



2023 Waste Management Facility Annual Report

City of North Battleford
Department of City Operations
1291 – 101st Street
North Battleford, SK
S9A 2Y6
March 2024

EXECUTIVE SUMMARY

This report provides an overview of the 2023 Waste Management Facility (WMF) operations for the City of North Battleford (CNB). All the procedures outlined in the Permit to Operate a Municipal Waste Disposal Ground (Permit to Operate) and the WMF Operations Plan are being followed to ensure the City is within regulatory guidelines.

A summary of the WMF operations are as follows:

- In 2023, the City of North Battleford continued to experience a decrease in volume of waste entering the main pit through increased recycling. These total volumes have shown to be steadily decreasing over the years.
 - The amount of waste disposed of in the main pit decreased from 11,914 tonnes in 2022 to 8,878 tonnes in 2023.
 - The amount of household recyclables increased from 521 tonnes in 2022 to 550 tonnes in 2023.
- The current working cell (cell 3) is expected to be full in 14 to 26 years.
 - With the construction of cell 4 the remaining life of the main pit changes to 59 to 84 years.
 - The 2023 compaction rate decreased slightly from 0.69 tonne/m³ in 2022 to 0.65 tonne/m³ in 2023.
- In 2023 there were 52 weekly inspections completed. The findings of the inspections indicated that:
 - Perimeter fencing was observed in good condition in 51 of 52 inspections.
 - Standing water was observed in the NE corner of the undeveloped/unlined section of the pit between cell 3 and 4 in the pit in six of the 52 inspections.
- In 2023 the WMF experienced 16 landfill intruder incidents afterhours between May 3rd and July 7. On July 7th newly installed motion detection cameras alerted City staff of an intruder, RCMP were called, and an arrest was made.
- The low chloride concentrations in the monitoring wells suggest that leachate has not been detected in the monitoring wells, however chloride concentrations may be related to both the historic and active landfill activities.

The City of North Battleford continues to work towards diverting more recyclable and reusable material from the main pit of in 2024.

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INTRODUCTION

The City of North Battleford (the City) Annual Waste Management Facility (WMF) Report is designed to provide information to City Council, internal management, and government agencies.

The WMF accepts and disposes of domestic municipal waste as authorized by the Permit to Operate a Municipal Waste Disposal Ground (Permit to Operate) and the WMF Operations Plan. All the procedures outlined in this permit are being followed to ensure the City is within regulatory guidelines. The City is continually taking steps to reduce, reuse, recycle and recover wastes directed to the WMF.

The City's Permit to Operate Waste Disposal Grounds (Permit PO21-012) was renewed on February 1, 2021 and is in effect until January 31, 2026. Of note, Permit PO21-012 introduced a new requirement that volatile organic compounds (VOCs) be added to the annual groundwater program to establish baseline data and trends. Depending on analytical results, VOC sampling may be amended in future years once baseline conditions are established.

BACKGROUND

The WMF is located near Wearing Road, approximately 2.1 km east of Territorial Drive North. The legal land description is SW-15-44-16 W3M. A map showing the location of the WMF and current site diagram can be found in Appendix A.

The WMF design consists of four cells, constructed over the lifetime of the facility. Cell No. 1 was constructed in 1996, Cell No. 2 was constructed in 2002, and Cell No. 3 is currently being used and was constructed in 2012. Cell No. 3 was expected to have a serviceable life of nine years and provide approximately 375,000 m³ of landfill capacity. Cell No. 4 was originally projected for construction in 2030. The WMF design features a clay till liner, leachate collection system, leachate pumping station and force main to deliver leachate to the wastewater treatment plant for treatment.

The WMF operates Monday through Saturday from 08:00 to 18:00. The WMF is closed on all statutory holidays. At all times that the WMF is operational, and the main gate is open, the scale house is manned by a scale house attendant.

From the hours of 18:00 to 08:00 access to the WMF is restricted. The main gate remains closed until the scale house attendant opens it to the public. Security cameras and facility monitoring are completed at the main gate, the tool shed, and the equipment lean-to. The WMF perimeter is fenced, and weekly inspections monitor the fence integrity. There is one secondary access point to the WMF located in the northeast near the cell stockpile. This access is secured with a chain-link gate and locked to prohibit unauthorized access.

The City is the main contributor to the waste that enters the facility. Historically contributors included the Town of Battleford, the RM of North Battleford No. 437, and the RM of Battle River No. 438. In April 2018, the Town of Battleford diverted their waste to the newly constructed Loraas Transfer Station.

