landfill site is located in the northeastern corner of the current landfill site. It has been capped with soil (EBA, 2010). The vegetation is present and in good condition.

Additional historic waste disposal sites are reported to be located in the fishing village located in Town near the shore of Great Slave Lake and under Wright Crescent. The types and quantities of waste in these landfills are unknown.

Opportunities for Waste Diversion

Hay River currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community recycling depot, which also functions as the regional processing centre. The recycling depot in Hay River is located at 36 Industrial Drive, operated by Tri R Recycling.

The Town of Hay River has been collaborating with the organization Ecology North and a local poultry barn to plan a centralized composting program.

The community would be interested in participating in additional waste diversion programs.



Figure 7-16: Aerial Location of the Hay River Landfill

7.16 Inuvik

Information Sources

A community waste management survey was not completed for the Town of Inuvik. Other information on the landfill was obtained largely from the water license application (EarthTech, 2005) and an interview with town staff.

Golder completed a site visit to the town landfill on September 5, 2014 and interviewed the director of public services (Rick Campbell).

The following documents from the GLWB registry and communication with GNWT were reviewed to assess waste management and landfill operations in Inuvik:

- EarthTech, 2005. *Submission in Support of Inuvik's Application for Renewal of Water Licence N3L4-0036*. December, 2005.
- Ripley, Shannon, 2015. Personal communication with Shannon Ripley of GNWT with Golder, May, 2015

General Information

The town of Inuvik (68°21'N, 133°43'W) has a population of approximately 3,463 (Statistics Canada, 2012) and is located on the East Channel of the Mackenzie River, in the Mackenzie Delta, 1,110 km northwest of Yellowknife. The community is accessible by an all-weather road, with seasonal ferry and ice road crossings, barge and scheduled air service.

The mean annual precipitation as rainfall is 114.5 mm and as snowfall is 158.6 cm. The daily average temperature during the warmest month is 14.1°C, and during the coldest month is -26.9°C (Environment Canada, 2014).

The town's water supply is from the East Arm of the Mackenzie River and from the Hidden Lake and Lake B which are connected by a pipeline. Lake B is located approximately 5 km east of the community.

The town is in the Mackenzie Delta which is characterized by alluvial deposits of fine sand and silt, underlain by Precambrian argillite. The surficial soils at the landfill were noted during Golder's site visit to be silty sand with clay.

Permafrost in the area is reported to be discontinuous.

Landfill Location and Geographic Conditions

The landfill is located approximately 1 km southeast of the town on High Road off the Dempster Highway leading out of town (Figure 7-17). It is located on municipal land, and was first established in 1980 (MACA, 2014).

The landfill is located approximately 1.2 km east of the East Channel of the Mackenzie River.

The surrounding terrain slopes away from the landfill to the west and to the north. To the southeast and east, the topography rises towards Mount Baldy. The landfill area elevations are higher than the native grades to the southeast and east.

Surface water enters the landfill from the Mount Baldy access road. A pond was observed in the southwest corner of the landfill. The pond appeared murky, reflecting suspended sediment from the cover material and possibly

runoff or seepage impacted by the landfill. Surface water ponds are also noted on the north side of the site, beyond the access road to Mount Baldy.

Regulatory Requirements

The Town of Inuvik was granted a water licence (no. G06L3-001) on July 1, 2006 for the disposal of MSW by the GLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on June 30, 2016. The local bylaws that govern landfill management in Inuvik include both Dumping Fees Bylaw No. 2504 and Solid Waste Levy Bylaw No. 2498. The water licence requires that an annual report be filed with the Land and Water Board.

A solid waste facility operation and maintenance manual is not available for the landfill through the Land and Water Board registry. The director of public services indicated that an operations and maintenance manual has been developed internally. The manual includes information on waste management procedures contained in the document “Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories” (MACA, 2003b).

No annual reports or inspection reports were available through the Land and Water Board registry.

Use of the Landfill

The Inuvik landfill is used solely by the residents and institutional/commercial operations in Inuvik for the disposal of MSW, institutional and commercial solid waste and CRD waste. Hazardous waste is also accepted at the landfill and managed by landfill staff.

The Town of Inuvik has received requests from private industry to deposit waste in the landfill, and it is reported by staff that waste is accepted from outside sources for a tipping fee. At the time of the Golder site visit, CRD waste, including utilidors from the community, were observed.

According to Mackenzie Gas Project reports, nearby work camps dispose of the ash from camp incinerators at the Inuvik landfill (EarthTech, 2005).

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2005 EarthTech Report and from Golder’s site visit in September, 2014.

General Information and Landfill Access

The entrance to the landfill is off of the Dempster highway a kilometer from town. Access to the landfill is restricted by a gate and a fence extending along the majority of the west and south landfill site property. Staff are present at the landfill site during hours of operations.

The size of the landfill is approximately 6 ha (EarthTech, 2005). Access to the landfill is restricted using fencing and an entrance gate (EarthTech, 2005). Wildlife including grizzly and black bears regularly frequent the site, as there is no wildlife fencing. There are no plans to install a wildlife fence at this time.

Community Waste Collection

The town has placed 80 dumpsters (4 m^3 and 6 m^3) around the town to collect waste from community members. There is no individual residential pick up. The director of public services estimated 300 pickups occur each week

through these dumpsters. Assuming the dumpsters are full, this suggests a weekly maximum collection of approximately 1,500 m^3, however it is anticipated that the collection totals are less, as the bins are collected regularly, not when filled to capacity.

Landfill Design

The landfill was designed using the area fill method of waste disposal (EarthTech, 2005). It is reported that each cell will contain a total of three lifts.

The landfill cell has been constructed and filled on the basis of the 'area method'. The landfill cell is not restricted to MSW; with the exception of hazardous waste, all waste brought to the site is buried in the cell. The waste thickness in the landfill is unknown, but is reported to be deeper than the maximum depth of an excavator reach, when excavation operations were undertaken at the site.

The berm on the north side of the site is composed of waste vehicles covered with native soils and is estimated to be up to 4 m high. The eastern and southern edges of the site abut Mount Baldy and are not bermed, however a portion of the southwestern side of the landfill does appear to be bermed. The composition of the western berm is unknown and appears to have been constructed as an access road.

No design drawings of the landfill were available for review.

Waste Receipt Procedures

A weigh scale has recently been installed at the landfill. Once commissioned, it will be used to weigh incoming waste. Waste is dropped off in the central part of the landfill cell and spread using a bulldozer.

Waste materials at the site were observed to be generally separated as follows**:**

- MSW;
- CRD waste;
- Household fuel tanks (empty);
- Paint;
- Used oil and lubricants;
- Batteries;
- Tires;
- Vehicles;
- Fuel drums; and,
- E-Waste.

A new honey bag disposal tank has recently been constructed outside of the fence and has yet to be used. The purpose of the honey bag disposal tank is to separate the bags from the waste.

Landfill Management and Waste Handling

Compaction of MSW is undertaken by landfill staff as needed. Staff report that covering is not completed on a set schedule; when the bulk metals, tire and waste vehicle piles become unsightly, they are covered. The borrow source for cover material is located on Mount Baldy to the north of the landfill. The borrow source is only accessible during summer months, which limits covering to typically once per year during the summer. The borrow source material is reported to be a clayey material, consistent with that observed on-site.

Construction waste is often used to cover the MSW when cover material is not available. No cover material is stockpiled on-site for use throughout months when the borrow source is not accessible. Compaction is undertaken by either a D6 or D9 bulldozers, which are parked on-site.

This is a natural attenuation site and therefore, with the exception of the berms on the north and west side of the site, there is no containment or collection of leachate. Surface water samples are collected in areas downslope of the site (both north and south) for water quality analysis.

Special Concerns, Environmental Risks and Future Planned Activities

Special concerns identified by the community include wildlife access. The Town of Inuvik also indicated that they have begun to look at closure and reclamation planning.

During a site visit in May 2014, ENR staff observed uncovered bags of asbestos discarded at the surface of the landfill site.

Estimated Remaining Lifespan of Landfill

The estimated remaining lifespan of the landfill is reported as two to three decades from 2005 (i.e., at least 2025) (EarthTech, 2005).

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of a private contractor.

Hazardous Waste Management Practices

The hazardous waste is managed at the landfill in small sheds. Hazardous waste is shipped off-site for disposal. Hazardous waste was observed in various steel sheds near the entrance of the landfill. The attendant indicates where to deposit the hazardous waste. Household fuel tanks and various drums are stored adjacent to the hazardous waste area.

The community staff indicated that asbestos waste is accepted at the landfill and buried immediately and that records are kept by town staff as to the location and depth of the buried asbestos. During a site visit in May 2014, ENR staff observed uncovered bags of asbestos discarded at the surface of the landfill site (Shannon Ripley, personal communication, May, 2015).

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at the landfill site (KBL, 2013a). At the time of the inventory, a total of 109 drums (205 L) and 171 pails (20L) of hazardous waste was present, along with totes, propane cylinders and batteries.

Sewage Sludge Management

The last documented sludge acceptance at the landfill was completed in 1993, which transferred accumulated sludge from the primary lagoon cells to adjacent sludge holding cells (EarthTech, 2005). More recent data on the frequency of sewage sludge removal was not available.

Historic Waste Disposal Sites

A dry inert special waste site was located 7 km southeast of the community along the Dempster Highway, before the turn-off to the airport. Referred to as the Shale Pit site, it was covered and closed in 1995 (EarthTech, 2005).

Opportunities for Waste Diversion

Inuvik currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the Inuvik bottle depot, which also serves as the regional beverage container processing centre. The depot in Inuvik is located at #31 Distributor Street, operated by Wrangling River Supply.



Figure 7-17: Aerial Location of the Inuvik Landfill

7.17 Jean Marie River

Information Sources

A community waste management survey was not completed for Jean Marie River. Other information on the landfill was obtained from the Sewage Lagoon and Solid Waste Preliminary Evaluation (Dillon, 2012) and the 2011 AANDC inspection report, as well as an interview with the SAO.

Golder completed a site visit to the community landfill on August 22, 2014 and was accompanied on the visit by the SAO, Pamela Norwegian.

The following key documents were obtained from the MVLWB registry and reviewed to assess waste management and landfill operations in Jean Marie River:

- Aboriginal Affairs and Northern Development Canada, 2011. *Jean Marie River Municipal Water Licence Inspection Report*.
- Dillon Consulting Limited, 2012. *Sewage Lagoon and Solid Waste Site Preliminary Evaluation, Jean Marie River, NT*.
- Dillon Consulting Limited, 2011. *Jean Marie River Community Map*.
- ENR, 2011. *Report on Hazardous Waste*.

General Information

The community of Jean Marie River (61°31'N, 120°37'W) has a population of approximately 64 (Statistics Canada, 2012). The community is located on Jean Marie River where it joins the Mackenzie River, approximately 345 km southwest of Yellowknife. The community is accessible by an all-weather road. The community also has an airstrip, but there is no scheduled air service.

The mean annual precipitation as rainfall is 238.6 mm and as snowfall is 187 cm. The daily average temperature during the warmest month is 17.4°C, and during the coldest month is -24.2°C (Environment Canada, 2014).

The water supply for the community is the Jean Marie River, by means of an intake and reservoir located approximately 450 m west of the community. It is reported that the water supply is to be changed to the Mackenzie River (Dillon, 2012). The landfill is located approximately 600 m from the Jean Marie River, approximately 3.5 km upstream of the water intake.

Landfill Location and Geographic Conditions

The landfill is located approximately 2 km south of the community along the Jean Marie River access road towards the Mackenzie Highway (Figure 7-18). It is located on Commissioner's land, was first established in 1990 (MACA, 2014) and is approximately 1 ha in size (Dillon, 2012). Prior to the development of the current site, the landfill was located adjacent to a sewage lagoon 700 m north of the current landfill.

The community is located in the Great Slave Plain eco-region, consisting of low rolling marshlands and willows, dense spruce, pine and poplar forests. The community is also approximately where sporadic and discontinuous permafrost zones meet.

Based on test pits completed in the landfill area, shallow soils in the area consist of approximately 2 m of sandy soil underlain by clayey till (Dillon, 2012). The surficial soils were observed during the Golder site visit to consist of sandy soils underlain by clay. Dense spruce and poplar forests surround the site. A drainage path is visible leading east of the sewage lagoon towards the Mackenzie River. At the time of the inspection, all drainage trenches were dry.

Regulatory Requirements

A water licence for the community of Jean Marie River is not currently available through the MVLWB registry. There are no reported local bylaws or guidelines that govern landfill management in Jean Marie River.

A solid waste facility operation and maintenance report has not been written for the community of Jean Marie River. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) noted that the used oil/fuel storage area requires spill containment and recovery materials on-site to address potential spills. It also noted that the hazardous waste storage area requires secondary containment for materials to be stored on-site. The solid waste and sewage facilities are reported to be well maintained.

Use of the Landfill

The landfill is used solely by the residents and institutional/commercial operations in Jean Marie River for disposal of MSW, institutional and commercial solid waste and CRD waste. Hazardous waste is accepted at the landfill for storage prior to shipment to an approved facility. The landfill is used only for the community and the number of people that use the landfill does not appreciably change seasonally.

The SAO reports that the community does not allow private industry to use the landfill, however culverts have been deposited at the landfill from prior highway road works operations completed by private contractors.

A separate vehicle storage area is located 250 m north of the landfill site, along the Jean Marie River access road. Access to the vehicle storage area is restricted by boulders at the entrance to prevent unauthorized dumping.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2012 Dillon Report and from Golder's site visit in August, 2014.

General Information and Landfill Access

The entrance to the landfill site is off of the main access road leading to Jean Marie River. The sewage lagoon is also located on the property. Access to the landfill site and adjacent sewage lagoon is from a gravel access road and not restricted nor is there set hours of operation. The landfill is approximately 1 ha in size (80 m by 120 m). The landfill is partially fenced to reduce the amount of windblown litter.

Community staff is present at the site regularly during the week to conduct waste disposal and sewage disposal operations. Sewage disposal staff indicated that a black bear had been present the morning of the site visit and was observed in the MSW waste area. There is no wildlife fencing at the site.

Community Waste Collection

Details about the responsibility and frequency of community waste collection are unknown.

Landfill Design

The landfill was designed using the trench, compact and bury method of waste disposal (Dillon, 2012). There are separate areas designated for the various waste streams (metals, appliances, construction wastes, etc.), however these are not properly bermed or segregated (Dillon, 2012).

The landfill is constructed using the trench fill method. A recently closed trench has been covered however some surficial waste remains visible and vegetation has not yet been established. The former litter fence surrounding the closed trench is now in a state of disrepair. Signage is present to direct community members to the active trench. The active trench contains marsh grasses, indicative of the presence of standing water prior to establishment of drainage from the MSW trench. The drainage path leads from the cell towards the sewage lagoon drainage path, east of the site.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Signage is present identifying the active MSW cell, the bulk metals pile, paints and oils.

Waste materials at the site were observed to be generally separated as follows**:**

- Vehicles (at a separate site);
- Bulk metals including white goods;
- Tires;
- Brush and other combustibles;
- MSW; and,
- Used oil.

A dry summer and threat of forest fires has resulted in an increase in brush removal around the community, resulting in a large stockpile of brush at the landfill. It is anticipated that this brush will be burned once conditions in the fall/winter allow.

The vehicle storage area 250 m north along the Jean Marie River access road from the landfill contains approximately ten vehicles; however, more may be present and obscured by vegetation. One large fuel storage tank was also present at this site. Access to the vehicle storage area is blocked by placement of large boulders on the access road.

Landfill Management and Waste Handling

MSW is managed in a trench. Brush and bulk metals are managed in piles on the surface. A contractor is brought on-site seasonally to push up metals and brush piles and compact the MSW trench. Intermediate cover is not used.

A drainage trench has been excavated leading south of the current MSW cell towards the sewage lagoon. Surface water is diverted from the relatively level site by means of a berm surrounding the site. The berm likely consists of overburden removed when the site was initially developed.

The landfill is a natural attenuation design and therefore, with the exceptions of the trench design for the waste fill, there is no containment or collection of leachate runoff.

Special Concerns, Environmental Risks and Future Planned Activities

The SAO indicated that discussions with the town council with respect to the siting of a new landfill or expansion of the current landfill are currently underway.

Estimated Remaining Lifespan of Landfill

The active MSW cell is the last excavated cell at the landfill site. The estimated remaining lifespan of the landfill is unknown, however it is noted that there is significant room to expand the existing site or change to an area fill method and develop the landfill vertically. Studies on an expansion or relocation of the landfill site are planned in the near future.

Human Resources

The daily operation and maintenance of the landfill is the responsibility of community government/municipal staff. The SAO is responsible for the overall operation of the landfill facility.

Hazardous Waste Management Practices

Hazardous waste observed at the landfill included used oil, paints and batteries. Signage is present directing community members where to deposit hazardous waste. There was no specified storage area within the segregation compound and no containment area (berm, liner) was observed. The SAO indicated that the oils will be shipped to a disposal facility; however, the frequency is unknown.

As noted above and reported in Dillon (2012), there is no system in place for the safe disposal of waste gas, grease, glycol and mixed substances.

Sewage Sludge Management

As of 2012, sewage sludge had never been removed from the sewage lagoon (Dillon, 2012). The SAO indicated that the sewage lagoon recently drained overnight due to a failure in the liner/berm. Effluent from the sewage lagoon flows to the east, away from the landfill.

Historic Waste Disposal Sites

A historical waste site next to a historical sewage lagoon was also inspected. The approximate latitude and longitude for the historical landfill is 61.516°N, -120.634°W. The waste fill area is capped and mounded about the surrounding grade. No waste was evident. Vegetation on the cap was well established and included grass, willows and small trees.

Opportunities for Waste Diversion

Jean Marie River currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community depot, at which point the bags or bales of containers are brought to the regional processing centre in Hay River. At the time of writing this report, the depot in Jean Marie River was located at and operated by the Louie Norwegian School.

It has not been reported if the community would participate in additional diversion programs.



Figure 7-18: Aerial Location of the Jean Marie River Landfill

7.18 Kakisa

Information Sources

A community waste management survey was completed for the community of Kakisa by the hamlet foreman and the SAO on April 10, 2014. Information on the landfill was largely obtained from the community waste management survey.

Golder completed a site visit to the community landfill on October 15, 2014 and interviewed the SAO.

There are no documents on the MVLWB registry pertaining to the landfill operations in Kakisa. The following reference was provided from the GNWT:

- Spring, Andrew, 2015. *Personal communication with Andrew Spring, PhD Candidate, Laurier Centre for Sustainable Food Systems*. March 2015.

General Information

The community of Kakisa (60°56'N, 117°24'W) has a population of approximately 45 (Statistics Canada, 2012) and is located on the eastern shore of Kakisa Lake, approximately 235 km southwest of Yellowknife. The community is accessible by an all-weather road.

The mean annual precipitation as rainfall is 217.4 mm and as snowfall is 138.9 cm. The daily average temperature during the warmest month is 16.1°C, and during the coldest month is -21.8°C (Environment Canada, 2014).

Potable water is trucked from Hay River each week.

Landfill Location and Geographic Conditions

The landfill is located approximately 6 km northeast of the community along the Kakisa access road. The landfill is located on Commissioner's land, and was first established in 1991 (MACA, 2014). The cleared area in which the landfill is located occupies an area of approximately 0.6 ha.

The surficial soils observed at the site during the Golder site visit consist of silty sand. Bedrock was not visible at the landfill. No surface water ponding was evident at the landfill.

Regulatory Requirements

No water licence information for the community of Kakisa is currently available through the MVLWB registry.

Use of the Landfill

The landfill is used solely by the residents and three institutional buildings in Kakisa. The landfill is also used by Parks GNWT. The number of people that use the landfill fluctuates seasonally, increasing when visitors use the nearby campgrounds from May to September. Requests have been received from the following private industries to use the landfill:

- Highway construction crews; and,
- Camps.

The community did not authorize the disposal of sewage and cement waste from industry which was nevertheless deposited in the landfill. The waste was dumped in contravention of community instructions.

Unauthorized dumping of variable waste is occurring in town, on the land next to the landfill and at a historic landfill site. The community has applied for and received funding to assist in the cleanup of waste from historic waste dumping areas around the community.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2014 Golder site visit. There are no available reports for this site.

General Information and Landfill Access

The entrance to the landfill site is off of the main community access road leading from the community to the Mackenzie Highway. Partial fencing exists along the southeast edge of the landfill to reduce windblown litter. Access to the landfill is restricted using a front gate and signage. The hours of operation at the landfill are 9 am to 5 pm, Monday to Friday, and it is reported by staff that the gate is closed during non-operational periods. Currently, wildlife can access the landfill as it is not fully fenced.

The landfill occupies a clearing approximately 0.6 ha in size.

Community Waste Collection

Waste is collected twice per week. Waste is placed in bags by the residents and placed next to the road for collection. A ¾ ton pickup truck is used for collection.

Landfill Design

The landfill is designed based on the trench method. Two trenches were observed to be present in 2014. The depth of the trench is unknown due to the waste in the trenches, which did not allow for inspection of the trench base. One trench is for MSW, whereas the other trench is used for CRD waste. No engineering report or design drawings were available.

Metal waste, white goods and hazardous wastes are segregated in piles adjacent to the trenches.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community collection vehicle. Waste is deposited in the trenches from the collection vehicles by staff.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- Bulk metals including white goods; and,
- Unsorted hazardous waste.

No waste vehicles were present at the landfill. The SAO indicated that a contractor from Alberta has mobilized to the site on numerous occasions to remove the waste vehicles and bulk metals. Bulk metals are stored in a pile

adjacent to the sewage trench, which is located on the landfill site. Tires were also noted to be present in the bulk metals pile.

Landfill Management and Waste Handling

The landfill has been constructed using the trench method. Two parallel trenches are present. One trench for MSW and one trench for CRD waste, each approximately 10 m by 70 m. The depth of the trenches is estimated to be 1.5 m. The CRD trench has waste the entire length and a small pile of waste is stored adjacent to the trench. The reason for the waste being placed out of the trench is unknown.

Waste is deposited in the end of the west end of the MSW trench and occasionally pushed the length of the trench and compacted. No equipment was present at the landfill; the community staff report that they mobilize heavy equipment to the site for compaction of the waste, which occurs seasonally. The landfill is a natural attenuation design and therefore, with the exception of the trench design for the waste fill, there is no containment or collection of leachate runoff. Surface and groundwater monitoring is not carried out.

No interim cover nor compaction of waste in the trench were apparent during the Golder site visit. The site is partially fenced to reduce windblown litter.

Special Concerns, Environmental Risks and Future Planned Activities

The community identified explosive materials such as propane bottles as special concerns at the landfill. Air and contaminated soil environmental risks were identified by the community. These risks were associated with windblown litter and the previous disposal of old machinery at the landfill, which has since been removed. It is reported that the landfill is opening a new cell to the south of the existing waste site.

During a 2015 Climate Change and Health Study funded by Health Canada and conducted by researchers from Wilfred Laurier University, Kakisa community members identified serious concerns about the impact that the landfill is having on water quality and wildlife health, and expressed a desire to implement recycling and composting programs (A Spring, personal communication, March 2015).

Estimated Remaining Lifespan of Landfill

The estimated closure date of the landfill is 2020; there is currently no closure plan in place.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on an occasional basis of an estimated 4 hours per week, in addition to twice per week waste collection.

The landfill operator in Kakisa has not completed any training.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. Hazardous wastes are stockpiled at the landfill. Hazardous waste is deposited adjacent to the bulk metals. A sign indicates the location of the segregated area, however no controls or containment (i.e., berms and liner) are in place.

Sewage Sludge Management

The sewage trench is located on the landfill site and adjacent to the bulk metals pile at the landfill. Sewage sludge from the trench has never been dredged. The estimated closure date for the sewage sludge trench is reported to be 2026 or beyond.

Historic Waste Disposal Sites

It is reported that historically, waste was deposited behind residences within the community. These areas contain MSW, bulky items and hazardous waste. It is further reported that these dump sites were cleaned up through an AANDC program, however there is a stated concern that contamination may still exist.

Opportunities for Waste Diversion

Kakisa residents participate in the GNWT BCP by transporting their beverage containers to the Hay River bottle depot for recycling. The community has indicated that it is interested in participating in additional waste diversion programs. In 2015, the community successfully applied to the ENR Waste Reduction and Recycling Initiative to create a community waste reduction plan.



Figure 7-19: Aerial Photograph of the Kakisa Active Landfill and Sewage Lagoon

7.19 Lutsel K'e

Information Sources

A community waste management survey was not completed for the community of Lutsel K'e. Information on the landfill was obtained largely from the water license application (2012) and the Operations and Maintenance Manual (FSC, 2003) and the site visit completed by Golder on June 18, 2015. Golder interviewed community staff including the SAO (Agatha Marlowe).

The following documents were obtained from the MVLWB registry and pertain to the review of waste management and landfill operations in Lutsel K'e:

- FSC Architects & Engineers, 1993. *Lutsel K'e (Snowdrift) Engineering Planning Study. Part 1 Planning Study*. May 1993.
- Lutsel K'e Dene Band, 2012. *Water Licence Amendment Application*. January, 2012.

General Information

The community of Lutsel K'e (62°24'N, 110°44'W) has a population of approximately 295 (Statistics Canada, 2012) and is located on the south shore of the eastern arm of Great Slave Lake, approximately 190 km east of Yellowknife. The community is accessible by barge and scheduled air service.

The mean annual precipitation as rainfall is 172.4 mm and as snowfall is 146.6 cm. The daily average temperature during the warmest month is 14.3°C, and during the coldest month is -28.1°C (Environment Canada, 2014).

The community obtains its water supply from Great Slave Lake from an intake line located on the north side of the community.

Landfill Location and Geographic Conditions

The community is accessible by barge and air service only. The landfill is located 1.8 km east of the community on Commissioner's land, and was first established in 1998 (MACA, 2014) (Figure 7-20).

The landfill is located approximately 500 m south of Great Slave Lake.

The community lies within the discontinuous permafrost zone, and has moderate amounts of ground ice. Poor drainage and peat bogs are prominent examples of a high permafrost table. On south facing slopes and elevated areas the permafrost is discontinuous to absent. The topography of the community is rugged, characteristic of the Canadian Shield. The community is near the southern border of sedimentary rock formations and is underlain by Precambrian sedimentary and volcanic rocks. The topography is typified by southeast-northwest linear trending gently sloping ridges on rocky terrain (FSC, 1993).

Based on observations during the 2015 site visit, the shallow soils in the vicinity of the landfill site consist of weathered shale and thin loam.

Regulatory Requirements

There is no water licence for the community of Lutsel K'e currently available through any of the Land and Water Board registries. The community previously had a water licence, but it expired on May 31, 2002. The status of the 2012 application referenced herein is not known.

There are no local bylaws or guidelines within the community related to solid waste management or operation of the landfill.

Use of the Landfill

The community landfill is only used by the residents of Lutsel K'e and not shared with any other communities. Based on discussions with community staff in 2015, the number of people that use the landfill is not expected to vary substantially over the year.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill site is accessed from the south side of the road leading to the community airstrip. The landfill covers an area of approximately 2 ha. The landfill is partially fenced; however, the fence is in a state of disrepair and requires attention. There is no access gate.

Community Waste Collection

Collection occurs three times per week, using a 10 m^3 collection vehicle. The SAO indicated that the collection vehicle is rarely full and is looking to reduce the collection frequency. Previously the collection was 5 days per week and has been recently reduced. It is estimated that less than 50 m^3 of waste is collected weekly.

Landfill Design

There is no landfill design listed in reports or apparent based on the operation of the landfill during the site visit. Waste is placed within the cell, largely consisting of a depression at the edge of a slope.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation is limited at the landfill. There are no signs delineating areas and as a result there is poor segregation of material.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- Hazardous waste;
- Bulk metals; and,
- CRD materials.

Landfill Management and Waste Handling

A loader is used to push waste away from access road. No compaction occurs as the community does not have an operational bulldozer. A front end loader is used to move the waste and keep it within the fenced area. No cover is placed, and it was reported by staff during the 2015 site visit that MSW is often burned at the site in the winter. It is also reported that cover is placed on the waste every two years.

Bulky metal is almost entirely stored beside the access road leading to the landfill. Hazardous waste is stored together on-site, but is not on a liner or within a bermed area.

Special Concerns, Environmental Risks and Future Planned Activities

Burning of the waste is a major concern and environmental risk. Standing water is present in the southwest corner of the MSW area and is evidently impacted by leachate based on the water colour.

Estimated Remaining Lifespan of Landfill

The estimated remaining lifespan of the landfill is unknown.

Human Resources

The community SAO is responsible for the overall operation of the landfill. The SAO estimates that collection requires 20 hours of staff time per week.

Hazardous Waste Management Practices

There is no hazardous waste management plan. Hazardous waste including paints, batteries and waste fuel and oils are stored together.

Sewage Sludge Management

No current information regarding the management of sewage sludge at the landfill is known. Previous studies (FSC, 1993) state that sewage deposited into the sewage lagoon permeates into the ground due to the high infiltration rates. The sewage then seeps through a low marshy area and eventually into the east end of the bay where Lutsel K'e is located.

Previous water quality sampling conducted in 1990 and 1991 did not show any exceedances.

Historic Waste Disposal Sites

The SAO was unaware of any historical waste locations.

Opportunities for Waste Diversion

Lutsel K'e is a satellite depot for the BCP under the *Waste Reduction and Recovery Act*. Periodic beverage container collection events are held in the community. The *I Care NWT* website instructs people to contact the ENR head office for depot information.



Figure 7-20: Aerial Photograph of Lutsel K'e Landfill (left) and Bulky Waste Storage Area (right).

7.20 Nahanni Butte

Information Sources

A community waste management survey was completed for the community of Nahanni Butte and this information has been incorporated into the community waste system profile. As no other reports could be found for the Nahanni Butte landfill, the information contained in the community summary was derived largely from the community waste management survey and Golder's site visit in 2015. Golder completed the site visit on June 10, 2015 and interviewed community staff including the Chief and the community foreman/operator.

There is no information available from the MVLWB registry for the community of Nahanni Butte.

General Information

The community of Nahanni Butte (61°02'N, 123°23'W) has a population of approximately 102 (Statistics Canada, 2012) and is located at the confluence of the Liard and Nahanni Rivers, 500 km southwest of Yellowknife. The community is accessible by winter road. There is an airstrip in the community, but there is no scheduled regular service.

The mean annual precipitation as rainfall is 238.6 mm and as snowfall is 187 cm. The daily average temperature during the warmest month is 17.4°C, and during the coldest month is -24.2°C (Environment Canada, 2014).

The water supply for the community is a groundwater well located within the community, approximately 1.5 km from the landfill.

Landfill Location and Geographic Conditions

The landfill is located approximately 1.9 km southwest of the community at the end of an access road. The landfill is located 1.4 km east of the Nahanni River. The landfill site is reported to be located on Commissioner's land, and was first established in 1990 (MACA, 2014).

The landfill is located in a floodplain. There are no descriptions of shallow soil provided in reports. Based on the 2015 site visit, the soils at the landfill consist largely of fine grained lacustrine silt and clay.

Regulatory Requirements

The community does not currently have a water licence. There are no local bylaws or guidelines within the community related to solid waste management or operation of the landfill.

According to the community waste management survey response, there is no unauthorized waste disposal occurring in the community.

Use of the Landfill

The landfill is used by the residents of Nahanni Butte and is not shared with any nearby communities. The community has received a request from a nearby camp to use the landfill for food waste and similar waste streams. The community has authorized this request. Parks Canada ships waste from the park for disposal at the sewage lagoon. The number of people that use the landfill fluctuates with the seasons, and an increase of approximately 300 people is reported by the SAO to occur during the summer months.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

Access to the landfill is not restricted; current hours of operation are from 9 am to 5 pm, however they are not enforced. There is a fence and a gate but these are left open, as the foreman indicated that when the gate is closed, community members deposit waste at the gate. Wildlife can access the landfill.

Community Waste Collection

Waste is placed in bags by the residents and placed next to the road for collection. Individuals are also able to drop waste off at the landfill. Waste is collected two days per week by community staff, using a pickup truck. It is reported by staff that eight to ten loads are collected daily. Based on this, the weekly waste volume is estimated at less than 50 m^3.

Landfill Design

The landfill is operated as a trench fill landfill; the trench is excavated, as needed, to a depth of approximately three metres. Waste compaction is not possible as the trench does not have an access ramp. Some minor consolidation of the waste occurs as a result of the small size of the trench.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation at the landfill is largely limited to white goods, vehicles, empty drums and tires. There are no signs delineating areas for these materials, and as a result there is some mixing of the piles.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD materials;
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks; and,
- Tires.

Landfill Management and Waste Handling

There is no compaction of household waste and no interim cover is used. Closed cells are covered.

Special Concerns, Environmental Risks and Future Planned Activities

Previous floods are reported to have inundated the landfill area and represent a major concern with respect to environmental impact, as well as the ability to use the site.

Air related environmental risks related to windblown litter were identified through the community waste management survey. There were no special concerns or future planned activities identified through the community waste management survey. The community has held annual spring cleaning events to collect unauthorized waste deposited around the community.

Estimated Remaining Lifespan of Landfill

The community foreman indicated that there is space for another two cells to be excavated. Each cell is estimated to contain 4 to 5 years of waste.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on a part-time basis of 10 hours per week.

The landfill operator in Nahanni Butte has not completed any waste management training.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. Hazardous waste is stored in sea cans from post flood renovations.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage sludge lagoon. The estimated closure date for the sewage sludge lagoon is 2024. This is a new sewage lagoon with construction completed in March of 2014.

Historic Waste Disposal Sites

An historic landfill was described by the foreman as being adjacent to the airport bulk fuel facility. This historic landfill has been capped and there was no evidence of waste at the surface.

Opportunities for Waste Diversion

Nahanni Butte is a satellite depot through the BCP under the *Waste Reduction and Recovery Act*. Periodic beverage container collection events are held in the community. On the *I Care NWT* website individuals are instructed to contact ENR head office for additional information. The community did not indicate if they would be interested in participating in additional diversion programs.



Figure 7-21: Aerial Photograph of the Nahanni Butte Landfill and Sewage Lagoon

7.21 Norman Wells

Information Sources

A community waste management survey was not completed for the Town of Norman Wells. Information on the landfill was obtained largely from the 2009 landfill operating manual, the 2011 inspection report and a site visit completed by Golder on July 22, 2015. Golder interviewed community staff including the Director of Public Works and Utilities (Keith MacDonald).

The following documents were obtained from the SLWB registry and pertain to the review of waste management and landfill operations in Norman Wells:

- Aboriginal Affairs and Northern Development Canada, 2011. *Norman Wells Municipal Water Licence Inspection Report*.
- AECOM, 2009. *Norman Wells Operation and Maintenance Manual*.
- AECOM, 2008. *Landfill Expansion Master Plan*.
- Dillon Consulting Limited, 2004. *Background Report October 2004 Draft Submission – Prepared for Public Hearing and 2nd Reading*.
- Norman Wells, 2014. *Municipal Water Licence Annual Report*. Reporting date assumed (not provided in document).
- Northern News Service, 2014. "Eight bears shot in Norman Wells: Town building new fence to prevent animals from feeding at the dump". *Cody Punter article, published September 1, 2014.*

General Information

The Town of Norman Wells (65°16'N, 126°49'W) has a population of approximately 727 (Statistics Canada, 2012) and is located on the north shore of the Mackenzie River, 690 km northwest of Yellowknife and 450 km southeast of Inuvik. The town is accessible by winter road, barge and scheduled air service.

The mean annual precipitation as rainfall is 171.7 mm and as snowfall is 161.5 cm. The daily average temperature during the warmest month is 17.1°C, and during the coldest month is -26.1°C (Environment Canada, 2014).

The community water supply is obtained from the Mackenzie River.

Landfill Location and Geographic Conditions

The landfill is located approximately 6 km northeast of the community, on an unnamed road (Figure 7-22). It is located on Commissioner's land, and was first established in 1970 (MACA, 2014).

The landfill is located approximately 3 km from the Mackenzie River to the south and 1.5 km from Jackfish Lake to the northeast.

The community lies within the discontinuous permafrost zone. The town is also located within the Taiga Plains Eco zone; an area of low-lying plains centered on the Mackenzie River. Sedimentary bedrock underlies most of this ecozone (Dillon, 2004).

The landfill is situated between the rock outcrops and glacial deposits of the valley plain. The underlying material is a glacial moraine plain and is described as glacial till (clay, silt, minor sand and gravel). The bedrock beneath the glacial deposits is the Imperial Formation which is Upper Devonian in age and consists of shale, sandstone and minor limestone (AECOM, 2008).

Based on observations at the time of the 2015 site inspection, the soils local to the landfill consist of fine-grained material, consistent with the glacial till described in the reports.

Regulatory Requirements

The Town of Norman Wells was granted a water licence (no. S07L3-002) on August 2, 2008 for the disposal of MSW by the SLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on August 1, 2018. The local bylaws that govern landfill management in Norman Wells include Service Rates Bylaw No. 12-33 and Domestic Garbage Collection Bylaw No. 04-21. However, these bylaws are not actively enforced.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2013 annual report.

An Operation and Maintenance Manual is available for the landfill (AECOM, 2009). The most recent annual report and inspection report available through the Land and Water Board (Norman Wells, 2013; AANDC, 2011) lists reoccurring issues at the landfill, including wildlife, the need for electrified fencing and accumulation of batteries, fuel drums and other hazardous wastes that are only meant to be stored temporarily.

Use of the Landfill

The landfill is not shared with any nearby communities. The number of people in Norman Wells can vary according to industrial activities occurring in the region and additional activity and movement of goods and people during the winter road season.

Hazardous wastes are accepted at the landfill for temporary storage. ENR staff in the Norman Wells office have documented incidents of commercial businesses from the industrial sector depositing hazardous wastes at the Norman Wells landfill, without seeking permission or paying tipping fees to the Town of Norman Wells.

An agreement between the town and Esso allows waste from Esso to be stored at the site over the summer season, following which the waste is shipped out on the winter road.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

Based on the satellite airphoto, it is estimated that the landfill site is approximately 3 ha (150 m by 200 m). Access to the landfill is not restricted as the gate is unused. Whereas as there is an electric perimeter fence at the landfill, wildlife can access the landfill as the gate is left open and the electric fence is in disrepair. Bears are frequently observed at the landfill site and it is reported that eight bears where killed at the site in 2014 (Northern News Services, 2014).

Community Waste Collection

Waste is bagged by the residents and placed in communal steel bins, for collection. The landfill and collection services are operated and maintained by a private contractor. The contractor collects waste four days per week

(once per week per house) using a compactor truck. There are no available estimates for weekly waste collection volume.

Landfill Design

The landfill was designed using the cell method of waste disposal. A modified expanded landfill design is described in the Landfill Expansion Master Plan (AECOM, 2008).

Waste Receipt Procedures

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- White goods;
- Tires;
- Used oil, containers and filters;
- Lead-acid batteries;
- Fuel drums;
- End-of-life vehicles / parts;
- Discarded household oil tanks and larger fuel storage tanks);
- Cardboard;
- Clean wood waste; and,
- Bulky metals;

Landfill Management and Waste Handling

Waste is covered two to three times per week with a loader. This is performed by a local contractor as the town does not own or operate any heavy equipment. The contractor uses a bulldozer once per week to compact the waste.

Special Concerns, Environmental Risks and Future Planned Activities

A request for tenders has recently been let by the town to enter in an agreement with a contractor for the removal of wastes from the landfill on an “as and when needed” basis. This is not limited to hazardous wastes, but all waste which may be shipped to a southern receiving facility for recycling or ultimate disposal.

Estimated Remaining Lifespan of Landfill

The estimated remaining lifespan of the landfill is unknown, however the landfill Master Plan suggests it could be on the order of 75 years based on the proposed modified landfill design. A 2075 closure plan has been indicated.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is performed by a local contractor.

Hazardous Waste Management Practices

Hazardous wastes are stored in a bermed area and include: batteries, used oil and antifreeze. There is a significant accumulation of hazardous waste at the site. A number of batteries were observed, ouside of the bermed area.

A waste inventory and labelling program was completed for Ecology North in 2013, at which time it was noted that hazardous waste was present at the landfill site (KBL, 2013b). At the time of the inventory, a total of 259 drums (205 L) and 6 pails (20L) of hazardous waste was present, along with totes, paint material, propane cylinders and batteries.

Sewage Sludge Management

A dewatering pump has recently been purchased to undertake removal of sludge from the lagoon in an effort to increase the lifespan of the sewage lagoon. The dewatering of the sludge is to occur adjacent to the lagoon, not at the landfill cell.

Historic Waste Disposal Sites

No historical waste disposal sites were noted in earlier reports, or to Golder during the Golder 2015 site visit.

Opportunities for Waste Diversion

Norman Wells currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community bottle depot, at which point the bags or bales of containers are sent to the Hay River regional processing centre. At the time of writing this report, the depot in Norman Wells was located at 47 Mackenzie Drive, operated by Norman Wells Recycling.



Figure 7-22: Aerial Location of the Norman Wells Landfill

7.22 Paulatuk

Information Sources

A community waste management survey was completed for the Hamlet of Paulatuk and this information has been incorporated into the community waste system profile. Information on the landfill was also obtained from the 2004 Operation and Maintenance Manual, the 2011 inspection report, the 2009 water licence renewal application and the 2012 annual report, as well as the Golder site visit in 2015.

Golder conducted a site visit to the Paulatuk landfill on August 11 and 12, 2015. Interviews with the SAO (Greg Morash) and the community works foreman (Keith Dodge) were also undertaken. A site visit to the location of an historical landfill to the west of the community was also undertaken at this time.

The following documents obtained from the IWB registry pertain to the review of waste management and landfill operations in Paulatuk:

- Aboriginal Affairs and Northern Development Canada, 2011. *Hamlet of Paulatuk Municipal Water Licence Inspection Report.*
- Community of Paulatuk, 2013. 2012 *Annual report. Assumed report date (not provided on document)*.
- Dillon Consulting Limited, 2009. *Hamlet of Paulatuk Water Licence Renewal Application*.
- Dillon Consulting Limited, 2004. *Operations and Maintenance Manual, Sewage and Solid Waste Facility*.

General Information

The Hamlet of Paulatuk (69°21'N, 124°04'W) has a population of approximately 313 (Statistics Canada, 2012) and is located adjacent to Darnley Bay in the Amundsen Gulf of the Beaufort Sea, 890 km northwest of Yellowknife and 404 km northeast of Inuvik. The hamlet is accessible by barge and scheduled air service.

The mean annual precipitation as rainfall is 92.9 mm and as snowfall is 131.8 cm. The daily average temperature during the warmest month is 10.1°C, and during the coldest month is -26.2°C (Environment Canada, 2014).

The Paulatuk community water supply is located in New Water Lake, approximately 1.5 km southeast of the community.

Landfill Location and Geographic Conditions

The landfill is located approximately 1.8 km southeast of the community along an unnamed road (Figure 7-23) and is located on community/municipal land. The landfill is reported to have been established in 1980; the exact size of the landfill site is not outlined on maps provided in the water licence application.

The community lies within the continuous permafrost zone with predominantly sandy, glacial till and marine sands and silts (Dillon 2009). Based on the site visit completed by Golder in 2015, the shallow soils at the landfill consist largely of coarse sand and gravel beach deposits.

Regulatory Requirements

The Hamlet of Paulatuk was granted a water licence (no. N7L3-1619) on November 30, 2009 for the disposal of MSW by the IWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on

November 20, 2015. A new water licence, N7L3-1619, was approved for the community subsequent to the site visit and summary by Golder, and is not further discussed herein or included in the database. There are no local bylaws or guidelines that govern landfill management in Paulatuk.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2012 annual report.

A solid waste facility operation and maintenance manual is not available for the landfill but was requested by the AANDC inspector in 2010. It is reported by the Supervisor that this manual will be prepared as part of the current water licence application under preparation at the time of the site visit.

There is no reported unauthorized waste disposal occurring in the community.

Use of the Landfill

The landfill is not shared with any other communities. The number of people that use the landfill does not fluctuate seasonally.

The landfill has not received any requests from private industry to use the landfill, however it is noted that waste deposited in the landfill cell and the bulky waste area includes packaging and leftover material from construction activities for community buildings and the airport.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill site is located approximately 1.8 km southeast of the community and is accessed off an unnamed road leading from the west side of the community.

The overall size of the community landfill site is not defined. A land parcel of approximately 10 ha is outlined in the area of the sewage lagoon (“Dead Lake”), presumably corresponding to the licence for that facility, however the landfill cells and the bulky waste areas lie outside of these limits. As noted in the 2009 water licence application and the site visit, there is significant space for new cells to be constructed, however some cells constructed closer to Darnley Bay are flooded and cannot be used.

The landfill is located adjacent to the sewage lagoon and approximately 230 m from Darnley Bay to the west, and 150 m from Old Water Lake to the north. Based on topography, the landfill site and sewage lagoon are not within the drainage area of the community water supply at New Water Lake (Dillon, 2009).

Access to the community landfill is occasionally restricted during off-hours using a front gate during the summer and signage year round. The regular hours of operation for the landfill are 9 am to 5 pm, Monday and Friday only, however the landfill site is open at other hours and contractors regularly drop off waste from construction projects.

A fence is present on the northern side of the landfill, however there is no fence on the other sides, and therefore wildlife can access the site. Brown bears are commonly present at the landfill and have damaged the existing fence. The purpose of the fence is largely for litter control as the prevailing winds are from the south, and to limit public access from the community side when the gate is closed. Community staff indicate that they intend to shut the gate in the evenings to prevent contractors from depositing waste while unsupervised.

Community Waste Collection

Waste is placed in bags by the residents and placed next to the road for collection. Waste is collected two days per week (Monday and Friday) by community staff, using a side-loading collection truck with a capacity of approximately 11 m^3. It is reported that up to eight loads of waste are collected daily, amounting to an estimated maximum of approximately 160 m^3 per week (based on partly full vehicles).

Landfill Design

The landfill was designed using the trench method of waste disposal. It is most recently (2009) reported that the cells are 50 m by 15 m in size and 4.5 m deep, resulting in a volume of approximately 3,400 m^3.

Waste Receipt Procedures

There are no defined waste receipt procedures for the landfill and there is no site attendant; however, there are usually community staff at the site on a regular basis when waste and sewage is disposed.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Used oil;
- Lead-acid batteries;
- Tires;
- Fuel drums;
- End-of-life vehicles;
- Discarded household oil tanks and larger fuel storage tanks); and,
- Bulky metals;

The above areas are not marked with signage. Information provided in the community waste management survey stated that the public does not adhere to dropping these wastes off in the specified areas; however, it appears that staff move the material as required.

Landfill Management and Waste Handling

It is reported by staff that the active waste face is pushed back weekly using a front end loader. Waste is compacted less frequently, no more than monthly and possibly only a few times in the summer (April to October) months. Cover is not frequently applied to the landfill cell and windblown litter was observed. Whereas the older part of the active waste cell appeared to be compacted, there was no cover placed on the area which was reported to have been placed early in the summer.

There are separate disposal areas for MSW, wood/cardboard, hazardous materials and bulky metal waste. Based on the most recent AANDC inspection and Golder's site visit, separation of the bulky metal waste has been well managed at the Paulatuk landfill. At the time of the 2015 site visit, it was noted that a housing unit had been

demolished and dumped in the bulky waste area. It was also observed that some burning had taken place in the wood waste cell. Waste materials in the active MSW cell included a substantial portion of packing materials and leftover construction debris from a construction project for a new community building. It was also noted that leftover material from airport runway upgrades were also deposited in the bulky waste area.

