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Best Management Practices for Natural Attenuating Landfill Operations & Maintenance

NOFNEC 2015

Presented by: Deneen Brigham, Environmental Scientist OFNTSC – Thunder Bay

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OFNTSC – ENVIRONMENT

Two Environmental Scientists:

- Stephanie Allen: Toronto office
  - Directly serves southern region First Nations & Tribal Councils
- Deneen Brigham: Thunder Bay office
  - Directly serves northern region First Nations & Tribal Councils

Types of Services

- Advisory – provision of information such as relevant regulations & policies; generic TOR; guidance material; AADNC funding
- Technical – scientific/technical project reviews; and project management support for UFN environment projects
- Training – dependent on client needs and available funding
- Special Projects – based on need, time, and funding availability

Ontario First Nations Technical Services Corporation

OFNTSC Environment

Areas of Service

- Solid Waste Management & Diversion
- Environmental Assessment
- Water Quality & Source Water Protection
- Spills & Environmental Emergencies
- Contaminated Site Assessment & Remediation
- Environmental Legislation & Regulations

Presentation Goal

To share and discuss “best practices” for operating a natural attenuating landfill site within a First Nation community

“Best practices” are based on Provincial Standards & Guidelines

No Federal Regulations for landfills or waste disposal sites on Reserve, except for the “*Indian Reserve Waste Disposal Regulations*”, current as of June 17th, 2015

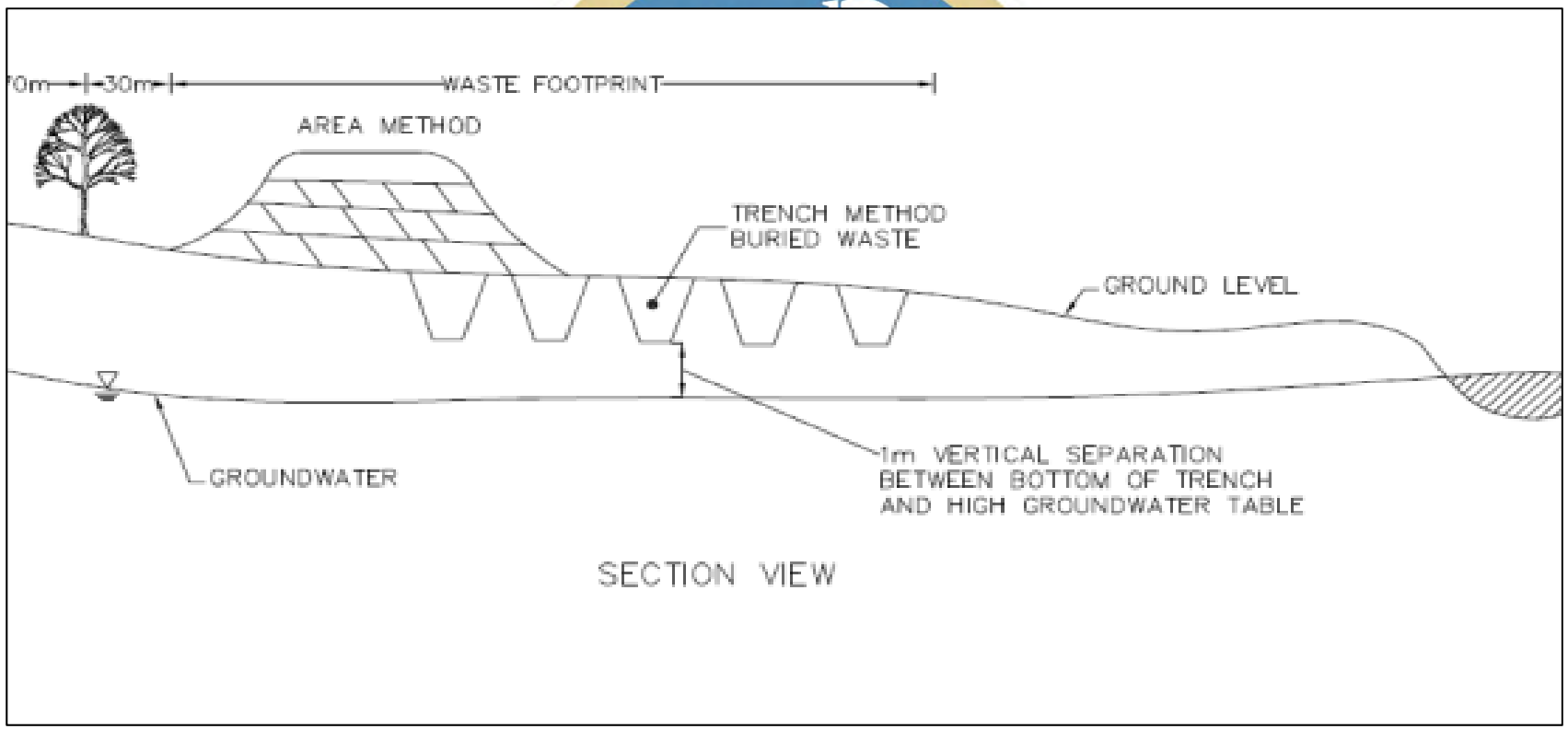
By the end of this presentation, you should be familiar with:

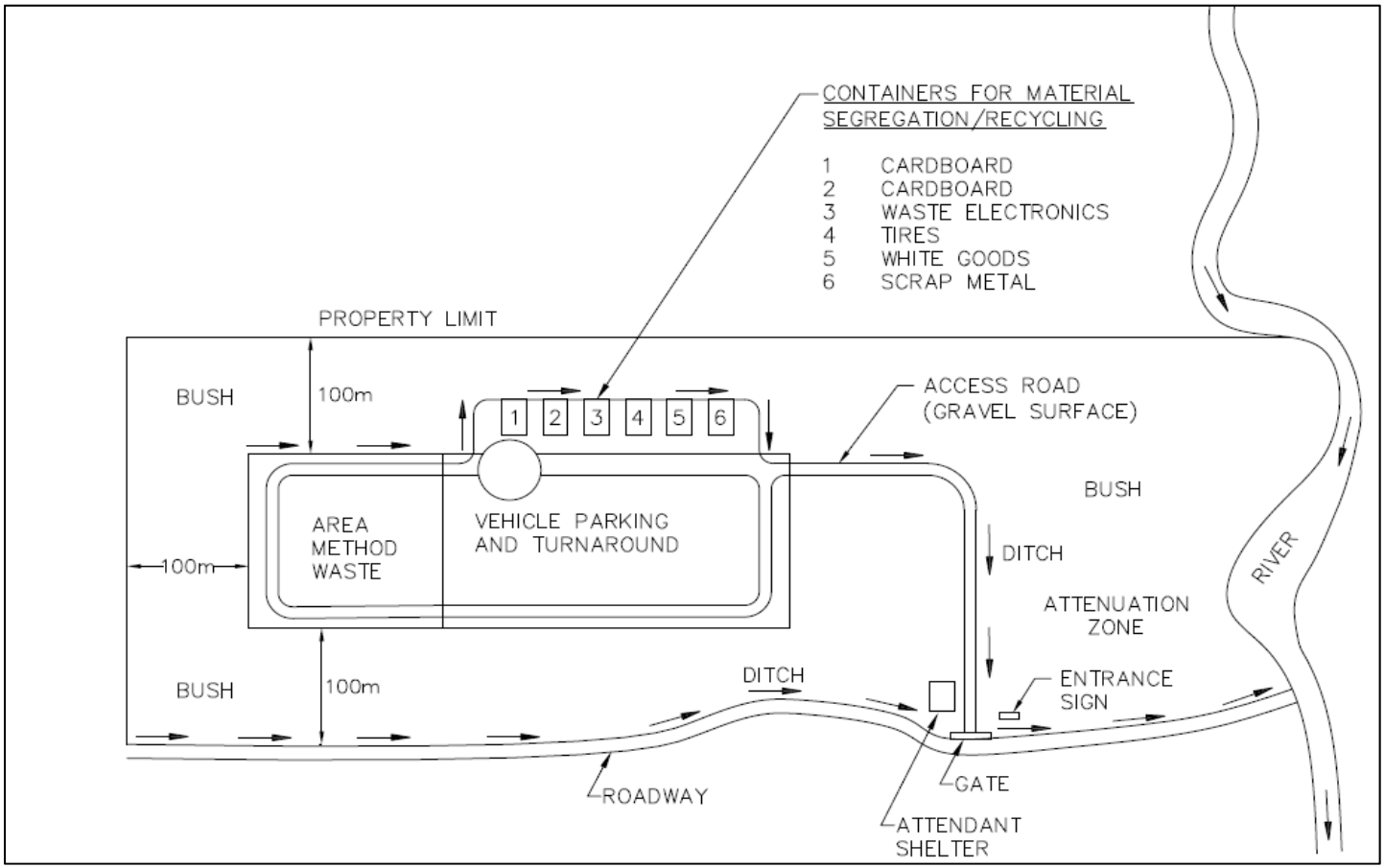
- best practices for the O&M of LFs
- ideas of what you can do to improve conditions at your site, based on your Community's needs