The WMF collection site for used oil, oil containers and filters, and antifreeze is located within the EcoCentre.

The WMF offers free disposal of compostable materials, blue bin recyclable materials, and fluorescent light bulbs and ballasts (limited quantities/week) to City residents. Blue bin recyclable materials can be disposed of into two 30-yard bins. The WMF stores some recyclables which are processed at other locations including white goods (refrigerants), metal objects, tires, empty propane canisters, grain bags, batteries, used cooking oil, antifreeze, and waste oil. Other materials that are diverted from the main pit and stored onsite include clean wood/lumber, trees/shrubs, concrete, asphalt, compostable material, clean soil, and high-quality resalable items. Clean wood/lumber is stockpiled and chipped, trees/shrubs are stockpiled and burnt, concrete and asphalt are crushed onsite for resale, and compostable material and clean soil are used for cover in the main pit. Resalable items are stored in a neat row next to the trees/shrubs pile and include items such as peddle bikes, lawn mowers, desks, bricks, and lumber.

Curbside garbage and recycling pick-up is completed by third-party contractors who monitor the contents and volumes of the bins they collect. Any non/rejected recyclable material found after sorting is baled and disposed of in the WMF main pit.

To prevent household hazardous waste from entering the WMF, the City hosts a semi--annual Household Hazardous Waste Day. Residents within the City and surrounding area can dispose of any hazardous or unknown waste at no cost.

The WMF accepts asbestos which is buried on-site in designated areas.

WMF ACCEPTED MATERIALS VOLUMES

A record of the types and volumes of waste and other materials collected are listed in Appendix B. These records also show which materials were disposed and which were diverted from the main pit at the WMF. Where available the 2023 waste volumes have been compared to the 2022 volumes to demonstrate year over year variances in waste and recycling streams.

WMF MAIN PIT VOLUMES

The volumes shown in Appendix B under Main Pit Volumes include all waste entering the main pit. The amount of waste disposed of in the main pit decreased from 11,914 to 8,878 tonnes. As of 2023 the estimated total material that has been deposited in the main pit is 1,031,016 m³ which represents approximately 59% of the design volume (1,750,000m³). In 2022, The City retained Tetra Tech Canada. Inc (Tetra Tech) to complete an airspace assessment and airspace optimization as part of the WMF Master Plan. Based on the 2022 Tetra Tech Airspace Assessment and Optimization study, the current working cell (cell 3) is expected to be full in 14 to 26 years depending on above grade slope. With the construction of cell 4 the remaining life of the main pit changes to 59 to 84 years depending on above grade slope.

GENERAL WASTE

General waste entering the main pit consists of sorted domestic waste and rejected recyclables, construction and demolition waste, and carcasses. Sorted domestic waste includes waste from the curbside residential waste collection program and sorted waste brought into the WMF from residential and non-residential customers.

The amount of general waste entering the main pit decreased from 11,830 to 8,808 tonnes.

ASBESTOS

The amount of asbestos disposed of and buried in the main pit decreased from 84 to 70 tonnes.

LEACHATE

The total volume of leachate pumped from the leachate collection well to the Wastewater Treatment Plant (WWTP) decreased from 9,921 m³ to 5,238 m³.

DIVERTED MATERIALS

The volumes/units shown in Appendix B under Diverted Materials include all materials diverted from the main pit.

SORTED CONSTRUCTION RECYCLABLES

Sorted construction recyclables consists of concrete, wood, metal, and asphalt. The amount of sorted construction recyclables decreased from 13,904 to 10,416 tonnes.

ECO-CENTRE OIL/ANTIFREEZE

The amount of oil removed from the eco-centre decreased from 11,900 to 10,800 litres.

The amount of antifreeze removed decreased from to 1,300 to 400 litres.

8 drums of oil filters, 1108 empty oil containers (20L pails), and 225 large garbage bags filled with empty oil jugs were removed.

HOUSEHOLD RECYCLABLES

The amount of household recyclables increased from 521 to 550 tonnes.

COVER MATERIAL

Cover material consists of clean soil, compost, and vac truck clean-out.

The amount of cover material received decreased from 20,255 to 14,141 tonnes. All compost received and processed in 2023 was used as cover material. No compost was sold or used off-site.

Vac truck clean-out increased from 232 to 246 tonnes.