The closed landfill cells have been capped with local sandy soils, however it is noted that in some areas, the cap has settled as a result of waste consolidation and degradation. It is suggested that the cover be stripped from these areas and additional waste placed, followed by replacement of the final cover, to allow for positive drainage off the cell.

A new hazardous waste storage area had been recently constructed in the south part of the fill area by excavating into the side of the hill and using the material to make a berm to the south. It was noted that snow would likely fill into this area in the winter, preventing its use. The base of this cell was not lined.

Former soil remediation piles were noted to the west of the active fill area. Based on the reported age of the piles (over 5 years old) and visual and olfactory observations, it is recommended that this soil be sampled and be used as daily cover following approval from appropriate regulatory bodies.

There is no containment or collection of leachate, and surface water runoff from the current cells flow to the sewage lagoon.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern identified by the community is that they would like to improve their management of waste streams, including increased segregation and removal of large and/or hazardous items; however, there are no resources to complete these tasks. Hazardous waste stockpiled in the community for shipping is leaking into the soil, and cannot be shipped until funding is identified. The Supervisor indicated that they plan to move this material back to the landfill site.

Contaminated soil was identified through the community waste management survey as a known environmental risk. This is due to oil and battery acid contaminated soil and the potential dumping of transformers 10 to 20 years ago. There are no planned activities related to landfill management in the near future.

Estimated Remaining Lifespan of Landfill

As reported in the community waste management survey, the estimated remaining lifespan of the landfill is 10 years (estimated closure in 2024). There is currently no closure plan for the landfill.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on a part-time basis of 16 to 20 hours per week. The landfill operator has not completed any waste management training.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. The hazardous wastes in the community are handled by municipal staff. Hazardous waste such as waste paint, used oil, antifreeze and over 150 full old fuel

drums are stockpiled at the landfill unprotected and also in town. They are stockpiled until such time as they may be transported out of the community by barge (Dillon, 2009).

The Supervisor indicated that the annual hazardous waste generation included 5 to 10 barrels of used oil and antifreeze and 10 to 15 batteries.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at the landfill site, below the landfill site and the community works yard (KBL, 2013a). At the time of the inventory, a total of 356 drums (205 L) and 11 pails (20L) of hazardous waste was present, along with propane cylinders, heating oil tanks and vehicles.

Sewage Sludge Management

Sewage sludge has never been dredged from the sewage lagoon. The closure date for the sewage lagoon has not been established.

Historic Waste Disposal Sites

An historic landfill was identified at a location immediately west of the community and south of the airport. At the time of the inspection, the cover material appeared to be reasonably intact and only minor areas contained visible waste at surface. The approximate latitude and longitude for the historical landfill is 69.352°N, -124.080°W.

Opportunities for Waste Diversion

Paulatuk currently diverts beverage containers through a satellite depot of the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. There is no designated depot within the community listed on the *I Care NWT* website; instead periodic beverage container collection events are held in the community.

The community has indicated that it is interested in participating in additional waste diversion programs.

It is noted that wood from demolition of a housing unit was placed in the bulky waste area, however it was recommended by the Land and Water Board that this material be buried in the waste cell. It is suggested that, where possible, future demolition be organized in a way to allow scavenging of the wood from such operations. It is further recommended that allowable burning of clean wood, paper and cardboard be conducted at a location remote from the active waste fill area, for example in the area where the remediated soil is presently stored.



Figure 7-23: Aerial Location of the Paulatuk Landfill

7.23 Sachs Harbour

Information Sources

A community waste management survey was completed for the Hamlet of Sachs Harbour by the SAO on March 19, 2014. Information on the landfill was also obtained from the 2012 water licence renewal application, the 2010 annual report, and the 2011 inspection report.

Golder completed a site visit to the community landfill on September 9, 2014 and interviewed community staff including the SAO (Stephen Wylie) and the hamlet foreman (Darren Nasogaluak).

The following key documents obtained from the IWB were reviewed to assess waste management and landfill operations in Sachs Harbour:

- Aboriginal Affairs and Northern Development Canada, 2011. *Sachs Harbour Municipal Water Licence Inspection Report*. Completed by Jan Davies on September 26, 2011. Department of Environment and Natural Resources Government of the Northwest Territories (ENR), 2013. *Ecological Regions of the Northwest Territories Northern Arctic Ecosystem Classification Group*.
- Sachs Harbour, 2011. 2010 Annual Report. July 11, 2011.
- Sachs Harbour, 2012. *Water Licence Renewal Application*. October 11, 2012.

General Information

The Hamlet of Sachs Harbour (71°59'N, 125°14'W) has a population of approximately 112 (Statistics Canada, 2015) and is located on the southwestern coast of Banks Island on the Amundsen Gulf, 1,165 km northwest of Yellowknife and 516 km northeast of Inuvik. The hamlet is accessible by barge and scheduled air service.

The mean annual precipitation as rainfall is 58.3 mm and as snowfall is 97.7 cm. The daily average temperature during the warmest month is 6.6°C, and during the coldest month is -28.3°C (Environment Canada, 2014).

The nearest water body, the Beaufort Sea, is located 600 m to the south of the landfill. A small drainage course and wetland is noted north of the landfill towards Mary Sachs Creek. The community water supply is obtained from a freshwater lake located northwest of the community and approximately 4 km east of the landfill. Based on topography, the water supply is upgradient of the landfill.

Landfill Location and Geographic Conditions

The landfill is located approximately 7 km west the community (Figure 7-24) on Commissioner's land, and was first established in 1990. The limits of the landfill have not been defined.

The community is within the South Banks Coastal Plain, and the presence of widespread ice wedge polygons, turf hummocks, non-sorted circles and stripes, low-centre polygons and numerous slope failures indicate it is an area of continuous permafrost (ENR, 2013).

The surficial soils at the site consist of sand and gravel. No bedrock was observed. The area is underlain by continuous permafrost. Surface water was observed to be ponding in the northern most corner of the inactive MSW cell. A wetland is present to the north of the site, hydraulically downgradient from the landfill.

Regulatory Requirements

The Hamlet of Sachs Harbour was granted a water licence (no. N7L3-1531) on November 21, 2012 for the disposal of MSW by the IWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on November 20, 2017. There are no local bylaws or guidelines that govern waste management in Sachs Harbour.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2010 annual report. A solid waste facility operation and maintenance manual has not been completed for the landfill. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) lists a number of ongoing issues outlined in previous years' inspection reports. These issues are related to the leaking of liquid waste from drums, contaminated soil that should be moved into the land farm area, the placement of a liner under the contaminated soil and a berm around the area to prevent off-site contamination, proper signage for waste segregation, placing interim cover and fencing to prevent windblown litter, and the proper storage and handling of hazardous waste. Additionally, the inspector noted that the waste cells are reaching capacity, but there had been no planning studies undertaken to design a new landfill cell or landfill site.

There is no unauthorized waste disposal reported to be occurring in the community; however, the 2011 inspection report noted that unorganized dumping was occurring throughout the landfill site area.

Use of the Landfill

The landfill is used solely by the residents and institutional/commercial operations in Sachs Harbour and is not shared with any other communities. The SAO indicated that the number of individuals in the community varies seasonally due to families relocating to Inuvik for the school year.

The landfill has not received any requests from private industry to use the landfill.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2011 inspection report and the Golder site visit in September, 2014.

General Information and Landfill Access

Access to the landfill site is from an unnamed road which leads west from the community towards Mary Sachs Creek. Access to the landfill is not restricted and there are no set hours of operation. The landfill area is approximately 2 ha in size.

Community Waste Collection

The landfill and collection services are operated and maintained by municipal staff. Waste is collected two days per week. Waste is placed in bags by the residents and placed next to the road for collection. Most residents rely on the community waste collection service, as most residents rely on snow machines and all-terrain vehicles for transportation. Waste is primarily delivered to the site by the hamlet waste truck and is placed in the MSW cell.

Landfill Design

The landfill was designed using the area method of waste disposal. The MSW cells have been constructed using the area method, as per the design, and berms surround the closed and active cells. The landfill does not have a formal design and a single sign indicates where MSW is to be placed and that no metals are to be included in the

MSW cell. It is reported in the 2012 water licence renewal application that design of a new cell will be undertaken following hiring of an engineering firm. A new cell has not been designed at this time.

Waste Receipt Procedures

As noted above, waste is collected by the community staff. Waste is reported to also be placed at the landfill by residents and contractors, with no direction from community staff as to placement method or location. No signage is present to direct community members how to segregate their waste. Waste materials at the site were observed to be poorly segregated. Waste was generally separated as follows:

- MSW;
- Vehicles;
- Drums;
- Household fuel tanks; and,
- Unsorted bulk items;

Landfill Management and Waste Handling

A D6 bulldozer used for compaction is parked near the entrance of the landfill. The hamlet foreman indicated that the bulldozer was not currently in operation and required some repairs. A loader is currently mobilized to site as needed to move the MSW into the active cell as the bulldozer is not operational. Community staff are present at the landfill each week to conduct waste disposal.

Compaction of the MSW is completed on a monthly basis during the summer months using the D6 bulldozer. Interim/daily cover is not applied at the site. Two cells remain uncovered: the closed cell and the active cell. The closed cell has been compacted and is ready for cover, however the hamlet foreman indicated that due to dumping of waste in the closed cell, additional compaction will be undertaken prior to cover placement. The closed cell showed evidence of recent burning activity. The active MSW cell is identified by a sign.

The landfill area is elevated above the surrounding terrain. The foreman indicated that the majority of the landfill is constructed on previously capped MSW cells.

The landfill is a natural attenuation design and therefore other than the berms, there is no containment or collection of leachate. Surface and groundwater monitoring is not carried out on a regular basis. The hamlet foreman indicated that an inspector (AANDC) carried out some sampling from the ponded water in the inactive MSW waste cell recently. Burning of combustible waste was formerly undertaken at the landfill, however it is reported in the 2011 inspection report that this practice has recently stopped. During the Golder 2014 site visit, evidence of ongoing burning was observed.

Partial fencing is in place to control windblown litter from the active MSW cell.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern identified by the community was the presence of wildlife, especially polar bears and wolves at the landfill and the risk they pose to workers. Other environmental concerns that were identified pertained to dust and windblown litter. There are currently no future plans for the landfill, but the community expressed interest in improving segregation and bringing the landfill into compliance.

Estimated Remaining Lifespan of Landfill

The lifespan of the landfill was reported in the 2012 water licence renewal to be 20 years (i.e., 2022). There is no closure plan in place.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff, but the level of effort required to manage the landfill is unknown. Collection is carried out twice per week by hamlet staff using a pickup truck.

The landfill operator in Sachs Harbour has not completed any waste management training.

Hazardous Waste Management Practices

Hazardous waste was observed throughout the landfill. Hazardous waste noted during the Golder site visit included waste batteries, paint, oils, and drums containing product. Staining was noted on the ground near the bulk of the drums. Drums are stored upright throughout the landfill. More than 10 vehicle batteries were noted along the MSW berm along the western edge of the site. Fuel drums, oil containers and paint cans were noted to be mixed in with the MSW. The contents of these containers were not confirmed. A number of grocery bags of shotgun and rifle ammunition was observed outside of the bermed area of the inactive MSW cell. It is understood that this latter material has since been removed.

The landfill does not have a hazardous waste management plan. Based on the 2011 inspection report, there is no segregation or special handling of hazardous waste; it is placed in the landfill along with other waste.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at both the landfill site (KBL, 2013a). At the time of the inventory, a total of 468 drums (205 L) of hazardous waste was present, propane cylinders and vehicles.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage lagoon. There is no estimated closure date for the sewage lagoon.

Historic Waste Disposal Sites

There is an historic landfill site located at the western edge of town, however the size, years of operation and types of waste contained within it are unknown. The site was visited by Golder staff during the 2014 visit with the SAO. The latitude/longitude of the historic landfill is approximately 71.988°N, -125.266°W.

Opportunities for Waste Diversion

Sachs Harbour operates a satellite depot through the GNWT BCP, twice annually. The community has indicated that it is interested in participating in additional waste diversion programs.



Figure 7-24: Aerial Location of the Sachs Harbour Landfill

7.24 Trout Lake (Sambaa K'e)

Information Sources

A community waste management survey was completed for the community of Trout Lake and this information has been incorporated into the community waste system profile. Additional information was obtained from the sources noted below, as well as the Golder site visit completed on June 10, 2015. Golder interviewed community staff including the SAO (Ms. Ruby Jumbo), and the community foreman/operator.

The following documents obtained from the MVLWB pertain to the review of waste management and landfill operations in Trout Lake:

- Aboriginal Affairs and Northern Development Canada, 2011. Trout Lake Municipal Water Licence Inspection Report. Completed by Michael Martin on March 24, 2011. March 29, 2011.
- Lafontaine, C and Sambaa K'e, 2012. Sambaa K'e Municipal Environment Waste Management Practices and Monitoring Program.
- Vista Engineering, 1994. Trout Lake Water Supply Engineering Planning Study Final Report.

General Information

The community of Trout Lake (60°26'N, 121°4'W) has a population of approximately 92 persons (Statistics Canada, 2012) and is located on the southeast shore of Trout Lake, 430 km southwest of Yellowknife. The community is accessible by winter road and air.

The mean annual precipitation as rainfall is 217.4 mm and as snowfall is 138.9 cm. The daily average temperature during the warmest month is 16.1°C, and during the coldest month is -21.8°C. The community obtains its water supply from a storage reservoir, fed from Trout Lake.

Landfill Location and Geographic Conditions

The landfill is located approximately 3.5 km south of the community along an unnamed road (Figure 7-25) and approximately 2.5 km from Trout Lake. The landfill is located on Commissioner's land, and was first established in 1992 (MACA, 2014). The landfill is estimated to cover less than 0.5 ha. The community lies within the discontinuous permafrost zone in a heavily wooded and flat area. Soils are typified by a thin veneer of sand and gravel or peat over dense clay till. It is reported that there are no permafrost features evident, although the clay soils are highly frost susceptible and very soft during the spring (Vista Engineering, 1994). Based on the soils observed during the 2015 site visit, the shallow soils at the landfill site consist largely of gravelly sand.

Regulatory Requirements

The community of Trout Lake does not currently have a water licence. Trout Lake submitted an application for a water licence on November 21, 2012 but it was deemed incomplete by the MVLWB. The community was asked to provide an Operation and Maintenance Manual, a sampling schedule and criteria used to determine if wastewater and backwash water from the water treatment plant can be discharged to the surface or to the sewage treatment facility. The community was also asked to submit a spill contingency plan as part of a complete application. There are no local bylaws or guidelines that govern landfill management in the community.

An Environment Waste Management Practices and Monitoring Program is available for the landfill (Lafontaine and Sambaa K'e, 2012). The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) identified a number of areas for improvement with regards to waste disposal and hazardous waste storage procedures at the landfill. These included consolidating used oil into one location with spill containment and recovery materials on-site, the need for secondary containment for hazardous waste storage, erecting signs to aid with segregating waste and regularly burying and covering household refuse to minimize windblown waste on-site.

There is no unauthorized waste disposal reported to be occurring in the community.

Use of the Landfill

The landfill is used by the residents of Trout Lake and is not shared with any other communities. The number of people that use the landfill does not fluctuate seasonally.

The community has not received any requests from private industry to use the landfill. Contractors are encouraged to remove any hazardous or chemical waste that they generate within the community.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill site is accessed off the unnamed road leading from the south end of the community. The landfill covers an area less than 0.5 ha. Access to the landfill is not restricted (i.e., there is no gate). Whereas there is a fence surrounding the landfill, it is reported that bears can access the landfill by climbing the existing fence.

Community Waste Collection

Waste is collected three days per week which results in one pickup load per collection day from the community and one pickup load per collection day of cardboard waste from the store. Waste is placed in bags by the residents and placed next to the road for collection. Assuming a maximum truck volume of 2 m^3, this suggests a weekly waste volume of up to 6 m^3 of MSW.

Landfill Design

The landfill was designed using the trench fill and cover method of waste disposal.

Diapers and bones are placed in separate pits (Lafontaine and Sambaa K'e, 2012).

Waste Receipt Procedures

The waste receipt procedures at the landfill are unknown. There are separate disposal sites for diapers, and animal carcasses.

Waste materials at the site were observed to be generally separated as follows:

- MSW / CRD;
- White goods;
- Paint cans;
- Lead-acid batteries; and,

- Bulk metals;

It is reported in the community waste management survey that the public does not always adhere to dropping off these items in the specific areas.

Landfill Management and Waste Handling

According to the community staff, a D-4 bulldozer is used every few weeks in the summer months to compact waste. Cover is not regularly applied at the landfill.

A small steel container is located adjacent to the active cell, where residents are able to burn paper and cardboard waste.

Clean wood waste is collected at the old landfill and is burned in the fall/winter months. The approximate latitude and longitude of the old landfill is 60.435°N and -121.222°W.

There is no containment or collection of leachate. Surface water and groundwater monitoring are not carried out.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern identified by the community was that bears climb over the fence surrounding the landfill; an electric fence and gate is required to prevent this from occurring in the future. The community did not identify any environmental risks associated with the landfill. The community is currently in the planning stages to develop a new landfill within the next one or two years.

It was noted by staff that 44 drums of hazardous waste (oil, antifreeze) were shipped out of the community for proper disposal within the last few years.

Estimated Remaining Lifespan of Landfill

The estimated closure date for the landfill is 2015. The community is currently working on a management plan with ENR.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on an occasional basis of approximately 1 hour per week.

The landfill operator in Trout Lake has not completed any waste management training.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. The hazardous wastes in the community are handled by municipal staff. Hazardous waste such as batteries, paint cans, and other hazardous waste materials are accepted and stockpiled at the landfill.

Sewage Sludge Management

Sewage sludge from the lagoon is not dredged. Once per year the three sewage lagoons are pumped into the muskeg south of the lagoons. The estimated closure date for the current sewage lagoon is 2017.

Historic Waste Disposal Sites

There are two historic landfill sites located in or near the community. One is located behind the works department (estimated closure date of 1982); the other is located outside the community near the gravel stockpile (estimated closure date of 1986). The community has indicated that they would like to do testing and clean up these historic waste sites, but there is no budget to do so. These landfills contain MSW and hazardous waste.

Opportunities for Waste Diversion

Trout Lake currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community depot, at which point the bags or bales of containers are transported to the Hay River regional processing centre. At the time of writing this report, the depot in Trout Lake was located at the Band Office, operated by Sambaa K'e Development Corporation.

Trout Lake also started a small-scale composting program in 2013 in conjunction with the community garden. Community members have expressed interest in participating in additional waste diversion programs (ENR staff, personal communication, 2014).



Figure 7-25: Aerial Location of the Trout Lake Landfill

7.25 Tsiigehtchic

Information Sources

A community waste management survey was completed for the charter community of Tsiigehtchic by the SAO on April 24, 2014. Information on the landfill was also obtained from the 1999 water license renewal application and the 2005 water license.

Golder completed a site visit to the community landfill on September 10, 2014 and interviewed community staff including the SAO (Ms. Marjorie Dobson) and the hamlet operator.

The following key documents were obtained from the GLWB and reviewed to assess waste management and landfill operations in Tsiigehtchic:

- Gwich'in Land and Water Board, 2005. *Tsiigehtchic Water Licence*.
- Tsiigehtchic, 1999. *Water Licence Renewal Application*.

General Information

The charter community of Tsiigehtchic (67°26'N, 133°44'W) has a population of approximately 143 (Statistics Canada, 2012) and is located at the confluence of the Mackenzie and Arctic Red Rivers, 1,063 km northwest of Yellowknife and 102 km south of Inuvik. Access to the community is via an all-weather road and seasonal ferry / ice-crossing. Access to the community is restricted for a few months during the spring and fall when neither the ferry nor ice road are operating. There is no airstrip in the community.

The mean annual precipitation as rainfall is 145.9 mm and as snowfall is 152.5 cm. The daily average temperature during the warmest month is 15.2°C, and during the coldest month is -27.5°C (Environment Canada, 2014).

The community obtains its water supply from Tso Lake, located approximately 2.6 km south of the community.

Landfill Location and Geographic Conditions

The landfill is located approximately 1.5 km east of the community along an unnamed road (Figure 7-26) approximately 500 m from the Mackenzie River. It is located on community/municipal land, and was first established in 1980. No information related to the history of the landfill prior to the water licence application is known.

The sewage lagoon is located approximately 90 m east of the MSW cell.

The area is underlain by glacial till over sandstone and shale formations. To the north of the landfill, the shale and sandstone formations are visible along the banks of the Mackenzie River. The surficial soils at the site consist of glacial till.

Dense black spruce forest surrounds the MSW and bulk metals sites. No surface water was observed to be ponding within the MSW site. Ponded water is present in the southernmost edge of the bulk metals site, where a small wetland area receives surface water drainage from the site. A sheen was observed on the water surface.

Regulatory Requirements

The charter community of Tsiigehtchic was granted a water licence (no. G99L3-004) on August 1, 2005 for the disposal of MSW by the GLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on July 31, 2015. The local bylaw that governs waste management in Tsiigehtchic consists of a solid waste disposal rate bylaw.

The water licence requires that an annual report be filed with the Land and Water Board. No annual reports were available.

A solid waste facility operation and maintenance manual is not available for the landfill, but it is reported by the SAO that the community is currently working on developing one. There are no annual reports or inspection reports available through the Land and Water Board registry for the landfill.

It is reported that unauthorized dumping of MSW and vehicles occurs within town, on the land and at the landfill site.

Use of the Landfill

The landfill is used by the residents of Tsiigehtchic and is not shared with any nearby communities. The number of people that use the landfill does not fluctuate seasonally, but it was noted that use of the landfill increases when there is construction activity in town.

The community has received requests from private industry to use the landfill, and in some cases industry has used the landfill without seeking permission. Construction waste and waste from the contracted Mackenzie / Arctic Red River ferry operation has been dumped at the landfill without authorization. In one case, a contractor was given permission to deposit a small amount of household-style camp waste at the landfill, for a tipping fee and with permission from the community government (Communications with SAO, 2014). A recent request to dump contaminated soils at the landfill was rejected. A contractor working for Northwestel has abandoned a large pile of scrap metal within the community (Communications with SAO and Community Government staff during ENR site visit, May 2014).

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely based on the Golder site visit in September of 2014 and discussions with the SAO and community operators during this visit.

General Information and Landfill Access

The entrance to the landfill is off an unnamed road east of the community, which provides access to the sewage lagoon and a communication tower. Signage is present to direct individuals to the MSW site north of the unnamed road and to the bulk metals site south of the unnamed road. There is no fencing or gate restricting access to the landfill site and there are no set hours of operation. Signage is in place to help with the segregation of waste. Wildlife can access the landfill as it is not fenced.

The landfill site covers a total area of approximately 0.8 ha. This area is divided into two fill areas. One site contains bulk metals, tires, vehicles and white goods, whereas the other site contains the MSW, a burn tower, honey bag pit and hazardous goods pad.

Community Waste Collection

Waste is collected two days per week. Waste is placed in bags by the residents and placed next to the road for collection. During the spring/summer there is a community wide clean-up day where the entire community picks up waste throughout the community. Heavy equipment is used to move large items from homes and businesses to the landfill. Honey bags continue to be collected from a small number of residences which do not have sewage tanks and are disposed at the landfill site.

Landfill Design

The landfill design is based on the area fill method; the MSW cell covers an area of approximately 0.4 ha. The community operator indicated that an underlying waste layer was recently capped. The second layer has also been capped but is partly open and active filling is taking place.

A pit for honey bags is located adjacent to the MSW cell. A bermed gravel pad is used to store hazardous wastes and a separate site 50 m to the south of this pad is used to stock bulk metals, vehicles, tires and white goods.

Waste Receipt Procedures

There are no waste receipt procedures at the landfill. Community collection staff deposit waste twice each week on collection days.

Waste materials at the site were observed to be generally separated as follows**:**

- MSW;
- White goods;
- Tires;
- Burnable material;
- Used oils;
- Jerry cans;
- Batteries;
- Drums;
- Vehicles;
- Contaminated soils (small quantities in 5 gallon pails);
- Household fuel tanks; and,
- Brush.

There are separate disposal areas for MSW, oil, contaminated soils, honey bags, batteries, wood waste, old vehicles, bulk metals, fuel tanks, white goods and tires. It is reported that the public is inconsistent in adhering to dropping these items off in their specified areas and therefore community staff assist in the segregation of materials.

A large diameter culvert has been converted into a burn tower and is used to dispose of clean wood waste. The burn tower is located adjacent to the MSW cell.

The SAO indicated that three households in the community do not have sewage storage tanks. For this reason they still use honey bags. Honey bags are disposed of at the landfill in a pit south of the burn tower**.**

Landfill Management and Waste Handling

Compaction of household waste is conducted on an as needed basis; with additional compaction occurring during the summer months. Community operators push up the waste each week and cover during the summer months.

The MSW cell has been constructed and filled on the basis of the area method. The area is currently capped and contains two separate lifts of waste. Each lift has been capped. The first lift was placed in a bermed area then capped. The second lift did not receive a berm and was subsequently capped. Waste is visible around the entire perimeter. The southern corner of the cell remains active, and no berm is in place. Each lift of compacted waste is an estimated 1.5 m deep.

The landfill is covered as needed throughout the summer. The landfill is a natural attenuation design and therefore other than the berms, there is no containment or collection of leachate. Surface water sampling is carried out by community staff at SNP locations around the landfill.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern for the landfill was noted to be the lack of a fence and gate to control access of wildlife and the public. The community also identified an air-related environmental risk of windblown litter during the summer. There are currently no future planned activities for the landfill.

Estimated Remaining Lifespan of Landfill

The reported estimated remaining lifespan of the landfill is approximately 10 years (closing in 2024). There is no closure plan for the landfill.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff, who spend a few hours each week attending to the landfill. During the summer months, the hamlet employs a group of part-time municipal workers who carry out some work at the landfill.

The landfill operator in Tsiigehtchic has completed the NWT School of Community Government's *Water and Waste Management* program, as well as some additional training through MACA.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan, however the community is working on developing one. Hazardous waste in the community is handled by public works staff. Signage is present to direct individuals how to segregate hazardous wastes.

The hazardous waste area is a bermed gravel pad with signage indicating where to leave hazardous waste materials. Staining was evident around the used oil drums. Contaminated soils are stored in open 5 gallon pails.

Batteries are stored on pallets and Jerry (fuel) cans are similarly stored on pallets. The majority of the jerry cans were upright and had no lids, which allows the entry of water.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at the landfill site (KBL, 2013a). At the time of the inventory, a total of 172 drums (205 L) and 133 pails (20L) of hazardous waste was present, along with heating oil tanks, batteries and vehicles.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage lagoon. There is no estimated closure date for the sewage lagoon. Honey bags are currently collected from three residences each week and disposed of in a honey bag pit at the landfill.

Historic Waste Disposal Sites

There is a historic waste disposal site in town, located beside lot 41 and lot 2. It was operational in the 1930s and 1940s; the contents and size of this landfill are unknown.

Opportunities for Waste Diversion

Tsiigehtchic has in the past diverted beverage containers through the BCP under the *Waste Reduction and* currently *Recovery Act,* however, there is currently no beverage container depot operating in Tsiigehtchic. Beverage containers that can be recycled include water, juice, milk and liquid milk products, energy drinks and alcohol containers. These containers can be sent to the Fort McPherson or Inuvik depots.

The community has indicated that it is interested in participating in waste diversion programs.



Figure 7-26: Aerial Location of the Tsiigehtchic Landfill

7.26 Tuktoyaktuk

Information Sources

A community waste management survey was completed for the Hamlet of Tuktoyaktuk. Information on the landfill was also obtained from the 2006 Operation and Maintenance document, the 2013 water licence Application, the 2012 inspection report and the site visit by Golder and ENR staff.

A site visit to the existing landfill and sewage lagoon was undertaken on August 13, 2015 by Golder and ENR staff. A visit to the new landfill site was not undertaken as this is located on the closed section of the new highway. An interview with the SAO (Terry Testart) and the public works manager was also completed.

The following documents were obtained from the IWB for the review of waste management and landfill operations in Tuktoyaktuk:

- Aboriginal Affairs and Northern Development Canada, 2011. *Hamlet of Tuktoyaktuk Water Licence Inspection Report*. Completed by Jan Davies, on September 8, 2011. September 22, 2011.
- AECOM, 2013. *Background Report for Water Licence Renewal*.
- AECOM, 2009. *Hamlet of Tuktoyaktuk Background Report for Water Licence Renewal*.
- EarthTech, 2004. *Hamlet of Tuktoyaktuk Water Licence Reporting Landfill Condition Assessment*.
- EarthTech, 2006. *Hamlet of Tuktoyaktuk Operation and Maintenance Documentation Municipal Solid Waste Facility*.
- IEG Environmental, 2006. *Sewage Lagoon Discharge Assessment Tuktoyuktuk, Northwest Territories*. February, 2006.
- Tuktoyaktuk, 2013. *2012 Municipal Water Licence Annual Report*. Date of report assumed, not shown on document.
- Testsart, T, 2015. Personal communication from Terry Testart, SAO. August 13, 2015.

General Information

The Hamlet of Tuktoyaktuk (69°26'N, 133°01'W) has a population of approximately 854 (Statistics Canada, 2012) and is located on the shore of the Beaufort Sea, 1,145 km northwest of Yellowknife and 125 km north of Inuvik. The hamlet is accessible by winter road, barge and scheduled air service.

Fresh water to the community is supplied from a reservoir that is be replenished from Kulak Lake, located 4.2 km to the east of the reservoir. The landfill is approximately is not located within the drainage area of the water supply lake.

The mean annual precipitation as rainfall is 74.9 mm and as snowfall is 103.1 cm. The daily average temperature during the warmest month is 11°C, and during the coldest month is -26.6°C (Environment Canada, 2014).

Landfill Location and Geographic Conditions

The landfill is located approximately 2.4 km south of the community, approximately 900 m south of the airport runway (Figure 7-27). The landfill is located on Commissioner's land, and covers an area of approximately 20 ha. The current landfill site has been in operation since the early 1970s.

The landfill site is located in the Tuktouaktuk Peninsula, immediately adjacent to Kugmallit Bay the Arctic Ocean. A gravel and clay berm was constructed on the west side of the site, approximately 30 metres west of the current active fill area. As a result, a surface water drainage lagoon was formed between the berm and the former and current waste fill area to the north and west of the lagoon. It is reported by community staff that this lagoon is occasionally drained following sampling and testing that the water quality meets the approved standards.

The community lies within the continuous permafrost zone, with an active layer typically less than 0.5 m. The terrain around the community is flat, barren tundra dotted with shallow lakes and pingos. The peninsula on which the community sits consists of coarse sand, silt, clay and gravel with interbedded ice lenses, formed from erosion material. The surrounding vegetation consists of moss, peat, grasses, lichens, and small bushes of willow and Labrador Tea and small flowering plants (AECOM, 2009).

Regulatory Requirements

The Hamlet of Tuktoyaktuk was granted a water licence (no. N7L3-0714) on November 21, 2013 for the disposal of MSW by the IWB, in accordance with the *Northwest Territories Waters Act*. The license expired on June 30, 2014. The local bylaw that governs waste management in Tuktoyaktuk consists of a tipping fee bylaw. It is reported that the community charges non-residential users (e.g., local commercial establishments, shipping companies, government facilities) for waste disposal.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent available annual report was submitted in 2012 (Tuktoyaktuk, 2013).

A solid waste facility operation and maintenance manual is available for the landfill (EarthTech, 2006). The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) commended the community on their efforts to improve compliance with reporting and shipping hazardous waste out for recycling. The inspection report also noted a number of ongoing issues that had been identified in previous inspections. These include a need to update the Operation and Maintenance Plan, the need to segregate and store hazardous waste in one place and a general lack of organization at the landfill.

Unauthorized dumping of MSW and hazardous waste is occurring at the landfill, as the facility gate is not closed.

Use of the Landfill

The landfill is used by the residents of Tuktoyaktuk and is not shared with other communities. The number of people that use the landfill fluctuates seasonally in that the population doubles during the summer months. Historically, the landfill received waste from the local oil and gas industry (EarthTech, 2004).

Hazardous waste and dangerous goods are not accepted at the landfill. As noted below, hazardous waste in the community is stored at the community works building. The landfill operators report that they have had difficulty enforcing the recent change to not accept hazardous waste at the landfill, and uncontrolled dumping of hazardous waste has been occurring.

The landfill has received requests from the following private industries to use the landfill:

- Oil and gas;
- Highway construction crews; and,
- Camps.

The landfill has authorized the disposal of household waste, food, steel, automotive and commercial wastes from industry. At the time of the site visit, it was noted that large booms were disposed of at the site, which were reported to be from a coast guard vessel; demolition waste from housing units was also observed.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill site is accessed from a road leading from the south end of the community. The site is approximately 20 ha in size. Access to the landfill is not restricted, but signage is present and the landfill is entirely fenced except for the west side where the berm and ocean front are located. There are no set hours of operation. Wildlife can access the landfill, however community staff report that bears have not been observed at this site.

Community Waste Collection

Waste is placed in bags by the residents and placed next to the road for collection by a firm contracted by the community. Individuals can also drop off waste at the landfill. The waste is collected three days per week using a side loading waste truck with a maximum estimated capacity of 8 m^3. Based on the reported collection of three truck loads per day, up to 70 m^3 of waste is disposed at the landfill on a weekly basis.

Landfill Design

Until 1984, the MSW disposal area was on the northern side of the site (now a remediated area); the southern side had limited use as a disposal area. The southwestern side of the remediated area contained a large pile of bulky waste, originally comprised of old cars and metal construction debris; this area was covered in 2004. As noted above, prior to construction of a berm to form the lagoon, and the site was subject to tidal action, which frequently washed litter out into the adjacent inlet.

In 1986 a plan to improve the conditions of the site was developed, and this plan included an operation and management scheme to maintain these improvements. The plan consisted of filling in the site areas prone to tidal action with a layer of compacted debris to an elevation above the mean sea level, and then covering the debris with fill. A 150 m long gravel/clay berm was constructed along the western edge of the site to contain on-site runoff and to prevent flooding under typical storm tidal conditions.

Based on observations at the time of the 2015 site inspection, the majority of the remediated area is well covered, however there are a number of areas where holes in the cover have occurred where bulky materials with voids are present below. It is also noted that waste and metal (including construction vehicles) is visible at the edges of the lagoon and remediated area.

The landfill is operated using a modified area-fill method, over an area of approximately 160 m by 100 m. There is no berm surrounding the waste and it is reported by staff that no cover is used as there is not a sufficient quantity available locally. The community intends to cover the waste at closure.

The surface water runoff lagoon is located at the south side of the remediated area and the active cell, which is separated from the ocean by the berm noted above. This lagoon is reported to be drained approximately every three years following testing. It is noted that a ponded area with impacted discoloured water is also present within the waste on the southeast side of the landfill cell. In discussions with community staff regarding the potential to drain this area to the lagoon, it was indicated that in order to do this, a deep trench would need to be excavated in the intervening waste material.

Waste Receipt Procedures

The landfill is unattended except when waste is dropped off or compacted and there are no formal waste receipt procedures.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD waste;
- White goods;
- Tires;
- Fuel drums;
- End-of-life vehicles;
- Discarded household oil tanks and larger fuel storage tanks); and,
- Bulk metals;

Based on observations during the 2015 site visit, the materials at the site are reasonably segregated, however some intermixed materials are noted, including a large spill boom from a coast guard vessel.

Landfill Management and Waste Handling

Waste is dropped off at the active face, which is controlled by two guide rails. The community staff push the waste from the active face into the cell on a weekly basis.

Compaction of household waste is reported to be conducted every two months. Based on observations of the older part of the waste pile, compaction has not effectively been conducted at this site.

Based on a review of the 2012 annual report, surface water monitoring is carried out for the landfill; this sampling is in part used to assess water quality before draining the lagoon, as noted above. There are a number of groundwater monitoring wells located at the landfill, including near the north end of the berm, on the east side of the landfill and on the south side. These wells are open and are reported to be (and evidently) not in use.

Special Concerns, Environmental Risks and Future Planned Activities

The community indicates that a special concern is the potential that the landfill is a contaminated site. Another special concern is the unauthorized dumping from contractors and GNWT departments. The community identified air, water and contaminated soil environmental risks. The air related environmental risks are due to windblown litter; the water related environmental risk is related to the movement of water from the landfill to the ocean during

the summer months. It is understood from discussions with the SAO that a new landfill has been constructed and will be used in 2016 following opening of the Tuktoyaktuk – Inuvik highway.

Estimated Remaining Lifespan of Landfill

The community indicated through the survey that the landfill's estimated closure date is 2015, however this has been updated to 2016. A closure plan is currently being prepared for the landfill, which is considered a GNWT contaminated site (Terry Testart, pers. comm, 2015).

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on an occasional basis of up to 10 hours per week, including management of the bulky waste. The private contractor employs two persons to operate the waste collection vehicle.

The landfill operator in Tuktoyaktuk has not received any waste management training.

Hazardous Waste Management Practices

The hazardous wastes in the community are handled by municipal staff and are stored in the community at the works yard. Hazardous wastes are not accepted at the landfill but are sometimes left there by individuals. There was no hazardous waste (i.e., drums, pails, batteries) stored at the landfill at the time of the site visit in 2015, although a number of empty drums and residential heating oil tanks were observed.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at both the landfill site and the community works yard (KBL, 2013a). At the time of the inventory, a total of 40 drums (205 L) and 85 pails (20L) of hazardous waste was present, along with totes, propane cylinders, heating tanks and vehicles.

Sewage Sludge Management

All municipal wastewater generated in the Hamlet of Tuktoyaktuk is collected by vacuum truck and transported to the municipal sewage lagoon located approximately 5.0 km from the community. The lagoon is a natural lake, approximately 5.9 ha in area. It has been modified with a perimeter berm at the south edge for retention purposes. The lagoon is discharged to an adjacent ocean inlet once a year in the fall. A temporary pump is set up on top of the berm to accomplish the discharge, however no sludge is removed (IEG Environmental, 2006). The SAO indicated that the estimated closure date for the sewage sludge lagoon is more than 50 years.

Historic Waste Disposal Sites

The community staff indicated that a historical landfill is located in the vicinity of the north end of the runway, in the area of the community works building. This site was not evident at the time of the site visit.

Opportunities for Waste Diversion

Tuktoyaktuk currently diverts beverage containers through the BCP, under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community depot, at which point the bags or bales of containers are brought to

the Inuvik regional processing centre. At the time of writing this report, the depot in Tuktoyaktuk was located at the Community Recycling Depot, operated by Tuktoyaktuk Community Corporation.

The community has indicated that it is interested in participating in additional waste diversion programs, particularly for vehicles.

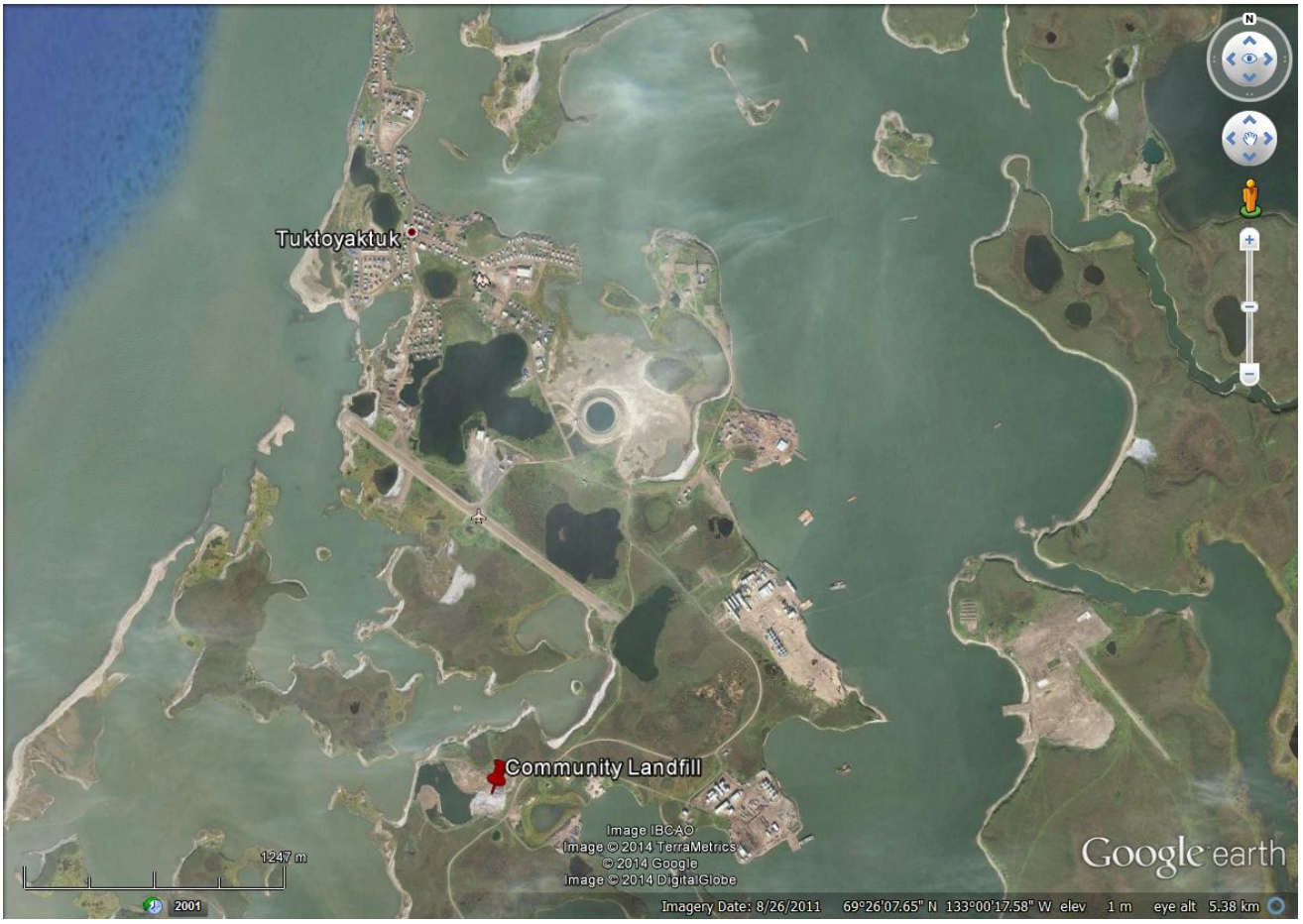


Figure 7-27: Aerial Location of the Tuktoyaktuk Landfill

7.27 Tulita

Information Sources

A community waste management survey was completed for the Hamlet of Tulita and this information has been incorporated into the community waste system profile. Additional information was provided from the references noted below as well as the Golder site visit to the community landfill on June 11, 2015. During this visit, community staff, including hamlet foreman Paul Mculley, were interviewed.

The following documents were obtained from the SLWB registry for review of waste management and landfill operations in Tulita:

- Aboriginal Affairs and Northern Development Canada, 2011. *Hamlet of Tulita Water Licence Inspection Report*.

- Sahtu Land and Water Board, 2005. *Tulita Water Licence Renewal Application Staff Report*.
- Tulita, 2014. *2013 Municipal Water Licence Annual Report*. Report date assumed, not indicated on document.

General Information

The Hamlet of Tulita (64°54'N, 125°34'W) has a population of approximately 478 (Statistics Canada, 2012) and is located at the confluence of the Great Bear River and the Mackenzie River, 615 km northwest of Yellowknife and 523 km southeast of Inuvik. The hamlet is accessible by winter road, barge and scheduled air service.

The mean annual precipitation as rainfall is 176.8 mm and as snowfall is 116.7 cm. The daily average temperature during the warmest month is 17.1°C, and during the coldest month is -25.2°C (Environment Canada, 2014).

The community obtains its water supply from the Great Bear River, near its confluence with the Mackenzie River. The landfill site is located approximately 800 m from the Mackenzie River.

Landfill Location and Geographic Conditions

The landfill is located on community/municipal land, and was first established in 1990 (MACA, 2014). The landfill is located approximately 2.2 km northeast of the community and east of the airstrip. Satellite imagery for the landfill area is poor, and there were no available maps in the reports contained on the Land and Water Board website.

Regulatory Requirements

The Hamlet of Tulita was granted a water licence (no. S05L3-001) on November 1, 2005 for the disposal of MSW by the SLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on October 31, 2015. A new water licence, S15L3-003, was approved for the community subsequent to the site visit and summary by Golder, and is not further discussed herein or included in the database.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2013 annual report (Tulita, 2014).

A solid waste facility operation and maintenance manual is not available for the landfill. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) lists ongoing problems with wildlife observed at the landfill due to lack of fencing, windblown garbage, the hazardous waste area becoming a permanent storage area (as opposed to hazardous waste being shipped out regularly) and incorrect methods being used for household waste disposal.

Use of the Landfill

The landfill is not shared with any other communities. The number of people that use the landfill does not fluctuate seasonally. The community received one request from a power company to use the landfill; this request was not authorized.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill is accessed off an unnamed road leading from the east side of the community. The size of the landfill is approximately 3.4 ha. Access to the landfill is not restricted and there are no set hours of operation. There is

minimal signage present to aid in the segregation of waste. Wildlife can access the landfill as it is not fenced. Bears, wolves and birds are frequently observed at the site.

Community Waste Collection

Waste is placed in bags by the residents and placed next to the road for collection. Individuals can also drop waste off at the landfill. Waste is collected two days per week during the summer and one day per week during the winter. A contractor hired by the community uses a 10 m^3 waste truck and is reported to deliver five to six loads of waste each collection day, which is estimated to be a maximum of 110 m^3 per week.

Landfill Design

The landfill was designed using the cell method of waste disposal. The foreman indicates that as the landfill site is nearing capacity within the trenches, the community intends on using the area fill method in future. The waste fill area is poorly defined at present, based on the 2015 site inspection.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation at the landfill is largely limited to MSW, CRD waste, hazardous waste, white goods, vehicles, empty drums and tires. There are no signs delineating areas for these materials, and as a result there is some mixing of the piles.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD materials;
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks;
- Tires; and,
- Vehicles, boats.

Landfill Management and Waste Handling

A loader is used two to three times per week to push waste into the active cell. A D4 bulldozer is used weekly to compact and cover waste with sand and soil from a neighbouring borrow source.

The landfill is not covered during the winter. There is no containment or collection of leachate but surface and groundwater monitoring is carried out.

It is reported that there is no burning at the landfill.

Soil from a fuel spill from the Power Corporation is contained in a fenced contaminated soils treatment area. The area is bermed and lined; two monitoring wells were noted downgradient of the area. Treated soils were placed behind the fenced facility and are not accessible. The area is unused at the present time.

Special Concerns, Environmental Risks and Future Planned Activities

A special concern for the community is the lack of funding to ship batteries, oil and other hazardous materials out of the community. No environmental risks were identified related to the landfill. The community would like to build a pad with a liner to store hazardous waste materials.

Estimated Remaining Lifespan of Landfill

The estimated closure date for the landfill was estimated in 2003 to be 7.5 years based on the addition of one or two new trenches (SLWB, 2005). An engineered design is required to further estimate the landfill capacity as there exists little room to excavate additional trenches.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on an occasional/as needed basis with no specific hours.

The landfill operator in Tulita has not completed any training but is planning on completing training offered by the GNWT.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. The hazardous wastes in the community are handled by municipal staff. Hazardous waste such as batteries, oil, appliances, fuel tanks, and other hazardous waste materials are accepted at the landfill for stockpiling. These wastes are stockpiled in segregated but unprotected areas at the landfill. A large quantity of used oil and batteries is stockpiled and has not been shipped out of the community for a number of years. Most drums have been labeled, however the community staff indicate that there is no contract to remove them from the landfill. There are also approximately 250 batteries at present.