Natural Attenuation vs Engineered Sites

Natural Attenuation	Engineered
Relies on natural processes to reduce contamination to safe levels at property boundaries, and generally requires more land to achieve	Liner either made of clay (natural or bentonite) with an impermeable geotextile membrane and/or a leachate collection system

Natural Attenuating Landfill Site Layout





Natural Attenuation Landfill
Site Layout: Plan View

Landfill Sites vs Refuse Sites Quick Facts

- Total of 80 on reserve waste sites (37 refuse & 43 landfills)
- 35 Communities with solid waste MTSAs
- O&M funding for on reserve waste sites is based on location (urban vs remote) and type of waste site (refuse vs landfill) and is provided at 80% cost share
- Typical Funding:

  Urban - Refuse = $2,874/a

  Landfill Site = $11,672/a

  Remote – Refuse = $4,569/a

  Landfill Site = $18,554/a

Best Practices for Managing a Waste Site

- Managing the fill area
  - Trench/Area method
  - Compaction
  - Cover
  - Equipment
- Monitoring and Reporting
  - Environmental monitoring
- Staffing
- Hours of operation
- Gating
- Uncontrolled Dumping
- Burning
- Vermin
- Contingency plans
- Reporting to Council

Managing the Fill Area

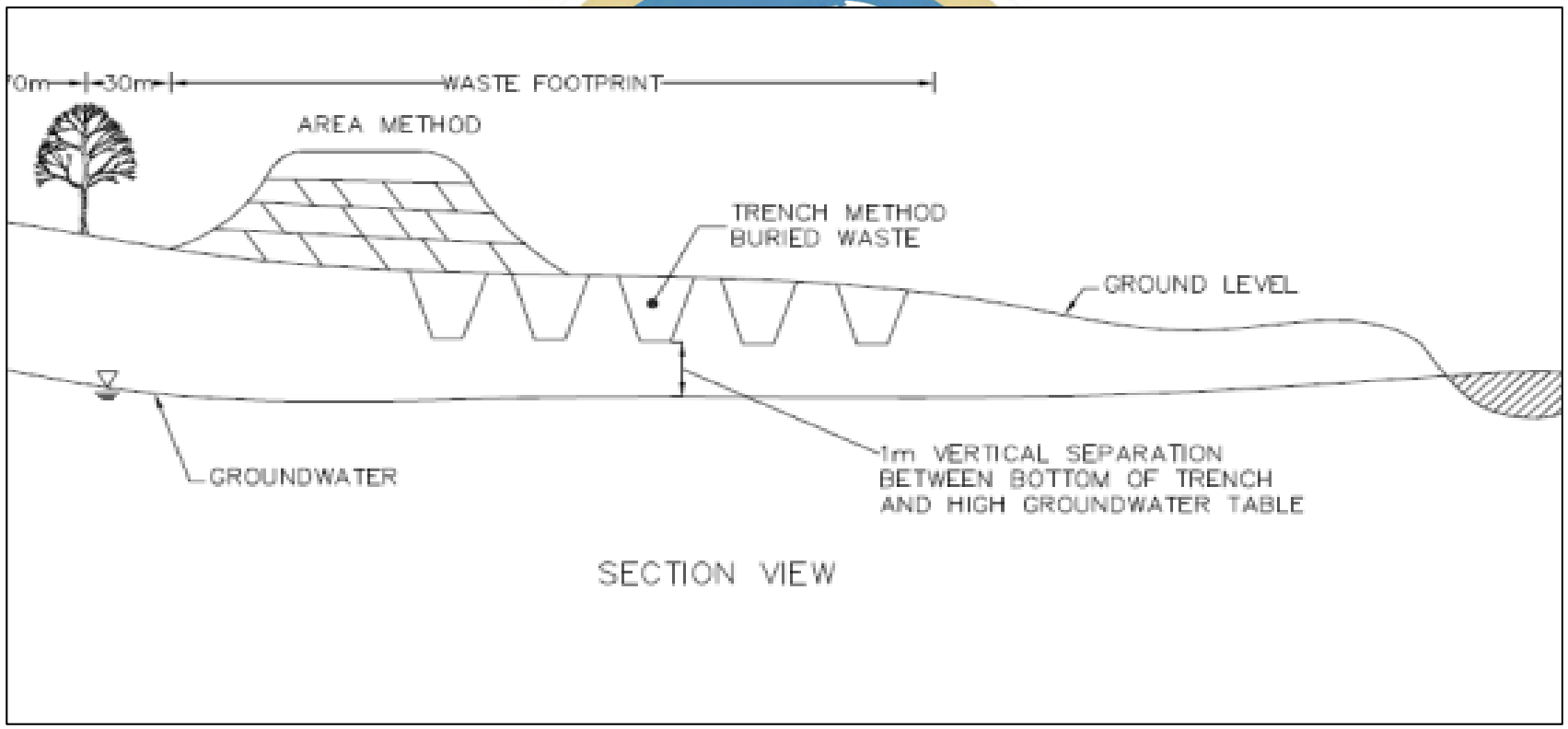
If the active face is not well defined, waste is simply deposited anywhere