COMPOST ANALYTICAL

On October 23, 2023 a composite sample of the WMF compost pile was collected and submitted to A & L Canada Laboratories of London, Ontario. The sample results were compared to the CCME guidelines for Compost Quality. Sample results are found in Appendix C.

Compost sampling results indicate that the 2023 WMF compost material was within the CCME guidelines for Category A – Unrestricted use.

OTHER RECYCLABLE MATERIAL

The WMF maintains stockpiles of recyclable materials that are used or held for processing elsewhere. The following materials were diverted from the Main Pit in 2023:

- 181 white good (refrigerants). The freon is removed by our third party metal recycling and the remaining metal is placed in the metal pile.
- 370 tires. Tires are collected by TW Trucking for recycling.
- 97 automotive batteries. Automotive batteries are sold for recycling.
- 9.5 tonnes of resalable items were sold for reuse.

COMPACTION

Daily compaction and cover activities are recorded in the Operator logbook at the WMF.

The latest compaction survey taken at the WMF was performed as part of the Airspace Assessment and Airspace Optimization completed by Tetra Tech. An Unmanned Aerial Vehicle (UAV) survey was completed on October 6, 2023 and was compared to the October 7, 2022 UAV survey. The landfill tonnage and the volumetric airspace consumption between these two surveys was 9,228 tonnes and 14,200 m³, resulting in a waste compaction rate of 0.65 tonne/m³. The 2023 compaction rate decreased slightly from the 2022 rate of 0.69 tonne/m³.

MASTER PLAN

In 2021 the City retained Tetra Tech to complete a Master Plan for the WMF. The purpose of this Master Plan is to have a substantial third-party review completed with recommendations made for updating of current practices and processes. The Master Plan is still ongoing.

MASTER PLAN OBJECTIVES

The Master Plan Objectives are:

- Airspace and Airspace Optimization Assessment
- Operational Review
- Landfill Gas Production Assessment
- Decommissioning and Reclamation (D&R) Plan
- Closure/Post-Closure Liabilities Analysis
- Limited Lifecycle Cost (tipping fees) Analysis
- Corporate Stewardship (carbon footprint) Assessment
- Strength, Weakness, Opportunities, Threat (SWOT) Assessment
- Equipment Lifecycle Analysis

MINISTRY OF ENVIRONMENT (MOE) COMPLIANCE

The WMF is required to comply with the conditions of the Permit to Operate and the approved Operations Plan. To maintain compliance the City is required to report annually on the following information that is not otherwise captured within sections of this report:

- Results of Inspections identifying:
 - Asbestos burrial
 - Perimeter fencing
 - Landfill pit observations
 - Adequate signage
 - Standing water
 - Storm water storage pond depth and any storage pond activities (i.e., sampling and pumping to WWTP)
- A summary of unauthorized discharges
- Verifying the presence of records:
 - Dates of clean wood burns
 - Date and sign-off of annual review of Operations and Emergency response plans
- Summary of urgent/upset conditions.
- Discharge and Discovery Reporting

SUMMARY OF INSPECTIONS

The WMF is required to have weekly and quarterly inspections. The inspections capture information on the general condition of the WMF, an estimate of stockpiled diverted materials, storm water retention pond water levels, and the main pit conditions and practices.

In 2023 there were 52 weekly inspections completed. The findings of the inspections indicated that:

- Asbestos was noted as “buried in pit” in all inspections.
- Perimeter fencing was observed in good condition in 51 of 52 inspections, one inspection noted the fencing connected to the SE secondary access was “drooping” from animals crossing over, WMF staff fixed the fencing before the next weekly inspection.
 - The SE secondary access gate was observed as being secured in all inspections.
- The landfill pit was observed as having “portable fencing in place” in all inspections.

- Signage was observed in good condition in all inspections.
- Standing water was observed in the NE corner of the undeveloped/unlined section of the pit between cell 3 and 4 in the pit in six of the 52 inspections. WMF staff pumped the standing water into cell 3 which is developed and lined. The access road between cell 3 and 4 was removed enabling any future standing water to naturally drain into the leachate collection system. Samples were not taken as the standing water did not leave the site and was determined to be surface water from spring melt/seasonal rains.
- The storm water storage pond was noted to be below the freeboard threshold in all inspections.

UNAUTHORIZED DISCHARGES

There were no unauthorized discharges in 2023.

RECORD VERIFICATION

The City tracks information for the WMF in the scale house waste tracking program TRUX, in the Daily Cover Log, through regular inspections, in the electronic file system, and in the WMF Supervisors logbook.