A waste inventory and labelling program was completed for Ecology North in 2013, at which time it was noted that hazardous waste was present at the landfill site (KBL, 2013b). At the time of the inventory, a total of 329 drums (205L) of hazardous waste was present, along with propane cylinders, heating oil tanks, batteries and vehicles.

Sewage Sludge Management

Sewage sludge has never been removed from the lagoon. The estimated closure date for the sewage sludge lagoon is unknown.

Historic Waste Disposal Sites

There is a historic landfill site located close to the present landfill site. It is reported by the community staff to contain MSW but its size and operational years are unknown.

Opportunities for Waste Diversion

Tulita currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to a specified depot, at which point the bags or bales of containers are brought to a regional processing centre. At the time of writing this report, the depot in Tulita was located at the Youth Centre, operated by the Tulita Dene Band.



Figure 7-28: Aerial Photograph of the Tulita Active Landfill and Sewage Lagoon

7.28 Ulukhaktok

Information Sources

A community waste management survey was completed for the Hamlet of Ulukhaktok by the SAO in May of 2014. Information on the landfill was also obtained from the report prepared for the water licence renewal by EarthTech (2008) and the AANDC 2011 inspection report.

Golder completed a site visit to the community landfill on September 9, 2014 and interviewed community staff including the SAO (Mr. Bill Bennett), the site supervisor (Mr. Gibson Kudlak) and the shop foreman/operator (Mr. Billy Kulik).

The following key documents were obtained from the IWB and the GNWT and reviewed to assess waste management and landfill operations in Ulukhaktok:

- Aboriginal Affairs and Northern Development Canada, 2011. *Hamlet of Ulukhaktok Municipal Water Licence Inspection Report*.

- EarthTech, 2008. *Hamlet of Ulukhaktok, NT Water Licence Renewal Background Report*.
- Enns, Gerald, 2015. Personal communication, Gerald Enns, Hazardous Waste Specialist, GNWT-ENR, May 26, 2015.

General Information

The Hamlet of Ulukhaktok (70°44'N, 117°46'W) has a population of approximately 402 (Statistics Canada, 2012) and is located on the west coast of Victoria Island, 948 km north of Yellowknife and 676 km northeast of Inuvik. The hamlet is accessible by barge and scheduled air service.

The fresh water supply for the community is from RCAF Lake, located approximately 1.8 km northeast of the community (just south of Upillik Lake). A small stream runs from the lake into the ocean. The closest water body to the landfill is a stream that runs from Upillik Lake to the ocean, approximately 300 m west of the landfill. Jack Bay, on the Admunsen Gulf is approximately 770 m to the southwest of the landfill.

The mean annual precipitation as rainfall is 74.2 mm and as snowfall is 83.3 cm. The daily average temperature during the warmest month is 9°C, and during the coldest month is -28.8°C (Environment Canada, 2014).

The water supply for the community is obtained from RCAF Lake, located 1500 m upslope of the landfill site.

Landfill Location and Geographic Conditions

The landfill site is located approximately 2 km north of the community along an unnamed road leading towards the airport Figure 7-30). The landfill is located on community/municipal land, and was first established in 1980 (MACA, 2014). Based on digital photographs, the bermed waste fill covers an area of approximately 1.5 ha, within a 2.3 ha facility area.

The landfill is underlain by sand and gravel which is part of raised beach deposits in the area of the community. These sand and gravel deposits are present under all of the waste fill area as well as the surrounding areas, except to the north. To the north, the deposits thin out or terminate at a local bedrock plateau. The bedrock in the area of the community consists of moderately sloping sedimentary rock towards the northwest and very rugged flat-lying intrusive diabase/gabbroic hills to the east and southeast.

The west, east and south sides of the site (Figure 7-29). consist of low lying wetlands which appears to drain generally to the south and then east, towards Jack Bay (. Larger ponds were observed immediately southwest, south and to the east of the landfill cell. One of these ponds, off the southwest corner, is evidently impacted by the landfill, based on the cloudiness and sheen (possibly petroleum related).

Regulatory Requirements

The Hamlet of Ulukhaktok was granted a water licence (no. N7L3-1525) on April 23, 2010 for the disposal of MSW by the IWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on November 20, 2016. The local bylaws or guidelines that govern landfill management in Ulukhaktok consist of a garbage rate bylaw which sets out a monthly cost for residents and businesses in the community, collected to offset waste management activities.

An operation and maintenance manual is not available for the landfill through the Land and Water Board registry, however the 2008 EarthTech report indicates a manual was prepared in 2004. The most recent annual report

available at the time of preparing this report was the 2009 annual report which was limited to a summary of monthly water and sewage volumes. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (AANDC, 2011) noted the community had been sending out fuel drums, batteries, tires and metal for recycling and completed a litter fence around the landfill. The inspection report noted some ongoing issues including:

- Uncovered waste leading to windblown litter;
- Spreading waste fill over too large an area;
- No signage in the waste segregation area;
- Spillage of hydrocarbons on the soil in one area of the site and open drums, and in general the need to consolidate and improve management of the empty drum storage area;
- Clean up of material in wetland outside of the waste segregation area;
- Development of a designated area for contaminated soil management; and,
- Recommendation to include a used oil burning attachment to an existing incinerator.

Use of the Landfill

The landfill is used solely by residents and institutional/commercial operations in Ulukhaktok for disposal of MSW, institutional and commercial solid waste and CRD waste. Hazardous waste is largely managed at the community works yard, primarily consisting of the storage of batteries, fuel, used oil and antifreeze. In 2010, it was reported that backhaul of historical hazardous materials from the community occurred; however, removal of hazardous wastes has not been recorded since this time (Enns, 2015). The landfill is used only for the community and the number of people that use the landfill does not appreciably change seasonally.

As noted below, tires and metal waste, including white goods, empty fuel drums, tanks and vehicles, are stored at the landfill site. It is reported that all fluids are drained into containers on-site, and transported to the community works building for shipping. Tires are also stored on-site. Cardboard and clean wood are burned in a contained area in the waste fill, as are animal carcasses.

The SAO reports that the community does not allow private industry to use the landfill. Two areas of drum storage are noted well outside of the landfill. It is understood that these drums are from former exploration camp activities.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operation is largely from the 2008 EarthTech Report and from Golder's site visit in September, 2014.

General Information and Landfill Access

The entrance to the landfill site is off of the main access road leading from the community to the airport. A trail is present north of the site and leads to the east. There was no gate or access fencing and the landfill site and cell are fully accessible. Community staff are present at the site regularly during the week to conduct waste disposal and manage waste placement and separation.

The landfill area is approximately 1.5 ha in size. Access to the landfill site is from an all-weather gravel access road and not restricted, nor are there set hours of operation. Litter fencing is in place surrounding most of the waste fill area, however wildlife can access the north side.

Community Waste Collection

Waste is collected five half days per week. Waste is placed in bags by the residents and placed next to the road for collection. The community picks up waste using an enclosed truck; based on interviews with the waste operator two to three loads are delivered to the landfill each collection day using an estimated 10 to 12 m^3 capacity truck.

Landfill Design

The landfill design is based on the area fill method, within an approximately 1.5 ha bermed area. Design drawings are not available, however based on aerial photos and Golder's site inspection, the landfill appears to have been developed by construction of sand and gravel berms extending from an upland area to the north, towards a low lying wetland area to the south, forming a single cell. There are no current plans for expansion of the landfill.

The maximum height of the berms is approximately 3 m and is highest in the lower areas to the south. The berms are approximately 2 m wide at the top and their slope was estimated to be close to the natural angle of repose of the materials, steeper than 2:1. Waste appears to have been placed across the entire cell footprint. The cell is approximately 90 m wide (E-W) and 150 m long (N-S). The waste thickness is not known, however based on the surrounding natural topography it is estimated to be on the order of two to four m depending on location.

Whereas the berms extend above the waste fill, leachate is presumed to seep from the toe of the berms. Drainage within the cell is directed to a low area in the central eastern side, where it infiltrates through the berm. Surface water on the northern side of the landfill site is controlled by a shallow ditch leading to the wetland on the northeast side of the landfill cell.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. This includes cardboard and clean wood that are segregated and burned in a large steel culvert in the northwest part of the cell. Waste segregation at the landfill is largely limited to white goods, empty drums, fuel storage tanks, , tires and vehicles. There are no signs delineating areas for these materials, and as a result there is some mixing of the piles.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD materials;
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks;
- Tires;
- Vehicles, boats; and,

- A small soil remediation pile north of the landfill (contained in a portable liner and tarp).

Landfill Management and Waste Handling

Compaction of household waste is reported to be typically conducted on a bi-monthly basis in non-frozen months using one of the two D-6 bulldozers owned by the community. . The landfill is covered on a sporadic basis with sand and gravel, however the material hauling vehicle is currently inoperable and is expected to remain so in the near future. The litter fence limits the amount of windblown litter, however it is reported that the fence causes a build-up of snow in the winter months, causing problems for landfill operations, which may also result in increased leachate generation in the spring.

Waste is dropped off in the central part of the landfill cell and is spread using a bulldozer on an approximately weekly basis., Waste in the south part of the berm was observed to be uncovered at the time of the site visit, whereas the central and south part of the cell was largely covered. A low area has been excavated in the central part of the site to drain water to the east, where it seeps through the berm. The top of the berm is approximately 0.6 to 1.5 m above the waste placed in the cell, and therefore all surface water drains to the central low area.

Litter was present at the toe of the berm and on the litter fencing, however in general the litter is contained within the cell. Waste, largely consisting of large bulky metal, is observed to be present in the wetland area outside of the landfill cell.

The landfill is a natural attenuation design and therefore other than the berms, there is no containment or collection of leachate. As noted above, leachate seeps through the berm. Evidence of this seepage is observed notably on the south side and northeast corner of the cell. It is reported that surface and groundwater monitoring is carried out during the summer, however data from this sampling was not available.

Special Concerns, Environmental Risks and Future Planned Activities

Special concerns identified by the community include windblown waste, poor site drainage and wildlife access. It is reported that the community is planning to improve drainage at the landfill, however based on discussions with staff, this consists of directing drainage to the central channel.

As noted above, seepage from the landfill is directed to the wetland which, based on visual observations and satellite photos, appears to drain south, then east towards Jack's Bay (Admunsen Gulf). It is recommended that the sampling results be reviewed to assess the environmental risk posed by the landfill, notably to the Bay.

Estimated Remaining Lifespan of Landfill

The estimated remaining lifespan of the landfill is 16 years (closure in 2030). No closure plan has been developed; however, it is reported that a study was recently completed on the closure/post closure costs and estimated lifespan of the landfill. This study was not available for review.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the conducted entirely by community staff. Waste operations staff operate the waste pick-up five days per week in the mornings.

The landfill operator in Ulukhaktok has not completed any waste management training.

Hazardous Waste Management Practices

Hazardous waste was not observed at the site. This material (batteries, oil, fuel drums) is managed off-site at the community works operation building. The community does not have a hazardous waste management plan. Waste such as waste paint, oils, batteries, and other hazardous waste materials are not accepted at the landfill and if dropped off, are sent to the community works yard for storage and eventual disposal. Minor evidence of staining or spills of hydrocarbons was observed in one area where the bulk metals were stored.

A waste inventory and labelling program was completed for ENR in 2013, at which time it was noted that hazardous waste was present at both the landfill site and the community works yard (KBL, 2013a). At the time of the inventory, a total of 65 drums (205L) and 85 pails (20L) of hazardous waste was present, along with batteries and vehicles.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage sludge lagoon. A closure date for the sewage sludge lagoon is not stated in the supporting documentation for the most recent water licence (i.e., EarthTech, 2008).

Historic Waste Disposal Sites

The respondent to the community waste management survey noted that there is an historic landfill site located close to Jacks Bay that contains MSW. The exact location of this site was not evident during the community visit.

Opportunities for Waste Diversion

Ulukhaktok participates in the Beverage Container Program. Beverage containers are intermittently collected in a central depot and shipped out for recycling. The community has indicated that it is interested in participating in further waste diversion programs. The community's participation will be dependent on logistics, cost and required manpower.



Figure 7-29: Aerial Location of the Uluhaktok Landfill



Figure 7-30: Ulukhaktok Landfill in Foreground and Jack's Bay in Background

7.29 Wekweètì

Information Sources

A community waste management survey was completed for the community of Wekweètì and this information has been incorporated into the community waste system profile. Additional information was provided from the references noted below.

Golder completed a site visit to the community landfill on July 24, 2015 and interviewed community staff including the SAO (Ms. Grace Angel), and the community foreman.

The following documents were obtained from the WLWB for the review of waste management and landfill operations in Wekweèti:

- Aboriginal Affairs and Northern Development Canada, 2013. *Wekweètì Water Licence Inspection Report*.
- EarthTech, 2007. *Water Licence Background Report Tłı̨chǫ Community Government of Wekweètì*.
- Wekweètì, 2014. *Municipal Water Licence Annual Report*.

General Information

The community of Wekweètì (64°11'N, 114°10'W) has a population of approximately 141 (Statistics Canada, 2012) and is located above the Snare River, 194 km north of Yellowknife. Wekweètì is one of four communities that are part of the *Tłı̨chǫ Land Claims Self Government Act*. Under this Act, the Tłıchǫ government may create their own regulations to govern waste management. However, the requirements of the broader *Northwest Territories Intergovernmental Agreement on Lands and Resources Management Act* that has been signed by the Tłıchǫ government take precedence. The community is accessible by scheduled air service and a winter road.

The mean annual precipitation as rainfall is 215.5 mm and as snowfall is 124.7 cm. The daily average temperature during the warmest month is 16.9°C, and during the coldest month is -25.4°C (Environment Canada, 2014).

The community water supply is obtained from Snare Lake, approximately 1.6 km east of the community.

Landfill Location and Geographic Conditions

The landfill is located approximately 1 km west of the community (Figure 7-31) and approximately 300 m from the nearest large water body (Snare Lake). It is located on community/municipal land, and was first established in 1993 (EarthTech, 2007).

The community lies within the discontinuous permafrost zone. The topography generally consists of southeast to northwest linear trenching, steep sloping rock ridges and wide areas of marsh, bog and wetlands. The community is located on a raised terrace that stretches along a rocky shoreline and is composed mostly of sand and coarse gravel (EarthTech 2007). This is consistent with the observations of the soil at the landfill site during the 2015 site visit.

Regulatory Requirements

The community of Wekweètì was granted a water licence (no. W2007L3-0001) on September 28, 2007 for the disposal of MSW by the WLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to

expire on September 27, 2017. There are no local bylaws or guidelines that govern waste management in Wekweètì.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2013 annual report.

A solid waste facility operation and maintenance manual is not available for the landfill through the Land and Water Board registry. The most recent annual report available through the Land and Water Board (Wekweètì, 2014) noted that fencing around the solid waste site had been completed in the previous year (2013). The most recent inspection report available at the time of the Golder site visit (AANDC, 2013) identified inadequate signage for waste segregation as a concern, as well as the need to remove hazardous materials from vehicles being stored outside the fenced area.

Use of the Landfill

Based on the responses in the community waste management survey, the landfill is not shared with any other communities. The number of people that use the landfill fluctuates seasonally; the summer population is reported to increase by an additional 30 to 50 people. The community has not received any requests from private industry to use the landfill. It is reported by staff that there is some use of the landfill for highways work completed by community staff.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill is accessed off an unnamed road leading from the west side of the community. The gate to the landfill is left open to permit wildlife to enter. The foreman noted that when the gate is closed the community sees an increase in wildlife (bears and wolves) in the community and therefore allows the wildlife to enter the landfill in an effort to keep wildlife away from the community.

The landfill covers an estimated 1 ha. The stated hours of operation for the landfill are 8 am to 5 pm Monday to Friday. A bin is set outside the gates after hours for people to drop off their waste if the landfill is closed.

Community Waste Collection

Waste is placed in bags by the residents and placed next to the road for collection. The landfill and collection services are operated and maintained by municipal staff. Waste is collected three days per week using an 11 m^3 collection vehicle. Based on the reported two loads per day, it is estimated that a maximum of approximately 60 m^3 per week of waste is generated.

Landfill Design

The landfill was designed using the trench method of waste disposal. No burning is permitted at the landfill.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation at the landfill is largely limited to white goods, vehicles, empty drums and tires. There are no signs delineating areas for these materials, and as a result there is some mixing of the piles.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD materials;
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks; and,
- Tires.

Landfill Management and Waste Handling

Compaction of household waste with a bulldozer is conducted every two weeks and a loader is used daily to place cover.

Electronic waste is segregated and stored in a shed.

There is a stockpile of remediated contaminated soils stored at the landfill.

There is no containment or collection of leachate. Surface water monitoring is carried out every month during the summer.

Special Concerns, Environmental Risks and Future Planned Activities

The community did not identify any special concerns with the landfill. Through the community waste management survey, a potential environmental risk was identified related to contaminated soil that was accepted at the landfill in 2008. A liner is not present beneath the segregated contaminated soil.

Estimated Remaining Lifespan of Landfill

According to the site foreman, there is one year left in the current cell. There is capacity for additional cells in the current landfill site footprint. The foreman estimates an additional 20 to 22 years of site life. There is no closure plan for the landfill.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The landfill operator performs their duties on a full-time basis.

The landfill operator in Wekweètì has completed the NWT School of Community Government's *Water and Waste Management* program.

Hazardous Waste Management Practices

The landfill does not have a hazardous waste management plan. Hazardous wastes in the community are handled by municipal staff. Wastes such as waste paint, oils, batteries, and other hazardous waste materials are not accepted at the landfill and if dropped off, are sent to the community works yard for storage and eventual disposal.

Sewage Sludge Management

Sewage sludge has never been removed from the sewage lagoon. The estimated closure date for the sewage lagoon is unknown.

Historic Waste Disposal Sites

There are no reported historic landfill sites located in or around the community.

Opportunities for Waste Diversion

Wekweètì currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community bottle depot, at which point the bags or bales of containers are backhauled annually to Yellowknife. At the time of writing this report, the depot in Wekweètì was located at the Band Office, operated by the Tli Cho Community Government. Tires in the community are currently being reused to beautify the community. They have been painted and are used at local beaches for seating areas and playgrounds.



Figure 7-31: Aerial Location of the Wekweètì Landfill

7.30 Whatì

Information Sources

A community waste management survey was not completed for the community of Whatì. Information on the landfill was obtained largely from the 2007 water licence application (EarthTech, 2007) and the GNWT 2014 inspection report, as well as a site visit completed by Golder on July 17, 2015. Golder staff interviewed community staff including the SAO (Larry Baran) and the shop foreman/operator.

The following key documents from the WLWB were reviewed to assess waste management and landfill operations in Whatì:

- EarthTech, 2007. *Water Licence Renewal Tłı̨chǫ Community Government of Whatì, NT*. July 11, 2007.
- GNWT Department of Environment and Natural Resources, 2014. *Whatì Municipal Water Licence Inspection Report*. April 16, 2014.

General Information

The community of Whatì (63°08'N, 117°16'W) has a population of approximately 492 (Statistics Canada, 2012) and is located on the eastern shore of Lac La Martre, 166 km northwest of Yellowknife. Whatì is one of four communities that are part of the *Tłı̨chǫ Land Claims Self Government Act*. Under this Act, the Tłıchǫ government may create their own regulations to govern waste management. However, the requirements of the broader *Northwest Territories Intergovernmental Agreement on Lands and Resources Management Act* that has been signed by the Tłıchǫ government take precedence. The community is accessible by winter road and scheduled air service.

The mean annual precipitation as rainfall is 215.5 mm and as snowfall is 124.7 cm. The daily average temperature during the warmest month is 16.9°C, and during the coldest month is -25.4°C (Environment Canada, 2014).

The community water supply for Whatì is obtained from a groundwater supply well located within the community near the shore of Lac La Martre.

Landfill Location and Geographic Conditions

The landfill is located approximately 3.9 km northeast of the community Figure 7-32 off the Wha Ti winter road. It is located approximately 4.1 km from Lac La Martre. The landfill is on Commissioner's land, and was first established in 1982 (MACA, 2014). It covers an area of 1.7 ha.

The community lies within the discontinuous permafrost zone, with glacial drift covering underlying bedrock consisting of dolomites and shale. The glacial drift is comprised of silty clay till. Silt, clay and peat deposits in the area have high ice contents (EarthTech, 2007).

Regulatory Requirements

The community of Whatì was granted a water licence (No. W2007L3-0002) on September 28, 2007 for the disposal of MSW by the WLWB, in accordance with the *Northwest Territories Waters Act*. The license is set to expire on September 27, 2017. There are no local bylaws or guidelines that govern waste management in Whatì.

The water licence requires that an annual report be filed with the Land and Water Board. The most recent annual report available at the time of preparing this report was the 2003 - 2004 annual data contained in Earth Tech (2007).

A solid waste facility operation and maintenance manual is not available for the landfill through the Land and Water Board registry, however it is reported by community staff that this is underway. The most recent inspection report available through the Land and Water Board at the time of the Golder site visit (GNWT, 2014) noted that backfill of the waste should be improved as there was a significant amount of windblown waste observed. The report indicated that cleanup was required and alternative methods to eliminate/reduce windblown waste should be employed. The inspection report also noted that hazardous waste currently being stored at the landfill need to be sent to an approved disposal facility.

Use of the Landfill

The landfill is not shared with any nearby communities.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill site is approximately 1.7 ha in size (130 m by 130 m). Access to the landfill is not restricted. The landfill has perimeter fencing and is gated, however wildlife can enter the landfill through gaps under the fencing. A separate landfill for CRD waste is located 1,500 m from the MSW landfill.

Community Waste Collection

The landfill and collection services are operated and maintained by the community government/municipal staff. Collection occurs daily during summer months (two to three half-loads daily 5 days a week) in an effort to reduce wildlife in the community. The community waste truck has a reported maximum capacity of 11 m^3 and it is estimated that a maximum of 65 m^3 of waste is collected weekly.

Landfill Design

The landfill was designed using the trench method of waste disposal in a cell approximately 20 m by 80 m in size.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation at the landfill is largely limited to white goods, vehicles, empty drums and tires. There are no signs delineating areas for these materials, and as a result there is some mixing of the piles.

Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD materials;,
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks;

- Tires; and,
- Vehicles.

Landfill Management and Waste Handling

Cover is placed two to three times annually and compaction is carried out sporadically during summer months with the use of a front end loader.

Special Concerns, Environmental Risks and Future Planned Activities

It is unknown if there are any special concerns, environmental risks perceived by the community or future planned activities at the landfill.

Estimated Remaining Lifespan of Landfill

The estimated remaining lifespan of the landfill is unknown, however it is noted that other cells can be constructed within the area of the current site.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The level of effort required to manage the landfill is unknown.

Hazardous Waste Management Practices

It is not known if the landfill has a hazardous waste management plan, as none was available at the time of the site visit. Hazardous wastes such as used oil and lubricants, batteries, waste paint and solvents, and other hazardous waste materials are stored at the landfill. Following an inspection by ENR, it was noted that this waste should be removed for proper disposal on a regular basis (ENR, 2014).

Sewage Sludge Management

The decant facility at the sewage facility is currently in a state of disrepair and is not being used (ENR, 2014).

Historic Waste Disposal Sites

It is not known if there are historic landfill sites located in or around the community.

Opportunities for Waste Diversion

Whatì currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the community bottle depot, at which point the bags or bales of containers are brought to the Hay River regional processing centre. At the time of writing this report, the depot in Whatì was located at Alex's Store, operated by Alex's Confectionery.

Community government staff have expressed interest in participating in additional waste diversion programs.



Figure 7-32: Aerial Location of the Whatì Landfill

7.31 Wrigley

Information Sources

A community waste management survey was not completed for the community of Wrigley. No information relating to the landfill at Wrigley was available through the MVLWB.

Golder completed a site visit to the community landfill on June 11, 2015 and interviewed community staff including the acting SAO (Ms. Ria Letcher), and the shop foreman/operator.

General Information

The community of Wrigley (63°13'N, 123°28'W) has a population of approximately 133 persons (Statistics Canada, 2012) and is located on the eastern shore of the Mackenzie River, just below the confluence with the Wrigley River, 470 km northwest of Yellowknife. The community is accessible by all-weather road, barge and scheduled air service.

The mean annual precipitation as rainfall is 215.5 mm and as snowfall is 124.7 cm. The daily average temperature during the warmest month is 16.9°C, and during the coldest month is -25.4°C (Environment Canada, 2014).

The community obtains its water supply from two groundwater wells located within the community.

Landfill Location and Geographic Conditions

The landfill is located approximately 3 km southeast of the community along the west side of Mackenzie Highway (Figure 7-33). The landfill is located on Commissioner's land, and was first established in 2002 (MACA, 2014). The Mackenzie River is located approximately 500 m to the southwest of the landfill. The landfill is located upstream of the community.

The size of the landfill site is approximately 2.5 ha and is irregularly shaped, approximately 225 m in length by 100 m in width. Based on the available airphotos, the current cell covers an area of approximately 0.5 ha.

Based on the 2015 site visit, the landfill site is underlain by sandy soils that are highly permeable.

Regulatory Requirements

No water licence information for the community of Wrigley is currently available through any of the Land and Water Board registries.

Use of the Landfill

The landfill is not shared with any nearby communities. The foreman has noticed an influx of waste (appliances and hot water tanks) from sources external to the community. Culverts were also present in the bulk metals pile, which are in part expected to be from local highway projects.

Landfill Facilities and Management Practices Summary

General Information and Landfill Access

The landfill is accessed from the main road leading out from the east side of the community. The landfill is not fenced, other than the hazardous waste area. The landfill entrance has been gated in the past, however residents left waste outside of the fence, so community staff removed the gate.

Community Waste Collection

Collection during the summer months is three times per week, and is reduced to twice per week in the winter. Collection is carried out by hamlet staff using a 1 tonne flat deck truck with side rails, estimated to contain 3 m^3per load. Based on a reported four to five loads each day, the maximum weekly waste generation is estimated to be 40 m^3.

Landfill Design

The landfill is operated using the trench fill method, however it is noted that rather than a narrow trench, a large area of the cell is being filled at once.

Waste Receipt Procedures

Waste is primarily delivered to the site by the community waste truck. Waste segregation at the landfill is largely limited to white goods, vehicles, empty drums and tires. There are signs delineating areas for waste segregation. Waste materials at the site were observed to be generally separated as follows:

- MSW;
- CRD materials;
- White goods;
- Fuel drums;
- Discarded household oil tanks and larger oil/fuel storage tanks;
- Tires; and,
- Vehicles.

Landfill Management and Waste Handling

The community staff indicated that they compact the waste every two to three weeks during the summer using a Caterpillar D4 bulldozer. Wind (litter) fencing is present on three sides of the active waste cell, which is moved when an area is covered, to ensure it is around the active area.

A burn pit is used in the spring and fall for clean wood waste.

Special Concerns, Environmental Risks and Future Planned Activities

The community noted a concern with respect to the sewage lagoon and landfill impacting a lake to the east.

Estimated Remaining Lifespan of Landfill

The landfill operator estimates there is less than 3 years capacity in the current cell. There is no known overall site life estimate.

Human Resources

The SAO is responsible for the overall operation of the landfill facility. The daily operation and maintenance of the landfill is the responsibility of the community government/municipal staff. The level of effort required to manage the landfill is not specified, however the waste is compacted every two to three weeks during the summer.

Hazardous Waste Management Practices

Hazardous wastes are stored in a fenced area at the landfill. The fenced area is not large enough to accommodate the volume of hazardous wastes including batteries and used oil; therefore hazardous waste is also stockpiled adjacent to the fenced area. The area of the hazardous waste storage is not lined.

Sewage Sludge Management

Sewage sludge has not been removed from the lagoon. Sewage is treated by rapid infiltration into the soil.

Historic Waste Disposal Sites

The foreman noted that adjacent to the airport, historical waste has been buried. During the Golder 2015 site visit, no waste was noted at the ground surface.

Opportunities for Waste Diversion

It is reported by staff that Wrigley beverage containers are collected and occasionally shipped to Fort Simpson.



Figure 7-33: Aerial Location of the Wrigley Landfill

7.32 Yellowknife

Information Sources

A community waste management survey was completed for the Yellowknife landfill by the Superintendent, Solid Waste Facility, Peter Houweling, on June 17, 2014. Information on the landfill was also obtained from 2014 City of Yellowknife Operations and Maintenance Manual and the 2009 City of Yellowknife Water Licence Renewal Application.

Golder completed a site visit to the Yellowknife landfill on July 21, 2014 and interviewed landfill staff.

The following key documents were obtained from the MVLWB for reviewed of waste management and landfill operations in Yellowknife

- City of Yellowknife, 2014a. *Solid Waste Facility Operation and Maintenance Plan*.
- City of Yellowknife, 2014b. *Solid Waste Facility Interim Landfill Closure and Reclamation Plan*.
- City of Yellowknife, 2014c. *Solid Waste Facility Hazardous Waste Management Plan (Version 3)*.
- Government of the North West Territories, 2014. *Yellowknife Municipal Water Licence Inspection Report.*
- Mackenzie Valley Land and Water Board, 2010. *Water License MV2009L3-0007.*

General Information

The City of Yellowknife (62°27'N, 114°22'W) has a population of 19,234 (2011 census data) and is located next to Great Slave Lake. Yellowknife is accessible by all season road and regular scheduled air service.

The mean annual precipitation as rainfall is 170.7 mm and as snowfall is 157.6 cm. The daily average temperature during the warmest month is 17.0°C, and during the coldest month is -25.6°C. (Environment Canada, 2014)

Surficial geology of the Yellowknife area includes exposed bedrock, and fine-grained sediments within low-lying areas deposited within post-glacial lake settings. Permafrost is discontinuous in the area.

Landfill Location and Geographic Conditions

The landfill is located within the City limits, approximately 2 km north of the City centre, adjacent to Highway 3 and is accessible from the Giant Mine access road (formerly Highway 4).

The landfill is situated adjacent to an active rock quarry. The landfill site is underlain by bedrock of the Greenstone Belt formation.

Regulatory Requirements

The City of Yellowknife was granted a water license (no. MV2009L3-0007) on May 31, 2010 for the disposal of MSW by the MVLWB, in accordance with the Northwest Territories Waters Act. The license is set to expire on May 30, 2022. The local bylaws that govern landfill management in Yellowknife include both Solid Waste Bylaw No. 4376 and Solid Waste Fee Bylaw No. 4436.

A solid waste facility operation and maintenance plan has been completed for the landfill (City of Yellowknife, 2014a). In addition, an interim Closure and Reclamation Plan (City of Yellowknife, 2014b) has been completed

outlining closure activities for the closed cells in the vicinity of the new centralized compost pad, in addition to closure activities for the concrete dump area.

The most recent annual report for the City was completed in 2014. The most recent inspection report available at the time of the Golder site visit (GNWT, 2014) indicated that the solid waste facility is in compliance with the water license. The hazardous waste staging area is situated on an asphalt pad, however the absence of secondary containment around the hazardous waste staging area was noted as a concern (GNWT, 2014).

Use of the Landfill

The landfill is used by the residents, commercial/institutional and industrial operations in Yellowknife, N'dilo and Dettah. The landfill only accepts waste from other communities under special circumstances. Industrial hazardous waste accepted at the site at the time of the Golder site visit included contaminated soil and water, lead paint, and asbestos. All other industrial hazardous wastes are diverted to KBL Environmental in Yellowknife.

There are currently up to five agreements in place with resource work camps outside of Yellowknife to accept external waste in the event of an emergency at the camp. Waste is limited to a maximum of 1,000 kg per month from each agreement, due to water license restrictions.

The intake to the landfill increases during summer months due to yard works and increased construction activities.

Landfill Facilities and Management Practices Summary

Information for the landfill design and operations was obtained primarily from the 2014 Operations and Maintenance Plan and the 2009 water license renewal application and from Golder's site visit in July, 2014.

General Information and Landfill Access

The landfill site covers an estimated 23 ha based on community mapping. The landfill is fenced and gated to prevent unauthorized access. A wildlife fence surrounds part of the MSW cells, however it has not been operational for two years. During hours of operation, a landfill attendant is present at the weigh scale. Recycling and compost drop-off bins are situated at the site, and can be used by residents free of charge.

Community Waste Collection

Residential curbside garbage collection is undertaken five days per week on a neighbourhood schedule, so each City residence receives collection, once per week. A residential curbside collection for compostable material began in the fall of 2014 in select neighborhoods. Residential garbage and compost collection is performed by a contractor, who is hired by the City. Commercial and institutional waste is collected by a waste contractor. Businesses and institutions directly contract the waste contractor to collect their waste and transport it to the landfill, where it is accepted for a fee. The Institutional, Commercial and Industrial (ICI) sector can also pay the contractor to collect and remove corrugated cardboard for recycling.

The City of Yellowknife has been operating a recycling program for cardboard, mixed paper/boxboard, glass, tin cans and plastics since 1994. Residents are encouraged to place recyclables at one of the six blue bin locations within the city. Recyclables are compressed into bales at the City of Yellowing baling facility and stockpiled at the City of Yellowknife landfill prior to shipment to Edmonton for recycling. The beverage container program operated by the ENR is separate from the Yellowknife recycling operations.

Landfill Design

The landfill operates a baling facility for MSW. Bales are then placed in the cell. The current active cell is lined with a geosynthetic liner and includes leachate collection. The cell operates using a modified area fill method.

Waste Receipt Procedures

The site attendant weighs incoming vehicles, charges a tipping fee as required and directs residents and haulers to the appropriate disposal areas. Waste that is not permitted for disposal at the site is not accepted.

Waste is brought to the site by contracted collection trucks and private contractors. The landfill operates a transfer facility for residents bringing waste to the site. Residents who self-haul waste place materials into the appropriate MSW, recycling or the household hazardous waste collection bin/area. Collection bins at the transfer facility are emptied by City staff.

Waste materials at the site were observed to be generally separated as follows:

- MSW (baled)
- CRD waste;
- White goods;
- Tires;
- Bulk metals;
- End-of-life vehicles;
- E-waste;
- Yard clippings;
- Propane tanks;
- Concrete;
- Hazardous waste;
- Treated wood;
- Untreated wood;
- Honey bags; and,
- Recycling trailer.

Hazardous waste is dropped off in designated bins. The bins are placed on an asphalt pad, however there are no secondary controls in place to contain hazardous waste spills. Evidence of significant staining or spills of hydrocarbons was not observed at the site.

Municipal waste is dropped off by the collection vehicle and residents at the baling facility, where it is compacted and bales are then transported to the MSW cell. Chipped wood waste is often used as cover, as are treated soils from the land farm.

A contractor is hired on a regular basis to remove bulk metals and the land farm is also managed by a contractor. All other site operations are conducted by City staff.

E-waste is deposited in a covered storage shed prior to transport and recycling off-site.

CRD waste is placed in a separate unlined fill area and compacted daily by a D6 bulldozer.

Salvaging is permitted in a designated salvaging area.

A small scale composting pilot project has been operating since 2009, focused on collecting food scraps from the ICI sector. In 2014, the City began a full-scale composting program, starting with residential organics collection in one waste collection area (neighbourhood). A large scale composting pad is currently under phased construction.

Landfill Management and Waste Handling

Compaction of all MSW and recyclables occurs in the baling facility. Once the bales are placed in the MSW cell, additional compaction is not required. Covering of the bales occurs on a daily basis; bales are stacked three high prior to covering.

Sampling of groundwater water wells in the area and SNP station occurs twice annually as per the requirements set out in the water license (MVLWB, 2010). It is understood that, to date, no leachate has been generated from the lined cell collection system.

Special Concerns, Environmental Risks and Future Planned Activities

Special concerns identified in the community waste management survey include the number of birds at the landfill due to the proximity to the Yellowknife Airport. The birds represent a hazard for aircraft in the area. In response, a bird culling program is in place to manage this issue. A lack of a functional wildlife fence was also identified as an issue, however the landfill operator indicated that since the realignment of Highway 4, a decrease in the number of black bears visiting the site has been noted. Future planned activities include the construction of an additional MSW cell to begin in 2015 and the installation of additional fencing.

Estimated Remaining Lifespan of Landfill

There is no closure date available at this time; an interim closure and reclamation plan is being updated as required to close out inactive waste cells as the site continues to operate. The current design lifespan described in the community waste management survey is for an additional 50 years at the current site.

Human Resources

The Superintendent is responsible for the operation of the landfill site. In general, the overall operation of the site is performed by the Superintendent – Solid Waste Facility; the Superintendent is responsible for the daily operation and maintenance of the facility. The baling facility attendants are responsible for performing the required day to day tasks as assigned by the Superintendent (City of Yellowknife, 2014a)

It is reported that nine full time staff are part of the operations staff for the landfill site.

Hazardous Waste Management Practices Summary

Household hazardous wastes including used oils, propane tanks, glycol, batteries and fluorescent lights are accepted at the landfill and shipped off-site for disposal. Industrial hazardous waste is diverted to KBL Environmental for handling and shipment to a disposal site.

The contaminated soils land farm at the landfill is operated by Biogenie.

Sewage Sludge Management

The City of Yellowknife sewage lagoon is located at Fiddler's Lake, 6 km west of the city. Floating islands are removed annually from the lagoon and placed on the banks of the lagoon. Sludge has previously been removed from the lagoon and relocated to the City of Yellowknife solid waste facility. Honey bags are collected at the landfill facility and trucked to a pit adjacent to the sewage lagoon for disposal by landfill staff.

Historic Waste Disposal Sites

The area of Yellowknife known as Fritz Theil Park covers a historic landfill, and is currently used as a site for two baseball diamonds and an open recreational field. Niven Lake was used as the sewage lagoon prior to Fiddler's Lake.

Opportunities for Waste Diversion

Yellowknife currently diverts beverage containers through the BCP under the *Waste Reduction and Recovery Act*. This includes water, juice, milk and liquid milk products, energy drinks and alcohol containers. These empty containers may be returned to the city bottle depot. The depot in Yellowknife is located on Old Airport Road.

Figure 7-34: City of Yellowknife Landfill

8.0 COMPARISON OF SELECT WASTE MANAGEMENT INFORMATION IN NWT

Table 8-1: Community Waste Management System Information (Part 1)

Community Name	Population	Climate	Accessibility	Use of Landfill by Industry	Approved Water Licence / Expiry	Landfill Operations & Maintenance Plan	Landfill Site Land Ownership	Landfill Established (Year) / Anticipated Closure Date	Landfill Controls	Illegal Dumping Identified as an Issue
Aklavik	633	129.8 mm / 136.3 cm 13.9°C / -26.3°C	Winter Road, Barge, Air	No	Yes / Dec 2019	Yes	Community	1975 / 2015	Gate	No
Behchokǫ̀	1,926	170.7 mm / 157.6 cm 17°C / -25.6°C	All-Weather Road	No	Yes / Nov 2029	Yes	Community	1980 / 2015	No gate or fence	Yes
Colville Lake	149	144.9 mm / 151.2 cm 16.7°C / -27.8°C	Winter Road, Air	No	No	No	Commissioner's Land	1985 / 2020	No gate or fence	No
Déljnę	472	162.3 mm / 150 cm 13.3°C / -25°C	Winter Road, Air	No	Yes / Dec 2017	No	Community	1989 / 2025	Partial fence	No
Dettah	210	170.7 mm / 157.6 cm 17°C / -25.6°C	All-Weather Road	No	Yes / Mar 2020	No	Commissioner's Land	1982 / 2030	Gate and fence	Yes
Enterprise	87	217.4 mm / 138.9 cm 16.1°C / -21.8°C	All-Weather Road	No	Yes / Aug 2024	Yes	Community	1986 / 2030	Gate and partial fence	No
Fort Good Hope	515	144.9 mm / 151.2 cm 16.7°C / -27.8°C	Winter Road, Barge, Air	No	Yes / Oct 2015	No	Commissioner's Land	1980 / 2015	Gate	No
Fort Liard	536	294.1 mm / 165.4 cm 17.3°C / -21.8°C	All-Weather Road, Air	No	Yes / Feb 2020	No	Commissioner's Land	2009 / 2051	Gate and fence	Yes
Fort McPherson	792	145.9 mm / 152.5 cm 15.2°C / -27.5°C	All-Weather Road, (Ferry Crossing), Air	No	Yes / Aug 2020	Yes	Community	1980 / Unknown. A new landfill is under construction	No gate, partial fence	Yes
Fort Providence	734	217.4 mm / 138.9 cm 16.1°C / -21.8°C	All-Weather Road, Barge, Air	No	Yes / July 2016	Yes	Commissioner's Land	1986 / 2019. Planning is under consideration	Gate and partial fence	Yes
Fort Resolution	474	217.4 mm / 138.9 cm 16.1°C / -21.8°C	All-Weather Road, Air	No	No	No	Community	1980 / 2024	Gate and partial fence	No
Fort Simpson	1,238	238.6 mm / 187 cm 14.7°C / -24.2°C	All-Weather Road (Ferry Crossing), Air	Yes	Yes / July 2025	No	Commissioner's Land	1980 / 2022	No gate or fence	Yes
Fort Smith	2,093	244.3 mm / 150.2 cm 17.0°C / -22.4°C	All-Weather Road, Air	Yes	Yes / Oct 2026	Yes	Commissioner's Land	1970 / 2031	Gate and fence	Yes
Gamètì	253	215.5 mm / 124.7 cm 16.9°C / -25.4°C	Winter Road, Air	No	Yes / Dec 2018	No	Community	1985 / 2016	No gate or fence	No
Hay River / Reserve	3,898	217.4mm / 138.9 cm 16.1°C / -21.8°C	All-Weather Road, Barge, Air	Yes	Yes / May 2020	Yes	Commissioner's Land	1970 / 2021	Gate, no fence	No
Inuvik	3,463	114.5 mm / 158.6 cm 14.1°C / -26.9°C	All-Weather Road (Ferry Crossing) , Barge, Air	Yes	Yes / Jun 2016	Yes	Community	1980 / 2025	Gate and partial fence	No
Jean Marie River	64	238.6 mm / 187 cm 17.4°C / -24.2°C	All-Weather Road, Air	No	No	No	Commissioner's Land	1990 / Unknown. Planning is under consideration	No gate, partial fence	No
Kakisa	45	217.4 mm / 138.9 cm 16.1°C / -21.8°C	All-Weather Road	No	No	No	Commissioner's Land	1991 / 2020	Gate and partial fence	Yes
Lutsel K'e	295	172.4 mm / 146.6 cm 14.3°C / -28.1°C	Barge, Air	No	No	No	Commissioner's Land	1998 / Unknown	No gate and partial fence	No
Nahanni Butte	102	238.6 mm / 187 cm 17.4°C / -24.2°C	Winter Road, Air	No	No	No	Commissioner's Land	1990 / 2023	Gate and partial fence	No
Norman Wells	727	171.7 mm / 161.5 cm 17.1°C / -26.1°C	Winter Road, Barge, Air	Yes	Yes / Aug 2018	Yes	Commissioner's Land	1970 / 2083	Gate and fence	No
Paulatuk	313	92.9 mm / 131.8 cm 10.1°C / -26.2°C	Barge, Air	No	Yes / Nov 2015	Yes	Community	1980 / 2024	Gate and partial fence	No

Community Name	Population	Climate	Accessibility	Use of Landfill by Industry	Approved Water Licence / Expiry	Landfill Operations & Maintenance Plan	Landfill Site Land Ownership	Landfill Established (Year) / Anticipated Closure Date	Landfill Controls	Illegal Dumping Identified as an Issue
Sachs Harbour	112	58.3 mm / 97.7 cm 6.6°C / -28.3°C	Barge, Air	No	Yes / Nov 2017	No	Commissioner's Land	1990 / 2022	No gate and partial fence	No
Trout Lake	92	217.4 mm / 138.9 cm 16.1°C / -21.8°C	Winter Road, Air	No	No	No	Commissioner's Land	1992 / 2015. A management plan in progress	Fence and no gate	No
Tsiigehtchic	143	145.9 mm / 152.5 cm 15.2°C / -27.5°C	All-weather Road (Ferry Crossing)	No	Yes / July 2015	No	Community	1980 / 2024	No gate or fence	Yes
Tuktoyaktuk	854	74.9 mm / 103.1 cm 11°C / -26.6°C	Winter Road, Barge, Air	Yes	Yes / Jun 2014	Yes	Commissioner's Land	1985 / 2016	Fence and no gate	Yes
Tulita	478	176.8 mm / 116.7 cm 17.1°C / -25.2°C	Winter Road, Barge, Air	No	Yes / Oct 2015	No	Community	1990 / 2010	No gate or fence	No
Ulukhaktok	402	74.2 mm / 83.3 cm 9°C / -28.8°C	Barge, Air	No	Yes / Nov 2016	No	Community	1980 / 2030	No fence or gate	No
Wekweètì	141	215.5 mm / 124.7 cm 16.9°C / -25.4°C	Occasional winter road, Air	No	Yes / Sept 2017	No	Community	1982 / 2035	Gate (not used), fence	No
Whatì	492	215.5 mm / 124.7 cm 16.9°C / -25.4°C	Winter Road, Air	No	Yes / Sept 2017	No	Commissioner's Land	1990 / Unknown	Fence and no gate	No
Wrigley	133	215.5 mm / 124.7 cm 16.9°C / -25.4°C	All-Weather Road, Barge, Air	No	No	-	Commissioner's Land	2002 / 2018	No gate or fence	No
Yellowknife	19,234	170.7 mm / 157.6 cm 17°C / -25.6°C	All-Weather Road, Barge, Air	Yes	Yes / May 2022	Yes	Community	Unknown / 2064	Gate and fence	Yes

Table 8-2: Community Waste System Information (Part 2)

Community Name	Waste Collection Vehicle	Frequency of Waste Collection	Waste Management Staff	Hazardous Waste Plan/Implemented	Type of Sewage Lagoon	Sewage Pond/Lagoon within 100 m of Landfill	Sewage Sludge Removal	BCP Participation	Completed Community waste management survey
Aklavik	Pick up (3.5 m^3)	3 days/week	Municipal & Private	No	Pond	Yes	No	Satellite Depot	Yes
Behchokǫ̀	Unknown	2 days/week	Municipal & Private	Yes / Yes	Engineered Lagoon	No	Yes	Yes	Yes
Colville Lake	ATV or Pick up	Varies each month	Municipal & Private	No	Trench	No	No	Yes	No
Déline	Garbage Truck	3 days/week	Municipal	No	Engineered Lagoon	No	No	Yes	Yes
Dettah	Unknown	1 day/week	Municipal & Private	Yes / Yes	Pond	No	No	No	Yes
Enterprise	Unknown	1 day/week	Municipal & Private	Unknown	Pond	Yes	No	Yes	No
Fort Good Hope	Compactor Truck (11 m^3)	2 days/week	Municipal	Unknown	Trench	No	Yes	Yes	No
Fort Liard	Truck (11 m^3)	2 day/week	Municipal	No	Engineered Lagoon	Yes	No	Yes	Yes
Fort McPherson	Ford F350 (8 m^3)	3 days/week	Municipal	Unknown	Engineered Lagoon	Yes	No	Yes	Yes
Fort Providence	Ford F450 (7 m^3)	2 days/week	Municipal	No	Engineered Lagoon	Yes	Yes	Yes	Yes
Fort Resolution	Unknown	2 days/week	Municipal	Unknown	Engineered Lagoon	Yes	No	Yes	Yes
Fort Simpson	Truck (15 m^3)	5 days/week	Municipal & Private	Yes / Yes	Wastewater Plant	-	Yes	Yes	Yes
Fort Smith	Truck (19 m^3)	2 days/week	Municipal	Yes / Yes	Lagoon	No	Yes	Yes	Yes
Gamètì	Truck (11 m^3)	3 days/week	Municipal	Currently no, a plan in progress	Pond	No	No	Satellite Depot	Yes
Hay River / Reserve	Waste Collection Trucks	2 days/week	Municipal & Private	No	Engineered Lagoon	No	Yes	Yes	No
Inuvik	4 m^3 and 6 m^3 bins and 16 m^3 side load vehicles	5 days/week	Municipal & Private	Unknown	Engineered Lagoon	No	Yes	Yes	No
Jean Marie River	Unknown	Unknown	Municipal	Unknown	Engineered Lagoon	No	No	Yes	No
Kakisa	¾ tonne pick up	2 day/week	Municipal	No	Trench	Yes	No	Yes	Yes
Lutsel K'e	Truck (10 m^3)	3 days/week	Municipal	No	Engineered Lagoon	No	No	Satellite Depot	No
Nahanni Butte	Ford F150	2 days/week	Municipal	No	Engineered Lagoon	No	No	Satellite Depot	Yes
Norman Wells	Compactor Truck	4 days/week	Municipal & Private	Unknown	Engineered Lagoon	No	No	Yes	No
Paulatuk	11 m^3 side load	2 days/week	Municipal	No	Pond	Yes	No	Satellite Depot	Yes
Sachs Harbour	Unknown	2 days/week	Municipal	No	Pond	No	No	Satellite Depot	Yes
Trout Lake	2 m^3 vehicle	3 days/week	Municipal	No	Engineered Lagoon	Yes	No	Yes	Yes
Tsiigehtchic	Pickup	2 days/week	Municipal	No	Pond	Yes	No	Satellite Depot	Yes
Tuktoyaktuk	8 m^3 side load	3 days/week	Municipal & Private	Unknown	Pond	No	No	Yes	Yes
Tulita	10 m^3 haul-all	2 days/week (summer) 1 day/week (winter)	Municipal	No	Pond	No	No	Yes	Yes
Ulukhaktok	10-12 m^3 enclosed truck	5 half days/week	Municipal	No	Pond	No	No	Yes	Yes
Wekweètì	11 m^3 vehicle	3 days/week	Municipal	No	Pond	Yes	No	Yes	Yes
Whatì	11 m^3 haul-all	5 half days/week	Municipal	Unknown	Engineered Lagoon	Yes	No	Yes	No
Wrigley	Pickup	3 days/week (summer) 2 days/week (winter)	Municipal	Unknown	Trench	No	No	Yes	No
Yellowknife	Waste truck (bin system)	5 days/week	Municipal	Unknown	Pond	No	Yes	Yes	Yes

9.0 COMMUNITY COMPARISON

9.1 Landfill Users

In most communities, the use of the landfill is relatively consistent throughout the year, as the full-time residential population is largely unchanged and there is no significant seasonal influx of visitors. Some communities located on all-weather roads noted that there were seasonal increases in local population due to construction and exploration activities (i.e., camps). Of note, responses for the community of Tuktoyaktuk noted that during the summer months, the population of the community doubles from 954 to approximately 1,900, putting additional pressure on local infrastructure, including the waste management site. Large construction or demolition projects in a community can also have a significant impact on landfill usage and lifespan.