Ideal Options for Managing the Fill Area

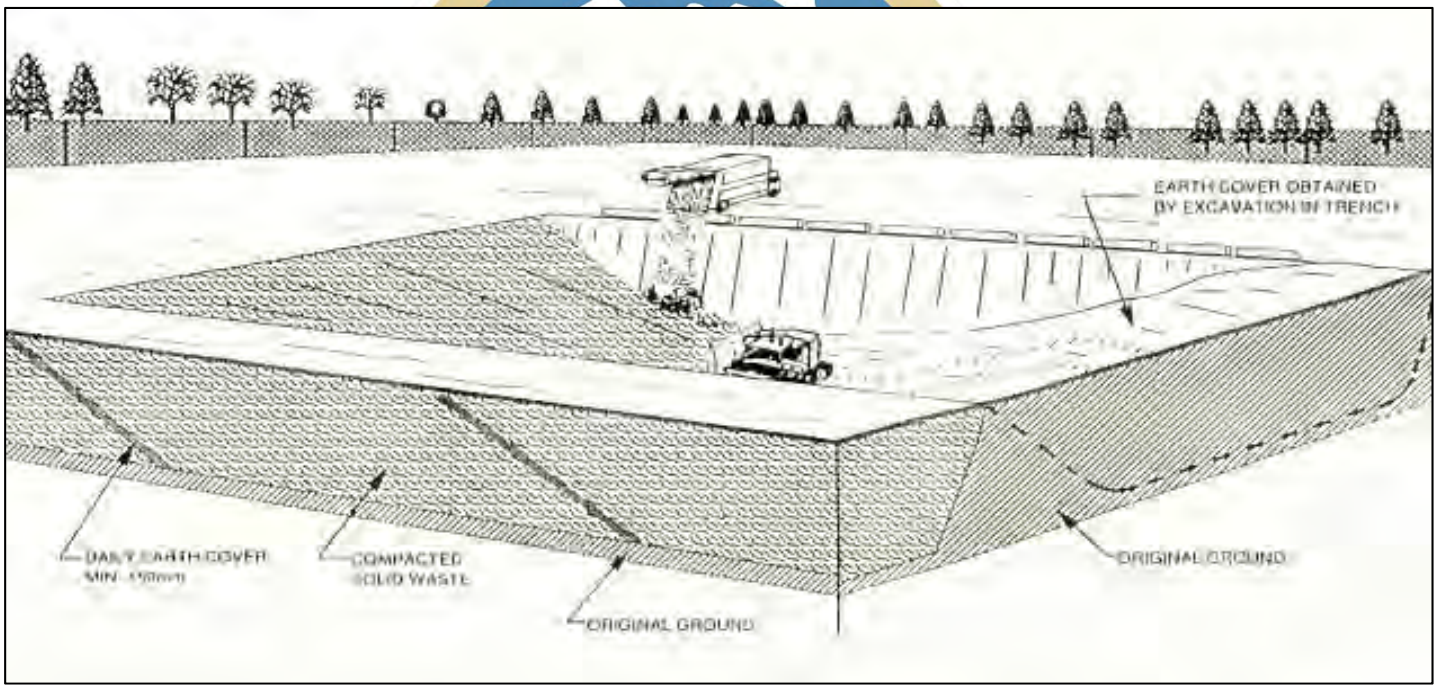
- Active face size – at small sites, should be able to accommodate 5 or more vehicles at any one time
- Access road to face is in good condition – no protrusions to puncture tires
- Built against existing cells to assist with compaction
- Ground sloping away from the face for drainage