Table 1B is generated using the records available in TRUX and provides the City with a record of all materials entering and diverted materials exiting the WMF. Leachate volumes are provided by the WWTP.

CLEAN WOOD BURNS

There were no clean wood burns in 2023.

OPERATIONS PLAN SIGN OFF

The Operations Plan was signed off on March 31, 2023. The Emergency Response Plan is included in the Operations Plan.

SUMMARY OF URGENT/UPSET CONDITIONS

In 2023 the WMF experienced 16 landfill intruder incidents afterhours between May 3rd and July 7. In all incidents, one to three individuals entered the facility by climbing over or crawling under the front gate. No property damage or facility equipment occurred. Items taken by the intruders included items from the resalable row and items from the household garbage drop off bins. On July 7th new installed motion detection cameras alerted City staff of an intruder, RCMP were called, and an arrest was made.

On May 16, 2023, a customer experienced a medical condition while approaching the weigh scale and drove his vehicle into the side of scale. The WMF was closed for approximately one hour while the customer received medical attention, the truck was removed from the scale, and the scale was recalibrated. No damage to the WMF equipment resulted from the incident.

DISCHARGE AND DISCOVERY REPORTING

On November 30, 2023, CNB notified the two properties to the north of the WMF that a historical chloride plume identified in the 2021 historical discharge report is present on their properties. CNB will provide the landowners with copies of the annual groundwater monitoring report and will specifically notify the landowners of any significantly increasing chemical concentrations that exceed the Saskatchewan Environmental Quality Guidelines.

GREENHOUSE GAS EMISSIONS

The City does not have an estimate for the 2023 Green House Gas (GHG) emissions at the WMF at the time this report was created but does have an estimate to report for 2022. The City contracted Tetra Tech to estimate and summarize GHG emissions at the WMF. In Tetra Tech's "North Battleford 2022 GHG Report", the WMF emitted 12.673 kt of GHG in 2022 vs 11.188 kt reported in the 2022 annual report for 2021. This estimate is above the Federal reporting threshold of 10 kt and was reported to Environment and Climate Change Canada.

GROUNDWATER MONITORING PROGRAM

Pinter & Associates LTD (Pinter) was contracted by the City to conduct the annual groundwater monitoring program at the WMF. On March 26, 2024, a copy of the Final the 2023 Groundwater Monitoring report was forwarded to the Ministry of Environment. As part of the monitoring program, water samples are collected from eight (8) monitoring wells, the leachate collection well, and the storm water retention pond. Monitoring wells are inspected at the time of sampling for potential damage and securement. The monitoring wells are grouped according to their location relative to the main pit. Two wells are up-gradient (upstream of the groundwater flow), three wells are immediately down-gradient (downstream of the groundwater flow), and three wells are in a buried channel further down-gradient of the main pit.

The findings of the 2023 groundwater monitoring are presented below.

CONDITION OF MONITORING WELLS

At the time of sampling all monitoring wells identified in the Permit to Operate were in good condition. Pinter noted all monitoring wells were protected by metal casing protectors and secure, BH521 was noted that it was secured with a locking-plug in absence of a locked casing protector.

CHLORIDE ANALYSIS

Chloride can be used an indicator for landfill leachate contamination as chloride moves un-attenuated through the subsurface. Additionally, Pinter plotted general water quality parameters on trilinear diagrams to illustrate the different water types at the WMF and compare the water quality at each monitoring well and private wells to the Leachate Collection Well chemistry.

The data indicates that water type differs between wells up-gradient of the active pit, wells immediately down-gradient of the active pit, and wells further down-gradient of the active pit (in the buried valley channel). The low chloride concentrations in the monitoring wells (BH519 and BH520-r, 123 and 332 ppm respectively) suggest that the leachate has not been detected in the monitoring wells, although increasing trends in chloride concentrations at BH504C-r, BH505C and BH506B have been noted and will continue to be monitored. In 2023 chloride concentrations in BH504C-r increased from 71.9 ppm to 140 ppm. Chloride concentrations in BH505C increased from 248 ppm to 267 ppm. Chloride concentration in BH506B increased from 249 ppm to 257 ppm. The increasing chloride concentrations in monitoring wells BH504-C, BH505C and BH506B may indicate chloride migration from the active lined landfill.