Waste deposited at the community landfills is almost entirely sourced from the local community and consists largely of MSW and ICI waste from the residences and community services (community administration, school, police, etc.), retail establishments and businesses that largely serve the local community. The landfills also receive a substantial quantity of CRD materials from the demolition of buildings through the NWT Housing Corporation, community buildings (e.g., schools) and some retail or rental establishments, which are no longer usable. Some CRD materials represent the waste from construction projects, including packaging and leftover materials. In addition, landfills receive bulky items including end-of-life vehicles, used appliances, tires, old fuel tanks, empty containers (e.g., sodium hypochlorite containers from water treatment operations), etc. from residents and community operations, as well as culverts from regional highway projects completed through the GNWT Department of Transportation. Wood, usually in the form of pallets, brush and some separated CRD material is also stockpiled at many sites, and in some cases is burned. In addition, some communities accept hydrocarbon contaminated soils, which are managed on site by “land-farming”, particularly in the past. Land farming is now largely limited to soils from spills associated with community operations; contaminated soil from airports and private operations are usually dealt with by the owners of these operations.

Industries in the NWT are primarily related to resource development for oil and gas or mining projects. For the definition in this study, industries are considered to exclude most commercial operations and service facilities within the communities (i.e., retail, trucking, vehicle repair). Use of the community landfill sites for industrial waste originating outside of the communities is limited to Fort Smith, Hay River, Inuvik, Norman Wells, Tuktoyaktuk and Yellowknife. Tuktoyaktuk previously received waste from the oil and gas industry, which is buried in the current site. Tuktoyaktuk no longer accepts waste from the oil and gas industry. At the Hay River landfill, large metal valves consistent with the oil and gas industry are present. At the Fort Smith landfill, historical low-level radioactive waste disposed of in the Fort Smith area from transportation of materials from the Port Radium operations was observed. Full fuel barrels from mining or other operations were noted at Inuvik, and it is also understood that this site receives materials from CRD operations in other communities. The primary concern with respect to industries relates to the part of their operations which may result in the generation of hazardous waste, which is incompatible with the current landfill site operations or design. These landfills (with the exception of Yellowknife) are unlined and have no leachate collection (i.e., they are “natural attenuation” landfill designs) and therefore even small amounts of hazardous waste can result in a spill to the environment. Furthermore, even if appropriate hazardous waste containment is present at the community landfills, they are not sized to handle external hazardous waste. In general, the operators of the community landfills understand the limitations of what should be disposed of at the landfills. Establishment of a standard regulation outlining acceptable and non-acceptable materials, as well as

limits on the levels of contaminants in soil or other material would, however, provide a clear means of establishing what is allowed to be disposed at a landfill and would standardize the water licences in this respect.

9.2 Waste Collection and Disposal

The frequency of waste collection (Table 8-2) is defined as the number of days community or contracted staff spend picking up waste within the community. In NWT most communities, this was typically reported to be two to three full days a week. Collection in small communities was reported to be typically completed in one day. The collection frequency for three communities (Inuvik, Fort Simpson and Yellowknife) was reported to be five full days a week. In almost all cases, the frequency of waste collection was developed in order to collect waste from each resident or business once a week. A few exceptions exist, for example daily pick up of waste from residences in Whati to control nuisance bears. In Inuvik communal containers are collected on a set schedule or when full, rather than picking up individual bags at all residences. Ten communities report that they contract out the waste collection operations. With a few exceptions (Hay River, Norman Wells, Inuvik and, up to 2014, Fort Simpson) communities do not contract out waste compaction and site operations, although they may retain contracted equipment.

Many NWT landfills are not fully enclosed by a fence. Some landfills have a gate and lock; however, the gate is often left open in order to limit dumping of waste at the gate after hours. Fenced landfills with locked gates outside of the regular hours of operation are reported / observed for in Dettah, Hay River, Norman Wells, Fort Smith, Inuvik and Yellowknife. Some communities report that they still experience issues related to wildlife access, including bears climbing or digging under the fence to gain access to the waste. As a deterrent, the fences surrounding some waste management sites are electrified, such as in Hay River, Fort Smith, Fort Good Hope and recently, Norman Wells. An issue with these wildlife fences is that they require regular maintainance to ensure they operate effectively.

Illegal dumping remains a problem in many communities, and is reported to be an issue at 12 out of the 32 community landfills . For the purposes of this report, illegal dumping was defined as waste being deposited at any location immediately outside of the waste management site. In order to limit the issue and reduce the effort required to relocate the waste, a number of communities leave the gates unlocked or open. This can lead to improperly placed items in the bulky waste area or unacceptable materials being deposited in the waste drop off area, particularly where the site does not have clear signage. In other cases (e.g., Fort Providence), the landfill is locked, but residents can sign out the gate key at the community office to gain access to the landfill.

All landfill sites contain an MSW cell, which includes material from residential users and a component of ICI waste, which is typically greater in larger communities where more services are available. At many sites, (e.g., Behchokǫ̀ and Fort Simpson) separate CRD waste cells are used. The CRD waste at NWT sites is sometimes mixed in with the MSW, occasionally as a rough cover.

Hazardous waste is present at most sites, largely in the form of drums or pails of used oil and antifreeze, unused fuel and lead-acid batteries. Few communities were observed to regularly collect and store household hazardous waste, which represents an opportunity for increased collection of materials that would most likely end up in the MSW waste stream deposited in the landfill. Some communities coordinate regular household hazardous waste collection events (Hay River and Fort Smith), where items like paint, propane tanks, batteries, household cleaners, aerosols, oils/fuels, fluorescent bulbs, thermostats, pesticides and electronic waste are accepted from residents

for proper disposal for free. The City of Yellowknife Solid Waste Disposal Facility accepts household hazardous waste items from residents year-round.

At most landfills, waste is typically dropped off at a tipping face, at or next to the active cell, largely by the community waste collection vehicles. This material is placed in the cell by the available heavy equipment (typically a front end loader or bulldozer), or in some cases (e.g., Inuvik) the waste collection vehicles drive on the covered waste cell to the tipping area. Compaction is completed irregularly at many sites, ranging from weekly to monthly, or even seasonally. Cover is reported or observed to be (based on the site visits) placed regularly at only 7 of the 32 landfills. As a result of the occasional compaction and covering, windblown litter is present at many of the landfill sites. It is also evident that many of the sites operate a larger active face/fill area than is needed, and as a result large areas of waste are uncovered (see Figure 9-1 and Figure 9-2).



Figure 9-1: Uncovered Waste, Aklavik Landfill Site



Figure 9-2: CRD (right) and MSW (left) cells at the Behchokǫ̀ Landfill Site

9.3 Water Licence Requirements

Water licence requirements differ by Land and Water Board and community, and are based on the community's solid waste and sewage management infrastructure. With respect to a determination of the conditions at each community for this report, the primary documents relied upon typically included the supporting engineering reports in the water licence applications, the AANDC inspection reports (as of April 1, 2014 these inspection reports have been the responsibility of ENR) and the annual reports. The information contained in these documents (with the exception of the structured AANDC inspection reports) varied substantially between communities and it was often difficult to determine current conditions because of conflicting information and limited report organization. A standardized approach to annual reporting including information relevant to regulatory management of the waste management sites and inventories of accepted bulky and hazardous waste items would be of substantial benefit.

All water licences require that an operation and maintenance (O&M) manual be prepared for the solid waste sites. These O&M manuals have not been completed for 11 of the communities with water licences. The details and consistency of the content in the solid waste facility operation and maintenance manuals that were reviewed as part of this study were highly variable. In some cases, a copy of the general MACA (2003) procedures was simply provided, whereas in others there were detailed procedures outlined for the operators. In some cases, the O&M manual provided useful information on the landfill layout, but in many cases it was difficult to determine the locations and areas of waste operations. It is also noted that the available manuals are not always well understood by operations staff, who operate the site based on the incoming material, equipment and resources available at the time, which can in some cases vary from what is outlined in the O&M manual. For example, in Ulukhaktok, the sole dump truck in the community is not operational, and as a result, delivery of cover material is not possible.

In Lutsel K'e, the bulldozer used for compaction was not operational at the time of the site visit (and had not been for some time) and therefore compaction was not being undertaken.

Of the 32 communities surveyed for this report, 24 have approved water licences (77%). Of these, five water licences were set to expire by December 2015. Seven communities do not have approved water licences, or the status of their water licence is unknown. It is recommended that follow-up be conducted for these communities. It is understood that a water licence application for the community of Fort Resolution (no water licence at present) is in process.

Water Licenses in Progress	No Water License
Fort Good Hope	Colville Lake
Paulatuk	Fort Resolution
Tsiigehtchic	Jean Marie River
Tuktoyaktuk	Kakisa
Tulita	Lutsel K'e
	Nahanni Butte
	Trout Lake
	Wrigley

Of the 32 communities in the NWT that operate landfill sites, only 6 (19%) are fully compliant with their approved water licences. Of the 24 approved water licences, 18 communities (75%) are not in compliance with their water licences, based on the most recent (typically 2011) inspection reports completed by AANDC. Some of the common issues related to non-compliance include:

- Presence of wind-blown litter;
- Insufficient or infrequent cover and compaction of waste;
- Lack of adequate signage;
- Poor site control (fencing, gates);
- Lack of proper waste segregation at the landfill;
- Improper storage of hazardous waste;
- Improper storage of fuel drums, used oils and lubricants;
- Operation and maintenance manual out of date or missing;
- Closure plan out of date or missing;
- Lack of or missing "as-built" drawings for the waste management infrastructure; and,
- Lack of or missing hazardous waste management plan.

As noted above, whereas completion of the appropriate reports will meet the requirements for reports under the water licence, inconsistent level of detail, absence of site mapping, open site access and lack of training result in inadequate management of many sites compared to the standards required by the regulatory authorities. Following

a review of the information in the community profiles, it is recommended that the GNWT include more critical aspects of the non-compliance issues in their determination of selected sites for follow up. This should clearly include management of hazardous waste, discussed below.

9.4 Landfill Management Training

Recommended training for landfill operators varies across Canada. In larger municipalities, where the management of waste from larger communities often requires multiple staff and sometimes entire departments, landfill operators are often required to complete the Manger of Landfill Operations (MOLO) course offered by the Solid Waste Association of North America (SWANA). SWANA also offers further detailed courses grouped into four main categories:

1) Planning and management;

2) Landfill and landfill gas;

3) Recycling and special waste; and

4) Collection and transfer.

Many of these courses are offered remotely (i.e., both as e-learning courses and in person) to accommodate the training of personnel in remote communities.

Through MACA, the School of Community Government offers a program entitled, “Water and Waste Management.” This program offers training in the design, operation and management of water, waste water treatment and disposal, and solid waste site works. Results of the community waste management survey illustrated that landfill operators in only approximately ten communities have completed a waste management training program.

Aurora College, which has campuses in Inuvik, Fort Smith and Yellowknife, and 31 Community Learning Centres in various communities throughout the NWT, offers several courses that incorporate waste management training and best management practices. Course No. 163-341 “Environmental Health Promotion” focuses on the proper handling of food, water and waste to decrease the incidence of disease and injury in the community and to the natural environment.

Waste management facility operators and waste collection vehicle operators in most NWT communities work on a part-time basis. In many cases, operators work less than three days per week, and in some cases, only a few hours per week. Whereas classroom training available through organizations as noted above is useful, it is often difficult to provide the “hands-on” experience required for operators to understand site management and equipment operations which are needed to meet the expectations of the regulations and to both maximize use of the available landfill capacity and limit issues which increase leachate generation and litter generation. Training at an active landfill, or even at each of the community landfills may assist in improving operator understanding and performance.

9.5 Hazardous Waste Management Practices

Only six communities (19%) report that they have a Hazardous Waste Management Plan that is being actively implemented. The communities with Hazardous Waste Management Plans which are actively being implemented include Behchokǫ̀, Dettah, Fort Resolution, Fort Simpson, Fort Smith, and Yellowknife.

As noted above, in some cases, there are procedures provided for hazardous waste in the O&M manual, however these are procedures that are viewed as either not sufficiently comprehensive or clear to provide adequate guidance for landfill site operators with respect to their specific site.

Hazardous waste is stored without the required controls or protection at many landfill sites. Several communities made specific mention that they have concerns related to soil and groundwater contamination due to the improper storage and handling (spills) of hazardous waste at the community landfill. During the site visits, this was confirmed to be the case at a number of facilities including, for example, Aklavik, Trout Lake and Fort McPherson. At these sites, and others, evident staining of soil assumed to be from hydrocarbons was observed.



Figure 9-3: Hazardous Waste, Fort McPherson Landfill Site

The proper storage of hazardous waste would consist of a lined area (Figure 9-4) and/or covered containers capable of containing spills from the material stored within (Figure 9-5). It is noted that materials stored on a lined area are still required to be stored upright and in sealed containers, which is not the case in the depicted photo.



Figure 9-4: Lined Hazardous Waste Disposal Area



Figure 9-5: Hazardous Waste Storage Containers, Yellowknife Landfill

Low-level radioactive waste is currently buried in a separate cell at the Fort Smith Landfill. An earlier pile of material from the former Port Radium mine on Great Bear Lake is reported to have been removed from the a closed landfill in Tulita (Benitez et. al., 2011).

9.6 Sewage Sludge Management

Wastewater in NWT communities is managed in sewage lagoons or trenches, with the exception of Fort Simpson, which operates the only wastewater treatment plant in the NWT. The process of wastewater disposal largely consists of emptying the contents of wastewater holding tanks into the lagoons, through a waste chute (Figure 9-6). A number of these lagoons are natural ponds (e.g., Aklavik, Gamètì, Paulatuk), whereas others are engineered lagoons, some with multiple cells (e.g. Fort Resolution, Fort Providence, Fort Liard). Most commonly, the larger natural ponds are not designed for sludge removal, although they are decanted regularly. The engineered lagoons, particularly those with multiple cells, are often designed to allow full decanting and removal of the sludge. Sewage trenches are usually found in smaller communities at sites with highly permeable soils, and therefore standing water is not present (e.g., Wrigley).

Only five communities report that they remove sludge from their sewage lagoons. Fort Simpson also removes sludge from their wastewater treatment plant. Only Fort Simpson was able to provide information on the volume of sludge removed on a yearly basis. Some water licences note that sludge from the lagoons may be placed at the community landfill, however this is not commonly reported to occur.



Figure 9-6: Sewage Lagoon and Chute, Aklavik

9.7 Waste Diversion

All communities participate in the BCP with a permanent depot or via a satellite deport in their community. The one exception is Dettah, which does not have a depot as residents are encouraged to use the nearby depot in Yellowknife. Yellowknife is currently the only NWT community with a centralized composting program. The communities of Fort Smith and Hay River have implemented programs to encourage residents to purchase and use backyard composters. Many NWT communities have backyard composters located at their community garden sites.

With the exception of the materials included in the BCP, very few communities send recyclable materials (e.g., plastics, cardboard, metals, white goods) out of the community for recycling and/or disposal. This is largely due to the high cost of transportation and the absence of organized waste diversion alternatives where economies of scale could, in part, overcome the transportation costs. The BCP and the newly established electronics recycling program (February 1, 2016) are good examples of organized waste diversion and illustrate the need for management of diversion at the territorial level.

Considering the amount of stockpiled material at community landfills that could be removed (i.e., white goods, bulky metals, end-of-life vehicles, hazardous waste, etc.), there are opportunities for additional waste diversion. This will likely require considerable financial backing to support these initiatives and would likely also be best managed, at least in part, at the territorial level, to be successful. This is further discussed in Volume II.

GOLDER ASSOCIATES LTD.





Paul Dewaele, P.Eng.
Principal

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

10.0 REFERENCES

Arktis Solutions, 2010. Final Report. Development of an Overview of the State of Waste Management in Canada's Territories. March 31, 2010.

Arktis Solutions, 2011. Report on Current State of Solid Waste Management and Facilities in Nunavut and Cost Benefit Analysis of Selected Solid Waste Management Approaches. March 30, 2011.

Arktis Solutions, 2012. Foundation Report for a Technical Document on Municipal Solid Waste Landfills in Northern Conditions: Engineering Design, Construction and Operation.

Environment Canada, 1989. *Ecoclimatic Regions of Canada. Ecological Land Classification Series, Number 23.* 1989. Strong, W.L.; Zoltai, S.C.; Ironside, G.R. Canadian Wildlife Service, Ottawa. 122 p.

Environment Canada, 2014. Government of Canada Canadian Climate Normals. Accessed at http://climate.weather.gc.ca/climate_normals/index_e.html, Site accessed 2014.

KBL Environmental Ltd, 2013a, Municipal Hazardous Waste Inventory Beaufort Delta. December 2, 2013.

KBL Environmental Ltd, 2013b, Sahtu Hazardous Waste Inventory Project. November 15, 2013.

Natural Resources Canada, 1993. Canada-Permafrost (map_ Fifth Edition, National Atlas of Canada.

MACA, 2003a. Background Report for Updating the Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories. Prepared by R. Kent, P. Marshall and L. Hawke, FSC Group. April 10, 2003.

MACA, 2003b. Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories. Prepared by R. Kent, P. Marshall and L. Hawke, FSC Group. April 21, 2003.

MACA, 2014. Age of Solid Waste and Sewage Lagoon Sites. Summary provided in Excel spreadsheet by Northwest Territories Department of Municipal and Community Affairs (MACA), March 10, 2014.

Natural Resources Canada, 2012. Long term mean climate grids for Canada and the United States. http://cfs.nrcan.gc.ca/projects/3?lang=en_CA. Accessed on February 7, 2012 as provided in Arktis (2012).

Northwest Territories Bureau of Statistics, 2015. Population Estimates, Community Totals 2001 – 2014. From: http://www.statsnwt.ca/population/population-estimates/ExcelFiles/commtotals_2001-2014.xlsx Accessed September 23, 2015.

Statistics Canada, 2012. Government of Canada Statistics Canada 2011 Census. Accessed at http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/search-recherche/lst/page.cfm?Lang=E&GeoCode=61&TABID=1&G=1&Geo1=PR&Code1=01&Geo2=0&Code2=0 on June 8, 2015.

APPENDIX A

Site Inspection Forms and Photos

SITE INSPECTION REPORT
Site: Aklavik

(Licence N3L3-0570)

Date of Inspection:	Sept	05	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1100 HRS			**Weather Conditions:**	**0** °C
Inspected by:	KR/PD				

		Yes	No	Comments
1.	Waste Segregation	X		MSW/C&D/White goods/Drums & Tanks/tires/Vehicles &Bulk metal Stockpiles. Overall waste is poorly segregated.
2.	Waste Inventory		X	No landfill attendant/no inventory maintained
3.	Operations Manual		X	Water license application in progress, draft in progress
4.	Site Life Estimates	X		At end of life according to SAO. Road to the mountains will allow a new site to be chosen away from the community and away from lakes.
5.	Closure/Remediation Plan		X	Water license application in progress, draft in progress
6.	Contaminated Soil Management		X	Site does not accept contaminated soils.
7.	Estimated waste (day/week)	X		Estimated 250 households on garbage pickup. 3 to 4 truckloads M/W/F truck has 8ft box with wooden sides.
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill	X		Culverts, housing projects, construction waste.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Dozer onsite twice this summer Hamlet loader onsite m/w/f to push up recently collected MSW
11.	Construction/Demolition waste and sources			Hamlet construction projects including roads (culverts), Housing Corp projects.
12.	Burning		X	
13.	Hazardous Waste	X		Hazardous waste stockpiled together.
14.	Hazardous Waste Control/Separation		X	No controls in place
15.	Entrance Gate	X		Unused, always open.
16.	Perimeter Fencing		X	Site is bounded by lakes.
17.	Signage (Site, Recycling, Hazardous)		X	Partial signage, new signs are being working on and painted at the time of the visit.
18.	Bulky Metals Storage	X		Bulky metals and vehicles stored together
19.	Fuel Drum Storage			Fuel drums stockpiled together. Appears that drum storage was managed at one point as a number of drums are stored on their sides stacked neatly. More recent drums are upright.
20.	Waste Cell Design (type)			Area fill
21.	Separated from SW Drainage	X		Waste is uncovered, perimeter berm on three sides
22.	Waste in active fill area	X		
23.	Waste Compacted	X		Dozer onsite twice this summer
24.	Daily cover being used		X	Dozer onsite twice this summer

25.	Waste fill area dry	X		Surface water present adjacent to fill area.
26.	Surface Water Quality/Colour			Surface puddles appear clear. Water in excavated trench is murky.
27.	Scavenging	X		
28.	Slopes in good condition		N/A	Site is relatively flat
29.	Vegetative Cover In good condition	X		Grass is present over covered MSW cell.
30.	Evidence Of Surface Water Ponding	X		Excavated trench adjacent to metals stockpile contains murky water. Wet area adjacent to white goods and fuel drum stockpile.
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Grizzly bears are commonly present at the landfill
- MSW fill area roughly follows a design however berms are hard to discern.
- Landfill is in close proximity to lakes, situated between Clearing Lake (sewage lagoon) and Pump Lake.
- Windblown litter is a concern.
- Recycler from Inuvik using water taxi to remove recycling from community
- Berms are made with construction waste and capped with soil.
- D8 and D6 available through K&N contracting
- Hamlet has a loader
- Peel river floods landfill access road on occasion.



Photo 1. Aerial photograph of site – MSW fill on left side of photo.



Photo 2. Brush and soil cover.



Photo 3. C&D waste.



Photo 4. Waste collection truck.



Photo 5. Covered C&D waste.



Photo 6. Flooded excavation.



Photo 7. Hazardous waste storage (as well as empty barrels).



Photo 8. Bulk metals storage.



Photo 9. MSW area, perimeter berm visible on right side of photo.



Photo 10. MSW drop off area.



Photo 11. MSW drop off area.



Photo 12. White goods and tires segregation.

SITE INSPECTION REPORT
Site: BEHCHOKO
(Licence W2014L3-0002)

Date of Inspection:	July	21	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1130 HRS			**Weather Conditions:**	Smoke, 25 °C
Inspected by:	KR, PD				

		Yes	No	Comments
1.	Waste Segregation	X		MSW, cars, mattresses, white goods, home heating fuel tanks
2.	Waste Inventory		X	
3.	Operations Manual		X	As per the water licence an operations manual is due by May 1, 2015.
4.	Site Life Estimates	X		3 Years in the current cells, expect another year in the current cell (SAO).
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management	X		Has previously accepted contaminated soil, as per the water licence an updated land farm operations and maintenance plan is required prior to accepting any additional soils.
7.	Estimated waste (day/week)			160 yards of MSW per week estimate from operator, pick up twice per week. Estimate 75% from Rae, 25% from Edzo.
8.	Honey Bag usage and disposal	X		Honey bags disposed of at lagoon (north of landfill.
9.	Private/Commercial Use of Landfill			Yellowknife residents believed to be using Rae Landfill on occasion. Fortune Minerals approached Rae to accept waste, was rejected. Other industry has approached Rae but has been declined (hazardous waste)
10.	Frequency that hamlet/contractor is onsite with heavy equipment			No set schedule, Hamlet equipment on site when possible but other projects such as highways projects often take precedence. D6N on site
11.	Construction/Demolition waste and sources	X		Local residents, housing corporation, local industry. Recent institutional building projects.
12.	Burning		X	
13.	Hazardous Waste		X	Hazardous waste is received in town at the hamlet garage.
14.	Hazardous Waste Control/Separation	X		Located in town, off site.
15.	Entrance Gate		X	Sign, no gate, accessible 24/7
16.	Perimeter Fencing		X	No fencing present.
17.	Signage (Site, Recycling, Hazardous)		X	Signage “For oil disposal contact ENR” assumed to be a historical sign.
18.	Bulky Metals Storage	X		Large amount of bulky metals and vehicles.

SITE INSPECTION REPORT
Site: BEHCHOKO
(Licence W2014L3-0002)

19.	Fuel Drum Storage	X		One drum located in water in cell 3. 1 pile of drums on site.
20.	Waste Cell Design (type)	X		Trench (3 separate ones) and berms above grade. Area fill method
21.	Separated from SW Drainage	X		Trenches contain some standing water.
22.	Waste in active fill area	X		Filling cell by cell.
23.	Waste Compacted	X		Typically once per week when they compact
24.	Daily cover being used		X	No intermediate cover; no final cover to date
25.	Waste fill area dry		X	Ponded water in trenches
26.	Surface Water Quality/Colour			Surface water is yellow/grey
27.	Scavenging	X		Scavenging is permitted by residents
28.	Slopes in good condition			Site is relatively flat, no slopes noted
29.	Vegetative Cover In good condition			No cover in place over current landfill, adjacent covered landfill vegetated, but many bare areas present
30.	Evidence Of Surface Water Ponding	X		Ponded water present
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Waste fill is flush with berm.
- Windblown littler is an issue.
- D6N on site
- Cover sand source on site; Final cover anticipated to be trucked from Russell Lake road (clayey source)
- 160 yards of MSW per week estimate, pick up twice per week. Estimate 75% from Rae, 25% from Edzo.
- Tipping fees exist but not enforced and not updated.
- Housing pays 60$ a load for pickup of white goods; Housing removes ODS from these white goods
- White goods are to be moved to old site.
- No Hazardous materials (oil, batteries, etc.) accepted at site; accepted in town at the community garage. Worked with KBL to remove hazardous waste previously.
- The water table is near surface based on ponds near entrance
- Leachate is present, discharging from the closed landfill into wetland

SITE INSPECTION REPORT
Site: BEHCHOKO
(Licence W2014L3-0002)



Photo 1. New landfill site entrance off Highway 3 (south of Behchoko).



Photo 2. White goods area on access road to new landfill.



Photo 3. Active MSW fill area looking south.



Photo 4. Landfill cells and separation berm.

SITE INSPECTION REPORT
Site: BEHCHOKO
(Licence W2014L3-0002)



Photo 5. MSW and C&D waste cells.



Photo 6. Contaminated ponded water in waste receiving area.



Photo 7. Edge of trench and mattresses.



Photo 8. Household fuel tanks.



Photo 9. White goods west of public drop off area (note bedrock at surface).



Photo 10. Site Bulldozer (for waste compaction).



Photo 11. Tire segregation.



Photo 12. Litter to west of active fill area.

SITE INSPECTION REPORT
Site: BEHCHOKO
(Licence W2014L3-0002)



Photo 13. Behchoko works yard hazardous waste drop off area.



Photo 14. Pond located near entrance to closed landfill east of active site.



Photo 15. Closed landfill cover.



Photo 16. End of life vehicles and bulk metals.



Photo 17. South face of closed landfill, adjacent to wetland, water is discolored.



Photo 18. Contaminated soil remediation area signage (closed landfill).



Photo 19. Metals and end of life vehicles at closed landfill east side of entrance.



Photo 20. End of life vehicles south of soil remediation area.

SITE INSPECTION REPORT
Site: Colville Lake

(No Water Licence)

Date of Inspection:	July	22	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1600HRS			**Weather Conditions:**	15 °C
Inspected by:	KR				Scattered showers

		Yes	No	Comments
1.	Waste Segregation	X		All waste streams (MSW, C&D, ICI disposed in one pit, with exception of honey bags and some metal (white goods, empty drums) and EOL vehicles.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		Additional 5 to10 years available in current cell. Estimated by the operator.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	
7.	Estimated waste (day/week)		X	Collection is contracted out to community members with vehicles. Contract changes each month. Community members are contracted on a monthly basis and collect the community waste with ATV's or pickup trucks.
8.	Honey Bag usage and disposal	X		Honey bags are still commonly used in the community. Disposed of in a lagoon "pit".
9.	Private/Commercial Use of Landfill		X	All waste is from within the community. Health center, hamlet office, a school, power plant and approximately 100 residences.
10.	Frequency that hamlet/contractor is on site with heavy equipment	X		Once a year with a loader to push waste into the pit.
11.	Construction/Demolition waste and sources	X		Housing projects, power projects (solar array and new generator station)
12.	Burning	X		Operator noted that last fall there was a burn. Believes it was wood waste, but could not confirm.
13.	Hazardous Waste		X	
14.	Hazardous Waste Control/Separation		X	
15.	Entrance Gate		X	No gate
16.	Perimeter Fencing		X	Operator discussed the need for a wind fence as windblown litter is an issue.
17.	Signage (Site, Recycling, Hazardous)		X	
18.	Bulky Metals Storage		X	
19.	Fuel Drum Storage		X	
20.	Waste Cell Design (type)			Pit or trench. Steep sides, no ramp for cat to compact waste within the pit.
21.	Separated from SW Drainage		X	No controls in place to reduce runoff entering the pit.
22.	Waste in active fill area	X		

23. Waste Compacted		X	
24. Daily cover being used		X	
25. Waste fill area dry	X		
26. Surface Water Quality/Colour		X	No surface water noted.
27. Scavenging	X		EOL snowmobiles and ATV are located at different site. This area is used for scavenging. There is no scavenging at the main pit
28. Slopes in good condition			Relatively flat site.
29. Vegetative Cover In good condition		X	No vegetative cover.
30. Evidence Of Surface Water Ponding		X	No ponding observed.
31. Evidence Of Leachate Seeps		X	No evidence of leachate seeps
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	
34. Other Observations			

- Metals including EOL vehicles, empty tanks and bulk metal are also dumped at a separate site. White goods (appliances) and some empty tanks are primarily at the landfill site.
- Community has 3 dozers (D7/D6/D3)
- A new sewage lagoon is currently being constructed
- The community and landfill sit on an esker and as a result, the soils are predominantly sand and gravel. Material from the borrow pit is located adjacent to the lagoon
- No water licence.



Photo 1: Aerial view of the Colville Lake landfill facing south.



Photo 2: Aerial view of the Colville Lake landfill facing north.



Photo 3: Empty drums, metal and white goods sit adjacent to active MSW pit.



Photo 4: Empty drums, metal and white goods sit adjacent to active waste trench.



Photo 5: Active waste trench.



Photo 6: Active waste trench containing MSW, electronics, tires, some empty hydrocarbon containers.



Photo 7: Active lagoon/honey bucket trench west of the active waste trench.



Photo 8: Active lagoon/honey bucket trench west of the active waste trench. Bulk Metal (white goods) visible along the treeline.



Photo 9: ATV and snow machines at the bulk metal dumping area east of the community.



Photo 10: Bulk metals area east of the community.



Photo 11: Bulk metals dumped east of the community. Tanks and drums, scrap metal

SITE INSPECTION REPORT
DETTAH LANDFILL

(Licence MV2009L3-0028)

Date of Inspection:	July 21 2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1400 HRS	**Weather Conditions:**	Smoke, 25 °C
Inspected by:	KR, KB, JB, PD		

		Yes	No	Comments
1.	Waste Segregation	X		Poorly segregated, metals, white goods and hazmat in one pile.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates		X	
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	
7.	Estimated waste (day/week)		X	
8.	Honey Bag usage and disposal			No honey bags noted onsite.
9.	Private/Commercial Use of Landfill			Used by residents of Dettah
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Unknown
11.	Construction/Demolition waste and sources			No visible C&D area.
12.	Burning		X	
13.	Hazardous Waste	X		Hazardous waste including drums present, new transfer pad being installed outside of current landfill, no signage.
14.	Hazardous Waste Control/Separation		X	New bins outside of fenced area appear to be a hazmat transfer area, no signage.
15.	Entrance Gate	X		Upon arrival gate was open with no gate.
16.	Perimeter Fencing	X		8ft chain link fence around perimeter. Gaps under fence.
17.	Signage (Site, Recycling, Hazardous)		X	Poorly marked areas. One sign was visible but wording faded.
18.	Bulky Metals Storage		X	A few bulky metals onsite, not segregated.
19.	Fuel Drum Storage		X	Drums present near main gate. Staining apparent.
20.	Waste Cell Design (type)		X	Appears to be area fill.
21.	Separated from SW Drainage			No surface water present within the perimeter fencing.
22.	Waste in active fill area		X	Active area not defined
23.	Waste Compacted	X		Waste is compacted. Freshly placed waste has not been compacted. No compacting equipment present onsite.
24.	Daily cover being used		X	Not being covered regularly. Approx. 50% of MSW has been covered.

25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour			N/A
27.	Scavenging			Unknown
28.	Slopes in good condition	X		No signs of erosion.
29.	Vegetative Cover In good condition		X	Limited vegetation present
30.	Evidence Of Surface Water Ponding	X		Surface water ponding outside of fenced perimeter.
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours			N/A
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Litter in bushes to the east of site. Includes snow machine parts and windblown litter.
- No separation between treated and un treated wood.
- Sand and gravels present
- Uncovered waste has been compacted.
- Brush cuttings is being placed this season over MSW.
- Surface west of site at SNP Station 1586-3
- Estimate standing water is 3-4m below height of waste.
- Tires mixed in with white goods.



Photo 1. Entrance.



Photo 2. Hazardous waste transfer area under construction.


Photo 3. Litter off site.



Photo 4. Overall site.



Photo 5. White goods.

SITE INSPECTION REPORT
Site: ENTERPRISE

(Licence MV2008L3-0004)

Date of Inspection:	July	23	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	900 HRS			**Weather Conditions:**	25 °C Sunny
Inspected by:	KR/PD				

		Yes	No	Comments
1.	Waste Segregation	X		MSW, C&D Hazardous Waste, vehicles, white goods, e-waste, bulk metals.
2.	Waste Inventory		X	No landfill attendant
3.	Operations Manual	X		Licence renewal application in progress
4.	Site Life Estimates	X		2030 as per FSC 2010
5.	Closure/Remediation Plan	X		2010 as per FSC CRP
6.	Contaminated Soil Management		X	
7.	Estimated waste (day/week)			1 pickup day per week (600m^3/year estimate)
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill			Landfill only accepts waste from Enterprise residents. No landfill attendant, unauthorized dumping occurs.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Dozer onsite. Operator onsite as required.
11.	Construction/Demolition waste and sources			Residential sources authorized. Housing trailer onsite but not authorized. Highways culverts onsite but not authorized.
12.	Burning		X	
13.	Hazardous Waste	X		
14.	Hazardous Waste Control/Separation	X		Area defined with signage, no controls in place. Large oil tank used for bulk disposal of oils.
15.	Entrance Gate	X		With signage indicating no commercial/industrial
16.	Perimeter Fencing		X	
17.	Signage (Site, Recycling, Hazardous)	X		
18.	Bulky Metals Storage	X		Bulky metals pile onsite.
19.	Fuel Drum Storage	X		Fuel drums stored with bulk metals and in hazardous waste area.
20.	Waste Cell Design (type)			Trench
21.	Separated from SW Drainage		X	Not separated from SW, SW is able to enter trench from where vehicles access trench.
22.	Waste in active fill area		X	MSW in both trench and C&D area.
23.	Waste Compacted	X		C&D waste compacted. MSW trench nearly empty, existing trench recently capped, appears compacted.
24.	Daily cover being used		X	Covered upon filling of cell.
25.	Waste fill area dry		X	Trench has water in it. Appear to be perched water table based on geology visible in nearby hay river valley.

26. Surface Water Quality/Colour			No sheen on water
27. Scavenging	X		Scavenging is permitted
28. Slopes in good condition	X		Site relatively flat.
29. Vegetative Cover In good condition		X	No vegetation on closed cell.
30. Evidence Of Surface Water Ponding	X		Ponding in trench, possibly SW contribution.
31. Evidence Of Leachate Seeps		X	
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	

34. Other Observations

- Soil staining observed where waste oil is stored
- Culverts present (unauthorized dumping)
- House trailer present (unauthorized dumping)



Photo 1. C&D active area.



Photo 2. C&D area.



Photo 3. Covered trench.



Photo 4. Culverts.



Photo 5. Standing water in active trench.



Photo 6. Unauthorized dumping of house trailer.


Photo 7. Waste oil and waste vehicles.



Photo 8. Waste oil staining.



Photo 9. E-waste propane tanks.

SITE INSPECTION REPORT
Site: Fort Good Hope

(Licence S09L3-002)

Date of Inspection:	July	22	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1300 HRS			**Weather Conditions:**	15 °C
Inspected by:	KR				Scattered rain

		Yes	No	Comments
1.	Waste Segregation	X		MSW/ C&D/White goods/bulk metals/waste oils /batteries/waste paint/propane tanks and end of life vehicles.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		Site is currently at the end of its life. SAO indicated that planning is underway for an expansion.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Numerous soils bags stored with hazardous waste. Some drums full of contaminated soil.
7.	Estimated waste (day/week)	X		Monday and Friday collection. Estimate 6 loads each Monday and Friday with an 11m^3 waste collection vehicle. Approximately 120 m^3 weekly
8.	Honey Bag usage and disposal	X		One load a week of honey bags from the community. Disposed of in a pit adjacent to the MSW pit.
9.	Private/Commercial Use of Landfill	X		Landfill is used by local residents and institutional buildings. Mainly from housing projects.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Loader on-site twice a week (collection days) to move waste. D6 used for compaction “multiple times” each summer.
11.	Construction/Demolition waste and sources	X		Housing projects are the main source of C&D waste.
12.	Burning	X		Burning of clean wood waste occurs sporadically.
13.	Hazardous Waste	X		Large quantity of drums containing product labeled by KBL and stored on pallets. Soil bags containing contaminated soils are present.
14.	Hazardous Waste Control/Separation	X		Bermed area contains hazardous waste including waste oils and fuel drums. Batteries are stored adjacent to the bermed area. Large number of batteries. Waste propane cylinders are stored upright on pallets.
15.	Entrance Gate	X		Entrance is gated, but left open.
16.	Perimeter Fencing	X		Bear fence surrounds the site. Bear fence requires repairs as it is not operational.
17.	Signage (Site, Recycling, Hazardous)		X	No signage present.

18.	Bulky Metals Storage	X		End of life vehicles stored in central area of landfill. Numerous culverts and approximately 100 empty fuel drums stored with bulk metals.
19.	Fuel Drum Storage	X		Approximately 100 empty drums stored on their side. An additional 50+ fuel drums stored with hazardous wastes in bermed area.
20.	Waste Cell Design (type)	X		Trench fill
21.	Separated from SW Drainage		X	MSW trench is above grade, no berm in place to separate from SW drainage. Site was dry during visit, coarse grained soils.
22.	Waste in active fill area	X		Waste is in the active fill, however active fill area is beyond capacity.
23.	Waste Compacted		X	Waste did not appear to be compacted.
24.	Daily cover being used		X	Cover is used annually. Currently not using cover as cell is beyond capacity.
25.	Waste fill area dry	X		No surface water noted.
26.	Surface Water Quality/Colour		X	No surface water noted.
27.	Scavenging	X		Scavenging is permitted.
28.	Slopes in good condition	X		No erosions paths noted on slopes.
29.	Vegetative Cover In good condition	X		Grass present in undisturbed and historically covered areas of the landfill.
30.	Evidence Of Surface Water Ponding		X	No evidence of surface water ponding.
31.	Evidence Of Leachate Seeps		X	No evidence of leachate seeps.
32.	Presence Of Leachate Odours		X	No odours noted.
33.	Evidence Of LFG Vegetation Kill		X	No evidence of vegetation effected by LFG noted.

34. Other Observations

- Community staff do not spend regularly attend the landfill. Waste segregation last occurred when Ecology north assisted in the segregation of waste oils, batteries, propane tanks.
- Water licence expires this fall, the community is working on renewal.
- The Community fluctuates in size in the winter due to residents working in Norman Wells. The SAO estimates that currently between 600 and 700 residents reside in the community.



Photo 1: Aerial view of the Fort Good Hope landfill.



Photo 2: Aerial view of the Fort Good Hope landfill with the Mackenzie River in the background.



Photo 3: Active MSW fill area. Cover material stored behind waste area.



Photo 4: White goods.



Photo 5: Wood waste.



Photo 6: White goods.



Photo 7: Waste tires.



Photo 8: White goods and wood waste.



Photo 9: Waste vehicles are located in the central area of the landfill.



Photo 10: Empty drums stored on their side adjacent to the bulk metals pile.



Photo 11: Drums containing waste oil and fuel located in a bermed area. Drums have been labeled. Note tote full of contaminated soil.



Photo 12: Additional drums containing waste oil and fuel.



Photo 13: Hazardous waste including batteries, waste oil and contaminated soil stored in bags.



Photo 14: Waste batteries, on pallets.



Photo 15: Waste batteries and propane tanks.



Photo 16: Propane tanks.



Photo 17: Bear fence at landfill.



Photo 18: Entrance gate to landfill.



Photo 19: Collection vehicle.

SITE INSPECTION REPORT
Site: Fort Liard

(Licence MV2009L3-0025)

Date of Inspection:	June	8	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1300 HRS			**Weather Conditions:**	15 °C
Inspected by:	KR/KB				

		Yes	No	Comments
1.	Waste Segregation	X		MSW, bulk metals, hazardous waste, white goods, bulk waste area (reported to require additional sorting by hamlet staff)
2.	Waste Inventory		X	Have MSW load counts from previous 4 years
3.	Operations Manual		X	
4.	Site Life Estimates	X		~30 year (site has capacity for 6 cells, estimated 5 years per cell)
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	
7.	Estimated waste (day/week)	X		Annual Estimate: 2011 1150 cu m 2012 1230 cu m 2013 1260 cu m 2014 1220 cu m
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill			Residents of Fort Liard use the landfill; oil and gas industry in the region does not use the landfill.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		On site once per week with loader. Once a year contract out compaction with D7 or D8.
11.	Construction/Demolition waste and sources			Housing projects, and small construction projects.
12.	Burning		X	
13.	Hazardous Waste	X		
14.	Hazardous Waste Control/Separation	X		Lined and bermed area.
15.	Entrance Gate	X		Gate is left open as residents just leave garage in front of the gate when it is closed.
16.	Perimeter Fencing	X		The active landfill area is fenced. Old litter fence has been removed except for one section along the current site, which assists in managing windblown litter.
17.	Signage (Site, Recycling, Hazardous)	X		Signage for hazardous waste area/bulk metals/appliances/MSW
18.	Bulky Metals Storage	X		Bulk metals are mainly culverts and household fuel storage tanks.
19.	Fuel Drum Storage	X		Stored in hazardous waste cell
20.	Waste Cell Design (type)			Trench fill. Six cells have been designed for the current site. First cell is nearing capacity, plans to open second cell are in the works.

21.	Separated from SW Drainage	X		The active landfill area is separated from surface water by a ditch which has been excavated around the site. Note that images show surface water ponded in the active cell, this is likely due to precipitation the day of and just before the inspection. The old landfill cell currently is under water.
22.	Waste in active fill area	X		MSW is only in the active fill area.
23.	Waste Compacted	X		Once a year contract out compaction with D7 or D8.
24.	Daily cover being used		X	
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour			No surface water observed in the active landfill area.
27.	Scavenging	X		Batteries are scavenged, as batteries have never been shipped off site and the operator noted having seen someone removing batteries from the landfill.
28.	Slopes in good condition	X		
29.	Vegetative Cover In good condition	X		
30.	Evidence Of Surface Water Ponding	X		Surface water is ponding on the historical landfill site adjacent to the sewage lagoon.
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Tipping fees in place, but not enforced.
- Supervisor 2 hours a week at the landfill.
- Labourer/operator onsite 3 hours per day.
- Vehicles are not accepted at the landfill.
- Hamlet hires labourers a few times each year to segregate bulk waste.
- Vehicles are not drained; CFC not removed.



Photo 1: Signage at entrance of landfill.



Photo 2: Hazardous waste, bermed and lined area.



Photo 3: Segregated televisions and tires.



Photo 4: Bulk metals.



Photo 5: White goods.



Photo 6: Bulk metals.



Photo 7: Active MSW cell, soil being placed in preparation to cover cell.



Photo 8: Active MSW area, note ponded water. Likely from recent rainfall event.



Photo 9: Landfill in foreground with sewage lagoon adjacent. Note previous MSW cell is located amid the sewage lagoon and is mostly obscured with ponded surface water.



Photo 10: Active landfill area.