Otherwise!

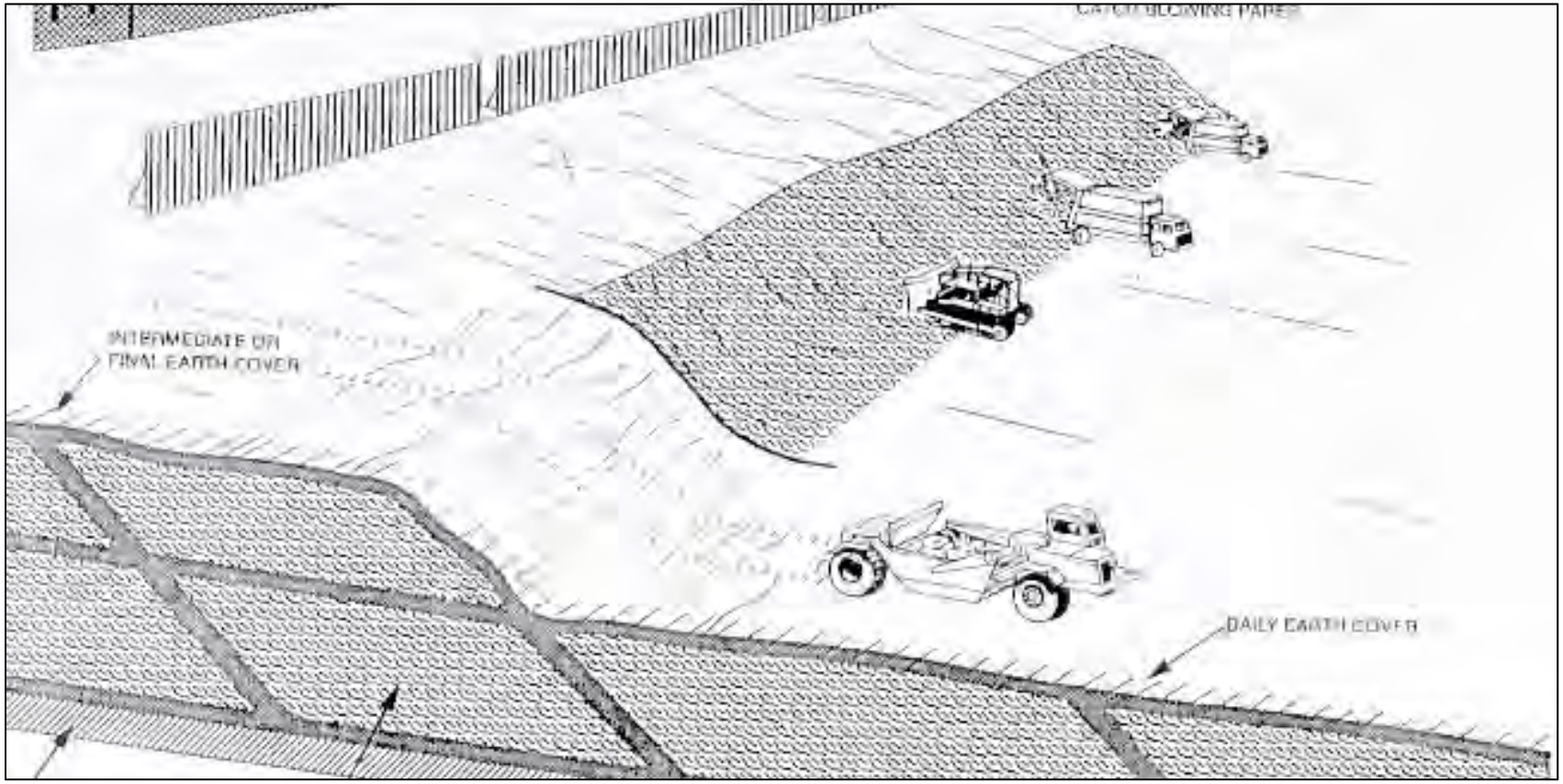
Natural Attenuating Landfill Site Layout