Increased chloride concentrations in this area may be related to historical landfilling operations that occurred prior to the operation of the new lined cell. Historic groundwater chemistry at monitoring wells within the buried valley channel do not exhibit trending that would indicate impacts from landfill leachate. Rather, monitoring wells installed in the buried valley channel are within a different hydrostatic unit, to which attribution could be given for the difference in overall water chemistry from up-gradient wells. It is noted that the water type at each well has been relatively consistent over time and has not changed at individual monitoring wells.

Surface water quality from the storm water retention pond was different then the leachate water quality and chloride concentrations were significantly lower than leachate (87.1 ppm compared to 1,790 ppm respectively).

VOC ANALYSIS

VOCs were monitored in mid and down gradient monitoring wells including: BH505C-r, BH505C, BH506B, BH519, BH520-r, and BH522, and in the Storm Water Retention Pond (Only Benzene, toluene, ethyl benzene, xylene, fractions 1 and 2 hydrocarbons, and oil and grease) and Leachate Collection Well.

VOC exceedances were noted in monitoring wells BH519 for cis-1,2-Dichloroethene (7.4 ppb), Trichloroethene (0.47 ppb), and Vinyl Chloride (4.54 ppb), and in monitoring well BH520r for 1,2-Dichlorobenzene (1.60 ppb), cis-1,2-Dichloroethene (7.1 ppb), Trichloroethene (1.50 ppb), and Vinyl Chloride (1.80 ppb).

VOC exceedances were noted in the Leachate Collection Well for chlorobenzene (4.36 ppb), and 1,4-Dichlorobenzene (4.12 ppb).

NEIGHBOURING DOMESTIC WELLS

Water chemistry at up-gradient domestic well KB1 and surface water from KB Dugout indicate that they are not influenced by groundwater from the WMF. Domestic well BB1, which is downgradient of the Site, does not have elevated chloride concentrations and is installed at a deeper elevation than the buried valley channel which indicates that BB1 has not been influenced by groundwater from the WMF.

CONCLUSION

The WMF accepts and disposes of domestic municipal waste as authorized by the Permit to Operate a Municipal Waste Disposal Ground. All the procedures outlined in the Permit to Operate a Municipal Waste Disposal Ground (Permit to Operate) and the WMF Operations Plan are being followed to ensure the City is within regulatory guidelines.

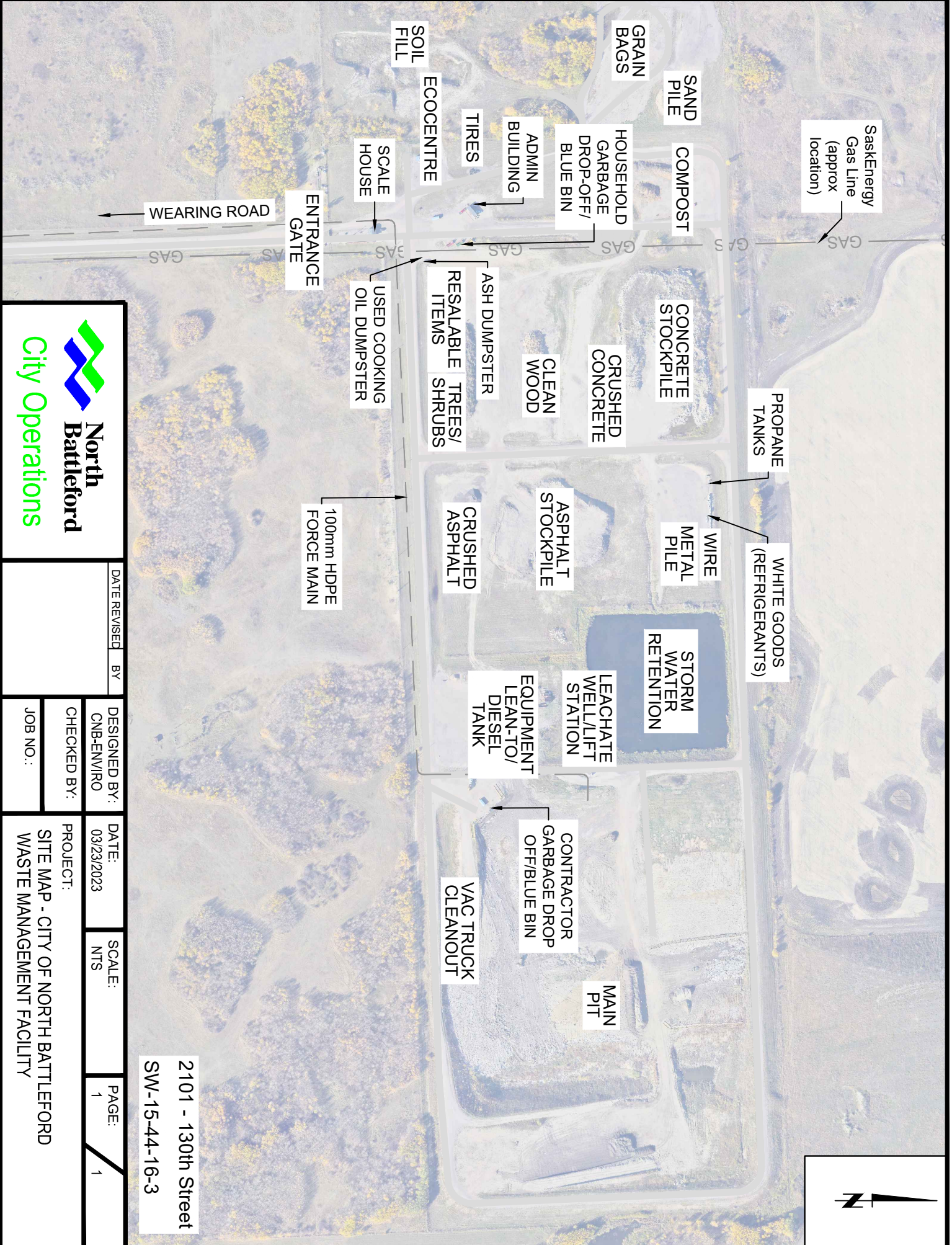
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The City of North Battleford continues to work towards diverting more recyclable and reusable material from the main pit of in 2024.