SITE INSPECTION REPORT
Site: Fort McPherson

(Licence G03L3-001)

Date of Inspection:	Sept	11	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	0930 HRS			**Weather Conditions:**	0°C
Inspected by:	KR/GM				

		Yes	No	Comments
1.	Waste Segregation	X		Poorly segregated waste
2.	Waste Inventory		X	
3.	Operations Manual	X		Circa 1990
4.	Site Life Estimates			New site currently under construction. New site construction delayed due to SW issues.
5.	Closure/Remediation Plan			Closure to occur once new site is operational
6.	Contaminated Soil Management	X		Pile of contaminated soils adjacent to bulk metals area.
7.	Estimated waste (day/week)			3 days a week morning pickup. 4hrs for 1 person; Ford Cube truck (F350 frame) 845 residents in the community; 316 households on pickup.
8.	Honey Bag usage and disposal	X		Honey bucket pit was recent covered.
9.	Private/Commercial Use of Landfill	X		Unauthorized dumping of waste occurs as the site is highway accessible. (including large tires and vehicles…) Ferry services uses the landfill (unauthorized)
10.	Frequency that hamlet/contractor is onsite with heavy equipment			C&D waste recently pushed up; D6 onsite twice per summer for compaction.
11.	Construction/Demolition waste and sources			Housing projects, local industry, highways projects.
12.	Burning	X		Burn pit for carcasses, burn pit for clean wood.
13.	Hazardous Waste	X		Large area containing waste oils. Staining is present. Large tank house in secondary containment. Secondary containment is full of water mixed with oil, open to rain.
14.	Hazardous Waste Control/Separation		X	No control, no separation.
15.	Entrance Gate		X	New gate under construction
16.	Perimeter Fencing		X	Fencing under construction
17.	Signage (Site, Recycling, Hazardous)	X		Some signage exists; not maintained.
18.	Bulky Metals Storage	X		Bulk metals are poorly sorted.
19.	Fuel Drum Storage	X		Fuel drums are stored together with other waste oils.
20.	Waste Cell Design (type)		X	Current MSW cell is over capacity; unknown as to original design; likely area fill. No berms visible.
21.	Separated from SW Drainage		X	MSW on hillside, not capped, no berms. Sewage lagoon adjacent and down gradient.

22. Waste in active fill area		X	MSW area is overcapacity, waste is spilling out. Salvage area is full of unsegregated wastes.
23. Waste Compacted		X	D6 Dozer onsite twice per summer for compaction.
24. Daily cover being used		X	
25. Waste fill area dry	X		
26. Surface Water Quality/Colour			Surface water present in new site, none present in current active waste areas.
27. Scavenging	X		Salvage area is full of unsorted waste.
28. Slopes in good condition			Landfill is in an active quarry area, hillsides are being actively quarried.
29. Vegetative Cover In good condition	X		Vegetation is present on previously capped areas.
30. Evidence Of Surface Water Ponding		X	None in current waste areas.
31. Evidence Of Leachate Seeps		X	
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	
34. Other Observations			

- CFC removed last year by Inuvik contractor.
- Lagoon in center of site.
- New site has issues with water.
- Commercial waste is often cardboard mixed with food waste
- Hamlet has invoiced Ferry services for the unauthorized dumping of marine hardware.



Photo 1. Burn area.



Photo 2. C&D area.



Photo 3. C&D area.

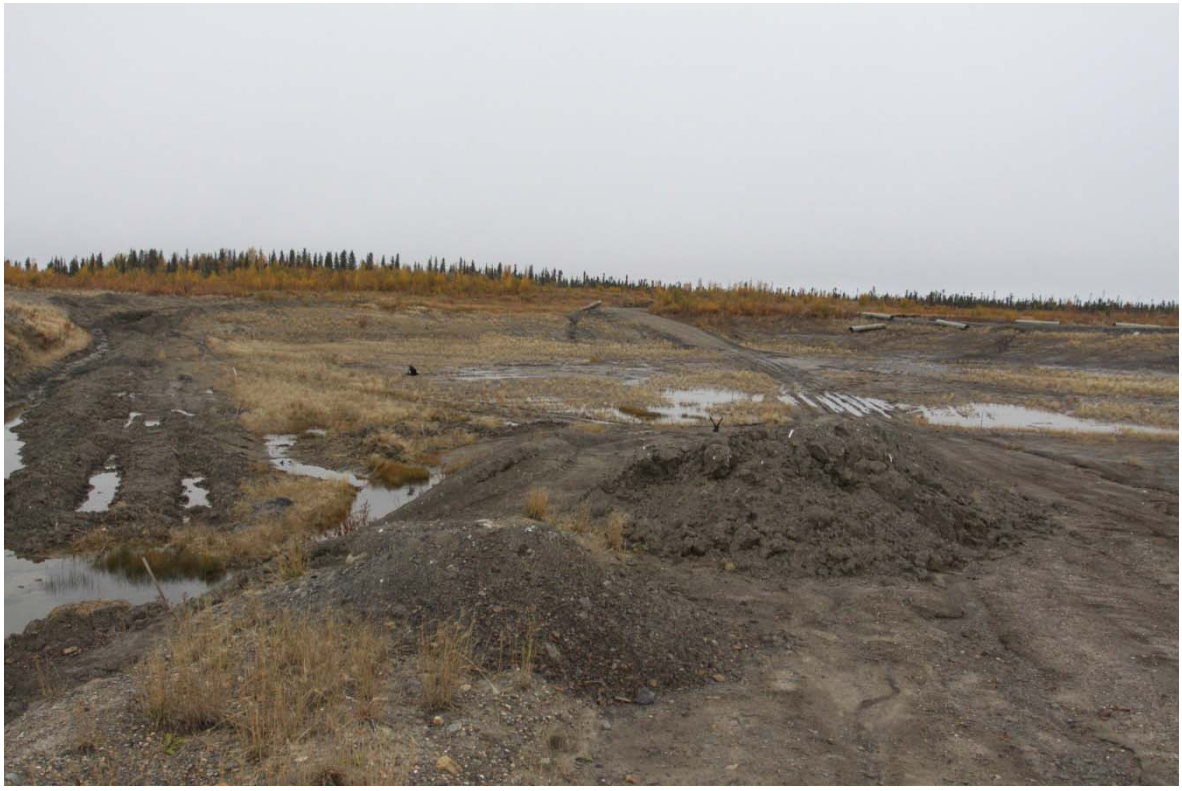


Photo 4. Future landfill area.



Photo 5. Lagoon (foreground) white goods (background).



Photo 6. MSW.



Photo 7. MSW.



Photo 8. Tires.



Photo 9. Unsorted dumping area.



Photo 10. Waste oil.



Photo 11. Waste oil.

SITE INSPECTION REPORT
Site: Fort Providence

(Licence MV2006L3-0002)

Date of Inspection:	Oct	15	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1300 HRS			**Weather Conditions:**	-5 °C Fresh snow on ground
Inspected by:	KR/KB				8°C, over cast on Sept 21, 2015 at 1130 HRS. Second visit for photos

		Yes	No	Comments
1.	Waste Segregation	X		Construction, hazardous, MSW, tires, cars, concrete, contaminated soils, brush, fridges, metal segregation.
2.	Waste Inventory		X	
3.	Operations Manual	X		Manual at office, was not able to provide a copy of the manual for inspection
4.	Site Life Estimates			5 years to fill 1.5 cells. Additional 1.5 cells constructed. 5 Years estimated remaining
5.	Closure/Remediation Plan			Unknown, operator unsure if plan exists.
6.	Contaminated Soil Management	X		5 to7 years ago contaminated soil was accepted, recently been tested and good to use as cover.
7.	Estimated waste (day/week)	X		Monday and Thursday pickup. 6 loads in a F450 with sides each day. 1.5 days in summer when busy, mostly cardboard.
8.	Honey Bag usage and disposal		X	No honey bag disposal. Lagoon adjacent to the landfill. Lagoon is down gradient.
9.	Private/Commercial Use of Landfill			All waste from bridge project was diverted from the landfill and was shipped south.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Biweekly with loader
11.	Construction/Demolition waste and sources	X		Large pile of recent waste from housing corporation projects.
12.	Burning		X	Reported that youths recently tried to set a fire however fire department responded quickly.
13.	Hazardous Waste	X		Fridges are drained via contractor from Hay River. Oil drums, propane canisters, batteries at landfill. Contractor from Hay River has been previous hired to package haz wastes for shipment.
14.	Hazardous Waste Control/Separation	X		No controls in place, area designated by signage.
15.	Entrance Gate	X		Entrance gated and fenced.
16.	Perimeter Fencing		X	Only fencing at entrance gate and 8ft chain link east of MSW
17.	Signage (Site, Recycling, Hazardous)	X		Old faded signage is present.
18.	Bulky Metals Storage	X		Bulky metals area.
19.	Fuel Drum Storage	X		Fuel drums stored upright with hazardous wastes

20.	Waste Cell Design (type)	X		Area fill, 3 berms per cell.
21.	Separated from SW Drainage	X		MSW area bermed, operator indicated that SW not an issue, area is very dry.
22.	Waste in active fill area	X		3 cells being used, none covered.
23.	Waste Compacted	X		Biweekly compaction with loader
24.	Daily cover being used		X	No daily cover, cover occurs sporadically, none visible.
25.	Waste fill area dry	X		No apparent standing water
26.	Surface Water Quality/Colour		X	Operator indicated no SW, none observed
27.	Scavenging	X		
28.	Slopes in good condition			Vegetation present on old cells.
29.	Vegetative Cover In good condition	X		
30.	Evidence Of Surface Water Ponding			No evidence of SW ponding. Water is limited to lagoon adjacent to landfill site.
31.	Evidence Of Leachate Seeps			No evidence of leachate seeps.
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	No evidence of vegetation kill, grass is thick around perimeter of site.
34.	Other Observations			

- E-waste received in the community and shipped to Hay River



Photo 1. C&D waste area.



Photo 2. MSW fill area, note 3 cells; one capped on the front only, with topsoil.



Photo 3. Site overview from MSW berm.



Photo 4. Tire segregation.



Photo 5. End-of-life vehicles with pooled water visible to right.



Photo 6. Bulk metals segregation, note leftover orange pipe from construction.



Photo 7. Contaminated soils area and brush pile.



Photo 8. Entrance gate (2014).


Photo 9. Culverts.



Photo 10. Signage.


Photo 11. Waste oil (2014).



Photo 12. White goods.



Photo 13. Waste consolidation and compaction completed with front end loader.

SITE INSPECTION REPORT
Site: Fort Resolution

(Licence MV2014L3-0008)

Date of Inspection:	Oct	16	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1000 HRS			**Weather Conditions:**	-5 °C Snow on ground
Inspected by:	KR/KB				5°C, over cast with slight rain on Sept 21, 2015 at 7:30 am (second visit for photos)

		Yes	No	Comments
1.	Waste Segregation		X	One site for MSW other site for C&D. MSW often found with C&D. C&D includes waste vehicles and bulk metals, carcasses and miscellaneous waste
2.	Waste Inventory		X	
3.	Operations Manual		X	New water license currently being worked on. No manual currently, one in progress.
4.	Site Life Estimates		X	See above
5.	Closure/Remediation Plan		X	See above
6.	Contaminated Soil Management	X		Contaminated soils stored at current landfill have been tested and are suitable for cover material now. Small batch of soil recently accepted.
7.	Estimated waste (day/week)	X		2 pickups per week, 2 persons completed the pickup. 3 institutional buildings in town; the rest are residential.
8.	Honey Bag usage and disposal		X	No honey bucket usage
9.	Private/Commercial Use of Landfill			Turning down industry and vehicles. Working with local industry. No tipping fees or bylaws in place.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Dozer, backhoe, loader and grader are owned by hamlet. On site whenever possible. Dozer is currently not operational.
11.	Construction/Demolition waste and sources	X		Housing corp. and old industry (Bison farm) are main sources of C&D waste apart from residents.
12.	Burning	X		Yes, but not in over a year. Need to segregate waste before it can be burned.
13.	Hazardous Waste		N/A	Collected in town at hamlet garage
14.	Hazardous Waste Control/Separation		N/A	Collected in town at hamlet garage
15.	Entrance Gate		X	
16.	Perimeter Fencing			Partial fencing at C&D waste area
17.	Signage (Site, Recycling, Hazardous)			Signage for No dumping, for active MSW area, and C&D&
18.	Bulky Metals Storage		X	Not segregated from current C&D area. Historical bulk metals dump located adjacent to MSW.
19.	Fuel Drum Storage		X	No storage area for drums. Fuel tanks mixed in with C&D area

20.	Waste Cell Design (type)	X		Area fill, cut out of historical compacted MSW area.
21.	Separated from SW Drainage	X		No SW visible, site is bermed from surrounding area.
22.	Waste in active fill area		X	MSW in active area, however MSW present at C&D site.
23.	Waste Compacted		X	Dozer currently not operable. Using loader.
24.	Daily cover being used		X	No daily cover being used. Operator stated intermediate cover being used however it was not visible.
25.	Waste fill area dry	X		No SW visible
26.	Surface Water Quality/Colour		N/A	
27.	Scavenging	X		
28.	Slopes in good condition	X		All slopes in good condition, re-vegetation includes grass.
29.	Vegetative Cover In good condition	X		
30.	Evidence Of Surface Water Ponding		X	
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Burned soil and trees adjacent to MSW indicate recent burn.
- Lagoon adjacent to MSW and at higher elevation.



Photo 1. Entrance to landfill – left path leads to sewage lagoon, right path leads to MSW cell.



Photo 2. Signage and fencing.



Photo 3. Assumed historical MSW.



Photo 4. MSW trench.



Photo 4. MSW fill cell.



Photo 5. MSW berm.



Photo 6. Contaminated soil area.



Photo 7. C&D waste fill cell.



Photo 8. C&D and bulky metals area rear view.



Photo 9. Bulky metals area separation.

SITE INSPECTION REPORT
Site: Fort Simpson

(Licence MV2003L3-0011)

Date of Inspection:	Aug	21	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1500 HRS			**Weather Conditions:**	20°C
Inspected by:	KR				

		Yes	No	Comments
1.	Waste Segregation	X		Attendant ensure proper segregation of wastes
2.	Waste Inventory		X	Attendant on site, no inventory kept.
3.	Operations Manual		X	Attendant was unaware of O&M manual.
4.	Site Life Estimates		X	
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management			Previously accepted contaminated soils, does not accept soils now.
7.	Estimated waste (day/week)		X	
8.	Honey Bag usage and disposal			Sewage sludge trench located at the site, no honeybags. Wastewater plant now dewaters sludge.
9.	Private/Commercial Use of Landfill			Tipping fees in place, fees collected by contractor.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Contractor infrequently onsite with equipment.
11.	Construction/Demolition waste and sources			Highways projects, local contractors, housing projects.
12.	Burning	X		Clean wood and brush are burned twice a month.
13.	Hazardous Waste	X		Batteries, waste oil, paints, fire extinguishers, propane tanks,
14.	Hazardous Waste Control/Separation		X	No controls (liner, berm) in place, area defined by signage.
15.	Entrance Gate	X		Locked outside of business hours
16.	Perimeter Fencing		X	No fencing
17.	Signage (Site, Recycling, Hazardous)	X		Poor signage
18.	Bulky Metals Storage	X		Large stockpile of bulk metals.
19.	Fuel Drum Storage	X		Large quantity of drums stored together. Many stored empty; stacked on their side.
20.	Waste Cell Design (type)			Area fill, trench fill cell recently covered.
21.	Separated from SW Drainage	X		Site was dry at the time of the site visit. Separation from nearby wetlands achieved by a berm.
22.	Waste in active fill area	X		
23.	Waste Compacted		X	
24.	Daily cover being used		X	Cover is applied infrequently. Likely once per season.
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour		N/A	

27.	Scavenging	X		Scavenging is permitted
28.	Slopes in good condition	X		Sandy area, slopes appear in good condition, vegetation is present on outer side of berm.
29.	Vegetative Cover In good condition			Grass is beginning to take hold over previously capped MSW area.
30.	Evidence Of Surface Water Ponding		X	
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Nine black bears on site during the site visit. Represents a hazard to the public accessing the site, a hazard to the landfill attendant and to the bears.



Photo 1: 2014 site signage at entrance to landfill



Photo 2: C&D disposal area



Photo 3: Covered historical MSW area



Photo 4: Empty drum storage



Photo 5: Extinguishers, propane tanks adjacent to bulk metals



Photo 6: Bulk metals pile, looking east



Photo 7: 2014 Paint can storage



Photo 8: Tire storage



Photo 9: Waste vehicle storage



Photo 10: White goods and bulk metals from drum storage area



Photo 11: Borrow source, excavated cell



Photo 12: MSW active fill area



Photo 13: MSW active fill area



Photo 14: Fort Simpson 2014 MSW area, overlooking wetland below



Photo 15: MSW area overlooking wetland



Photo 16: MSW fill area, bulk metals in background



Photo 17: Bulk metals, and MSW in background, bears visible in MSW area



Photo 18: Bulk metals (culverts) and white goods



Photo 19: Clean wood burn pile

SITE INSPECTION REPORT
Site: Fort Smith

(Licence MV2011L3-0001)

Date of Inspection:	Oct	17	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1030 HRS			**Weather Conditions:**	+4°C
Inspected by:	KR / KB				Melting snow on ground

		Yes	No	Comments
1.	Waste Segregation	X		Cars, fuel tanks, white goods drained, white goods undrained, bicycles, BBQs, radioactive waste, asbestos, MSW, construction and demolition waste, batteries, fire extinguishers, propane cylinders, e-waste, ATV, small engines
2.	Waste Inventory	X		Landfill attendant logs vehicle size upon entry to landfill and types of wastes being dumped.
3.	Operations Manual	X		Attendant was unable to show us the document as it was in a locked filing cabinet.
4.	Site Life Estimates	X		30+ Years
5.	Closure/Remediation Plan		X	Currently working on a plan
6.	Contaminated Soil Management	X		Bermed and lined area with geo-membrane. Monitoring well directly adjacent to the lined area.
7.	Estimated waste (day/week)	X		1.75 loads in a 25 yard garbage truck twice weekly. Estimate maximum 65 m^3 weekly.
8.	Honey Bag usage and disposal		X	No usage of honey bags in the community or by cabin users.
9.	Private/Commercial Use of Landfill	X		Tipping fees are in place
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Town mobilizes equipment to the landfill to compact MSW as needed. No set schedule.
11.	Construction/Demolition waste and sources			Industrial, commercial and residential sources.
12.	Burning	X		Fenced in burn pit, centrally located. Residents are able to place burnable materials directly into the burn pit at the directly of the landfill attendant. Additional burning of brush piles will occur once sufficient snow is on the ground.
13.	Hazardous Waste	X		Hazardous waste is segregated on site and shipped out. E-waste is now accepted in town.
14.	Hazardous Waste Control/Separation	X		Liquid hazardous waste is stored in drums in a bermed and lined area.
15.	Entrance Gate	X		Gated after hours, the highway side of the landfill is fenced.
16.	Perimeter Fencing	X		The highway side of the landfill is fenced. The MSW area has electric fencing.
17.	Signage (Site, Recycling, Hazardous)	X		All segregation areas have signage.
18.	Bulky Metals Storage	X		Bulky metals are sorted and stored separate from vehicles. Bulky metals are shipped south to a recycler on an as needed basis.

19.	Fuel Drum Storage	X		Fuel drums with product are stored with hazardous liquids in bermed and lined area.
20.	Waste Cell Design (type)	X		Area fill, no berms.
21.	Separated from SW Drainage			In a depression, appears to receive some runoff from the site above. Also may receive surface water from ravine adjacent to fill area as there are no berms.
22.	Waste in active fill area	X		Two active fill areas, one for residents one for garbage truck.
23.	Waste Compacted	X		Waste is compacted as needed by hamlet operators and equipment.
24.	Daily cover being used		X	No daily cover, cover is placed as needed when hamlet staff are onsite. Quarry source onsite to the west.
25.	Waste fill area dry	X		Skiff of snow on ground, no water.
26.	Surface Water Quality/Colour			None visible
27.	Scavenging			None permitted
28.	Slopes in good condition			No visible erosion
29.	Vegetative Cover In good condition	X		Grass cover appeared in good condition over covered waste area.
30.	Evidence Of Surface Water Ponding		X	No evidence of surface water ponding. Earlier in the season, drum and liquid hazardous waste storage area received a large amount of runoff as per discussion with attendant. Waste in the area was moved
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	

34. Other Observations

- Asbestos buried onsite, managed by ENR, space provided by landfill
- Radioactive waste buried on site.



Photo 1. Batteries and attendant office.


Photo 2. Brush pile.



Photo 3. Burn pit.



Photo 4. C&D waste.



Photo 5. C&D waste area.



Photo 6. Collection vehicle, reported to contain 25 cubic yards.



Photo 7. Covered MSW.


Photo 8. Crushed drums and treated timber.



Photo 9. Culverts.



Photo 10. Entrance signage.



Photo 11. Entrance gate.



Photo 12. Hazardous waste storage area.



Photo 13. MSW disposal area.



Photo 14. Pallets, e-waste and white goods storage area.



Photo 15. Radioactive waste disposal area, fencing and sign visible.



Photo 16. Segregated bicycles.



Photo 17. Segregated waste BBQs.



Photo 18. Signage at MSW disposal area.



Photo 20. Tire shreds.



Photo 21. Tire storage area.



Photo 22. Waste vehicle storage area.

SITE INSPECTION REPORT
Site: Gameti

(Licence W2008L3-0003)

Date of Inspection:	July	24	2015	**Project Number:**	**11-1188-0001**
Time of Inspection:	1300 HRS			**Weather Conditions:**	20 °C
Inspected by:	KR				Sunny

		Yes	No	Comments
1.	Waste Segregation	X		MSW, white goods, end of life vehicles.
2.	Waste Inventory		X	
3.	Operations Manual		X	Currently under development.
4.	Site Life Estimates	X		Existing landfill is at end of life. The new landfill has a 20 year design. SAO estimates that will it will last closer to 50 years.
5.	Closure/Remediation Plan		X	No plans in place.
6.	Contaminated Soil Management		X	No contaminated soils accepted at the landfill.
7.	Estimated waste (day/week)	X		M/W/F collection, 6 loads a day with a 11m^3 collection vehicle. (Up to 180 m^3 weekly)
8.	Honey Bag usage and disposal	X		2to 3 residences continue to use honey bags. Disposed of in existing lagoon.
9.	Private/Commercial Use of Landfill	X		No industry in town, used solely by residents and institutional buildings.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Waste Compacted Daily with D4 Dozer.
11.	Construction/Demolition waste and sources	X		Housing projects.
12.	Burning		X	No burning occurs as all clean wood waste is left for salvage.
13.	Hazardous Waste		X	Hazardous wastes is accepted at the community garage. 5 years of hazardous waste currently stockpiled at the community garage.
14.	Hazardous Waste Control/Separation	X		Separated to garage (none at landfill)
15.	Entrance Gate	X		New site is gated, active site does not have a gate.
16.	Perimeter Fencing	X		No fencing at active site. New site is fenced (chain link).
17.	Signage (Site, Recycling, Hazardous)		X	No signage present at either site.
18.	Bulky Metals Storage		X	No bulk metals observed. Likely buried.
19.	Fuel Drum Storage		X	No waste drums observed.
20.	Waste Cell Design (type)	X		Trench fill in a natural depression.
21.	Separated from SW Drainage		X	No berms in place to separate active fill area from SW.
22.	Waste in active fill area	X		
23.	Waste Compacted	X		
24.	Daily cover being used	X		Daily cover is placed.
25.	Waste fill area dry	X		No surface water observed. Coarse grained soils.

26.	Surface Water Quality/Colour		N/A	No surface water observed.
27.	Scavenging	X		Scavenging is encouraged.
28.	Slopes in good condition	X		No evidence of erosion.
29.	Vegetative Cover In good condition		N/A	No vegetative cover noted on closed cells.
30.	Evidence Of Surface Water Ponding		X	No evidence of surface water noted.
31.	Evidence Of Leachate Seeps		X	No evidence of leachate seeps noted.
32.	Presence Of Leachate Odours		X	No evidence of leachate odours.
33.	Evidence Of LFG Vegetation Kill		X	No evidence of impacts to vegetation from LFG.
34.	Other Observations			

- The community has constructed a new landfill and has transported end of life vehicles to the new site. The new site will open once approved by the Land and Water board. Requires operations and maintenance manual to be completed. Appliances stockpiled at old site to be relocated to new site. New site is near the new sewage lagoon.
- Partnering with neighbouring communities to facilitate the removal of hazardous waste out of the community, including waste oil and batteries.
- Current landfill site has been operational since 1985.
- 350 residents and 46 buildings in the community.
- D4 Dozer at the landfill.
- Tires/waste oil and batteries stored are the community garage. SAO looking at cleaning waste household fuel tanks to be used as water tanks for community gardens. Waste tires to be used as planters at community gardens.



Photo 1: Aerial image of the active Gameti landfill and inactive sewage lagoon.



Photo 2: Aerial image of the future landfill and current sewage lagoon.



Photo 3: Hazardous wastes including batteries are stockpiled at the community garage.



Photo 4: Hazardous wastes including waste oil is stockpiled at the community garage.



Photo 5: Waste tires are stockpiled at the community garage.



Photo 6: White goods located at the landfill, adjacent to the active MSW area.



Photo 7: Active waste fill area.



Photo 8: Covered waste area.



Photo 9: Inactive sewage lagoon.



Photo 10: D4 dozer located at the landfill. Used for cover and compaction.



Photo 11: Entrance to the new landfill site.



Photo 12: New fenced landfill.



Photo 13: End of life vehicles have been relocated to the new landfill.

SITE INSPECTION REPORT
Site: Hay River

(Licence MV2009L3-0005)

Date of Inspection:	July	23	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1300 HRS			**Weather Conditions:**	30°C Sunny
Inspected by:	KR/PD				

		Yes	No	Comments
1.	Waste Segregation		X	Poorly segregated, C&D often mixed with MSW
2.	Waste Inventory		X	Landfill attendant present, but no records kept
3.	Operations Manual	X		
4.	Site Life Estimates	X		Estimated closure: 2026
5.	Closure/Remediation Plan		X	Abandonment and reclamation plan is under development
6.	Contaminated Soil Management	X		Cell operated by KBL environmental.
7.	Estimated waste (day/week)			
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill	X		Tipping fees in place to accommodate commercial use of landfill. Contractor accepts tipping fees, no benefit to local municipality.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Contractor on site daily with heavy equipment, at the time of the site visit, cover material was being excavated onsite and placed on MSW pile. Sheepsfoot compactor on site but not regularly used.
11.	Construction/Demolition waste and sources			Local industry and residents as well as highways projects and northern industries further afield.
12.	Burning		X	
13.	Hazardous Waste	X		Hazardous waste area near entrance to landfill.
14.	Hazardous Waste Control/Separation	X		Hazardous waste on pallets, in staging area near entrance to landfill. Hamlet staff are responsible for packaging and shipment of waste (not contractor).
15.	Entrance Gate	X		Gate locked after hours. Electrified
16.	Perimeter Fencing	X		Electrified perimeter fencing. At the time of the inspection, contractor was clearing brush adjacent to fence to prevent shorts.
17.	Signage (Site, Recycling, Hazardous)	X		Signage present on site. Poorly visible.
18.	Bulky Metals Storage		X	No defined area for bulk metals, mixed with vehicles and other bulky waste.
19.	Fuel Drum Storage		X	Not a defined area
20.	Waste Cell Design (type)			Area over existing trench (mounded). Berm was identified as construction waste, filled with MSW then capped and covered.
21.	Separated from SW Drainage	X		MSW above grade of surrounding area
22.	Waste in active fill area	X		Waste in active fill area, not organized or contained.

23.	Waste Compacted	X		Sheepsfoot compactor on site, however dozers currently used for compaction.
24.	Daily cover being used		X	
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour			Surface water present adjacent to contaminated soil cell in lined area. Rest of site is dry
27.	Scavenging		X	Scavenging is not permitted at the site
28.	Slopes in good condition		X	MSW cell slopes are not covered.
29.	Vegetative Cover In good condition	X		Vegetation in good condition on historical MSW fill areas.
30.	Evidence Of Surface Water Ponding			See above
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Landfill operated by contractor. Town oversees contracts, has additional contractors onsite for removal of brush along electric fence.
- Recent fire in MSW was extinguished by local fire department.
- Tire shredding program in the works.
- Mercury switches are currently removed by town staff.



Photo 1. Batteries packaged in hazardous waste storage area.



Photo 2. Cover being placed, top of MSW pile.



Photo 3. Fine-grained cover source on site.



Photo 4. Covered historical MSW cell.



Photo 5. E-waste segregation area, some palletized material evident in wrapping.



Photo 6. Hazardous waste (used oil) prepped for shipment.



Photo 7. Sheepsfoot compactor.



Photo 8. Hay River landfill site as seen from the entrance gate.


Photo 9. Runoff containment adjacent to contaminated soils area.



Photo 10. Tires storage.



Photo 11. Uncovered MSW, rear of pile where a recent fire occurred.



Photo 12. Waste vehicles, bulk metals as seen from cover source area.



Photo 13. White goods, tires as seen from covered MSW pile.

SITE INSPECTION REPORT
INUVIK
(Licence G06L3-001)

Date of Inspection:	Sept	05	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1000 HRS			**Weather Conditions:**	0°C
Inspected by:	KR, PD				

		Yes	No	Comments
1.	Waste Segregation	X		Waste is being segregated; signage may improve segregation.
2.	Waste Inventory		X	
3.	Operations Manual	X		Operations manual is provided to the contractor by the town of Inuvik. Operations manual includes procedures for handling different types of waste – copies of NWT Guidelines.
4.	Site Life Estimates			Unknown
5.	Closure/Remediation Plan	X		Town of Inuvik is beginning to look at closure plans.
6.	Contaminated Soil Management			No contaminated soils accepted at the landfill.
7.	Estimated waste (day/week)			80 blue bins in town, $6m^3$ and $4m^3$ Estimate 300 pickups per week.
8.	Honey Bag usage and disposal	X		Honey bag tank located at the landfill, new bag/tank separator at entrance to landfill. When commissioned, tank to be pumped out and sewage dumped at lagoon.
9.	Private/Commercial Use of Landfill	X		Commercial waste being dumped at landfill, including C&D, utilidor demolition, barrels labelled GSH.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			D6 and D9 dozer on site at the time of the site visit. Cover is only accessible during dry part of the year due to soft road up Mount baldy at rear of landfill towards borrow source. Borrow source is clayey material.
11.	Construction/Demolition waste and sources			C&D waste present, sources including housing, local contractors and local industry.
12.	Burning		X	No burning occurs at the landfill.
13.	Hazardous Waste	X		Hazardous waste is collected and stored at the landfill. Asbestos has been accepted. Trench was dug in MSW area, and asbestos buried and covered.
14.	Hazardous Waste Control/Separation	X		Hazardous waste storage is located in covered shed structures onsite. (batteries, paints)
15.	Entrance Gate	X		Entrance gate locked outside of operating hours
16.	Perimeter Fencing		X	Some perimeter fencing, on 2 sides.
17.	Signage (Site, Recycling, Hazardous)	X		Signage is present indicating, areas for Paint, Batteries and Honey bags. No signage for active MSW area, white goods, metals, C&D or tires

18.	Bulky Metals Storage			Bulky metals buried on site. Vehicles drained of fluids prior to burial.
19.	Fuel Drum Storage		X	Fuel drums segregated near entrance, no formal storage area.
20.	Waste Cell Design (type)			Area fill, buried vehicles form berm for area fill, no berm to rear and sides of the landfill.
21.	Separated from SW Drainage		X	Surface water from slopes above the landfill above site flows through site, no berm in place, no surface water observed during the time of the visit.
22.	Waste in active fill area		X	No waste observed outside of landfill area. No defined active area.
23.	Waste Compacted	X		Waste compacted as needed, with D6 and D9 onsite. no defined schedule, however appeared well compacted and covered.
24.	Daily cover being used	X		Used seasonally when cover material accessible.
25.	Waste fill area dry			No standing water observed in waste area. Ponded water located adjacent to landfill.
26.	Surface Water Quality/Colour			No odour from pond, murky water
27.	Scavenging	X		Scavenging is permitted
28.	Slopes in good condition			Natural slopes appear in good condition
29.	Vegetative Cover In good condition			No vegetative cover in waste areas.
30.	Evidence Of Surface Water Ponding			No water ponding in waste area.
31.	Evidence Of Leachate Seeps			Ponded water downslope of landfill (north and south). Murky.
32.	Presence Of Leachate Odours		X	No odours
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- All waste including waste vehicles, metal, crushed drums, C&D is buried once waste piles become unsightly. This excludes hazardous waste.
- Weigh scale recently installed at entrance, not calibrated/commissioned.
- Grizzly/Black bears are prevalent near MSW area.
- Perimeter of site delineated by berm composed of buried vehicles overlain with soil. Vehicles are visible.
- SNP stations are sampled by community staff.



Photo 1. Attendant shack and new weigh scale.



Photo 2. Berm with exposed vehicles north side of landfill (site fence visible).



Photo 3. C&D Waste near entrance, road to Mounty Baldy, cover source in background.



Photo 4. Dozers on site, access road to borrow area in background.



Photo 5. Hazardous waste containers.


Photo 6. Hazardous waste containers and furniture/scavenging shack.



Photo 7. MSW active area, collection vehicle.



Photo 9. MSW active area in foreground; covered landfill in background.



Photo 10. Standing water below north access road to borrow area.



Photo 11. Standing water on site, south of MSW area.



Photo 12. Hazardous waste and empty fuel tank storage .



Photo 13. White goods segregation area.



Photo 14. Wood waste used as cover on northeast part of site.

SITE INSPECTION REPORT
Site: Jean Marie River

(Licence MV2011L3-0006)

Date of Inspection:	Aug	22	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1100 HRS			**Weather Conditions:**	20°C limited visibility due to smoke
Inspected by:	KR				

		Yes	No	Comments
1.	Waste Segregation	X		MSW area, bulk metals, hazardous waste area, scrap wood.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates		X	Currently in excavated MSW cell, no additional cells excavated onsite.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Do not accept contaminated soils
7.	Estimated waste (day/week)			
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill	X		Community members and community businesses use the site.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Seasonally to push up wood waste and bulk metals
11.	Construction/Demolition waste and sources			Highway construction has resulted in culverts being deposited at landfill, not authorized.
12.	Burning			No burning due to dry summer. Wood pile is now too large to burn, would have to separate for small contained burns.
13.	Hazardous Waste			Sign indicates area for paints and oils, no formal area
14.	Hazardous Waste Control/Separation			No delineation, no controls.
15.	Entrance Gate		X	
16.	Perimeter Fencing		X	
17.	Signage (Site, Recycling, Hazardous)	X		Signage for Paints and oil, MSW, bulk metals.
18.	Bulky Metals Storage	X		
19.	Fuel Drum Storage		X	
20.	Waste Cell Design (type)			Pit or trench fill.
21.	Separated from SW Drainage			Partial berm around site. Drainage from current MSW cell is towards lagoon outflow.
22.	Waste in active fill area	X		
23.	Waste Compacted		X	Waste has not been compacted
24.	Daily cover being used		X	No cover being used in current cell. Black bears feed in the current cell. Old cell has been covered.
25.	Waste fill area dry	X		No water observed in the MSW fill area
26.	Surface Water Quality/Colour		X	No SW observed
27.	Scavenging	X		

28.	Slopes in good condition			Site is relatively flat
29.	Vegetative Cover In good condition			No vegetative cover, MSW cell recently covered, no growth. (<1yr since covered)
30.	Evidence Of Surface Water Ponding		X	
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	

34. Other Observations

Lagoon directly adjacent to landfill.



Photo 1. Active MSW cell in background, drainage trench in foreground.



Photo 2. Active MSW cell.



Photo 3. Bulk metals segregation area.



Photo 4. Clean wood and brush burn pile.



Photo 5. Covered MSW and hazardous storage area.



Photo 6. Covered MSW cell.


Photo 7. Vehicles (located at a separate site).



Photo 8. White goods and metals segregation area.



Photo 9. Site entrance viewed from landfill.



Photo 10. Waste oil storage area with sign.

SITE INSPECTION REPORT
Site: Kakisa

(No water licence)

Date of Inspection:	Oct	15	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1430 HRS			**Weather Conditions:**	-5°C Fresh snow on ground
Inspected by:	KR, KB				7°C, over cast with slight rain on Sept 21, 2015 at 1040 HRS, second visit for photos

		Yes	No	Comments
1.	Waste Segregation	X		MSW/ bulk metals/white goods/C&D
2.	Waste Inventory		X	
3.	Operations Manual		X	SAO unaware of an ops manual
4.	Site Life Estimates		X	No formal estimate, SAO indicated upwards of 5 years in the current cell.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Does not accept contaminated soils
7.	Estimated waste (day/week)	X		Pickup truck twice per week, 3 non-residential buildings, 15 households.
8.	Honey Bag usage and disposal		X	No honey bags used
9.	Private/Commercial Use of Landfill			Residential use mainly, some construction waste currently from new town hall construction project.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Hamlet staff are rarely onsite with equipment. Likely seasonal. Have hired southern contractor to haul metals south before.
11.	Construction/Demolition waste and sources			New town hall construction and some housing projects.
12.	Burning	X		Wood waste is burnt once a year.
13.	Hazardous Waste	X		Area set aside for hazardous waste, not sorted.
14.	Hazardous Waste Control/Separation		X	No controls in place.
15.	Entrance Gate	X		Locked outside of business hours.
16.	Perimeter Fencing		X	Partially fenced, chain link on north side. Temporary fencing on south side. SAO indicated that would like to enclose the site with chain link.
17.	Signage (Site, Recycling, Hazardous)	X		Signage for hazardous waste area.
18.	Bulky Metals Storage	X		Pile of bulky metals and white goods onsite.
19.	Fuel Drum Storage	X		Fuel drums/tanks mixed with hazardous goods.
20.	Waste Cell Design (type)			Trench
21.	Separated from SW Drainage	X		Site is elevated from surrounding area. Snow on ground impeded observations of flow pathways.
22.	Waste in active fill area	X		
23.	Waste Compacted		X	

24. Daily cover being used		X	
25. Waste fill area dry		N/A	Snow on ground.
26. Surface Water Quality/Colour		N/A	
27. Scavenging	X		Scavenging is permitted.
28. Slopes in good condition		N/A	
29. Vegetative Cover In good condition		N/A	
30. Evidence Of Surface Water Ponding		N/A	
31. Evidence Of Leachate Seeps		N/A	
32. Presence Of Leachate Odours		N/A	
33. Evidence Of LFG Vegetation Kill		N/A	

34. Other Observations

- Sewage trench is in southwest corner of the landfill site.
- Small site due to number or users.



Photo 1. Bulk metals.



Photo 2. C&D waste trench.



Photo 3. C&D active dumping area.



Photo 4. MSW waste trench.



Photo 4. Hazardous waste and empty barrels and tanks



Photo 5. Sewage trench.



Photo 6. MSW Site.



Photo 7. Sewage lagoon and C&D site.



Photo 8. Entrance gate.

SITE INSPECTION REPORT
Site: Lutselk'e

(No water licence)

Date of Inspection:	June	18	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1700 HRS			**Weather Conditions:**	Cloudy 18 °C
Inspected by:	KB				

		Yes	No	Comments
1.	Waste Segregation	X		MSW, bulk metals, hazardous waste, tires.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		Site is beyond its lifespan and extending into bush.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	
7.	Estimated waste (day/week)	X		Collection is 3 times a week, 10 yard compaction truck. Unlikely that the compaction truck is filled each collection day; SAO is looking to reduce number of collection days. Previously collection was 5 days a week. 20 hours a week currently for 1 collection staff. Estimate less than 50 m^3 weekly.
8.	Honey Bag usage and disposal		X	Sewage lagoon is adjacent to airport, no honey bag pit at landfill.
9.	Private/Commercial Use of Landfill		X	Mainly residential use.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Rarely, no work completed at site since 2014. Dozer is not operational. Will use loader at site to push garbage away from access road.
11.	Construction/Demolition waste and sources	X		Housing projects are the main source of construction and demolition waste.
12.	Burning	X		Burning of waste occurs in the winter.
13.	Hazardous Waste	X		Batters, fuel barrels, paint.
14.	Hazardous Waste Control/Separation		X	No controls in place, segregation of hazardous waste does occur and these materials are stored in one area.
15.	Entrance Gate		X	
16.	Perimeter Fencing	X		Fencing is in disrepair, present on two sides of the MSW pile.
17.	Signage (Site, Recycling, Hazardous)		X	One sign on access road indication landfill location.
18.	Bulky Metals Storage	X		Large quantity of bulk metals located adjacent to access road.
19.	Fuel Drum Storage	X		Mainly stored with hazardous waste.
20.	Waste Cell Design (type)		X	No design, appeared to be area fill at one time, no berms present.
21.	Separated from SW Drainage		X	
22.	Waste in active fill area	X		Waste in in old fenced area, however has been pushed beyond by loader to provide additional

			space alongside access road.
23. Waste Compacted		X	Waste has not been compacted in over a year as dozer has not been operational.
24. Daily cover being used		X	Landfill is covered every 2 years. May be less frequent based on observations
25. Waste fill area dry		X	Pond within the MSW area. Low area which the community fills with granular fill continues to pond surface water.
26. Surface Water Quality/Colour	X		Ponded water is very dark. Blackish.
27. Scavenging	X		Scavenging occurs in the bulk metals area (snow machine parts). In addition scavenging of tires is common.
28. Slopes in good condition		X	Slopes appear to be mainly shale – signs of some movement.
29. Vegetative Cover In good condition		X	Some vegetation noted in MSW area. Sparse.
30. Evidence Of Surface Water Ponding	X		See comment: Waste fill area dry
31. Evidence Of Leachate Seeps		X	No leachate seeps noted, ponded water may contain leachate.
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	
34. Other Observations			

- Site is constrained by 2 cliffs/hillsides.
- Shale is present on-site, and readily available as cover.
- Recycling program in place in community (beverage container).



Photo 1: Bulk metals stored along landfill access road.



Photo 2: Bulk metals stored along landfill access road.



Photo 3: Waste tires (typically salvaged by residents to use as retaining walls/fences/flowerpots.



Photo 4: Southern edge of MSW being pushed into the brush.



Photo 5: Remnants of fencing around the MSW area.



Photo 6: Ponded water southwest corner of the MSW area.



Photo 7: Looking east across the MSW area. Note the ponded water in the foreground.



Photo 8: Hazardous wastes stored onsite include waste fuel drums, paint and batteries. Not shown are waste propane tanks which are stockpiled adjacent.



Photo 9: Signage indication landfill access road.



Photo 10: Dozer in disrepair, has not be operational in a year, resulting in no compaction in over a year at the landfill.



Photo 11: Collection vehicle.



Photo 12: Aerial shot of the landfill facing north. Bulk metals on access road. MSW area to the west.

SITE INSPECTION REPORT
Site: Nahanni Butte

(No water licence)

Date of Inspection:	June	10	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1000 HRS			**Weather Conditions:**	20 °C
Inspected by:	KR/KB				

		Yes	No	Comments
1.	Waste Segregation	X		Partial segregation occurs. MSW, bulk metals, white goods, hazardous waste, and household heating oil tanks.
2.	Waste Inventory		X	
3.	Operations Manual		X	No operations manuals for the site.
4.	Site Life Estimates	X		Current cell will last this year, another cell will need to be excavated to last another few years.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Contaminated soils have been accepted, placed on a liner. No spill management plan in place.
7.	Estimated waste (day/week)	X		F150 – 8 to 10 truckloads, normal box on truck, pickup Tuesday/Thursday by 2 persons. Up to 30 - 40 m^3 weekly
8.	Honey Bag usage and disposal		X	No bags used. Parks Canada sends barrels of waste to be deposited in the lagoon from within Nahanni Park. Hamlet staff empty barrels/pressure wash and return to Parks Canada to be used again.
9.	Private/Commercial Use of Landfill		X	See above note re: Parks Canada at landfill.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Once every 2 weeks with cat D6 or loader-backhoe.
11.	Construction/Demolition waste and sources	X		Housing projects.
12.	Burning		X	No burning occurs.
13.	Hazardous Waste	X		Hazardous waste (waste oil, batteries, paint) onsite
14.	Hazardous Waste Control/Separation		X	No controls in place for hazardous waste.
15.	Entrance Gate		X	Removed entrance gate as it proved to be ineffective. Residents would just leave waste in front gate.
16.	Perimeter Fencing		X	No perimeter fence. (Lagoon is fenced)
17.	Signage (Site, Recycling, Hazardous)		X	No signage in place.
18.	Bulky Metals Storage	X		Bulk metals are segregated. Metals are often buried.
19.	Fuel Drum Storage	X		Fuel drums are stored
20.	Waste Cell Design (type)	X		Trench fill
21.	Separated from SW Drainage		X	Area has previously flooded due to high water levels in the river.
22.	Waste in active fill area	X		MSW is placed in trench, no MSW observed outside of trench.

23. Waste Compacted		X	Trench does not have an entrance ramp. Foreman indicated that a ramp would be excavated to permit the entry of the D6
24. Daily cover being used		X	
25. Waste fill area dry	X		
26. Surface Water Quality/Colour		X	No surface water noted.
27. Scavenging	X		Scavenging is permitted
28. Slopes in good condition		N/A	Site is relatively flat.
29. Vegetative Cover In good condition		X	No vegetation cover on site.
30. Evidence Of Surface Water Ponding		X	
31. Evidence Of Leachate Seeps		X	
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	
34. Other Observations			

- 136 residents in Nahanni Butte
- Historical landfill under/adjacent to airport tank farm.
- Recycling; one day each winter contractor from Simpson collects all recycling in the community.



Photo 1: Capped cells.



Photo 2: Construction and demolition waste left over from the previous flood. The rest of the construction and demolition waste has previously been buried.



Photo 3: Active MSW trench.



Photo 4: White goods and tires.



Photo 5: Hazardous waste next to metal waste and white goods.



Photo 6: Household heating fuel tanks.



Photo 7: Clean wood waste stockpiled adjacent to the sewage lagoon.



Photo 8: Bulk metals.


Photo 9: Aerial view of the landfill looking northeast.



Photo 10: Aerial view of the landfill looking southeast.

SITE INSPECTION REPORT
Site: Norman Wells

(Licence S07L3-002)

Date of Inspection:	July	22	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	900 HRS			**Weather Conditions:**	15 °C
Inspected by:	KR				Scattered showers

		Yes	No	Comments
1.	Waste Segregation	X		MSW/ C&D/White goods/bulk metals/waste oils /batteries/waste paint/ and end of life vehicles.
2.	Waste Inventory		X	
3.	Operations Manual	X		
4.	Site Life Estimates	X		A new cell is to be opened in 2016.
5.	Closure/Remediation Plan	X		Closure plan has been stated.
6.	Contaminated Soil Management		X	Landfill reported to not accept contaminated soils.
7.	Estimated waste (day/week)	X		Collection is contracted out; contract is approximately $110k. No estimate on waste volume as contractor completes collection on an as needed basis.
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill	X		Contractors in town use the landfill, no tipping fees. Esso uses a portion of the landfill to stage their waste, but ships all their waste off-site in the winter.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		2 to 3 times a week with the loader to cover waste. This is contracted out. Contractor has a dozer for compaction which occurs weekly.
11.	Construction/Demolition waste and sources	X		Housing projects, oil and gas, local contractors.
12.	Burning		X	No burning occurs at the landfill.
13.	Hazardous Waste	X		Batteries, waste oil, antifreeze, propane tanks accepted.
14.	Hazardous Waste Control/Separation	X		Hazardous waste placed in bermed area. (no liner)
15.	Entrance Gate		X	No gate
16.	Perimeter Fencing	X		Perimeter bear fence in place. Bears are still able to access the landfill. One black bear was noted at the time of the inspection.
17.	Signage (Site, Recycling, Hazardous)	X		Signage does not appear to be adhered to by the public.
18.	Bulky Metals Storage	X		Bulk metals and end of life vehicles.
19.	Fuel Drum Storage	X		Fuel drums stored in bermed area.
20.	Waste Cell Design (type)			Area fill, no berm to push waste against. Edge of landfill to be capped after multiple cells have been capped and reached capacity.
21.	Separated from SW Drainage	X		Multiple berms onsite restrict movement of surface water. Shale is predominately used as

			cover material, high infiltration rates.
22. Waste in active fill area	X		Waste is placed in active fill area.
23. Waste Compacted	X		Compaction occurs 2 -3 times per week.
24. Daily cover being used	X		Cover is placed 2 – 3 times per week.
25. Waste fill area dry	X		
26. Surface Water Quality/Colour			Surface water observed below the MSW cell, unable to observer quality/colour as the area was not accessible due to a black bear in the MSW cell.
27. Scavenging	X		
28. Slopes in good condition	X		
29. Vegetative Cover In good condition	X		Vegetation noted in good condition on closed cell.
30. Evidence Of Surface Water Ponding	X		Surface water observed below the MSW cell.
31. Evidence Of Leachate Seeps		N/A	Unable to walk the southwestern (down gradient) berm to look for evidence of leachate seeps due to bear at the landfill
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	
34. Other Observations			

- The town does not own any heavy equipment, all heavy equipment needs are contracted out.
- Sludge in lagoon has never been removed. The community staff indicate they have obtained a pump and filter system to remove sludge from the lagoon. The town intends to spread and compost organics removed from the lagoon at a location near the lagoon (not at the landfill).
- The community has released an RFP currently out seeking interested parties to remove hazardous wastes, including waste oil, batteries, propane tanks as well as bulk metals, tires and vehicles on an “as and when” basis.