Trench Method used for Waste Disposal



Area Method for Waste Disposal



Trench Method

Area Method

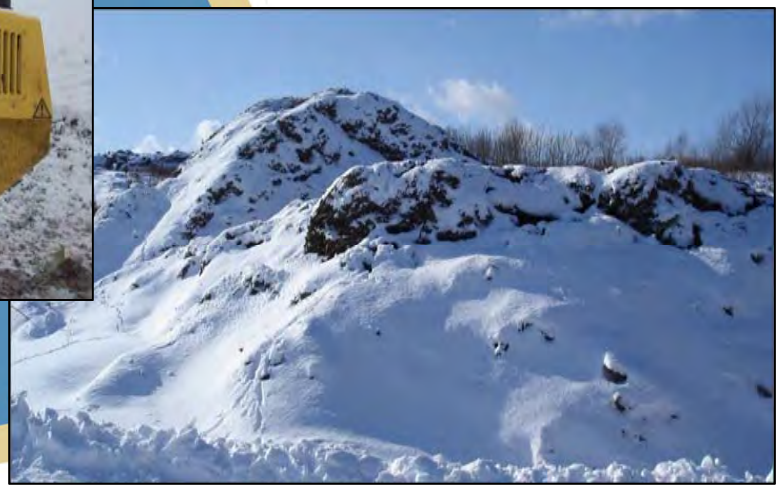
Managing Waste

Cell Structure

Compaction

Daily Cover

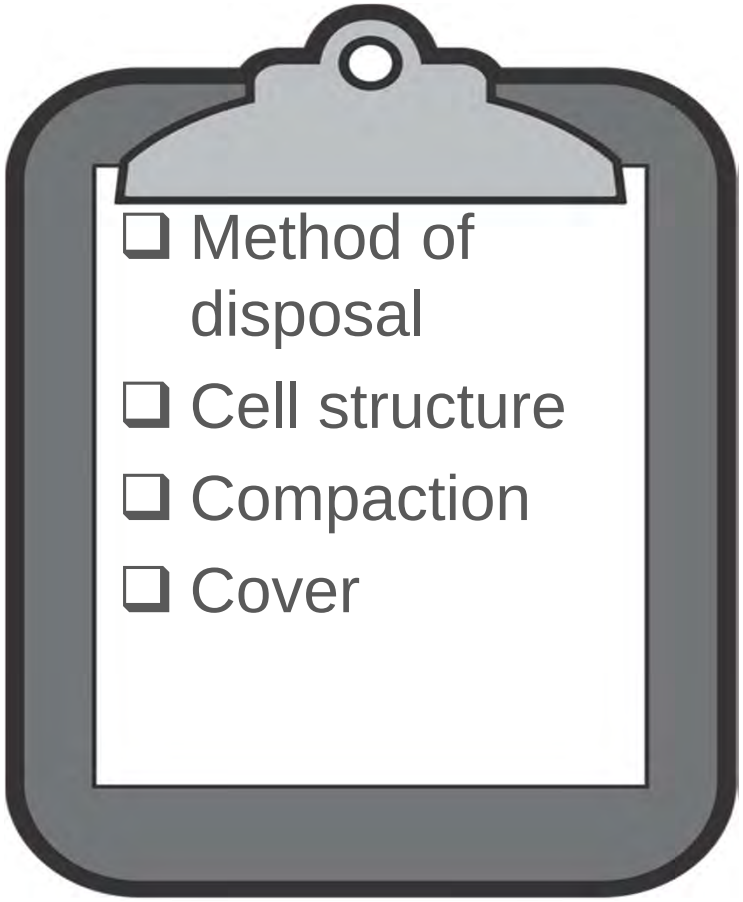
- Applied on weekly or daily basis to control odours, vermin, vectors and other nuisance predators
- Minimum cover thickness is 150 mm (6 inches)
- Soil stockpiles should be kept near active face
- Use one part cover to four parts waste