APPENDIX A: SITE MAP



2101 - 130th Street
 SW-15-44-16-3

		DATE REVISED	BY
		DESIGNED BY:	CNB-ENVIRO
PROJECT: SITE MAP - CITY OF NORTH BATTLEFORD WASTE MANAGEMENT FACILITY		DATE:	03/23/2023
		CHECKED BY:	
		SCALE:	NTS
		PAGE:	1 / 1

APPENDIX B: TABLES

Table 1B - WMF ACCEPTED MATIERALS VOLUMES		
Main Pit Volumes	Total	Unit
GENERAL WASTE	8807.9	tonne
Sorted Domestic and Rejected Recyclables	4995.9	
Construction and Demolition	3809.2	
Carcasses	2.8	
ASBESTOS	69.7	tonne
	69.7	
	Total	8877.6
LEACHATE ¹	5237.9	m ³
	5237.9	
¹ Leachate is pumped to the Wastewater Treatment Plant		
DIVERTED MATERIALS		
SORTED CONSTRUCTION RECYCLABLES		
	10415.8	tonne
Concrete, wood, metal, asphalt	10415.8	
ECO-CENTRE OIL/ANTIFREEZE		
	11200.0	L
Oil	10800.0	
Antifreeze	400.0	
HOUSEHOLD RECYCLABLES		
	550.2	tonne
Curbside Program	514.5	
WMF	35.7	
COVER MATERIAL		
	14141.1	tonne
Clean Soil	13202.2	
Compost	692.9	
Vac Truck Clean-Out	246.0	
OTHER RECYCLABLE MATERIAL		
	648.0	units
Tires	370.0	
White Goods (refrigerants)	181.0	
Batteries Outbound	97.0	
Resalable Items Outbound (\$125/tonne - \$6 minimum)	9.5	tonne

APPENDIX C: COMPOST ANALYTICAL

Appendix C: Compost Analytical					
Parameter	City of North Battleford WMF Compost Sample Results	CCME Guidelines			
		Category A Max Concentration within Product (mg/kg dry weight)	Max Concentration within Product (mg/kg dry weight)	Category B Max Concentration within Product (mg/kg dry weight)	Max Cumulative Additions to Soil (kg/ha)
Arsenic	3.95	13	75	15	15
Cobalt	4.55	34	150	30	30
Chromium	17.22	210	**	**	**
Copper	10.18	400	**	**	**
Molybdenum	1.4	5	20	4	4
Nickel	11.1	62	180	36	36
Selenium	BDL	2	14	2.8	2.8
Zinc	49.57	700	1850	370	370
Cadmium	BDL	3	20	4	4
Mercury	BDL	0.8	5	1	1
Lead	7.67	150	500	100	100

** = Limits for copper and chromium are not established in the Trade Memorandum.