Photo 1: Aerial image of the Norman wells landfill.



Photo 2: Soil bags containing contaminated soils adjacent to waste oil/fuel in drums.


Photo 3: Soil bags containing contaminated soils adjacent to waste oil/fuel in drums.



Photo 4: Waste tire pile.



Photo 5: Hazardous waste stockpile.



Photo 6: White goods.



Photo 7: Cardboard waste.



Photo 8: Bulk metals area.



Photo 9: Bulk metal and vehicles.



Photo 10: Bulk metal and vehicles. Note shale hillside.



Photo 11: Waste fuel oil tanks and waste buildings.



Photo 12: Active MSW fill area. Capped and closed MSW fill area in background.



Photo 13: Active MSW fill area. No berm was observed immediately downslope of the waste. Director of public works indicated that the exposed face of waste would be covered following closure of the cell.



Photo 14: Litter fence in state of disrepair.



Photo 15: Batteries stockpiled in plastic bins.



Photo 16: Batteries stockpiled on pallets.



Photo 17: Waste pallets.

SITE INSPECTION REPORT
Site: Paulatuk

(Licence N7L3-1619)

Date of Inspection:	Aug	12	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	0800 HRS			**Weather Conditions:**	7°C
Inspected by:	PD				10 kph South Wind

		Yes	No	Comments
1.	Waste Segregation	X		Waste is segregated by bulky metal, barrels, some C&D in bulky metal area, vehicles (snow machines separate), two MSW areas – one for "burnables", the other for basic MSW.
2.	Waste Inventory		X	No inventory kept. Staff are aware of non-community waste location.
3.	Operations Manual	X		2004 Dillon Manual, not available on site or in office. Will be updated in current water licence, along with spill plan.
4.	Site Life Estimates		X	Not known. Current cell remaining volume estimated to be no more than 500 m^3 in current cell(s) however area for additional cells and filling in of waste in old settled cells will increase available volume. Dillon to estimate site life in new licence.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management	X		Minor soils from small spills located in two bags in bulky waste area. Larger spills taken out of town (i.e., by others responsible for spill). Old soil management piles to west of landfill.
7.	Estimated waste (day/week)	X		Pick up is twice per week (Monday and Friday), 7 to 8 truck trips each day, partially compacted. Truck volume estimated at 10m^3. It is estimated that each household has 2 bags at each pick-up. Confirm total # of residences to estimate total volume.
8.	Honey Bag usage and disposal		X	None used at site
9.	Private/Commercial Use of Landfill	X		Northern and Green Stores, Paulatuk Visitors Centre, RCMP. All community construction waste, including packaging, goes to landfill, as does material from demolished housing and recent airport runway infrastructure upgrades.
10.	Heavy equipment use frequency			The loader and/or the bulldozer are used to push waste back into cell. Based on visual observation of top of cell, compaction with a bulldozer in the back area has not been recently undertaken.
11.	Const./Dem. waste and sources	X		Community Housing demolition material is disposed of at the landfill. One building demolished on Aug 11th is in the bulky metals cell, as are others recently demolished. A significant amount of packaging (Styrofoam,

				boxes, etc.) from contractors noted at site in MSW area, as well as wire, pipe, etc.
12.	Burning	X		Minor burning of some material in one of the landfill cells evident. The Supervisor and foreman were told by ENR inspector that no burning is allowed of any materials including clean wood and cardboard.
13.	Hazardous Waste	X		Primary hazardous waste is waste oil and antifreeze, estimated at 5 to 10 drums annually. Material in 5 gallon pails noted at landfill appears to consist of roofing tar. A total of 10 to 15 batteries per year are brought to landfill. Up to now, have been buried, not shipped. A number of batteries located in beach area not brought to landfill.
14.	Hazardous Waste Control/Separation	X		Stored in separate piles, however a new bermed cell has been built to hold the hazardous waste. It will have geotextile, but no liner under it. Staff somewhat unclear on purpose of cell and concerned with snow build up in winter. Material brought from landfill to community area for shipping in 2012 is still there and will be brought back to the landfill.
15.	Entrance Gate	X		Not closed at night. It is intended to do so, in order to limit contractors from dumping. There is no regular attendant at the gate. Hamlet staff regularly come to landfill for sewage dumping.
16.	Perimeter Fencing	X		Partial fence only, on north side of landfill, largely for litter control. The fence is partly pulled down – by bears. Litter collecting on fence.
17.	Signage (Site, Recycling, Hazardous)		X	No signage observed at the site, other than a small sign identifying it as a landfill.
18.	Bulky Metals Storage	X		Significant quantity of bulky metals present to east of MSW cells. Well segregated.
19.	Fuel Drum Storage	X		A number of empty drums observed in two areas, well segregated. An area of full tanks also observed, approximately 150, in central bulky metal area. Most appear to be sealed, no apparent evidence of significant leakage.
20.	Waste Cell Design (type)	X		Largely trench, into the side of a hill – deeper areas already filled between area east of entrance road and the large peak. Cells open on low side though slightly sloped inward. Runoff potentially to sewage lagoon (Dead Lake)
21.	Separated from SW Drainage		X	MSW cells and all of other areas drain directly to sewage lagoon (Dead Lake)
22.	Waste in active fill area	X		Waste consists largely of typical MSW, however a few tires, beverage containers noted. Significant amount of Styrofoam from contractor dumping.
23.	Waste Compacted		X	Waste recently deposited (estimate two weeks worth) not recently compacted, however it is noted that the loader pushed material to the back of the cell, occasional use of D-6 dozer to compact. Material in back of cell appears to be partly compacted.
24.	Daily cover being used		X	The current waste cell is largely uncovered.

25. Waste fill area dry	X		
26. Surface Water Quality/Colour			Dead Lake is clear at the shoreline, though rocks on shore have black deposits and scum noted nearest to sewage discharge
27. Scavenging	X		Scavenging of material from bulky metal allowed
28. Slopes in good condition		X	Old waste cells on west side have settled, resulting in depression. Recommended removing some cover (to a daily or interim thickness of 0.15 to 0.3 m) and filling in new waste, then recovering with final cover to promote drainage.
29. Vegetative Cover In good condition			No significant surface vegetation in area – all sandy with sparse grasses consistent with the local vegetation.
30. Evidence of Surface Water Ponding		X	Largely dry at the time of inspection, however the old cells have depressed areas and water would pond in this area.
31. Evidence of Leachate Seeps		X	
32. Presence of Leachate Odours		X	
33. Evidence of LFG Vegetation Kill		X	
34. Other Observations			

- Contaminated soil pile to west of the fill area appears to be completed remediation – over 10 years old, from spill at airport, remediation overseen by the company “Biogenie”. No evident odour in soil closest to base of pile. Recommend using as daily cover;
- Beverage container storage located next to youth centre. Generally organized/counted once a month and shipped out;
- Significant number of empty drums on-site, recommend the use of a drum crusher if one can be brought to the community for a period of time, to provide additional space in the bulky waste management area;
- C&D waste from housing corporation currently dumped in bulky waste area. Recommended moving non-salvageable wood to area west of entrance road;
- Hazardous waste located near SAO office located on pallets. Supervisor considering moving back to the landfill;
- Burn area for animals (renewable resources department) located to west of landfill.



Photo 1. Active landfill cell.



Photo 2. Active landfill cell tipping face.



Photo 3. Airport construction debris.



Photo 4. Bulk metals, appliances.



Photo 5. Bulk storage area.



Photo 6. C&D and burn area.



Photo 7. Compacted landfill cell.



Photo 8. C&D.



Photo 9. Contaminated soil.



Photo 10. Culverts.



Photo 11. Dead animal burn vessel.



Photo 12. Depression on old cell cover.



Photo 13. Empty drums, bulk metal.



Photo 14. End of life vehicles.



Photo 15. Flooded empty waste cell north of fence.



Photo 16. Full drums.



Photo 17. Hazardous waste storage in community.


Photo 18. Landfill fence and gate, north side.



Photo 19. New hazardous waste storage.



Photo 20. Overlooking sewage lagoon.



Photo 21. Waste truck.


Photo 22. Remediated soil.



Photo 23. Sewage discharge chute.



Photo 24. Uncovered waste in active cell.

SITE INSPECTION REPORT
Site: Sachs Harbour

(Licence N7L3-1531)

Date of Inspection:	Sept	9	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	900 HRS			**Weather Conditions:**	2°C **Sunny**
Inspected by:	KR, SAO, Foreman (Darren)				

		Yes	No	Comments
1.	Waste Segregation	X		MSW is poorly separated from other waste streams. Metals are present in active and existing MSW cells.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates			Water license/Inspection documents note 20 years, operator believes 30 years. Estimated by operator an additional 5 years are available in the current MSW cell if managed properly.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Contaminated soils are stockpiled on-site, will be used for cover, POL contaminated soils near Icicle inn is being used as cover at the landfill. Fine grained soil, difficult to work with. Foreman would like to mix with coarse material, but course material stockpile is extremely small.
7.	Estimated waste (day/week)	X		3 loads per day, 2 days a week. F150, 5 foot long box, 4 foot wide, does not stack bags above sides of truck box. Estimate 12 m^3 maximum weekly .
8.	Honey Bag usage and disposal		X	No one uses honey bags here, not even at camps.
9.	Private/Commercial Use of Landfill		X	No industry in community. Commercial use from Coop/school/nursing station. Old siding from school is going to landfill. House corp has plan to remove 2-3 houses, likely end up in landfill, will be scavenged.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Once a month on site with either dozer (D6) or loader to push garbage up and compact.
11.	Construction/Demolition waste and sources	X		School siding project. RCMP siding project. Old tank farm tanks and piping.
12.	Burning	X		Evidence of MSW having caught fire recently.
13.	Hazardous Waste	X		Batteries on site, west of entrance, no pad or cover. White goods not segregated. Barrels stored upright, bungs on and off, some contain product, others empty. No hazmat signage. Paints not segregated. Vehicles not drained prior to disposal.
14.	Hazardous Waste Control/Separation			See above.
15.	Entrance Gate			No gate.

16.	Perimeter Fencing	X		Partial fencing South east and west of active and uncovered cell. Fencing to west is temporary, to be relocated to active areas.
17.	Signage (Site, Recycling, Hazardous)		X	One sign onsite detailing active dumping area (MSW).
18.	Bulky Metals Storage		X	Metals not segregated, located across the site.
19.	Fuel Drum Storage			See hazardous waste comment re: drums.
20.	Waste Cell Design (type)	X		Area, berm 4-5ft high.
21.	Separated from SW Drainage		X	Area bermed, snow accumulation in cell accounts for water within bermed area.
22.	Waste in active fill area	X		MSW being deposited in active cell due to new signage.
23.	Waste Compacted	X		Waste compacted once a month by D6 (currently on site requires repairs (hydraulic hose, additional new D6 in town with wider tracks available for use) Alternatively they use loader to move waste and compact.
24.	Daily cover being used		X	Cover only when cell is completed. Discussed with operator the ability to cover as you go. Previous cell has not been covered.
25.	Waste fill area dry		X	Ponded water northeast corner of existing uncovered cell. Operator noted it has been sampled by AANDC. No ponding water observed in active cell.
26.	Surface Water Quality/Colour			Surface water frozen during the time of the site visit.
27.	Scavenging	X		Scavenging is permitted and encouraged. Segregation of waste would permit more efficient scavenging.
28.	Slopes in good condition	X		Bermed slopes do not show signs of erosion.
29.	Vegetative Cover In good condition	X		Historical cells are vegetated where waste is not placed.
30.	Evidence Of Surface Water Ponding			See above comment re: surface water northeast corner of inactive cell.
31.	Evidence Of Leachate Seeps			No evidence of leachate through berms. Partially snow covered. Water partially frozen.
32.	Presence Of Leachate Odours			Fuel odour west of active smell adjacent to 2 drums, no additional odours noted.
33.	Evidence Of LFG Vegetation Kill			No evidence of vegetation kill. Northeast of ponded water, wetland does not show signs of leachate impact.

34. Other Observations

- 2x dead sea gulls observed on berm to the west of the active MSW cell.
- Animal carcasses, skulls and fur in and around landfill.
- Recyclables in MSW. Once a year someone comes by to pick up recyclables and transport to Inuvik. Most community members do not recycle (as per operator).
- MSW is often burnt.
- No SNP sampling.
- One polar bear this year at the landfill.
- Landfill is used as shooting range. Bullet holes in drums, vehicles, shattered glass from bullets.
- Hamlet staff collects MSW and manages landfill, no tipping fees.
- 2 years of waste in current cell, additional 5 years estimated if managed properly.
- Evidence of staining around drums.
- Geology; glacial till, silty sand. On plateau, muskeg is prevalent.
- No O/M manual for the site.
- Most recent census details 115 persons, SAO estimates 70 persons.
- 32 households.

- Seasonal fluctuation exists. SAO believes it is based on school year with families spending time in Sachs for the summer and spending the school year in Inuvik.



Photo 1. Bulk metals, vehicles, drums.



Photo 2. Dumping area ready for capping.



Photo 3. Misc. construction waste, drums.



Photo 4. Tray for consolidating waste in drums.



Photo 5. Vehicle batteries.



Photo 6. Waste vehicles, unsegregated C&D and metals.



Photo 7. Active MSW area.


Photo 8. Burned mixed waste area.



Photo 9. Compacted waste to be covered.



Photo 10. D6H.



Photo 11. Drum storage.



Photo 12. Hazardous waste.



Photo 13. Paints.


Photo 14. Tanks, bulky items.

SITE INSPECTION REPORT
Site: Trout Lake

(No water licence)

Date of Inspection:	June	10	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1300 HRS			**Weather Conditions:**	Clear 25 °C
Inspected by:	KR/KB				

		Yes	No	Comments
1.	Waste Segregation	X		Bulk metals, diapers, dead animals, MSW, appliances, batteries, household hazardous waste, clean wood waste segregated.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		Estimated 4 years to fill up current cell and another small trench cell on the site , according to the operator.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Contaminated soils have been deposited at the landfill and are currently stored on a clear poly ground sheet in a bermed area. No water/spill management plan is available.
7.	Estimated waste (day/week)	X		Collection 3 days per week, 1 pickup load of MSW per collection day and 1 pickup load of cardboard from the store.
8.	Honey Bag usage and disposal		X	Diaper pit is located off of the landfill site, for diapers only, not for honey bags.
9.	Private/Commercial Use of Landfill	X		No industry or commercial operations apart from the store, which is hamlet owned.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Hamlet D4 cat is used on site. D4 onsite every few weeks in the summer.
11.	Construction/Demolition waste and sources	X		Housing projects are the only source of C&D waste.
12.	Burning	X		A small steel incinerator is located adjacent to the active cell where residents are able to burn paper and cardboard waste. Clean wood waste is stockpiled at the previous landfill site (10V 597895m 6701211m) and burned in the fall/winter.
13.	Hazardous Waste	X		Household hazardous waste is accepted at the landfill;
14.	Hazardous Waste Control/Separation		X	No controls in place, hazardous waste is segregated.
15.	Entrance Gate		X	
16.	Perimeter Fencing	X		Fencing is present around the landfill. Fence is in disrepair along northwest edge due to wildlife.
17.	Signage (Site, Recycling, Hazardous)		X	
18.	Bulky Metals Storage	X		Bulk metals are stored in a large clearing to the west of the MSW area.
19.	Fuel Drum Storage	X		Fuel drums are stored on site, recently 45

				drums with product were shipped off site. Approximate cost was $8,500. No spill controls in place; most of the remaining drums are empty. Staining is present adjacent to area where the drums are stored.
20.	Waste Cell Design (type)	X		Trench
21.	Separated from SW Drainage		X	Dry site, no surface water observed, small.
22.	Waste in active fill area	X		Waste is restricted to the active fill area. Wind fence is keeping windblown litter to the landfill area.
23.	Waste Compacted	X		Hamlet has a D4 dozer used for compaction on regular basis to help reduce wind blow litter.
24.	Daily cover being used		X	
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour		N/A	
27.	Scavenging	X		Scavenging is permitted, a small shed stores engine/vehicle parts for salvage.
28.	Slopes in good condition		N/A	Relatively flat site.
29.	Vegetative Cover In good condition	X		
30.	Evidence Of Surface Water Ponding		X	
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Current landfill site was developed in 1992.
- Community is concerned that the landfill site is reaching capacity using the current trench landfill methods.



Photo 1: Clean wood waste segregated near historical landfill site.



Photo 2: Diaper pit.



Photo 3: Dead animal pit.



Photo 4: Contaminated soils area.


Photo 5: Fuel drums and household fuel tanks.



Photo 6: Shed to be used as scavenging area.



Photo 7: Bulk metals.



Photo 8: Bulk metals, note waste vehicle pile.



Photo 9: Waste oil.



Photo 10: Waste oil and batteries.



Photo 11: Waste oil and batteries.



Photo 12: Active MSW trench.



Photo 13: Aerial view looking west. Bulk metals area in the west beyond the MSW area.

SITE INSPECTION REPORT
Site: Tsiigehtchic

(Licence G99L3-004)

Date of Inspection:	Sept	10	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1345 HRS			**Weather Conditions:**	0°C
Inspected by:	KR/GM				

		Yes	No	Comments
1.	Waste Segregation	X		MSW/Hazardous waste/Burnables/Honey Bags/Vehicles/White goods/Bulk metals/Tires (no C&D waste area).
2.	Waste Inventory		X	
3.	Operations Manual			SAO unaware of OM manual.
4.	Site Life Estimates			No formal estimate, SAO believes site is good for at least 10 more years.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management			Tipping fee in place for contaminated soils, however contaminated soils not accepted. 5 gallon pails of contaminated soils have been accepted in the past.
7.	Estimated waste (day/week)			Tues/Thurs pickups. 1-2 people afternoon only. Hamlet is <200 residents.
8.	Honey Bag usage and disposal	X		Honey bag pit located adjacent to MSW area. 3 household still on honey bags.
9.	Private/Commercial Use of Landfill			Commercial waste from the northern store. Power Corp back hauls all of their waste out of the community.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Onsite regularly to compact and cover waste.
11.	Construction/Demolition waste and sources			No segregated C&D waste area.
12.	Burning	X		Burn chamber made from culvert used to burn clean wood wastes.
13.	Hazardous Waste	X		Batteries, waste oil, jerry cans, empty 5 gallon pails, full 5 gallon pails, contaminated gravels in 5 gallon pails, paints.
14.	Hazardous Waste Control/Separation	X		Hazardous waste in bermed area. Soil is stained around waste oil drums.
15.	Entrance Gate		X	
16.	Perimeter Fencing		X	
17.	Signage (Site, Recycling, Hazardous)	X		
18.	Bulky Metals Storage	X		Bulky metals are stored at a separate site from the MSW.
19.	Fuel Drum Storage	X		Stored with hazardous waste.
20.	Waste Cell Design (type)			Area fill, first lift appears to have berm, second lift does not appear to have a berm.
21.	Separated from SW Drainage	X		MSW is separated from SW. Metals and vehicle are placed on pad adjacent to standing

				water/wetlands.
22.	Waste in active fill area	X		
23.	Waste Compacted	X		Waste compacted on a regular basis
24.	Daily cover being used	X		Waste is covered on a regular basis.
25.	Waste fill area dry			X
26.	Surface Water Quality/Colour			Small sheen apparent in standing water adjacent to metals/vehicle area.
27.	Scavenging	X		Scavenging is permitted
28.	Slopes in good condition		N/A	Site is relatively flat
29.	Vegetative Cover In good condition		N/A	No vegetation on cover.
30.	Evidence Of Surface Water Ponding			Yes near bulk metals
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Annual spring cleanup of the dump, employ 3-4 labourers to collect wind blown litter
- Red River band has equipment in town.



Photo 1. Active MSW area, recently covered.



Photo 2. Active MSW area.



Photo 3. Battery storage.



Photo 4. Burn tower.



Photo 5. Contaminated soils.



Photo 6. Covered MSW area.



Photo 7. Drum storage.



Photo 8. Edge of covered MSW waste pad.



Photo 9. Edge of MSW area.



Photo 10. Honey bag disposal area.



Photo 11. Jerry can storage.


Photo 12. Bulk metals and vehicles.


Photo 13. Bulk metal.



Photo 14. SNP sampling location, adjacent lagoon, note windblown litter.


Photo 15. Surface water adjacent to metals.



Photo 16. Tires.



Photo 17. Waste oil storage area.



Photo 18. White goods, C&D and metals area.



Photo 19. White goods storage.



Photo 20. Willows and brush.

SITE INSPECTION REPORT
Site: Tuktoyaktuk

(Licence N7L3-0714)

Date of Inspection:	Aug	13	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1330 HRS			**Weather Conditions:**	15°C
Inspected by:	Paul Dewaele				NW Winds, 10 KPH

		Yes	No	Comments
1.	Waste Segregation	X		MSW disposed in landfill cell; C&D waste placed in bulky segregation area.
2.	Waste Inventory		X	
3.	Operations Manual	X		2006 O&M Manual (Earth Tech) to be updated for the new landfill site (underway). No spill contingency plan – also under preparation with documents for new landfill.
4.	Site Life Estimates	X		Existing site to be closed in 2016 when the new landfill opens (following commissioning of Tuk-Inuvik Highway).
5.	Closure/Remediation Plan		X	Existing landfill site to be closed and remediated following commissioning of new landfill. No landfill closure plan completed to date. (check to see if cost estimate provided).
6.	Contaminated Soil Management		X	Contaminated soils not allowed at site, not observed during site visit.
7.	Estimated waste (day/week)			3 days collection weekly, 3 truckloads a day, estimated at up to 8 m^3 based on collection truck size. Estimate up to 70 m^3 weekly.
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill	X		Disposal of MSW from retail (Northern, Stantons), Gruben Transport, NTCL, Government offices and material from NWT housing (demolished houses, one this year).
10.	Heavy equipment use frequency	X		Compact waste every 2 months in summer (May-Sept) and monthly in winter.
11.	Const./Dem. waste and sources	X		NWT Housing.
12.	Burning		X	No waste burning. Fires rare, but have occurred (last one 7 years ago).
13.	Hazardous Waste		X	Hazardous waste not accepted at landfill. It is stored at the works yard located near the north end of the runway.
14.	Hazardous Waste Control/Separation	X		Batteries, waste fluids separated at works yard. Reported to include twelve 45 gallon drums of leftover fuel.
15.	Entrance Gate		X	Gate (north end of site) is not operational, no plans to fix the existing one. A second gate located on south end is blocked off to prevent use of this area.
16.	Perimeter Fencing	X		Perimeter fencing surrounds all of site except the west (ocean) side.

17.	Signage (Site, Recycling, Hazardous)	X		Signs indicating metal, tires, etc. observed.
18.	Bulky Metals Storage	X		Bulky materials and metals separated into white goods, culverts, tires, vehicles and "miscellaneous", as well as some C&D waste. Historical bulky metals disposed of near (and within) the western lagoon, including heavy equipment (excavator, etc.). CFC and mercury switch removal not undertaken. It is reported that vehicles placed at the site now are drained of fluids before acceptance.
19.	Fuel Drum Storage	X		Some older drums observed, however no new drums accepted. Some empty household oil tanks observed – dropped off without permission.
20.	Waste Cell Design (type)			Area Fill, however there are no berms on the sides of the waste cell.
21.	Separated from SW Drainage		X	Drainage from the landfill and bulky waste area is all directed to a pond/lagoon, which is separated from the ocean by a berm. This berm had less than 0.5 m at the time of the landfill visit; plans in place to elevate the berm in 2 years. It is reported that the lagoon is drained approximately every three years following testing and confirmation the results meet compliance objectives.
22.	Waste in active fill area		X	MSW is contained within the active area, barriers placed to keep waste deposits at active face. Some evidence of illegal dumping at second gate. Waste in remediated (covered) area is reported to include DEW Line waste material as well as material from the 1970's and 1980's oil industry.
23.	Waste Compacted		X	Waste was partly compacted in southerly older area, however bulky waste prevented proper compaction. Overly large cell size and limited summer compaction limits ability to compact waste.
24.	Daily cover being used		X	No cover available on site or in area. Expense of soil import in Tuktoyaktuk has resulted in operation of site entirely without cover. It is intended to cover the landfill at closure only.
25.	Waste fill area dry	X		The fill area is largely dry, with the exception of the extreme south of the landfill cell, where standing water was noted. This area is blocked off from further waste deposition. Drainage of the area to the lagoon would require excavation into to old covered.
26.	Surface Water Quality/Colour			Surface water appears dark, but clear.
27.	Scavenging	X		Site is open, so scavenging occurs, largely for old vehicles.
28.	Slopes in good condition		X	Overall, the cover of the remediated areas is intact, however there are some areas where waste is visible, and some where erosion of cover into bulky waste has occurred.
29.	Vegetative Cover In good condition	X		Marginal growth of vegetation, consistent with local environment.
30.	Evidence Of Surface Water Ponding		X	
31.	Evidence Of Leachate Seeps	X		The leachate is expected to seep to the adjacent lagoon.

32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Observation wells located both up gradient (east) and down gradient of the landfill area, including a well on the berm and one adjacent to the main road, near the south gate;
- It is reported that the hazardous waste is shipped out to KBL, through Whitehorse;
- There is a waste oil burner at Grubens, however the unit has not been inspected/approved recently and is not in use;
- Tipping fee at the landfill in $100 per pick-up truck load, $400 for a dump truck;
- Waste in bulky waste area includes a used spill boom from the Coast Guard (paid $400);
- Estimated that heavy equipment operated at the site approximately 10 hours per week, largely consisting of a front end loader to clean up the drop-off area and the bulky waste area;
- No bears at the site; and,
- Lack of controlled access gate reported to result in issues with waste placement/separation.



Photo 1. Active Fill area.



Photo 2. Bulky metals.



Photo 3. Bulky waste.



Photo 4. C&D waste.



Photo 5. Hazardous waste works yard.



Photo 6. Landfill lagoon berm.



Photo 7. Looking east to waste lagoon berm from old covered cell.



Photo 8. Old monitoring well west side of site.



Photo 9. Partly compacted older waste.



Photo 10. Ponding in southeast landfill corner.



Photo 11. Sewage lagoon berm south end.



Photo 12. Sewage lagoon discharge area.



Photo 13. Sewage lagoon.



Photo 14. Site fencing.



Photo 15. Waste truck.



Photo 16. Vehicles in waste lagoon.



Photo 17. Waste full area.



Photo 18. Waste lagoon overlooking old covered cell.

SITE INSPECTION REPORT
Site: Tulita

(Licence S05L3-001)

Date of Inspection:	July	21	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	0900 HRS			**Weather Conditions:**	17 °C
Inspected by:	KR				Scattered showers

		Yes	No	Comments
1.	Waste Segregation	X		MSW/ C&D/White goods including bulk metals/waste oils /batteries and end of life vehicles.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates		X	Relatively large area with multiple covered pits. Hamlet will likely start using the area fill method in the future to allow current site to remain active.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Fuel spill from the power corp. resulted in construction of fenced contaminated soils treatment area. The area is bermed and lined, 2 monitoring wells were noted down gradient of the area. Treated soils were placed behind the facility and are not accessible. The area is unused at the present time.
7.	Estimated waste (day/week)	X		Collection is contracted out to BJ Services. 10 cubic meter haul all vehicle is used twice a week for collection. Estimate by foreman is that 5 to 6 loads hauled on collection days (110 m^3 max weekly). Approximately 500 residents.
8.	Honey Bag usage and disposal		X	
9.	Private/Commercial Use of Landfill	X		Contractors in the hamlet use the landfill, no tipping fees. Mainly deposit waste oil
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		2 to 3 times a week with the loader. Once a week on-site with the D6 to compact waste.
11.	Construction/Demolition waste and sources			Housing projects.
12.	Burning		X	No burning occurs at the landfill. Have had fires in the landfill in the past, hamlet fire department has put out previous landfill fires.
13.	Hazardous Waste	X		Waste oil and batteries stockpiled. Large quantity, have not been shipped out of the community. Estimate that 40+ years of hazardous waste is stockpiled. Most drums have been labeled by KBL however no contract to remove them for the landfill. Approximately 250 batteries at present. KBL tags on most of the waste oil drums.
14.	Hazardous Waste Control/Separation		X	Hazardous waste is segregated but no controls or separation in place and some containers

				tipped over and generally not well stored.
15.	Entrance Gate		X	Access to the landfill is not restricted.
16.	Perimeter Fencing		X	Wolves are present at the landfill on a daily basis.
17.	Signage (Site, Recycling, Hazardous)	X		Signage does not appear to be adhered to by the public.
18.	Bulky Metals Storage	X		Metals and white goods segregated in same area.
19.	Fuel Drum Storage	X		Waste oil and fuel drums are stored together.
20.	Waste Cell Design (type)	X		Trench fill. Likely starting area fill in the future to provide additional site life.
21.	Separated from SW Drainage		X	
22.	Waste in active fill area	X		Hamlet members do not place waste in active fill area. Hamlet staff onsite with the loader multiple times a week to push waste into active fill area. Active waste area is poorly defined.
23.	Waste Compacted	X		Windrowing of the waste and moving waste to the active cell was underway during the inspection. Waste appeared to be compacted in the active cell.
24.	Daily cover being used		X	Cover is being used on a regular basis (once per month estimate) large granular source adjacent to landfill.
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour		X	No surface water observed.
27.	Scavenging	X		Scavenging is permitted.
28.	Slopes in good condition			No slopes noted.
29.	Vegetative Cover In good condition	X		Grass evident on previously closed cells.
30.	Evidence Of Surface Water Ponding		X	
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- Large quantity of waste oil and batteries awaiting shipment off site.
- Interim cover is being placed regularly however no operations and maintenance manual is in place to direct operators on how to cover.
- Carcasses are deposited along the edge of the landfill, which attracts wolves .



Photo 1: Aerial image of the Tulita landfill.



Photo 2: Active MSW fill area.



Photo 3: Active MSW fill area.



Photo 4: End of life vehicle stockpile.



Photo 5: Hazardous waste stockpile.



Photo 6: Hazardous waste stockpile.



Photo 7: Hazardous waste stockpile.


Photo 8: Construction and demolition waste area.



Photo 9: Construction and demolition waste area.



Photo 10: Fenced contaminated soil management area. (Currently inactive)



Photo 11: Recycling bin at water treatment plant.



Photo 12: Hamlet collection vehicle.



Photo 13: Stockpile of batteries adjacent to the hazardous waste area.



Photo 14: Same view point as Photo 3 after the loader has pushed the MSW into the active fill area.

SITE INSPECTION REPORT
Site: Ulukhaktok

(Licence N7L3-1525, April 23, 2010)

Date of Inspection:	Sept	9	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1000 HRS			**Weather Conditions:**	10 °C
Inspected by:	Paul Dewaele				Light Winds, easterly

		Yes	No	Comments
1.	Waste Segregation	X		Metals, vehicles, white foods tires, wood segregated. Cans collected in a depot occasionally. Annual large item pick up.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		Estimated 10 -15 years (Consultant Report).
5.	Closure/Remediation Plan		X	Current (Dillon) Report Underway may contain the information.
6.	Contaminated Soil Management	X		Contaminated soil contained in a bermed and lined “bag”, shipped out under POL contract.
7.	Estimated waste (day/week)	X		5 days weekly, 2 to 3 loads per day, approximately 9 cu-m/load.
8.	Honey Bag usage and disposal	X		All but one residence on community sewage pick-up.
9.	Private/Commercial Use of Landfill	X		Arctic Char Inn, Co-op/Northern. Charged $35/month.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Bi-weekly compaction
11.	Construction/Demolition waste and sources	X		Residences are dismantled, recycled. No evidence of significant C&D at landfill (some insulation, etc. in central area).
12.	Burning	X		Untreated wood, cardboard burned at the landfill in a barrel. Animal burn pit also in a steel ring at the landfill.
13.	Hazardous Waste	X		Collected at the works yard, drums labelled, stored and shipped off-site, typically annually. KBL (Yellowknife) used to manage.
14.	Hazardous Waste Control/Separation	X		Batteries, Oil, Antifreeze separated.
15.	Entrance Gate		X	Site is largely open, though litter fence present on three sides.
16.	Perimeter Fencing	X		Litter fence on 3 sides. Causes snow build up in winter.
17.	Signage (Site, Recycling, Hazardous)		X	No signage
18.	Bulky Metals Storage	X		Bulky Metals stored at site. Vehicles (drained) some empty tanks, white goods.
19.	Fuel Drum Storage			Empty fuel drums at site, some stockpiles of unaccepted exploration camps in community area
20.	Waste Cell Design (type)			Area Fill - single cell with gravel berm.

21. Separated from SW Drainage			SW drainage upstream prevented from entering landfill (channel). Seepage from gravel berm connected downstream.
22. Waste in active fill area	X		Partially covered – animals do scavenge at night (wolves).
23. Waste Compacted	X		Weekly to bi-weekly using a dozer (D-6H, D-6N available).
24. Daily cover being used	X		Partially covered on a weekly basis – however the haul truck for cover is broken.
25. Waste fill area dry		X	Largely dry, however drainage modifications in central area required to drain leachate through berm, to adjacent wetland.
26. Surface Water Quality/Colour			Stained pond in SW corner immediately adjacent to the berm.
27. Scavenging	X		Allowable in metals area only.
28. Slopes in good condition	X		Minimal slopes. Gravel .
29. Vegetative Cover In good condition			Not applicable – cover will ultimately be gravel.
30. Evidence Of Surface Water Ponding	X		One area in central waste fill.
31. Evidence Of Leachate Seeps	X		Downstream seepage from gravel berm, one pond is cloudy with evidence of staining.
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	Not applicable
34. Other Observations			

- Waste oil burner would be useful
- Permanent contaminated soil storage/treatment site would be useful



Photo 1. Waste oil and anti-freeze storage at community works building.



Photo 2. Overlooking the landfill.



Photo 3. Animal carcass burn pit.



Photo 4. Battery storage at the community works building .



Photo 5. C&D waste at the landfill (central cell area).

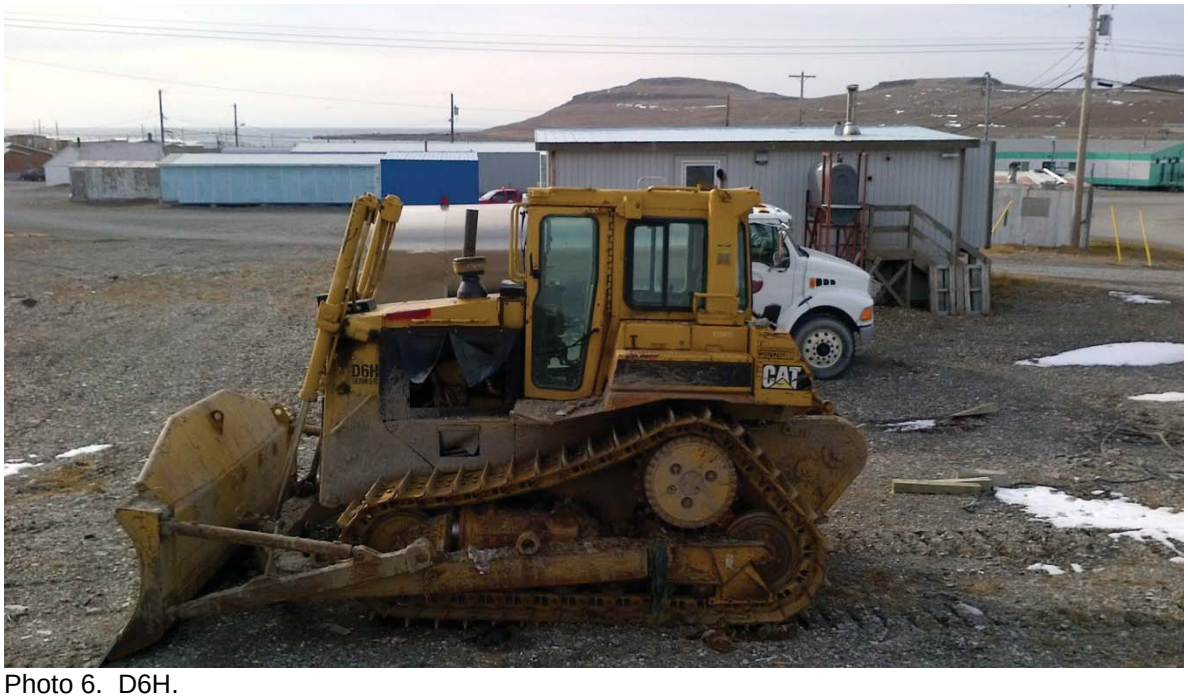


Photo 6. D6H.



Photo 7. D6N.


Photo 8. Drainage channel within the central landfill area.



Photo 9. East berm of the landfill.



Photo 10. Empty fuel drum storage at the landfill site.



Photo 11. Impacted pond close up (south of berm).



Photo 12. Impacted pond south of berm.



Photo 13. Bulky waste area.



Photo 14. Paper cardboard burn area, north west cell corner



Photo 15. Soil staining in bulk metal/tank storage area.



Photo 16. Surface pond sample location southwest of landfill.



Photo 17. Tire pile.



Photo 18. Waste fill.



Photo 19. Waste fill cover looking south.



Photo 20. Waste collection vehicle.



Photo 21. West berm close up.

SITE INSPECTION REPORT
Site: Wekweeti

(Licence W2007L3-0001)

Date of Inspection:	July	24	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1000 HRS			**Weather Conditions:**	20 °C
Inspected by:	KR				Sunny

		Yes	No	Comments
1.	Waste Segregation	X		MSW, C&D, bulk metals, white goods (freezers/fridges are separate from other white goods), furnaces. E-waste is stored in a small red shed near the entrance to the site.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		One year left in current cell. Capacity for additional cells in the current landfill footprint. Foreman estimates an additional 20 to 22 years of site life.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Stockpile of historical contaminated soils onsite. No records.
7.	Estimated waste (day/week)	X		M/W/F collections. 2 loads per day, 11m^3 collection vehicle. Completed by 1 person in a morning. Estimated up to 60 m^3 weekly.
8.	Honey Bag usage and disposal	X		One resident continues to use honey bags, disposal pit adjacent to lagoon.
9.	Private/Commercial Use of Landfill	X		Residents are main users of the landfill. Some use of the site by highways work being completed by community staff.
10.	Frequency that hamlet/contractor is onsite with heavy equipment	X		Loader is on-site daily at the landfill to cover. Every 2 weeks with a d6 to compact.
11.	Construction/Demolition waste and sources	X		Housing projects, road projects within the community.
12.	Burning		X	Burning does not occur on a regular basis. They burn clean wood waste on an as needed basis.
13.	Hazardous Waste		X	Hazardous wastes are accepted at the community garage.
14.	Hazardous Waste Control/Separation		N/A	
15.	Entrance Gate	X		The landfill site is gated.
16.	Perimeter Fencing	X		Chain link fence surrounds the site.
17.	Signage (Site, Recycling, Hazardous)		X	No signage present, but some has been ordered.
18.	Bulky Metals Storage	X		Cuverts/chainlink fence and other metal waste is stored together at the landfill.
19.	Fuel Drum Storage		X	Waste oil drums are located at the community garage.
20.	Waste Cell Design (type)	X		Trench fill

21. Separated from SW Drainage		X	Site is dry. Coarse grained soils. SNP location adjacent to the landfill has never been sampled. Always dry.
22. Waste in active fill area	X		
23. Waste Compacted	X		Waste is compacted and covered.
24. Daily cover being used	X		Daily cover is being used.
25. Waste fill area dry	X		Waste area is dry.
26. Surface Water Quality/Colour			No surface water noted.
27. Scavenging	X		Scavenging is permitted.
28. Slopes in good condition	X		Sandy slopes, no evidence of erosion.
29. Vegetative Cover In good condition	X		Grasses cover historical waste areas.
30. Evidence Of Surface Water Ponding		X	No evidence of surface water noted.
31. Evidence Of Leachate Seeps		X	No evidence of leachate seeps noted.
32. Presence Of Leachate Odours		X	No evidence of leachate odours.
33. Evidence Of LFG Vegetation Kill		X	No evidence of impacts to vegetation from LFG.
34. Other Observations			

- Gates at the landfill are left open to permit the free entry / exit of wildlife. The foreman noted that when gates to the landfill are closed, bears/wolves enter the community on a more regular basis. For this reason the gates are left open.
- Hazardous waste is collected at the community garage. Three totes of waste oil, ~30 drums containing product and one tote full of vehicle batteries were noted.
- Currently 2 years of appliances stockpiled at the landfill adjacent to 2 sea cans. Was previously shipped to the Yellowknife landfill for disposal. Currently looking into an arrangement with the Yellowknife landfill to allow this in the future.
- Site was developed in 1997
- 5 full cells have been covered.
- $2200 to ship appliances previously (one truckload), does not include disposal fee.



Photo 1: Aerial image of the Wekweeti landfill in relation to nearby water bodies.



Photo 2: Aerial image of the Wekweeti landfill and adjacent sewage lagoon. Note vehicles are in a fenced compound adjacent to the landfill and used for parts by community.



Photo 3: Active MSW fill area, with daily cover placed.



Photo 4: Empty drums stored at the landfill. Drums containing product are relocated to the community garage.



Photo 5: Wood waste.



Photo 6: Capped and closed MSW cell.



Photo 7: Culverts stockpiled at the landfill.



Photo 8: Pile of remediated contaminated soils at the landfill.



Photo 9: Vehicles stockpiled adjacent to the landfill are used for parts by community. Separate from landfill.



Photo 10: Lagoon in natural wetlands adjacent to the landfill.



Photo 11: Freezers/refrigerators and washers/driers are stockpiled near the entrance of the landfill. Two years of goods photographed here.



Photo 12: Forced air furnaces stockpiled adjacent to the ewaste shed.



Photo 13: Waste oils and batteries stockpiled at the community garage.



Photo 14: Batteries stockpiled in a covered tote.

SITE INSPECTION REPORT
Site: Whati

(Licence W2007L3-0002)

Date of Inspection:	July 17 2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1100 HRS	**Weather Conditions:**	16 °C
Inspected by:	KR		Low cloud with rain

		Yes	No	Comments
1.	Waste Segregation	X		Batteries (10 pallets), waste oil (8 totes), paint (1 pallet), MSW, C&D, white goods, end of life vehicles, tires, totes, drums, household fuel tanks (29)
2.	Waste Inventory		X	
3.	Operations Manual		X	Community is in the process of drafting an Operations and Maintenance manual as they have never had one.
4.	Site Life Estimates			No formal estimate. Each trench has an estimated approximate capacity of 4 years. Additional land outside of the fenced landfill is set aside for the landfill.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	No contaminated soils accepted at the landfill; recently a spill in town was excavated and placed in mega-bags for shipment south this coming winter.
7.	Estimated waste (day/week)	X		Haul-All collection vehicle, 11m^3 capacity. Currently operating daily to reduce bear activity within the community. Two to three half loads daily. Estimate 65 m^3 weekly waste collection. Waste generation varies due to large numbers of community members currently out of town.
8.	Honey Bag usage and disposal	X		Honeybags are used by less than 4 households. A trench for honey bags is maintained for the disposal of honeybags, however many plastic pails were also visible in the honey bag trench.
9.	Private/Commercial Use of Landfill			Residences do not pay any fees for collection or disposal of waste.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			On site 3 times a month with loader. Caterpillar loader is used to excavate trenches but rarely used on site apart from trench maintenance.
11.	Construction/Demolition waste and sources			Housing projects, community construction projects, Tlicho government construction projects.
12.	Burning	X		An incinerator is present at the landfill. It is used by residents. Community has plans to put a new door on the incinerator and begin to use it more regularly for burning cardboard and other clean wood waste.

13.	Hazardous Waste	X		Waste oil consolidated into totes. Paint and batteries stored on pallets. Propane tanks are stored upright and together. Barrels are stored on their side.
14.	Hazardous Waste Control/Separation		X	No controls in place.
15.	Entrance Gate		X	
16.	Perimeter Fencing	X		Fence in place, around MSW site. Partial fence around C&D site.
17.	Signage (Site, Recycling, Hazardous)		X	Signage is lacking.
18.	Bulky Metals Storage	X		White goods segregated. End of life vehicles segregated. No area for misc. bulk metals.
19.	Fuel Drum Storage	X		Fuel drums stacked and stored on their side. No containment.
20.	Waste Cell Design (type)	X		Trench
21.	Separated from SW Drainage		X	At the time of the inspection, during a period of 3 days of rain surface water was visible entering the trench and causing instability in the trench.
22.	Waste in active fill area	X		
23.	Waste Compacted	X		Waste consolidated with a front end loader 3 times a month.
24.	Daily cover being used		X	Interim cover is applied 2-3 times annually.
25.	Waste fill area dry		X	Surface water entering trench. Note inspection was during a period of rain, area is typically very dry and soils are well drained (sandy).
26.	Surface Water Quality/Colour			Surface water observed was clear, recent rainwater.
27.	Scavenging	X		
28.	Slopes in good condition	X		Site is relatively flat
29.	Vegetative Cover In good condition	X		Grass is present on non-roadway portions of the site.
30.	Evidence Of Surface Water Ponding		X	Minimal surface water was observed to be ponding.
31.	Evidence Of Leachate Seeps		X	
32.	Presence Of Leachate Odours		X	
33.	Evidence Of LFG Vegetation Kill		X	
34.	Other Observations			

- 6 totes of waste oil were removed from site in 2015 to a transfer facility in Yellowknife.
- No fees for collection of household garbage.
- Currently collecting waste daily to limit wildlife interactions in the community.
- Stockpiled soil around barrel area may be a stockpile of contaminated soil from the 1980's. SAO/Foreman unsure of history. They indicated that they are considering sampling the stockpile to see if it is suitable for cover material.
- C&D area, MSW area, honey bucket trench and lagoon are all separate sites.
- Approximately 550 residents and 180 residences.



Photo 1: Waste oil consolidated in totes adjacent to MSW area. Evident staining.



Photo 2: Five gallon pails consolidated after contents transferred to totes.



Photo 3: Propane tanks segregated adjacent to MSW cell.



Photo 4: Waste batteries placed on pallets adjacent to MSW cell.



Photo 5: Active MSW cell. Incinerator in background was used to burn clean wood waste, however it is currently non-operational until a new door is installed.



Photo 6: Active MSW cell, note erosion and undercutting of sidewall due to recent rain events.



Photo 7: Empty drum storage adjacent to MSW cell.



Photo 8: Honey bucket disposal trench located east of the MSW cell.



Photo 9: Sewage lagoon, currently in use and require repairs to decant structure.



Photo 10: Sewage decant over wetlands currently not in use as wetlands were damaged by forest fires in 2015. Currently using the adjacent lagoon with separate decant structure.



Photo 11: Construction and demolition waste area west of the MSW cell on separate site. Note burn scar from 2015 forest fires.



Photo 12: Construction and demolition waste area west of the MSW cell on separate site. Note burn scar from 2015 forest fires.



Photo 13: End of life vehicle stockpile adjacent to construction and demolition waste stockpile.



Photo 14: Waste home heating fuel tanks located adjacent to construction and demolition waste stockpile.

SITE INSPECTION REPORT
Site: Wrigley

(No water licence)

Date of Inspection:	June	11	2015	**Project Number:**	**14-1188-0001**
Time of Inspection:	1100 HRS			**Weather Conditions:**	Partly cloudy 20 °C
Inspected by:	KR/KB				

		Yes	No	Comments
1.	Waste Segregation	X		MSW, clean wood waste, bulk metals including vehicles and appliances are segregated.
2.	Waste Inventory		X	
3.	Operations Manual		X	
4.	Site Life Estimates	X		Operator estimates less than 3 years in current cell. No overall site life estimate.
5.	Closure/Remediation Plan		X	
6.	Contaminated Soil Management		X	Contaminated soils are not accepted at the landfill.
7.	Estimated waste (day/week)			1 tonne flat deck truck with side rails, estimate 3 cubic metres per load. 4 to 5 loads each day. Collect 3 days a week in the summer and twice a week in the winter (up to 40 cubic metres weekly).
8.	Honey Bag usage and disposal		X	Honey bags are not used in the community.
9.	Private/Commercial Use of Landfill	X		Landfill used primarily by residents of Wrigley. The foreman has noticed an influx of waste (appliances and hot water tanks) from sources external to the community. Culverts (presumably from Highway Department projects) were also present in the bulk metals pile.
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Every two to three of weeks during the summer. The hamlet completes the work using a Caterpillar D4 bulldozer.
11.	Construction/Demolition waste and sources			Housing projects, old water treatment plant. Very few sources of C&D waste.
12.	Burning	X		Burn pit is used in the spring and fall for clean wood waste.
13.	Hazardous Waste	X		Fenced area contains propane cylinders, paint cans, waste oils on pallets. A pallet of waste batteries located outside of fenced area (lack of room).
14.	Hazardous Waste Control/Separation	X		Fenced area with signage.
15.	Entrance Gate		X	Entrance has been gated in the past, however residents left waste outside of the fence so community removed the gate.
16.	Perimeter Fencing			Wind (litter) fencing on three sides of the active waste cell. The hamlet moves the fencing as they cover waste, to ensure it is around the active area.

17.	Signage (Site, Recycling, Hazardous)	X		Good signage at site. Hamlet identified need for signage at the burn pile as there is often MSW mixed in that they remove prior to burning. MSW, metals area and hazardous waste area s have signage.
18.	Bulky Metals Storage	X		Bulky metals including a large tank, vehicles, white goods, culverts are stored together.
19.	Fuel Drum Storage	X		More than 50 fuel drums stored on site. Some upright, some on their side.
20.	Waste Cell Design (type)			Trench fill.
21.	Separated from SW Drainage	X		Free draining soils, (sandy gravel). Foreman noted that water does not pond in the area.
22.	Waste in active fill area	X		Foreman noted since the placement of signage at the site that residents are adhering to placing waste in the prescribed areas.
23.	Waste Compacted	X		Waste is compacted every few weeks with a D4.
24.	Daily cover being used		X	Cover is placed as needed. Appears to be annually.
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour		X	No surface water present.
27.	Scavenging	X		Scavenging is permitted.
28.	Slopes in good condition	N/A		Site is relatively flat.
29.	Vegetative Cover In good condition	X		Grass was noted on the recently covered waste, adjacent to the active cell.
30.	Evidence Of Surface Water Ponding		X	No surface water present.
31.	Evidence Of Leachate Seeps		X	No leachate seeps noted.
32.	Presence Of Leachate Odours		X	No odours noted.
33.	Evidence Of LFG Vegetation Kill		X	No evidence of LFG vegetation kill.

34. Other Observations

- Sewage lagoon is on the landfill site. The lagoon does not contain any liquids as the soil is free draining. The community noted a concern with respect to the sewage lagoon and landfill impacting airport lake to the east.
- Collection is completed by one person who also operates the sewage truck.
- The school operates a beverage container recycling program.



Photo 1: Entrance signage.



Photo 2: Signage at the landfill.



Photo 3: Bulk metals.



Photo 4: End of life vehicles.



Photo 5: White goods and bulk metals.



Photo 6: Hazardous waste enclosure.



Photo 7: Hazardous waste adjacent to hazardous waste enclosure.



Photo 8: Batteries, propane tanks and paint cans stored in the hazardous waste enclosure.



Photo 9: Burn pile. Note operator sorts waste prior to burning to ensure only clean wood waste is left in the burn pile.



Photo 10: White goods.



Photo 11: Empty fuel barrels.



Photo 12: Sewage lagoon signage.



Photo 13: Sewage lagoon at landfill site.



Photo 14: Active MSW cell.



Photo 15: Wind fencing around MSW cell.

SITE INSPECTION REPORT
Site: Yellowknife

(Licence MV2009L3-0007)

Date of Inspection:	July	21	2014	**Project Number:**	**14-1188-0001**
Time of Inspection:	1600 HRS			**Weather Conditions:**	**25** °C
Inspected by:	KR/PD/KB/JB				Local Smoke

		Yes	No	Comments
1.	Waste Segregation	X		Segregated in to for scavenge, MSW, C&D, Tires, e-waste, Propane tanks, Batteries, Brush, Metals, white goods.
2.	Waste Inventory	X		Landfill attendant weighs and logs all vehicles entering site. Tipping fees in place.
3.	Operations Manual	X		
4.	Site Life Estimates	X		
5.	Closure/Remediation Plan	X		Interim closure and reclamation plan on file with MVLWB.
6.	Contaminated Soil Management	X		Contaminated soil and water management areas.
7.	Estimated waste (day/week)			
8.	Honey Bag usage and disposal	X		Bin for honey bag disposal. City staff empty bin at sewage lagoon.
9.	Private/Commercial Use of Landfill	X		
10.	Frequency that hamlet/contractor is onsite with heavy equipment			Daily, 9 full time staff present additional contractors onsite as required.
11.	Construction/Demolition waste and sources	X		Construction projects in and around Yellowknife.
12.	Burning		X	Burning does not occur at the landfill.
13.	Hazardous Waste	X		Hazardous waste accepted and segregated at the facility.
14.	Hazardous Waste Control/Separation	X		Bins for waste oils, antifreeze, fluorescent bulbs, pallets for batteries, signage to assist.
15.	Entrance Gate	X		
16.	Perimeter Fencing	X		Wildlife fencing in place around MSW cells
17.	Signage (Site, Recycling, Hazardous)	X		
18.	Bulky Metals Storage	X		
19.	Fuel Drum Storage			No fuel drums were observed.
20.	Waste Cell Design (type)	X		Area fill of baled waste.
21.	Separated from SW Drainage	X		Bermed and lined area, with sump.
22.	Waste in active fill area	X		Yes, waste is placed in the active fill area.
23.	Waste Compacted	X		Waste is compacted via the baling facility.
24.	Daily cover being used	X		MSW bales are covered and face left exposed to accommodate placement of additional bales.
25.	Waste fill area dry	X		
26.	Surface Water Quality/Colour			No surface water present.
27.	Scavenging	X		Scavenging is limited to 2 small cells.

28. Slopes in good condition	X		Slopes do not show signs of erosion, minimal vegetation present, slopes appear to be freshly graded.
29. Vegetative Cover In good condition		X	See above comment.
30. Evidence Of Surface Water Ponding		X	
31. Evidence Of Leachate Seeps		X	
32. Presence Of Leachate Odours		X	
33. Evidence Of LFG Vegetation Kill		X	
34. Other Observations			

- Wildlife fence not currently operating
- MSW is transferred from bins and collection vehicle to bailing facility. City staff then place bales in the MSW cell, no access to the public to MSW area.
- Tire shredding is currently underway
- Compost pad currently under construction
- Not subsidized by the GNWT



Photo 1. Baled paper.



Photo 2. Bale fill close up.



Photo 3. Bale fill current lined cell.



Photo 4. Bale fill facility.


Photo 5. Composting area.



Photo 6. Construction disposal area.


Photo 7. Covered bale fill.



Photo 8. Hazardous waste depot.



Photo 9. Honey bag disposal.



Photo 10. Metal crushed drum and vehicle storage.



Photo 11. Metal oil tank storage.

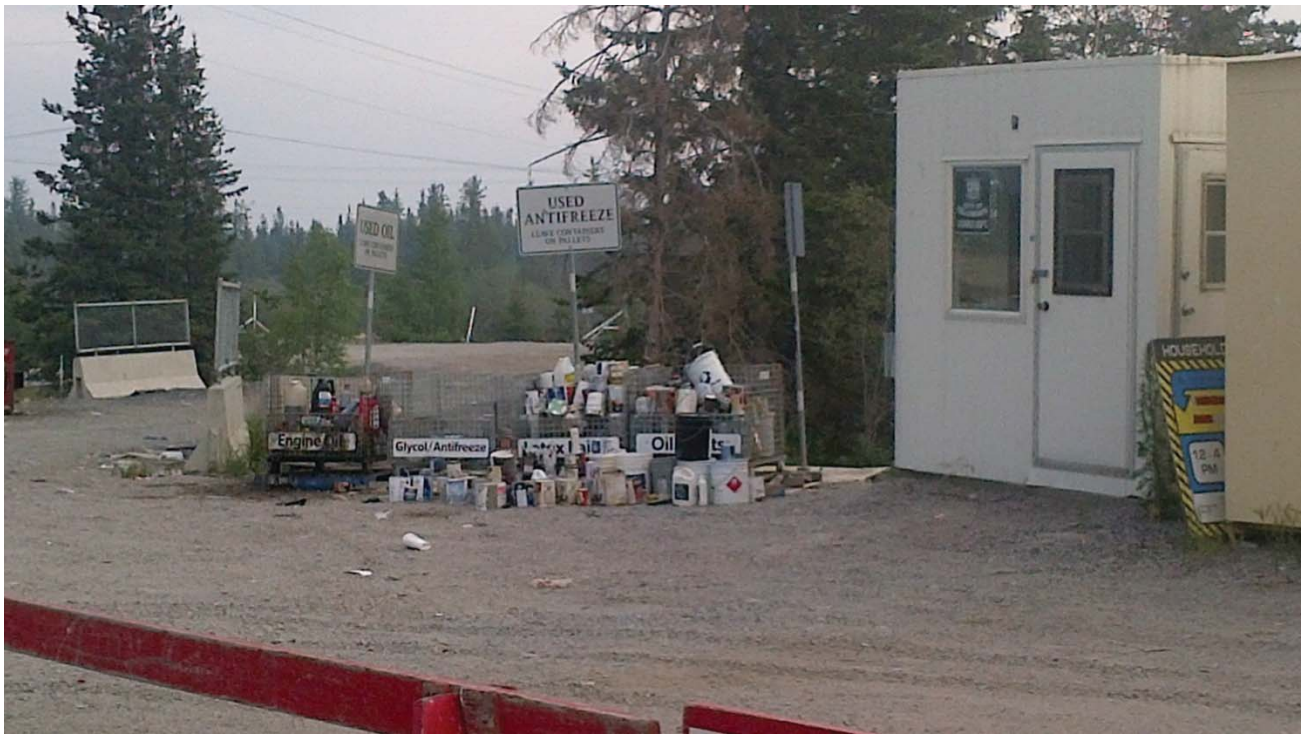


Photo 12. Oil hazardous waste storage.



Photo 13. Propane storage.



Photo 14. Tire shred testing.



Photo 15. Tire storage.



Photo 16. White goods and metal storage.

APPENDIX B

Community Waste Management Survey Results

December 2016
Report No. 14-1188-0001

Golder Associates

Aklavik Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? mon - fri 9-5, weekends can call to be let in

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? gates at entrance and sign

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? no, estimate a year left

Notes:
no estimated closure date

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? jan to mar increases use

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:

Increased use when ice road is open (jan to mar), some larger items are occasionally sent to Inuvik to be sent south (fuel tanks, furnaces).
Foreman authorizes what can be dumped for hazardous materials.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	carpentry, constrution	Quantity:	100 fuel tanks	Authorized? ☒ Yes	☐ No
Type:		Quantity:		Authorized? ☐ Yes	☐ No
Type:		Quantity:		Authorized? ☐ Yes	☐ No

Comments: housing department any oil wastes from construction of a housing project last year, batteries, waste wood, appliances, fuel tanks,

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☒Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Mackenzie River seasonal flooding in the delta is a concern every year. The flood water usually reaches the landfill.
Town foreman took over the survey at question 9.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ☐ Part-Time ■ Occasional

3. How many hours do you spend managing the community landfill? 3 hours/week to compact and push landfill

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ■ Yes ☐ No

   If Yes – Please list them:
   1. No burning, no contaminated material
   2. Hours of operation
   3. Tipping bylaws, fees for contractor

Notes:

Roxanne (Acting SAO) said they would email the bylaws.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? wood, batteries, corrosives, fuel tanks, tires, applicance, metal

How well does the public adhere to dropping off in the specific areas? ■ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

■No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☐Other: n/a

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: every 4 months Materials Used: D6 cat, WA250 loader

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐Fence ■Gate ☐Fence and Gate ■Signage

Notes:

Working on plan for new landfill once a road is built to quary west of town, have not started on plan yet. An engineering study was done last year for access to the site, they need bridge crossings. Nothing in the study relates to a landfill at all.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: new landfill being discussed to be built west of town in a quarry. No official planning has begun

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

1. Three times weekly collection

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

Batteries collected yearly by contractor
Fridges and fuel tanks stock piled at landfill, rarely removed

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ■On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? unsure

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:
batteries in a box on a pad at landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? one is located west of Aklavik

If Yes – What was its approximate size? no idea

If Yes – When was/were the landfill(s) operational (year – year)? closed and covered in early 80's

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

■ Municipal Solid Waste ■ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

Beverage container collection by a guy from Inuvik year-round, by ice road in winter and he flies there in summer and ships them to Inuvik by barge in the summer.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
☐ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ■ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: _____

Notes:

3. All of these items are stockpiled at the landfill seperately.

1. Unsure of documents, may be somewhere but unsure.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? not known

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? unknown

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

☐Single Community Government ☐Shared Community Governments

■GNWT ☐Other Government

4. How much money is collected yearly through user fees? Approximately $20,000

Notes:

20,000 in the past year because of a large housing project, would usually be around $5,000.

Did not know the annual budget. Will ask if they can share it and email.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Aklavik

Water Licence Information

1. Is the community currently in compliance with its water license? ☒ Yes ☐ No

Community Landfill Management

1. Is the community license currently in compliance with its water licence? ☒ Yes ☐ No

   If yes – Can a digital copy of the water license be sent to Golder? ☒ Yes ☐ No

Water license in due for renewal in November 2014. Roxanne said she will email it.

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Behchoko Community Survey
Completed by Lands
Administrator

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ■ Yes ☐ No

   If Yes – What communities share the site? Behchoko is one municipality, however it has 2 different townsites - Edzo and Rae

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? Gate and security

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? 2015

   Is there a Closure Plan? Yes

Notes:

CGB Apply

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)
- ☐ Household Hazardous Waste
- ☐ Industrial Hazardous Waste

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? see above

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☒Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

■ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? one hour per day

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
☐ Other SWANA Operators courses: _____
■ Water and Waste Management (School of Community Government, NWT
☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☐ Yes ■ No

If Yes – Please list them: 1. _____
2. _____
3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? construction waste, appliances

How well does the public adhere to dropping off in the specific areas? ■ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ■No cover in winter

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

■ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: target is once a week Materials Used: sand/clay

11. Is leachate contained and/or collected? ☐ Yes ☐ No ■ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ☐ No ■ Not in winter

If Yes – Frequency: once or twice per season Type: SNP testing site nearby

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ☐ Fence and Gate ☐ Signage

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: There is a landfarm site within the landfill that needs remediation and there are plans for remediation this summer.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: Landfill is nearing capacity; a site has been chosen for new landfill and a design is complete. CGB applying for a new Water Licence as part of process will be approval for the new site and of a closure and reclamation plan for old site.

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☐ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ☐Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ■ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ■ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☐Landfill ■In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☒On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? N/A

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ☒Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? not disposed in landfill - instead, it is put in bermed pit area adjacent to lagoons

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? A small site was located behind the area presently occupied by Tlicho Construction

If Yes – What was its approximate size? less than a hectare

If Yes – When was/were the landfill(s) operational (year – year)? prior to mid 1980's

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

■ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ■ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☒ White goods with coolants	☒ White goods without coolants	☐ Tires
☐ Used Oil Products	☐ Paints and Paint Products	☒ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	☐ End of Life Vehicles	☐ Pesticides etc.
☒ Antifreeze	☐ Untreated Wood Waste	☐ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☒ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☒ Yes ☐ No

If Yes – What types of reports / documents?

☒ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: Waste Management is a topic included in the CGB Annual Reports to the Wekeezhii Land and Water Board

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? _____

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

■ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? zero

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Behchoko Community Survey
Completed From SAO

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ■ Yes ☐ No

   If Yes – What communities share the site? Rae and edzo have seperate everything

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? employees are the 8-5, but people will drop things off 24-7

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? no

   Is there a Closure Plan? not currently

Notes:

currently at capacity, in process of determining new location, will be a requirement of their new water license. possible expansion or new location this spring

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? when Tlicho gov't has annual AGM, quarterly assemblies, holidays, c

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ■ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? fuel

Notes:
accepted contaminated soil from a fuel spill once but do not regularly accept industrial solid waste from outside the community.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

according to the land use permit if they go beyond capacity they will be checked by the inspectors and possible consequences can occur

8. once received an emergency dumping of contaminated soil from a fuel spill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ■ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? changes seasonally

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

■ Other SWANA Operators courses: Maca sponsored waste management course

☐ Water and Waste Management (School of Community Government, NWT

☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

■ Yes ☐ No

If Yes – Please list them:
1. no leaving items outside of landfil hours (tipping)
2. area designated for destroyed dogs from stray dog bylaw
3. _____

Notes:
no budget for bylaw officer

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ■ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? hazardous waste, batteries, paint, applicances, oil tanks, tires, vehicles, scrap metal

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ☐ Yes ■ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: winter less compaction, hauling. Summer is compaction season yellow cloth fence is erected around the landfill in the summer

8. What is the frequency of waste cover placement (soil or other)?

■No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☐Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: weekly Materials Used: tractor

11. Is leachate contained and/or collected? ☐ Yes ☐ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ☐ Yes ■ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ☐Signage

Notes:

13. in process of new water license to become compliant
14. only fenced in summer,

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☒ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☒ Yes ☐ No

If Yes – Describe these concerns: Community is growing, they are hoping to relocate the landfill and make the new one larger and more functional

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☒ Yes ☐ No

If Yes – Please describe: Relocation of landfill and sewage lagoon with new water license application in the coming year, will expand and improve both

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

■ Programs ☐ Awards ☐ Funding ☐ None

If Yes – Please describe these achievements: when training courses become available they will send employees to them, they attend meetings or programs for waste management

Community Waste Management

1. How is waste collected in the community? ■ At Homes/Businesses ■ Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐ Weekly ■ Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

■ In town ■ On the Land ■ Next to landfill ☐ In Ocean/River/Lake
☐ At historic landfill site

Notes:

town will go pick up large items from businesses at their request
vehicles or garbage in the 'bush' around town
up to 15 people are hired in the spring for community clean up, during this clean up the town will go pick up large items from homes and businesses for free.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

■ Municipal Solid Waste ■ Bulky Items ■ Hazardous waste ■ Variable
■ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☐Landfill ☐In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:
hazardous waste is stock piled at the community garage / yard

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ■Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? license expires this summer

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? it is nearing capacity, they are looking at expanding or removing some sludge

Notes:

They have a waste management consultant in house right now that will also fill out this survey and possibly expand on many of these items, he will submit it by email.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ■ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:
private recycling business for bottles, cans, beverage containers, nothing else is recycled

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	■ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	■ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: _____

Notes:

Waste management consultant will email this survey with any reports or documents.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? Consultant to provide

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☒ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? no user fee

Notes:

they receive some funding from federal government for waste management,

waste management consultant is to email this survey with additional information.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Deline Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? Early Summer 2014 Tentatively

   Is there a Closure Plan? Yes

Notes:

New landfill complete but not being used yet
Reclamation plan in place for current land fill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? chemicals (oil, pesticides, antifreeze)

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:
None of the above

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ■ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 14 hours a week, variable

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

   ☐ Other SWANA Operators courses: _____

   ☐ Water and Waste Management (School of Community Government, NWT

   ☐ None ■ Other: not sure what the specific training was called

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____

   2. _____

   3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? batteries, appliances, old vehices, wood, tires

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ☐ Yes ■ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

■No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:
people seem reluctant to drive to specific dump areas as they are affraid to damage tires

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

■ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: before wind picks up in july and before fall Materials Used: dozer

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

■ Fence ☐ Gate ☐ Fence and Gate ☐ Signage

Notes:

Reclamation plan in place for the old landfill, but no operations plan.

Operations plan has been develloped for the new landfill

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: would be good to have a better enclosure, and prevent wildlife access

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: new landfill site in process

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: new landfill site has been recognized for engineering work

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ■On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? estimating summer 2014

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? unknown

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

Notes:
batteries are stored on a segregated unit

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ☒ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☒ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:
beverage containers only

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
☐ Used Oil Products	☐ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
☐ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

■ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials
☐ Other: _____		

Notes:

planning documents for the new landfill are available but not willing to share documents at this point in time,
appliances (white goods), wood, tires, and batteries are all stored seperately at the landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? unknown

2. Do you have a community budget for waste management that you could share with us?

■ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

■ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? none

Notes:

They have an annual budget defined in 5 year planning but can't share right now.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Deline

Water License Information

1. Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

1. Yes

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Fort Liard Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? 8:30 AM - 4:40 PM

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? Site is fenced and gated but gate is not always closed. (access to sewage lagoon)

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ■ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? 2031

   Is there a Closure Plan? Not at this time

Notes:
New solid waste site opened in November 2011. Site has been designed for an estimated 20 year time span.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? Unknown - season is May thru October

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ☐ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ☐ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? Vehicles and waste oil products

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ■ Highway Construction Crews
■ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: Contaminated soil	Quantity:	Authorized? ☐ Yes ■ No
Type: Sewage	Quantity:	Authorized? ☐ Yes ■ No
Type: Bulk garbage	Quantity:	Authorized? ☐ Yes ■ No

Comments: Facility only accepts Municipal Waste

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)
☐ Water related environmental risk (surface water or groundwater quality impacts)
☐ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:
Landfill site is fenced and waste cell has wind fence around 3 sides. Plastic bags, etc still create challenges with containing windblown debris.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ■ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? Average 24 hours per week

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

   ☐ Other SWANA Operators courses: _____

   ■ Water and Waste Management (School of Community Government, NWT

   ☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ■ Yes ☐ No

   If Yes – Please list them:
   1. 212 - Waste Disposal Site Bylaw
   2. 229 - Municipal Service Rates Bylaw
   3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? Bulk waste, Hazardous waste, tires, appliances, metals

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences:
Summer operations include weed and brush control, road maintenance and picking up of wind blown waste.

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

■ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: Yearly Materials Used: none

11. Is leachate contained and/or collected? ■ Yes ☐ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ■ Fence and Gate ☐ Signage

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: New waste cells are to be constructed in 2014 and current waste cell is to be closed in 2015.

New waste cells are to be constructed at the solid waste disposal site in 2014.
Current waste cell is planned to be closed and covered in 2015

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

■Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

■In town ■On the Land ■ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:
Public waste is constantly being discarded along roads and path ways i.e. cans, bags, bottles, diapers, etc.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ■ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ☐ No ■ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:
Landfill site is located 12 km's outside of community.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐ In a Shed ■ On a Pad ■ Bermed to Prevent Spills ☐ Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? 2028

2. How often is the sludge removed from the sewage sludge lagoon?

■ Never ☐ Once/Year ☐ Twice/Year ☐ Every 4 months
☐ Every 3 months ☐ Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☒ Yes ☐ No

If Yes – Where was it / were they located? Within the community, exact locations unknown

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ☒ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:
Private contractor comes into the community on occasional basis and purchases recyclable items from community members. Cans, bottles etc.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
☐ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
■ Needles/Sharps	☐ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? _____

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☐Single Community Government ☐Shared Community Governments

☐GNWT ☐Other Government

4. How much money is collected yearly through user fees? _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Fort Liard

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐Yes ☐No

   If yes – Can a digital copy be sent to Golder? ☐Yes ☐No

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Fort McPherson Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? Road accessible, may receive waste from other community members

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? No

Notes:

no closure date, but we are doing an expansion right now under BCP (Building Canada Plan).

Expansion is being completed internally, have design drawings from Aecom, but lack of funds to contract it out? Completing the work with hamlet resources.

Aecom completed design drawings for expansion. May have completed a study years ago but has not seen report.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? More use in summer due to hwy. tourist/recreation and industrial act

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ☐ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? no monitoring

Notes:

Suspect that outside industry use, but can't confirm.

Form was filled out by supervisor Bill and Kevin Rattray via phone.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: don't know

8. Are there any known environmental risks with the community landfill? (check all that apply)

- ■ Air related environmental risk (dust or wind-blown litter)
- ■ Water related environmental risk (surface water or groundwater quality impacts)
- ■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

wind blown litter not dust. fence is part of expansion plan. expansion calls for a berm for water holding and managment. Contaminated soils laying on the land, no lined bermed area.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ☐ Part-Time ■ Occasional

3. How many hours do you spend managing the community landfill? couple

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____
   2. _____
   3. _____

Notes:
Tipping fees are the only "bylaws"

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? expansion calls for cells, dead vehicles/ appliances/oils/hazmat/batteries/paints. paper and wood burning pit.

How well does the public adhere to dropping off in the specific areas? ■ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic

☐Final cover only (future) ☐No cover in winter

Notes:

Not well segregated. Cover occurs following each burn. Following each burn, ash mixed with dirt compacted and covered. Try to burn each week to stay on top of things and manually segregate the waste prior to the burns.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ■Rock ☐Other: pit run gravel/dirt

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: once a week Materials Used: loader/dozer (hamlet equipment)

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ☐ Yes ■ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ☐Signage

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: Hazardous waste removal, costs, rules and regulations, security

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: expansion BCP project

Notes:
Bears/wolves/ravens/gulls

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☐ None

If Yes – Please describe these achievements: don't know

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

☐In town ☐On the Land ■ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

garbage pickup is three times a week; looking to introduce sorting during pickup. sorting bins outside of each store would likely make a difference. funding for sorting bins now worked out yet.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ■ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ☐ No ■ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? beyond design life but still ok. buliding berms higher as sludge has never been removed.

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? none

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

Notes:
no one wants to put equipment in sewage to remove sludge, too high of risk with 15ft of sludge estimated to loose equipment.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? Don't know

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

recycling beverage containers done by school

mark davy with maca would have historic location? if he's still around.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
☐ Antifreeze	■ Untreated Wood Waste	☐ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: don't know

Notes:

Waste listed above is segregated to the best of their ability. Would like to ship batteries south to recyclers however no local expertise to make this happen.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? unknown

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

■ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? ~50K

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Fort McPherson

Water License Information

1. Does the community landfill have a current valid water license? ■ Yes ☐ No

If yes – What is the expiry date? 2020

If yes – Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ■Yes ☐No

If yes – Can a digital copy be sent to Golder? ☐Yes ■No

1997 plan I don't know where it is we are scheduled to update in 2014

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Fort Providence Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? 9-5 monday to friday

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? gate, people will sometimes dump things at old fire guard

4. Who owns the land that the community landfill is located on?

   ■ Commissioner ☐ Private ☐ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? no, will barely make another 5 years

   Is there a Closure Plan? no

Notes:

personal use is free, contractors and corporate use is charged fees
need to start putting closure plan in place in next 5 years

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? summer, with clean up and construction work

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Commercial and Institutional Hazardous Waste
- ☐ Household Hazardous Waste
- ☐ Industrial Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ■ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? hazardous waste

Notes:
hazardous waste is not accepted but cannot monitor whether or not it is being dumped theere

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ■ Highway Construction Crews

■ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: mixed camp waste	Quantity: unknown	Authorized?	■ Yes	☐ No
Type:	Quantity:	Authorized?	☐ Yes	☐ No
Type:	Quantity:	Authorized?	☐ Yes	☐ No

Comments: highways camp waste came to get key from office, they were charged fees

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐ Air related environmental risk (dust or wind-blown litter)

■ Water related environmental risk (surface water or groundwater quality impacts)

■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

8. concerned long-term groundwater seepage but nothing has been identified or brought up
they do not accept contaminated soil but the hamlet cleaned up a contaminated site and soil was disposed of at the landfill, monitoring is being done by ENR, Enr said the soil could be used for berms at landfill.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ■ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? ~2 hours / week

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ☐ None ■ Other: Waste Management Course through MACA

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ■ Yes ☐ No

   If Yes – Please list them: 1. just tipping fees
   2. _____
   3. _____

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? construction waste, batteries, tires, waste metal, plastics,

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: compaction and convering is done in summer

8. What is the frequency of waste cover placement (soil or other)?

■No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:
8. usually once per year

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☒Soil ☐Rock ☐Other: use contaminate soil on site, clay material

10. Is there any compaction of the waste materials? ☒ Yes ☐ No

If Yes – Frequency: twice annually Materials Used: D6 Cat

11. Is leachate contained and/or collected? ☐ Yes ☐ No ☒ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ☒ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☒ Yes ☐ No

If Yes – Is the community in compliance? ☒ Yes ☐ No

14. Is access to the community landfill controlled? ☒ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☒Fence and Gate ☒Signage

Notes:
13. there is an O and M manual

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: Current landfill is near end of usefull life, need to plan for closure and a new site in next 5 years if not sooner.

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☒ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☒At Homes/Businesses ☒Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☒Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☒ Yes ☐ No

If Yes – Where is it taking place?

☒In town ☒On the Land ☒ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

2. dumping in old fire break has been happenning for years,

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☒ Municipal Solid Waste ☒ Bulky Items ☐ Hazardous waste ☒ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☒ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ☒ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☒ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

1. hamlet staff sorts / stockpiles batteries at landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? no

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ■Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? was done two years ago, no idea how much was removed

4. Where is the sewage sludge from the lagoon disposed of once it is removed?
within a bermed area in front of the lagoon

Notes:
4. batteries stored on pallets

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☒ Yes ☐ No

If Yes – Where was it / were they located? near current landfill

If Yes – What was its approximate size? no idea, no idea what type of waste is in it

If Yes – When was/were the landfill(s) operational (year – year)? no idea, no records of it

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☒ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:
beverage containers only

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
☐ Used Oil Products	☐ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
☐ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: _____

Notes:

3. these items are stockpiles as much as possible but its difficult to manage and make people follow the placement
1. no but the hamlet is doing a hazardous waste inventory this year, indicated to contact Jennifer re: our survey

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? will email

2. Do you have a community budget for waste management that you could share with us?

■ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

■ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? $5 monthly per household, will email

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Fort Providence

Water License Information

1. Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Fort Resolution Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? in process, not yet completed

Notes:
good for ten years

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? 50 in summer

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ■ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ☐ No

If Yes – What are they? _____

Notes:

7. have a household waste site and a seperate construction waste site
8. yes, shingles

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ■ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: highway contractor wan	Quantity: many	Authorized? ☐ Yes	■ No
Type:	Quantity:	Authorized? ☐ Yes	☐ No
Type:	Quantity:	Authorized? ☐ Yes	☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

8. none that the SAO knows of

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☒ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ☒ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 2 hours per week

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

☐ Water and Waste Management (School of Community Government, NWT

☒ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☐ Yes ☒ No

If Yes – Please list them: 1. _____

2. _____

3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? hazardous materials, construction waste

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: waste is dropped off in spread out areas in summer and more compact areas in winter

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:
8. as necessary

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

■ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: as required Materials Used: use loader and a backhoe

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ☐ Yes ■ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ☐ Fence and Gate ■ Signage

Notes:

13. Plan is still in administration and not shared with public
14. signage only indicates where to dump

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: land use planning with closure, considering new locations

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☒ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☒At Homes/Businesses ☒Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☒Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ☒ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ■ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ■ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■Landfill ☐In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:
2. will be available in future

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☒On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? none

2. How often is the sludge removed from the sewage sludge lagoon?

☒Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? n/a

4. Where is the sewage sludge from the lagoon disposed of once it is removed? n/a

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? near the current site

If Yes – What was its approximate size? small, less than a hockey rink

If Yes – When was/were the landfill(s) operational (year – year)? closed ~1999

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

■ Municipal Solid Waste ■ Bulky Items ■ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

1. beverage containers only
2. individuals

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	■ Mercury Containing Equipment	■ Pharmaceuticals
■ Needles/Sharps	☐ End of Life Vehicles	☐ Pesticides etc.
☐ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials
■ Other: might be some, unknown		

Notes:

all checked items are seperated and stored at landfill
collect oil at hamlet shop

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $100,000.00

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

☒ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? 0

Notes:

2. will email
3. maca

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Fort Resolution

Water License Information

1. Does the community landfill have a current valid water license? ☐ Yes ■ No

   If yes – What is the expiry date? _____

   If yes – Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ■ Yes ☐ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

Community Landfill Characteristics

1. What year was the community landfill established? 1980

water license in process
O&M plan currently being completed, unavailable

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Fort Simpson Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? None I am aware of.

2. Are there set hours of operation? ☒ Yes ☐ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☒ Yes ☐ No

   If Yes – What are they? Lock on the gate, however current operator allows after hours commercial dumping

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ☒ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? 5 - 10 years, not sure, need a study

   Is there a Closure Plan? not that I am aware of, need a plan

Notes:

The need for a volume capacity and life expectancy study and a closure plan with liability costs was identified in the 2012 Year End Audit. We will be putting out an RFP in 2014.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☒ Yes ☐ No

If Yes – How many people come through the community seasonally? unknown

7. What types of waste are accepted at the community landfill? (check all that apply)

- ☒ Residential Mixed Solid Waste
- ☐ Household Hazardous Waste
- ☒ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ☐ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☒ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☒ Yes ☐ No

If Yes – What are they? Hazardous wastes - Household and Commercial and petroleum products

Notes:

We are currently working on a plan to charge tipping fees and to limit the amount of materials the Village will except at the landfill.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☒ Oil ☒ Gas ☒ Exploration ☒ Highway Construction Crews

☒ Camps ☒ Mines

If Yes – What types of waste and related quantities were requested?

Type: Household	Quantity:	Authorized? ☒ Yes ☐ No
Type: Commercial	Quantity:	Authorized? ☒ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐ Air related environmental risk (dust or wind-blown litter)

☒ Water related environmental risk (surface water or groundwater quality impacts)

☒ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:
Working on a plan to identify the current and future risks

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☐ Community Government / Municipal Staff ■ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ■ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 20 hours a week

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

■ Water and Waste Management (School of Community Government, NWT

☐ None ■ Other: Unknown

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

■ Yes ☐ No

If Yes – Please list them: 1. Landfill Bylaw
2. Operation Guidelines Policy
3. _____

Notes:

The Village has historically done a horrible job managing the landfill.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☒ No

6. Is waste segregated / separated at the community landfill? ☒ Yes ☐ No

If Yes – What is segregated? Somewhat directed and divided

How well does the public adhere to dropping off in the specific areas? ☒ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ☒ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☒ Yes ☐ No

If Yes – Please describe the differences: _____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement	☐Daily cover placement	☒Sporadic
☐Final cover only (future)	☐No cover in winter	

Notes:
Contractor only spreads and covers periodically and sporadically.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☒Other: sand

10. Is there any compaction of the waste materials? ☒ Yes ☐ No

If Yes – Frequency: sporadic Materials Used: _____

11. Is leachate contained and/or collected? ☐ Yes ☒ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ☒ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ☒ No

If Yes – Is the community in compliance? ☐ Yes ☒ No

14. Is access to the community landfill controlled? ☒ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☒Fence ☒Gate ☒Fence and Gate ☐Signage

Notes:
Needs to be improved and monitored.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☒ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☒ Yes ☐ No

If Yes – Describe these concerns: right next to swamp land

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☒ Yes ☐ No

If Yes – Please describe: New landfill plan needs to be put into place.

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☒ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☒At Homes/Businesses ☒Dropped-off by individuals

If curb side pickup – How often is waste collected?

☒Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☒ Yes ☐ No

If Yes – Where is it taking place?

☒In town ☒On the Land ☒ Next to landfill ☐ In Ocean/River/Lake
☒At historic landfill site

Notes:

Working on cleaning up the Town, and unauthorized dumping near landfill and on the land

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

■ Municipal Solid Waste ■ Bulky Items ■ Hazardous waste ■ Variable
■ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ■ Contractor ■ Other

2. Is there a hazardous waste management plan? ■ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ■ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■Landfill ■In town ■Outside of town ☐On the land
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☒On a Pad ☐Bermed to Prevent Spills ☒Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? Not sure, 2014/15

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☒Monthly

3. How much sewage sludge is removed per year (in tonnes)? 1 tonne

4. Where is the sewage sludge from the lagoon disposed of once it is removed? in landfill pit

Notes:

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☒ Yes ☐ No

If Yes – Where was it / were they located? crown land

If Yes – What was its approximate size? unknown less than 20 acres

If Yes – When was/were the landfill(s) operational (year – year)? unknown

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☒ Municipal Solid Waste ☒ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ☒ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:
Working on both programs, hoping to launch in 2014.

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☒ White goods with coolants	☒ White goods without coolants	☒ Tires
☐ Used Oil Products	☒ Paints and Paint Products	☒ Batteries
☒ Mercury Containing Lamps	☒ Mercury Containing Equipment	☒ Pharmaceuticals
☒ Needles/Sharps	☒ End of Life Vehicles	☐ Pesticides etc.
☒ Antifreeze	☒ Untreated Wood Waste	☒ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☒ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ☒ No

If Yes – What types of reports / documents?

☐ Reports ☐ Standards ☐ Guidelines
☐ Communication Documents ☐ Educational Materials
☐ Other: _____

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above?
Un sure of the latest reports

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $30,000 per month includes pick up

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☒ Single Community Government ☐ Shared Community Governments

☒ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? $175,000

Notes:
The revenue is $175,000 the service expense is $350,000

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Fort Simpson

Water License Information

1. Is the community landfill currently in compliance with its water license? ☒ Yes ☐ No

Not sure

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Fort Smith Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☑ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☑ Yes ☐ No

   If Yes – What are the hours of operation? 10 AM - 6pm (SUMMER) 10AM - 4pm (WINTER)

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☑ Yes ☐ No

   If Yes – What are they? THE AREA IS FENCED AND GATED

4. Who owns the land that the community landfill is located on?

   ☑ Commissioner ☐ Private ☐ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)? 50

   Is there an estimated closure date? No

   Is there a Closure Plan? No

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ☑ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

☑ Residential Mixed Solid Waste
☑ Household Hazardous Waste
☑ Commercial & Institutional Mixed Solid Waste
☑ Industrial Hazardous Waste
☑ Commercial and Institutional Hazardous Waste
☑ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ☑ No

If Yes – What are they? _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill? No

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply) No

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☑ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☑ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 2500 / YEAR

4. What training has the community landfill operator completed?

☑ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☑ Other SWANA Operators courses: _____

☐ Water and Waste Management (School of Community Government, NWT

☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☐ Yes ☑ No

If Yes – Please list them: 1. _____

2. _____

3. _____

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ☑ Yes ☐ No

If Yes – What is segregated? CONSTRUCTION, HOUSEHOLD, METALS,

How well does the public adhere to dropping off in the specific areas? ☑ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ☑ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☑ Yes ☐ No

If Yes – Please describe the differences: HOURS OF OPERATION, AMOUNT OF COVER MATERIAL APPLIED, OPERATION OF BURN PIT

8. What is the frequency of waste cover placement (soil or other)?

☐ No regular cover placement ☑ Daily cover placement (SUMMER) ☐ Sporadic
☐ Final cover only (future) ☑ No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☑ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ☑ Yes ☐ No

If Yes – Frequency: 2-3 times/year Materials Used: CAT (DOZER)

11. Is leachate contained and/or collected? ☐ Yes ☑ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☑ Yes ☐ No ☐ Not in winter

If Yes – Frequency: ACCORDING TO WATER LICENSE Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ☑ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☑ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ☑ Fence and Gate ☐ Signage

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☑ Yes ☐ No

If No – How is access by wildlife limited?

☐ Bear Fence ☐ Storage ☑ Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ☑ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☑ Yes ☐ No

If Yes – Please describe: IMPROVEMENT, DEVELOPMENT OF OPS PLAN, CLOSURE PLAN

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☑None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☑At Homes/Businesses ☐Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☑Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☑Yes ☐ No

If Yes – Where is it taking place?

☐In town ☑On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☑ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☐ Public Works Staff (Community/Municipality) ☐ Contractor ☑ Other ENR

2. Is there a hazardous waste management plan? ☑ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☑ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☑ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☑On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? UNKNOWN

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ☑Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? UNKNOWN

4. Where is the sewage sludge from the lagoon disposed of once it is removed? LANDFILL

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ☑ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ☑ No

2. Is there a Composting Program in the community? ☐ Yes ☑ No

Notes:

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☑ White goods with coolants	☑ White goods without coolants	☑ Tires
☐ Used Oil Products	☑ Paints and Paint Products	☑ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	☑ End of Life Vehicles	☐ Pesticides etc.
☐ Antifreeze	☑ Untreated Wood Waste	☑ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☑ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ☑ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: _____

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $ 447,000/y

2. Do you have a community budget for waste management that you could share with us?

☑ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☑ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? $ 433,000/y

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Fort Smith

Water License Information

1. Is the community landfill currently in compliance with its water license? ☑ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ☑ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Gameti Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? Closing of the gate.

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? 2016

   Is there a Closure Plan? Yes

Notes:
SAO said he can email us the closure plan, it was done by Dillon.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)
- ☐ Household Hazardous Waste
- ☐ Industrial Hazardous Waste

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? Hazardous waste

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: None	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

- ■ Air related environmental risk (dust or wind-blown litter)
- ■ Water related environmental risk (surface water or groundwater quality impacts)
- ■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Risks are windblown litter blowing into the water and water runoff from the landfill is a concern with contaminating soil off the landfill site.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☒ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ☒ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 16hrs per week

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

☒ Water and Waste Management (School of Community Government, NWT

☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☒ Yes ☐ No

If Yes – Please list them: 1. waste management bylaw 013-14

2. _____

3. _____

Notes:

SAO said he would email the bylaw.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? wood, lumber, hazardous material

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
■Final cover only (future) ☐No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☒ Soil ☐ Rock ☒ Other: sand

10. Is there any compaction of the waste materials? ☒ Yes ☐ No

If Yes – Frequency: one per year Materials Used: sand and gravel

11. Is leachate contained and/or collected? ☐ Yes ☐ No ☒ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ☐ No ☒ Not in winter

If Yes – Frequency: each summer Type: ground water

13. Is there a Design and Operations Plan for the community landfill site? ☒ Yes ☐ No

If Yes – Is the community in compliance? ☒ Yes ☐ No

14. Is access to the community landfill controlled? ☒ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ☒ Fence and Gate ☒ Signage

Notes:
SAO said he will email the Design and Operations plan.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

■ Bear Fence ☐ Storage ☐ Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: closure of the old landfill and opening of a new landfill.

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ☐Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☒ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☒ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☒ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☒ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☒Landfill ☒In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:

2. currently are proposing a hazardous waste management plan
3. they store oil, batteries, chemicals in stockpiles at the landfill.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ■On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? 2015-2016

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:
4. on a lumber pad

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ■ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ■ Yes ☐ No

Notes:

Beverage containers are recycled
A new composting program is to be approved by council that will compost white paper and cardboard.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
■ Mercury Containing Lamps	■ Mercury Containing Equipment	■ Pharmaceuticals
■ Needles/Sharps	■ End of Life Vehicles	■ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

■ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials
☐ Other: _____		

Notes:

The landfill areas has signage to separate the checked items, these are stockpiled and removed seasonally.

SAO said that he will email the report.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? municipal annual report

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $13,305.71

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

■ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? none

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Gameti

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Hay River Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? Hay River Reserve

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? 10am-6pm daily

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? Perimeter fencing

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? 2026

   Is there a Closure Plan? Abandonment and reclamation plan is under development

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? 2000

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ☐ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? Industrial Hazardous Waste

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

■ Camps ■ Mines

If Yes – What types of waste and related quantities were requested?

Type: Tires	Quantity: 2 seacans	Authorized? ☐ Yes ■ No
Type: Construction Waste	Quantity: 100 m^3	Authorized? ■ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)

■ Water related environmental risk (surface water or groundwater quality impacts)

■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☐ Community Government / Municipal Staff ■ Private Contractor

2. What is the level of employment for the community landfill operator?

■ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? Mostly Seasonal

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
☐ Other SWANA Operators courses: _____
☐ Water and Waste Management (School of Community Government, NWT
☐ None ■ Other: WHIMIS and First Aid

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

■ Yes ☐ No

If Yes – Please list them: 1. Garbage Collections By-law No. 619
2. Dump Tipping Fees Bylaw No. 1516
3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? White Goods, Tires, Metal, Vehicles, Hazardous Waste, Waste Paint

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

■ Soil ☐ Rock ■ Other: Re-mediated soil

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: Weekly Materials Used: _____

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ■ Yes ☐ No ☐ Not in winter

If Yes – Frequency: May, June, July, August, September Type: Groundwater quality monitoring

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ■ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

■ Fence ☐ Gate ☐ Fence and Gate ☐ Signage

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☐ Yes ■ No

If No – How is access by wildlife limited?

■ Bear Fence ☐ Storage ☐ Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: Tires and cardboard

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: Transfer station to more effectively manage waste

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

■ Programs ☐ Awards ☐ Funding ☐ None

If Yes – Please describe these achievements: Subsidized composting program with ENR

Community Waste Management

1. How is waste collected in the community? ■ At Homes/Businesses ☐ Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐ Weekly ■ Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐ In town ■ On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐ At historic landfill site

Notes:
Some fridges and tv's are dropped off in surrounding gravel pits

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ■ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☐ Public Works Staff (Community/Municipality) ■ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ■On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? Undetermined

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? Removed every 5 years

4. Where is the sewage sludge from the lagoon disposed of once it is removed? In the sludge pit adjacent to the lagoon

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? One in the fishing village and under Wright Crescent

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ■ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	■ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials
☐ Other: _____		

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $489,000

2. Do you have a community budget for waste management that you could share with us?

■ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

■ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? N/A

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Hay River

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☒ Yes ☐ No

   If yes – Can a digital copy be sent to Golder? ☒ Yes ☐ No

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Kakisa Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ■ Yes ☐ No

   If Yes – What communities share the site? Parks GNWT

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? weekdays 9-5

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? signage and locked gate

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ■ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? no

Notes:

Completed by the Town Foreman, Luc called to follow up and clarify on Apr. 10, but he is now gone on leave, Ruby the SAO clarified what she could.

5. There are 6 years until estimated closure and waste area

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? campground use May to September

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ■ Commercial and Institutional Hazardous Waste
- ■ Household Hazardous Waste
- ■ Industrial Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ■ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? electronics, dont have a plan for them ie. computers and ink cartridges

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ■ Highway Construction Crews

■ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: sewage	Quantity: varies	Authorized? ☐ Yes ■ No
Type: cement	Quantity: varies	Authorized? ☐ Yes ■ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: sewage was from bridge construction fort providence, cement was from Parks waste was dumped without community being informed, companies no respect for community infrastructure or GNWT buildings

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

8. Windblown litter is a risk and for soil they used to dispose of old machinery at the landfill but it was all removed over the past two years.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ☐ Part-Time ■ Occasional

3. How many hours do you spend managing the community landfill? 4 hrs per week

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

   ☐ Other SWANA Operators courses: _____

   ☐ Water and Waste Management (School of Community Government, NWT

   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ■ Yes ☐ No

   If Yes – Please list them: 1. Listed in community Plan 2006

   2. _____

   3. _____

Notes:

5. Unsure of what or where this plan is, they are unable to share it.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ■ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? sewage, pampers

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: more activity in summer from Parks and tourists

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☒ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ☒ Yes ☐ No

If Yes – Frequency: once weekly Materials Used: loader

11. Is leachate contained and/or collected? ☐ Yes ☒ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ☒ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ☒ No

If Yes – Is the community in compliance? ☐ Yes ☒ No

14. Is access to the community landfill controlled? ☒ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☒ Gate ☐ Fence and Gate ☐ Signage

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

■ Bear Fence ☐ Storage ☐ Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: ink cartridges and explosive materials, propane bottles etc.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: opening site meters over to south of existing waste site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: cleaner than most in NWT

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

■Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

■In town ■On the Land ■ Next to landfill ☐ In Ocean/River/Lake
■At historic landfill site

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

■ Municipal Solid Waste ■ Bulky Items ☐ Hazardous waste ■ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☐ Public Works Staff (Community/Municipality) ☐ Contractor ■ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ■ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:
1. none,

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? 12 years +

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? none - good drainage

4. Where is the sewage sludge from the lagoon disposed of once it is removed? none

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☒ Yes ☐ No

If Yes – Where was it / were they located? behind peoples houses, Indian affairs and GNWT policies, Check it out!

If Yes – What was its approximate size? depends on family size

If Yes – When was/were the landfill(s) operational (year – year)? none

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☒ Municipal Solid Waste ☒ Bulky Items ☒ Hazardous Waste

☒ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ☒ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:

1. There was an AANDC program that cleaned all of these areas up in the past.

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☐White goods with coolants	☐White goods without coolants	■Tires
■Used Oil Products	■Paints and Paint Products	■ Batteries
☐Mercury Containing Lamps	☐Mercury Containing Equipment	■ Pharmaceuticals
■Needles/Sharps	☐End of Life Vehicles	■ Pesticides etc.
■Antifreeze	■Untreated Wood Waste	■Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports ☐ Standards ☐ Guidelines
☐ Communication Documents ☐ Educational Materials
☐ Other: _____

Notes:

3. These items are separated and stored at the landfill, contractors come once in a while and removed waste metal and steel

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? not kept track of

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

■ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? none

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Kakisa

Water License Information

1. Does the community landfill have a current valid water license? ■ Yes ☐ No

   If yes – What is the expiry date? don't know

   If yes – Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Nahanni Butte Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? 9am to 5pm

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ■ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? no

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? 300

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Commercial and Institutional Hazardous Waste
- ☐ Household Hazardous Waste
- ☐ Industrial Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

■ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: food waste and the like	Quantity:	Authorized? ■ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

☐ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

wind blown litter, new fencing around it but effictive at site. just had rebuilt completed the work, professionally done, engineered design. bermed and lined with fence and gate.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ■ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 10 hours a week

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____
   2. _____
   3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ☐ Yes ■ No

If Yes – What is segregated? _____

How well does the public adhere to dropping off in the specific areas? ☐ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☐Other: no cover used.

10. Is there any compaction of the waste materials? ☐ Yes ■ No

If Yes – Frequency: _____ Materials Used: _____

11. Is leachate contained and/or collected? ■ Yes ☐ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ☐Signage

Notes:
gate and fence open to anyone.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☐ Yes ■ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

_____

_____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☐ Yes ■ No

If Yes – Please describe: _____

_____

_____

_____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:
had an annual spring cleaning organized last year and again this year for picking up unauthorized waste if any and general community cleanup. was well received.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☐ Public Works Staff (Community/Municipality) ■ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☐Landfill ☐In town ■Outside of town ☐On the land
☐At historic landfill site

Notes:
hazardous waste stored in seacan. paint cans from post flood renovations.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? 10years

2. How often is the sludge removed from the sewage sludge lagoon?

☒Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? unknown

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

Notes:

New lagoon, very happy with engineered design. professionally done. kledo construction out of fort nelsonhighly recommended, and engineered by kledo. Completed early March 2014.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ☒ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☒ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☐White goods with coolants	☐White goods without coolants	■Tires
■Used Oil Products	☐Paints and Paint Products	■ Batteries
☐Mercury Containing Lamps	☐Mercury Containing Equipment	■ Pharmaceuticals
☐Needles/Sharps	■End of Life Vehicles	☐ Pesticides etc.
☐Antifreeze	☐Untreated Wood Waste	☐Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: _____

Notes:

old appliances and tires segregated at landfill. End of life vehicles.. only 3-4.. most are kept on peoples lots to use for parts.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? _____

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ☒ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

☒ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? none

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Nahanni Butte

Water License Information

1. Does the community landfill have a current valid water license? ☐ Yes ■ No

   If yes – What is the expiry date? _____

   If yes – Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

Do not have a current closure and reclamation plan (reference to an old one)... working on a strategic plan for the hamlet and while doing that, redoing the operation plan reviewing.

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Paulatuk Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? mon and fri only 9-5

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? not in winter, gates in summer

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? no

   Is there a Closure Plan? no

Notes:

5. estimated 10 years

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ■ Commercial and Institutional Hazardous Waste
- ■ Household Hazardous Waste
- ☐ Industrial Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: none	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

oil and acid battery contaminated soil, power corp may have put transformers in the past (approx. 10 to 20 years ago).

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ■ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 16-20 hours weekly

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____
   2. _____
   3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? batteries, oil, vehicles, appliances, scrap metal, wood

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic

☐Final cover only (future) ☐No cover in winter

Notes:

8. every ten days try to cover

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☒ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ☒ Yes ☐ No

If Yes – Frequency: every 20 days (every second time they cover it) Materials Used: cat dozer D6

11. Is leachate contained and/or collected? ☐ Yes ☒ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☒ Yes ☐ No ☐ Not in winter

If Yes – Frequency: one yearly Type: ENR and DFO test sewage lagoon, area surrounding and landfill surface water in area

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ☒ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☒ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ☒ Fence and Gate ☒ Signage

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: would like to get better control (more segregation, shipping large and hazardous waste out) but no resources to do it

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: in very far future, no resources or plans on paper right now

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☒ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☒At Homes/Businesses ☒Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☒Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ☒ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ■ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

3. did have some oil and batteries stored at garages that they are moving to the landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? none

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ■ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

1. beverage containers only

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	■ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports ☐ Standards ☐ Guidelines
☐ Communication Documents ☐ Educational Materials
☐ Other: _____

Notes:

3. all checked items are stock piled at landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? ~60,000

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ☒ No

3. Who provides the funding for the management of the community landfill?

☒ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? yes, government and residential fees, ~30,000 annually.

Notes:

3. through general operations fund, which comes from MACA

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Paulatuk

Water License Information

1. Is the community landfill currently in compliance with its water license? ■ Yes ☐ No

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Sachs Harbour Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? _____

Notes:

Not sure who owns land.

Possibly up to 30yrs left, SAO has heard the number bounced around but not sure of source, no closure plan in place. no estimated closure date.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ■ Commercial and Institutional Hazardous Waste
- ■ Household Hazardous Waste
- ☐ Industrial Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:
Open to anyone as no fence or gate, no industry in sachs...

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

☐ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

No requests from industry as no industry.

Dust and windblown litter. No water related risks seen by SAO, no contaminated soils accepted or stored at site. No official concern of contaminated soil beneath landfill. All contaminated oils are stored near airport. ENR manages the used oil area. Sends someone up once annually?

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? _____

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____
   2. _____
   3. _____

Notes:

2 staff members, twice a week for garbage collection. Hamlet heavy equipment operator uses dozer to compact and cover.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ☐ Yes ■ No

If Yes – What is segregated? _____

How well does the public adhere to dropping off in the specific areas? ☐ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ☐ Yes ■ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: more activity during summer, easier to get to it, winter road less people drive Employees delay more in the winter, so less activity. Had students out last summer trying to clean up area. Students segreated waste (tried little success). Burning of conbustible waste.

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ■No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☐Other: local soil/ sand and gravel.

10. Is there any compaction of the waste materials? ☐ Yes ☐ No

If Yes – Frequency: sporadic. Materials Used: dozer at landfill.

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ☐Signage

Notes:
Not an area of water collection, fairly dry area, not of known issue.

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: Concerns with respect to wildlife, polar bears access the site and having staff out there when bears are present and wolves especially students out there.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☐ Yes ■ No

If Yes – Please describe: Open to improvements in terms of segration and bringing landfill in compliances,

Notes:

Concerned that the landfill is not being addressed and looking into costs to segrate wastes, staffing requirements, closure plan not being in place. Need assistance and guidance on these issues and how it should be managed, closure plans, back haul of white goods?

Would benefit from a defined action plan for landfills in terms of what is required and how about implementing these requirements.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☒ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☒At Homes/Businesses ☒Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☒Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ☒ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☐ Public Works Staff (Community/Municipality) ☐ Contractor ■ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:
no segregation or handling of haz waste, just placed in landfill only domestic sources.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? no

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? west edge of town.

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ■ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☐White goods with coolants	☐White goods without coolants	☐Tires
■Used Oil Products	☐Paints and Paint Products	☐ Batteries
☐Mercury Containing Lamps	☐Mercury Containing Equipment	☐ Pharmaceuticals
☐Needles/Sharps	■End of Life Vehicles	☐ Pesticides etc.
■Antifreeze	■Untreated Wood Waste	■Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials
☐ Other: _____		

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

_____

_____

_____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? _____

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

☐Single Community Government ☐Shared Community Governments

■GNWT ☐Other Government

4. How much money is collected yearly through user fees? _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Sachs Harbour

Water License Information

1. Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

unsure of water license.

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Trout Lake Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ■ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? Another year or so

Notes:
Currently working on a management plan with enr

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ■ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:

Contractors are encouraged to remove any waste that they generate in the community, just hazardous or chemicals

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ☐ Part-Time ■ Occasional

3. How many hours do you spend managing the community landfill? 4 hours monthly

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ☐ Water and Waste Management (School of Community Government, NWT
   ■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____
   2. _____
   3. _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? batteries, paint cans, refrigerators, metal, appliances

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ☐ Yes ■ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: winter waste collection is 2 times weekly and summer is 3

8. What is the frequency of waste cover placement (soil or other)?

■No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☐Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: monthly Materials Used: _____

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ■Fence and Gate ☐Signage

Notes:
landfill is on high ground, environmental coordinator is working on design and operations plan for the new landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: sometimes bears climb over the fence, have to upgrade fence and gate

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: in planning stages for new landfill in next year or two

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ■Awards ☐ Funding ☐ None

If Yes – Please describe these achievements: award for sending out 44 drums of waste oil award from ENR

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ☐Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■Landfill ☐In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ■On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? none in place, guess is 3 years

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ■Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? all three ponds, no idea for amount

4. Where is the sewage sludge from the lagoon disposed of once it is removed? muskeg immediately behind the 3 settling ponds

Notes:

They have 3 settling ponds, pumped out once yearly into muskeg, this year was twice for the first time but usually once per year

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? there are 2 old landfills, one is behind their works department in the community outside their baseball field fencing, the second is outside of the community near their gravel stockpile, they want to clean them up and do testing, but no budget

If Yes – What was its approximate size? smaller than what they have guess 16 x 16 feet

If Yes – When was/were the landfill(s) operational (year – year)? baseball closed 1982, gravel 1986 (guesses)

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

■ Municipal Solid Waste ☐ Bulky Items ■ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ■ Yes ☐ No

Notes:

Recycle beverage containers. Have a goal to get a blue bin program. They started a compost program last year for their community garden.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	☐ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

■ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials
☐ Other: _____		

Notes:

Checked items above are separated at the landfill by community staff and community members are expected to separated their own items. Wood (both) is stockpiled at a different location, as are end of life vehicles.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above?
Hazardous Waste Management Report Plan, by ENR, will email a copy if she can find it.

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $24,000 annually

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

☒ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? none

Notes:
Transfer funding from Municipal Affairs, GNWT

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Trout Lake

Water License Information

1. Does the community landfill have a current valid water license? ☐ Yes ■ No

   If yes – What is the expiry date? _____

   If yes – Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

Currently working on a water license for the current landfill, sewage lagoon and water plant together

CANADA'S BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Tsiigehtchic Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? no

Notes:

5.approximately 10 years

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:

6. use increases when theres construction in town, ie housing association

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: Construction waste has been dumped at the landfill but was not authorized.

8. Are there any known environmental risks with the community landfill? (check all that apply)

☒ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

☐ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

8. windblown litter in the summer, in may they try to retain it as much as possible.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☒ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☒ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? a group of part-time people work in the summer, will get back to us with the hours

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

☒ Water and Waste Management (School of Community Government, NWT

☐ None ☒ Other: some training from MACA from time to time, unknown

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☒ Yes ☐ No

If Yes – Please list them: 1. solid waste disposal rates

2. _____

3. _____

Notes:

5. cannot share any details of it

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? oil, batteries, wood waste, old vehicles, metal, fuel tanks, appliances, tires

How well does the public adhere to dropping off in the specific areas? ■ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: more staff and more active in the summer,

8. What is the frequency of waste cover placement (soil or other)?

■ No regular cover placement ☐ Daily cover placement ☐ Sporadic
☐ Final cover only (future) ☐ No cover in winter

Notes:

6. sometimes well sometimes not well.
8. they do cover it time to time but unknown as for frequency, will get back to us

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ■Other: gravel, once in last 3 years

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: as needed basis, more frequent in summer Materials Used: grader, loader, d6 cat

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ■ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ■Signage

Notes:
13. not currently, they are working on one for the future

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: would like to enclose it with a fence and gate with access restricted.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☐ Yes ■ No

If Yes – Please describe: _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

■In town ■On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

1. in the spring/summer they do a cleanup day where the entire community gets into groups and picks up waste, they use equipment to move large items from homes and business.
2. within the landfill, unauthorized material and not segregating, mostly contractors and territorial government work as well

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☒ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☒ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☒ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ☒ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☒ No

3. Where is the hazardous waste stockpiled?

☒ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

2. they are working on a plan, inventory was done
3. power corp stores hazardous waste on their propoerty before its being sent out

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐ In a Shed ■ On a Pad ■ Bermed to Prevent Spills ☐ Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? unknown

2. How often is the sludge removed from the sewage sludge lagoon?

■ Never ☐ Once/Year ☐ Twice/Year ☐ Every 4 months
☐ Every 3 months ☐ Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? beside lot 41 and lot 2
unknown what kinds of waste it contains

If Yes – What was its approximate size? unknown

If Yes – When was/were the landfill(s) operational (year – year)? 1930-1940s

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:
beverage containers

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	■ Mercury Containing Equipment	☐ Pharmaceuticals
■ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ■ No

If Yes – What types of reports / documents?

☐ Reports ☐ Standards ☐ Guidelines
☐ Communication Documents ☐ Educational Materials
☐ Other: _____

Notes:

items above are stockpiled at the landfill, they likely have mercury from thermometers/thermostats in the landfill.
needles and sharps sent to Inuvik by the health centre.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? no idea, it is not seperated

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

■ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? no specific amount

Notes:

theres is an 'environment' budget which includes waste management
3. MACA, general operations
4. collect from contractors / agencies during construction and housing projects, they also collect $15 per month for garbage disposal.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Tsiigehtchic

Water License Information

1. Is the community landfill currently in compliance with its water license? ■ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Tuktoyaktuk Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ■ Commissioner ☐ Private ☐ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? 2015

   Is there a Closure Plan? none in place yet

Notes:

Terry arrived and began as SAO in Tuk on Feb 25 2014 but was a resident there previously
4. best guess, may be wrong
5. Closure plan is part of the landfill being considered as GNWT contaminated site.

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? Double population in summer

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Commercial and Institutional Hazardous Waste
- ☐ Household Hazardous Waste
- ☐ Industrial Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ■ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? hazardous waste, dangerous goods

Notes:

8. Recently do not accept hazardous waste if they are aware of it, but cannot control it

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

■ Oil ■ Gas ☐ Exploration ■ Highway Construction Crews
■ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: O&G - as with camps, s Quantity: large, exceeded mu Authorized? ■ Yes ☐ No

Type: Camps - foods, consum Quantity: large, as above, Authorized? ■ Yes ☐ No

Type: Highways crews - as wi Quantity: large, as above Authorized? ■ Yes ☐ No

Comments: yes and no, some unauthorized dumping is occuring from government and government agencies

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)
■ Water related environmental risk (surface water or groundwater quality impacts)
■ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Possible contaminated site, may be considered by GNWT, unknown what the contamination is

Water risk is movement from landfill to ocean seasonally

Air risk is windblown litter

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ☐ Part-Time ■ Occasional

3. How many hours do you spend managing the community landfill? 100 annually

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
☐ Other SWANA Operators courses: _____
☐ Water and Waste Management (School of Community Government, NWT
■ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

■ Yes ☐ No

If Yes – Please list them: 1. _____
2. _____
3. _____

Notes:

5. there are tipping fees, cannot share the hamlet bylaws, no time, someone can go in and look at them if they want

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ■ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? construction material, steel, vehicles, appliances

How well does the public adhere to dropping off in the specific areas? ■ Well ■ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: Higher volume dumped at landfill in summer

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

no batteries or oil accepted, tires are either separated or stored at a different location, batteries are stored at a municipal yard, oil and gas storage off site at municipal yard for residential use, industry removes their waste.
public dumps in specific areas relatively well,
waste covered in fall and spring, twice per year

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ■Other: Clay

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: as required Materials Used: garbage trucks compact, Komatsu K65

11. Is leachate contained and/or collected? ■ Yes ☐ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☐ Yes ☐ No ☐ Not in winter

If Yes – Frequency: unknown Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ■ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ■Signage

Notes:

11. Containment berm
13. no OM Plan
14. some signage and partially fenced

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: as contaminated site, unauthorized dumping, GNWT departments and contractors unauthorized dumping

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: Future plan for new landfill in 2015

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

daily collection
2. at the landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☒ Municipal Solid Waste ☐ Bulky Items ☒ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☒ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ☐ No ☒ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

☐Landfill ☒In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:
no fuel tanks or hazardous waste is allowed but is often left there
3. at designated area in town yards

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☒Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? unknown

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ☒Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? unknown

4. Where is the sewage sludge from the lagoon disposed of once it is removed? annual decant operation

Notes:

4. container inside of berm for oil products and antifreeze, batteries stored on pallets

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? believed to be approximately near the Northern Transportation Company site, possibly on the dew line site or in general area of dew line site

If Yes – What was its approximate size? unknown

If Yes – When was/were the landfill(s) operational (year – year)? unknown

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:
beverage containers only

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	■ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

■ Other: Through ENR, none to share

Notes:

3. oil and batteries, antifreeze at town yard, paint at the landfill, health center ships out pharmaceuticals and sharps, they can't control pharmaceuticals at the landfill residential waste. The other items are stored separately at the landfill. Tires are store separately at the landfill or the yard, unsure.
4. would be glad to participate in diversion programs, particularly for vehicles

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? unknown, possibly Oil spill reports

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? unknown, folded into a lot of other municipal programs

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☒ Single Community Government ☐ Shared Community Governments

☒ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? unknown, see comment

Notes:

2. there is a budget but unable to share at this time, someone could go to Tuk to see it but no time to search and email it.
3. just block funding from GNWT
4. User fees are under review, they collect some but nothing significant. They are planning substantial increases for government and industrial users, and some user fees for residents.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Tuktoyaktuk

Water License Information

1. Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

The municipality thinks GNWT should police their agencies and contractors on their waste disposal habits. Particularly housing, and public works.

BEST MANAGED COMPANIES
Platinum member

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Tulita Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ■ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? _____

Notes:

5. No idea, are trying to have an engineering study completed, no closure date or plan. Have been attempting to contact GNWT for answers or funding for the study.

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? some hazardous waste products

Notes:
will accept batteries and oil, they cannot police the landfill and often have no control over what is being left there

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America
Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: Other see below

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

9. power company has asked to use the landfill, they said no, no other company has asked

8. No, but there is a contaminated soil facility owned by the Fed govt nearby

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☒ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ☐ Part-Time ☒ Occasional

3. How many hours do you spend managing the community landfill? as needed, no specific hours

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

☐ Water and Waste Management (School of Community Government, NWT

☒ None ☒ Other: GNWT said someone is coming to do a training course

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☒ Yes ☐ No

If Yes – Please list them: 1. Cannot list them but will try to find them and email.

2. _____

3. _____

Notes:

5. will check and send us a copy of bylaws if possible

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ■ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? batteries, oil, appliances, vehicles, tires, oil tanks, wood, metal

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ☐ Yes ■ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: summer the waste is compacted and covered, not done in winter

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ■No cover in winter

Notes:
when pit is full it is compacted and covered

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☒ Soil ☐ Rock ☒ Other: sand and soil are used, landfill is in a sandy area

10. Is there any compaction of the waste materials? ☒ Yes ☐ No

If Yes – Frequency: when full Materials Used: D6 cat, loader, end-dump for hauling cover material

11. Is leachate contained and/or collected? ☐ Yes ☒ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☒ Yes ☐ No ☐ Not in winter

If Yes – Frequency: no idea how often Type: very dry and sandy area

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ☒ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ☒ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ☐ Fence and Gate ☒ Signage

Notes:

14. they only have signage to indicate where certain items are to be dumped / segregated

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☒ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☒ Yes ☐ No

If Yes – Describe these concerns: need money for shipping batteries and oil and other hazardous substances south

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☐ Yes ☒ No

If Yes – Please describe: Once they complete an engineering study they will know if they need to relocate and where to relocate to

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

1. twice weekly in summer, once weekly in winter

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■Landfill ☐In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:

3. Batteries, oil, appliances with refrigerants, fuel tanks are are stockpiled in segregated areas at the landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? didn't know

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? n/a

4. Where is the sewage sludge from the lagoon disposed of once it is removed? n/a

Notes:

4. trying to build a pad with a liner to store hazardous materials on

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☒ Yes ☐ No

If Yes – Where was it / were they located? old, was covered, close to present dump, could not give a specific location

If Yes – What was its approximate size? no idea

If Yes – When was/were the landfill(s) operational (year – year)? no idea

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☒ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☒ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ☒ No

Notes:

1. beverage containers

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	☐ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	■ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

■ Other: Engineering study and waste inventory.

Notes:

3. all checked items are stockpile separately at the dump, health care center ships out needles and sharps, they do not handle the other items

1. Will try to find the documents to share with us, GNWT MACA should have a copy, we have a copy, it is titled 'Sahtu Inventory Project' by Ecology North on the Extranet

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? approx $50,000

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☒ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? None

Notes:

2. Will attempt to find a copy of the budget and email it to us.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Tulita

Water License Information

1. Is the community landfill currently in compliance with its water license? ☒ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ☒ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

MACA has indicated that they want to create an O and M Plan for Tulita.

BEST MANAGED COMPANIES
Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Ulukhaktok Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☑ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ☑ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ☐ Yes ☑ No

   If Yes – What are they? _____

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☑ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? Estimated lifespan 10 years

   Is there a Closure Plan? No

Notes:

Just had a Study completed on the Closure / post Closure costs and estimated lifespan. The municipal corporation will develop a plan in the future to deal with Closure.

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ☑ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ☑ Residential Mixed Solid Waste
- ☑ Commercial & Institutional Mixed Solid Waste
- ☐ Commercial and Institutional Hazardous Waste
- ☐ Household Hazardous Waste
- ☐ Industrial Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☑ Yes ☐ No

If Yes – What are they? All Hazardous Waste

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill? ND.

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

☐ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

☑ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

☐ Full-Time ☐ Part-Time ☑ Occasional

3. How many hours do you spend managing the community landfill? 100 / Year

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

☐ Water and Waste Management (School of Community Government, NWT

☑ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☑ Yes ☐ No

If Yes – Please list them: 1. Garbage Rate Bylaw

2. _____

3. _____

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☑ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ☐ Yes ☑ No

If Yes – What is segregated? _____

How well does the public adhere to dropping off in the specific areas? ☐ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ☑ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ☑ No

If Yes – Please describe the differences: _____

_____

_____

_____

8. What is the frequency of waste cover placement (soil or other)?

☐ No regular cover placement ☐ Daily cover placement ☑ Sporadic
☐ Final cover only (future) ☐ No cover in winter

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☑Rock ☐Other: _____

10. Is there any compaction of the waste materials? ☑ Yes ☐ No

If Yes – Frequency: Monthly Materials Used: _____

11. Is leachate contained and/or collected? ☐ Yes ☑ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ☑ Yes ☐ No ☑ Not in winter

If Yes – Frequency: During Summer Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ☑ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ☐ Yes ☑ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ☐Fence and Gate ☐Signage

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☑ Yes ☐ No

If No – How is access by wildlife limited?

☐ Bear Fence ☐ Storage ☐ Bear fence and storage

16. Are there any special concerns with the community landfill? ☑ Yes ☐ No

If Yes – Describe these concerns: Wind blown waste, drainage, and wildlife.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

☑ Yes ☐ No

If Yes – Please describe: To improve drainage in the area.

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ☑None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ☑At Homes/Businesses ☐Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ☑Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ☑ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☑ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☑ No

3. Where is the hazardous waste stockpiled?

☑ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

BEST MANAGED COMPANIES Platinum member

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ☑Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? Unknown

2. How often is the sludge removed from the sewage sludge lagoon?

☑Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? 0

4. Where is the sewage sludge from the lagoon disposed of once it is removed? 0

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☑ Yes ☐ No

If Yes – Where was it / were they located? Close to Jacks Bay.

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☑ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ☑ No

2. Is there a Composting Program in the community? ☐ Yes ☑ No

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☐White goods with coolants	☐White goods without coolants	☐Tires
☐Used Oil Products	☐Paints and Paint Products	☐ Batteries
☐Mercury Containing Lamps	☐Mercury Containing Equipment	☐ Pharmaceuticals
☐Needles/Sharps	☐End of Life Vehicles	☐ Pesticides etc.
☐Antifreeze	☐Untreated Wood Waste	☐Treated Wood Waste

ALL @ Landfill.

4. If no any of the above questions, would the community participate in waste diversion programs?

☑Yes ☐ No Possibly depending on Cost & Manpower required. Also depending on logistics.

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ☐ Yes ☑No

If Yes – What types of reports / documents?

☐ Reports ☐ Standards ☐ Guidelines
☐ Communication Documents ☐ Educational Materials
☐ Other: _____

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $69,307

2. Do you have a community budget for waste management that you could share with us?

☑ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☑ Single Community Government ☐ Shared Community Governments

☐ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? $44,700

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Ulukhaktok

Water License Information

1. Is the community landfill currently in compliance with its water license? ☑ Yes ☐ No

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ☑ No

   If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Wekweeti Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ☐ No

   If Yes – What communities share the site? _____

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? 8am-5pm Monday to Friday

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? A bin is set outside the gates for people to drop off their garbage when landfill is closed.

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ■ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? no

   Is there a Closure Plan? no

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? 30-50

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ☐ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ☐ Yes ■ No

If Yes – What are they? _____

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

☐ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Fenced in keeps wind blown litter in, no water.

2008 accepted contaminated soil but not sure if liner is there, but segrated

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

■ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? 8

4. What training has the community landfill operator completed?

☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
☐ Other SWANA Operators courses: _____
■ Water and Waste Management (School of Community Government, NWT
☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

☐ Yes ■ No

If Yes – Please list them: 1. _____
2. _____
3. _____

Notes:

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ☐ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? hazardous against non-hazardous

How well does the public adhere to dropping off in the specific areas? ■ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ☐ Yes ■ No

If Yes – Please describe the differences: _____

8. What is the frequency of waste cover placement (soil or other)?

■No regular cover placement ☐Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:
even cover in the winter

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

■ Soil ☐ Rock ☐ Other: _____

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: every couple months Materials Used: loader and excavator

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ■ Yes ☐ No ☐ Not in winter

If Yes – Frequency: every month in the summer Type: surface water

13. Is there a Design and Operations Plan for the community landfill site? ☐ Yes ■ No

If Yes – Is the community in compliance? ☐ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐ Fence ☐ Gate ■ Fence and Gate ☐ Signage

Notes:

3 times a week garbage schedule, close gates at 5pm daily, but have garbage container at gate if dumping after hours.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ☐ Yes ■ No

If No – How is access by wildlife limited?

■ Bear Fence ☐ Storage ☐ Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: _____

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: On going classification and segregation of hazardous waste and final installation of fencing around the solid waste site.

Notes:

bear fence works, 8ft tall fence keeps critters out including wolves.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

☐Weekly ■Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ☐ Yes ■ No

If Yes – Where is it taking place?

☐In town ☐On the Land ☐ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ☐ Contractor ☐ Other

2. Is there a hazardous waste management plan? ☐ Yes ■ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ☐ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■ Landfill ☐ In town ☐ Outside of town ☐ On the land
☐ At historic landfill site

Notes:

hazardous waste is placed on pallets such as batteries, only 150 people so fairly easy to inform population and have them adhere to the plan. Backhaul ... KBL does this annually on the resupply backhaul. Used oil is burnt in town at no cost by locals.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☒In a Shed ☐On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? N/A

2. How often is the sludge removed from the sewage sludge lagoon?

☒Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

seacans used for hazardous waste.

natural lagoon, no management.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ☐ Yes ■ No

If Yes – Where was it / were they located? _____

_____

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:

Recycling program managed (popcan) nothing done for paper. Popcans are collected and backhauled annually to yellowknife, contractor hired by gnwt to collect and backhaul.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

☐White goods with coolants	☐White goods without coolants	■Tires
■Used Oil Products	■Paints and Paint Products	■ Batteries
☐Mercury Containing Lamps	☐Mercury Containing Equipment	☐ Pharmaceuticals
☐Needles/Sharps	■End of Life Vehicles	☐ Pesticides etc.
☐Antifreeze	☐Untreated Wood Waste	☐Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		■ Educational Materials
☐ Other: _____		

Notes:

Vehicles are segregated, no plans to backhaul. Tires are being recycled and used as part of beautification of the community, they have been painted and used at local beaches turned them into playgrounds and seating areas... built a pyramid.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? ENR Hazardous Waste Flyers

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? $30-50,000.00

2. Do you have a community budget for waste management that you could share with us?

☒ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

☒ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? n/a

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Wekweeti

Community Landfill Management

1. Does the community landfill have an Operations and Maintenance Plan? ☐ Yes ■ No

If yes – Can a digital copy be sent to Golder? ☐ Yes ☐ No

no formal plan, is in the works to develop a plans.

BEST MANAGED COMPANIES
Platinum member

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Yellowknife Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ■ Yes ☐ No

   If Yes – What communities share the site? Ndilo and Dettah

2. Are there set hours of operation? ■ Yes ☐ No

   If Yes – What are the hours of operation? city of yellowknife website details summer/winter hours

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? The landfill is gated

4. Who owns the land that the community landfill is located on?

   ☐ Commissioner ☐ Private ☐ Community/Municipal ■ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? _____

   Is there a Closure Plan? Yes.

Notes:

Only accept waste from other communities under special circumstances.

Leased federal land.

Current design 50 years,

Existing closure plan started in 2007, ongoing to keep it updated.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ■ Yes ☐ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ■ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ■ Commercial and Institutional Hazardous Waste
- ■ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? _____

Notes:

Summer is busier due to yard work and construction.

Stats are available by request; plenty of stats available.

Industrial hazardous waste; contaminated soil and water, lead acid and asbestos is accepted, rest of industrial waste diverted to KBL Environmental in town.

Industrial paints/aerosols/ ICI hazardous wastes not accepted.

Mining tires not accepted.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

■ Oil ■ Gas ■ Exploration ■ Highway Construction Crews

■ Camps ■ Mines

If Yes – What types of waste and related quantities were requested?

Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

☐Air related environmental risk (dust or wind-blown litter)

☐Water related environmental risk (surface water or groundwater quality impacts)

☐Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Currently have 4-5 authorized agreements in place; only accept external waste under emergency ; 1000kg / month max from each authorized agreement due to water license restrictions.

No environmental risks that are not managed.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

■ Full-Time ☐ Part-Time ☐ Occasional

3. How many hours do you spend managing the community landfill? full time job.

4. What training has the community landfill operator completed?

■ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)

☐ Other SWANA Operators courses: _____

☐ Water and Waste Management (School of Community Government, NWT

☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

■ Yes ☐ No

If Yes – Please list them: 1. Available on the City of Yellowknife Website.

2. _____

3. _____

Notes:

City of yellowknife manage landfill. Only thing done by contractors is contaminated water and soils. And metal recyclers are contractors.

average 8-10 city staff.

Manager is MOLO; actual operators have Landfill operations basics.

All operators whmis and tdg.

Bylaw
-4376 is the main solid waste bylaw.
-4436 is fee bylaw

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? well segregate based on 4 year study.

How well does the public adhere to dropping off in the specific areas? ■ Well ☐ Not Well

6. Is there a defined active area of the community landfill? ■ Yes ☐ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: see below.

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ■Daily cover placement ☐Sporadic
☐Final cover only (future) ☐No cover in winter

Notes:

Winter operations; materials include woodchip and construction waste as intermediate cover.

Summer use clean fill as intermediate cover.

Daily cover in summer. winter is more sporadic due to less volume.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ☐Rock ☐Other: see previous page, no rock.

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: _____ Materials Used: _____

11. Is leachate contained and/or collected? ■ Yes ☐ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ■ Yes ☐ No ☐ Not in winter

If Yes – Frequency: _____ Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ■ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐Fence ☐Gate ■Fence and Gate ☐Signage

Notes:

Bailing facility for residential waste; daily.

Construction waste is compacted by a D6 daily.

Leachate is collected and contained in a lined landfill sump. Winter it is managed as it does not freeze solid. Have not had to pump out if yet. Been in operation for 3 years. Leachate sampled twice a summer.

Groundwater twice a summer. 13 sample wells.

BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ■ Yes ☐ No

If Yes – Describe these concerns: bird culling program. bear fence under construction. future plans for additional fencing.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: Additional landfill class 2 landfill cells. constructing a centralized composting facilty. final closure of the existing landfill.

Notes:

No active bear fences. birds, foxes and wolves. No bears in the past 2 years.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ■Awards ☐ Funding ☐ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

■Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

■In town ■On the Land ■ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Won award for composting pilot project. FCM award possibly?

Receive 25k joint grant with hay river and fort smith for recycling tires. Shredder is in Yellowknife.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ■ Bulky Items ☐ Hazardous waste ☐ Variable
■ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

■ Public Works Staff (Community/Municipality) ■ Contractor ☐ Other

2. Is there a hazardous waste management plan? ■ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ■ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■Landfill ☐In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:
Mostly bulky items and vehicles. Likely due to high fees.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☒In a Shed ☒On a Pad ☐Bermed to Prevent Spills ☐Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? _____

2. How often is the sludge removed from the sewage sludge lagoon?

☐Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

1- no worry of closure date due to size of lagoon. uncertain of what is written
2- floating islands are removed from lagoon, nothing that has settled is removed. decant once per year.

if removed it would be placed on the bank of the lagoon.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? Raquet club area/willow flats. Niven lake was a lagoon back in the day frame lake or niven lake saw dumping as well unsure of details.

If Yes – What was its approximate size? _____

If Yes – When was/were the landfill(s) operational (year – year)? _____

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

☐Municipal Solid Waste ☐Bulky Items ☐Hazardous Waste

☐Radioactive Waste ☐Mine Waste ☐Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ■ Yes ☐ No

2. Is there a Composting Program in the community? ■ Yes ☐ No

Notes:

1974 open landfill.
1990 operating as a modified landfills
93 bailing facility
94 recycling program taken over by city.
Recycling program circa
Composting circa: 2009 started

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	☐ Paints and Paint Products	■ Batteries
■ Mercury Containing Lamps	■ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	■ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

☐ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

☐ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

■ Other: 2007 waste composition study

Notes:

White goods with coolants : segrated and evacuated of an ODS
Used oil: bulked and shipped south
Mercury containing lamps: bulked and shipped south.
Needles: not received
Antifreeze: bulked and shipped
White goods without refridgerants; bailed and recycled.
Paints and Paint products: bulked and shipped shouth.
Mercury containing equipment: bulked and shipped south.
Vehicles: crushed and shipped south
Untreated wood waste: composte or intermediate cover
Treated wood: landfilled
Tires: recycled; shipped 3000 last year.
Batteries: recycled shipped south.
Pharmaceuticals: collected and shipped out.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? _____
2007 waste composition study
additional report titles to be provided.

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? _____

2. Do you have a community budget for waste management that you could share with us?

■ Yes ☐ No

3. Who provides the funding for the management of the community landfill?

☐Single Community Government ☐Shared Community Governments

☐GNWT ☐Other Government

4. How much money is collected yearly through user fees? _____

Notes:

Annual Management cost:
Total admin and processing ~2.8million
all budgets are available on the city's website.

total operating budget including revenue of 2.9million.

City of Yellowknife provides all the funding.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Yellowknives Dene FN (Dettah) Community Survey

Community Survey – General

Community Landfill Characteristics

1. Is the community landfill in your community shared by any other nearby communities? ☐ Yes ■ No

   If Yes – What communities share the site? note divert some waste to Yellowknife landfill

2. Are there set hours of operation? ☐ Yes ■ No

   If Yes – What are the hours of operation? _____

3. Are there ways to prevent people from dropping off waste at the community landfill outside the set hours of operation? ■ Yes ☐ No

   If Yes – What are they? Gate at the road.

4. Who owns the land that the community landfill is located on?

   ■ Commissioner ☐ Private ☐ Community/Municipal ☐ Federal Crown Land

5. How many years do you think are left before the community landfill is full (estimated remaining lifespan)?

   Is there an estimated closure date? No.

   Is there a Closure Plan? Yes.

Notes:

15 - 20 Years remaining. FSC completed a closure and reclamation plan and they came up with the 15-20 year number - Stephan Folkers (GNWT - Lands) to supply Golder with reports.
Closure plan required under MVLWB license.

Gate is always locked, community members request a key to gain access to landfill. Community garbage trucks are the main users of the site.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

6. Are there any seasonal fluctuations in the number of people that use the community landfill (i.e., seasonal hunting camps, annual gatherings, ice road access, tourism)? ☐ Yes ■ No

If Yes – How many people come through the community seasonally? _____

7. What types of waste are accepted at the community landfill? (check all that apply)

- ■ Residential Mixed Solid Waste
- ■ Household Hazardous Waste
- ☐ Commercial & Institutional Mixed Solid Waste
- ☐ Industrial Hazardous Waste
- ☐ Commercial and Institutional Hazardous Waste
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Within** the Community
- ☐ Industrial Mixed Solid Waste or Other Wastes from **Outside** the Community (i.e., highway, mining camps, etc.)

8. Are there any categories of waste that are not accepted at the community landfill? ■ Yes ☐ No

If Yes – What are they? Waste from outside the community.

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. Have you ever received any requests from private industry to use the community landfill?

☐ Oil ☐ Gas ☐ Exploration ☐ Highway Construction Crews

■ Camps ☐ Mines

If Yes – What types of waste and related quantities were requested?

Type: Steel waste	Quantity: Unknown	Authorized? ☐ Yes ■ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No
Type:	Quantity:	Authorized? ☐ Yes ☐ No

Comments: _____

_____

_____

8. Are there any known environmental risks with the community landfill? (check all that apply)

■ Air related environmental risk (dust or wind-blown litter)

☐ Water related environmental risk (surface water or groundwater quality impacts)

☐ Contaminated soil (metal, oil, or hydrocarbon contaminated soil)

Notes:

Run-off water is monitored twice/year under the MVLWB license.

Wind blown litter is an issue in the spring prior to cover being placed. Dust not a significant issue.

Contractor is hired at minimum twice a year to move and cover waste. In 2013 contractor was used 4 times.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Management

1. Who operates the community landfill?

   ■ Community Government / Municipal Staff ☐ Private Contractor

2. What is the level of employment for the community landfill operator?

   ☐ Full-Time ☐ Part-Time ■ Occasional

3. How many hours do you spend managing the community landfill? One hour/day.

4. What training has the community landfill operator completed?

   ☐ Solid Waste Association of North America (SWANA) Manager of Landfill Operations Certification (MOLO)
   ☐ Other SWANA Operators courses: _____
   ■ Water and Waste Management (School of Community Government, NWT
   ☐ None ☐ Other: _____

5. Are there any local by-laws related to solid waste management or operation of the community landfill?

   ☐ Yes ■ No

   If Yes – Please list them: 1. _____
   2. _____
   3. _____

Notes:

No bylaws, access is only given to community members, gate is always locked. Community members need to borrow key to access site.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – Are they actively enforced? ■ Yes ☐ No

6. Is waste segregated / separated at the community landfill? ■ Yes ☐ No

If Yes – What is segregated? Hazardous waste(s), white goods, tires, wood, tanks (fuel and propane), batteries

How well does the public adhere to dropping off in the specific areas? ☐ Well ■ Not Well

6. Is there a defined active area of the community landfill? ☐ Yes ■ No

7. Is there a difference between summer and winter operations at the community landfill? ■ Yes ☐ No

If Yes – Please describe the differences: No cover in winter.

8. What is the frequency of waste cover placement (soil or other)?

☐No regular cover placement ☐Daily cover placement ■Sporadic
☐Final cover only (future) ■No cover in winter

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

9. When cover is placed on the waste, what material is used?

☐Soil ■Rock ☐Other: gravel - material from quarry down the hwy

10. Is there any compaction of the waste materials? ■ Yes ☐ No

If Yes – Frequency: Twice/year Materials Used: Contractor

11. Is leachate contained and/or collected? ☐ Yes ■ No ☐ Not in winter

12. Is there any surface or groundwater quality monitoring? ■ Yes ☐ No ☐ Not in winter

If Yes – Frequency: Twice/year Type: _____

13. Is there a Design and Operations Plan for the community landfill site? ■ Yes ☐ No

If Yes – Is the community in compliance? ■ Yes ☐ No

14. Is access to the community landfill controlled? ■ Yes ☐ No

If Yes – How is access to the community landfill controlled?

☐Fence ■Gate ☐Fence and Gate ☐Signage

Notes:

When a contractor is working nearby the community hires them to cover and "compact" the waste. Community does not own their own equipment. Equipment used varies from dozers to loaders. Compaction is minimal.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

15. Can wildlife access waste in the community landfill? ■ Yes ☐ No

If No – How is access by wildlife limited?

☐Bear Fence ☐Storage ☐Bear fence and storage

16. Are there any special concerns with the community landfill? ☐ Yes ■ No

If Yes – Describe these concerns: Bears/wolves/foxes frequent the landfill, fenced in but not effective.

17. Are there any future plans for the community landfill (i.e., expansion, improvements, closure)?

■ Yes ☐ No

If Yes – Please describe: Construction of a waste segregation and recycling area with signs, summer of 2014. Construction has started on pads, plan to continue construction if contractors nearby summer 2014

Notes:

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

18. Are there any special achievements that the community landfill has earned?

☐Programs ☐Awards ☐ Funding ■ None

If Yes – Please describe these achievements: _____

_____

_____

Community Waste Management

1. How is waste collected in the community? ■At Homes/Businesses ■Dropped-off by individuals

If curb side pickup – How often is waste collected?

■Weekly ☐Twice weekly ☐ Bi-weekly ☐ Unscheduled

2. Is there unauthorized waste disposal occurring? ■ Yes ☐ No

If Yes – Where is it taking place?

☐In town ☐On the Land ■ Next to landfill ☐ In Ocean/River/Lake
☐At historic landfill site

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community Landfill Characteristics

If Yes – What type of materials are being discarded?

☐ Municipal Solid Waste ■ Bulky Items ☐ Hazardous waste ☐ Variable
☐ Vehicles

Household Hazardous Waste

1. Who handles the Household Hazardous Waste (HHW) for the community?

☐ Public Works Staff (Community/Municipality) ■ Contractor ☐ Other

2. Is there a hazardous waste management plan? ■ Yes ☐ No ☐ Uncertain

If Yes – Is this plan available to public works staff? ■ Yes ☐ No

3. Where is the hazardous waste stockpiled?

■Landfill ☐In town ☐Outside of town ☐On the land
☐At historic landfill site

Notes:

Hazardous wastes and white goods are taken to the city of Yellowknife landfill periodically. No formal agreement, is dependant on who at the city of Yellowknife is asked as for permission.

City of Yellowknife has amnesty week a few times a year. During this time hazardous wastes are brought to the city of Yellowknife.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Household Hazardous Waste

4. How is hazardous waste stored?

☐In a Shed ☐On a Pad ☐Bermed to Prevent Spills ■Unprotected

Sewage Sludge Management

1. What is the estimated closure date for the sewage sludge lagoon? No date set.

2. How often is the sludge removed from the sewage sludge lagoon?

■Never ☐Once/Year ☐Twice/Year ☐Every 4 months
☐Every 3 months ☐Monthly

3. How much sewage sludge is removed per year (in tonnes)? _____

4. Where is the sewage sludge from the lagoon disposed of once it is removed? _____

_____

Notes:

Sewage sludge is monitored at the Dettah sewage lagoon. No removal needed or planned in the next five years.

Going to look at it in detail when renewing license. Look at sludge build up and removal methods and if required in coming years. Require maintenance on outflow pipe and berm.

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Historic Waste Disposal Sites

1. Are there historic landfill(s) in the community? ■ Yes ☐ No

If Yes – Where was it / were they located? Along the Dettah acces road.

If Yes – What was its approximate size? Unknown

If Yes – When was/were the landfill(s) operational (year – year)? Unknown

If Yes – What types of waste are in the historic landfill(s)? (check all that apply)

■ Municipal Solid Waste ☐ Bulky Items ☐ Hazardous Waste

☐ Radioactive Waste ☐ Mine Waste ☐ Military Waste

Opportunities for Waste Diversion

1. Is there a Recycling Program in the community? ☐ Yes ■ No

2. Is there a Composting Program in the community? ☐ Yes ■ No

Notes:
Setting up a program is not the issue, finding people to staff and run the program is the issue.

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Opportunities for Waste Diversion

3. How are the following items handled in your community? (check all that apply)

■ White goods with coolants	■ White goods without coolants	■ Tires
■ Used Oil Products	■ Paints and Paint Products	■ Batteries
☐ Mercury Containing Lamps	☐ Mercury Containing Equipment	☐ Pharmaceuticals
☐ Needles/Sharps	■ End of Life Vehicles	☐ Pesticides etc.
■ Antifreeze	■ Untreated Wood Waste	■ Treated Wood Waste

4. If no any of the above questions, would the community participate in waste diversion programs?

■ Yes ☐ No

Community-Based Waste Management Reports

1. Are there any community based waste management reports / documents? ■ Yes ☐ No

If Yes – What types of reports / documents?

■ Reports	☐ Standards	☐ Guidelines
☐ Communication Documents		☐ Educational Materials

☐ Other: Annual MVLWB solid waste and sewage facility reports.

Notes:

White goods and tires are main goods being diverted to city of Yellowknife landfill

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Community-Based Waste Management Reports

2. What are the names of the community reports identified above? 1. Operation and Maintenance Plan for the YKDFN (FSC 2010)
2. Interim Closure and Reclamation Plan for the YKDFN (FSC 2010) 3. Spill Contingency Plan for the YKDFN (FSC 2009)

rec'd copy of reports - filed on extranet -kr

Community Landfill Management Costs

1. What is the annual management cost for the community landfill? Approx. $ 10,000

2. Do you have a community budget for waste management that you could share with us?

☐ Yes ■ No

3. Who provides the funding for the management of the community landfill?

☐ Single Community Government ☐ Shared Community Governments

■ GNWT ☐ Other Government

4. How much money is collected yearly through user fees? No user fees.

Notes:

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

Additional Survey Questions – Yellowknives Dene First Nation (Dettah)

Water License Information

1. Is the community landfill currently in compliance with its water license? ☐ Yes ☐ No

In compliance however no compliance report or approval letter?

CANADA'S BEST MANAGED COMPANIES Platinum member

Golder Associates Ltd.
9, 4905 – 48 Street, Yellowknife, NT X1A 3S3
Tel: +1 (867) 873-6319 Fax: +1 (867) 873-6319 www.golder.com
Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

As a global, employee-owned organisation with over 50 years of experience, Golder Associates is driven by our purpose to engineer earth's development while preserving earth's integrity. We deliver solutions that help our clients achieve their sustainable development goals by providing a wide range of independent consulting, design and construction services in our specialist areas of earth, environment and energy.

For more information, visit golder.com

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 44 1628 851851
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Ltd.
9 - 4905 - 48th Street

Yellowknife, Northwest Territories
Canada X1A 3S3

(867) 873 6319
(867) 873 6379

Golder Associates