Winter Operations

Final Cover

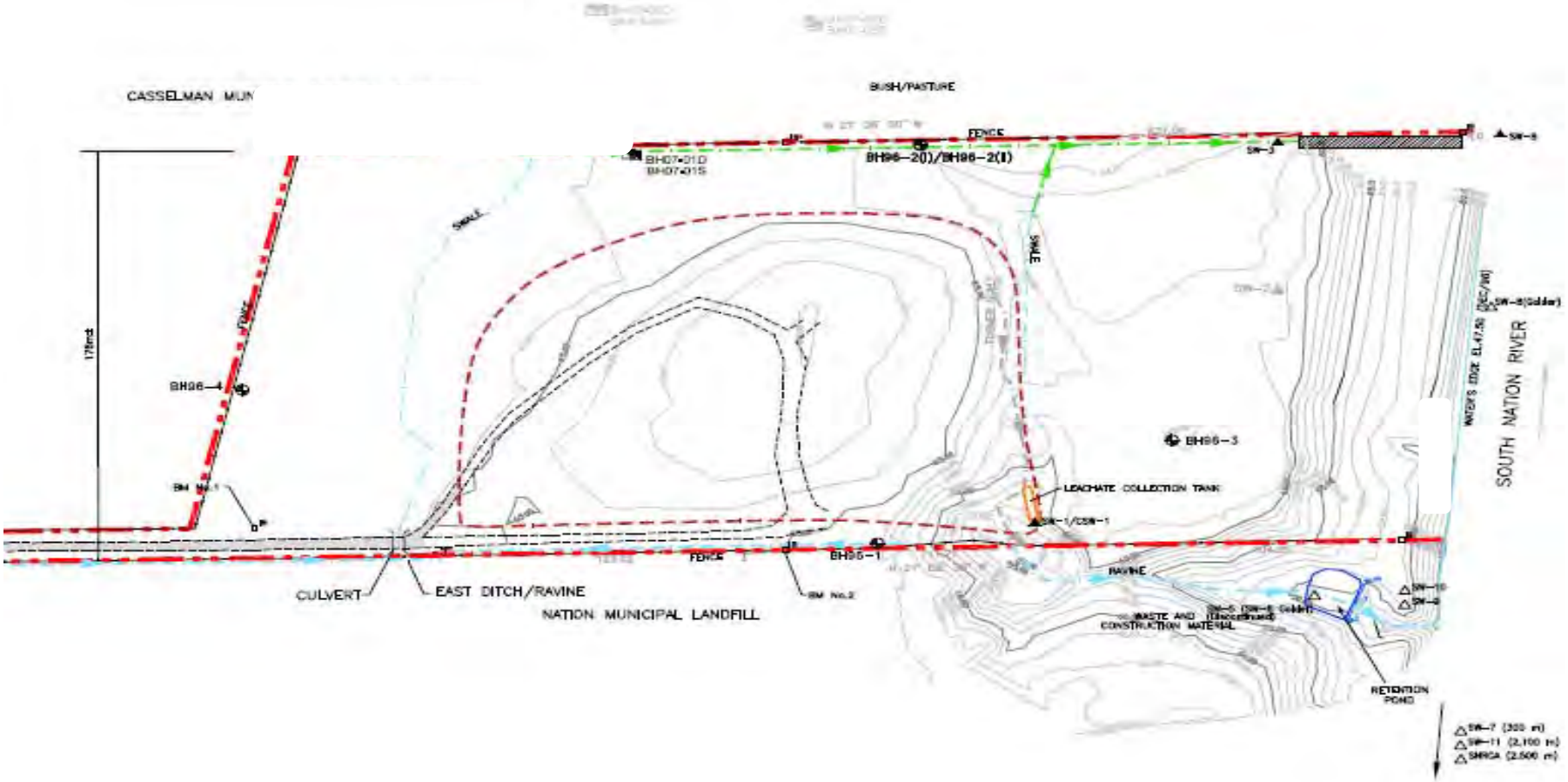
Managing the Fill Area



Monitoring and Reporting

Groundwater Monitoring

Monitoring Surface Water

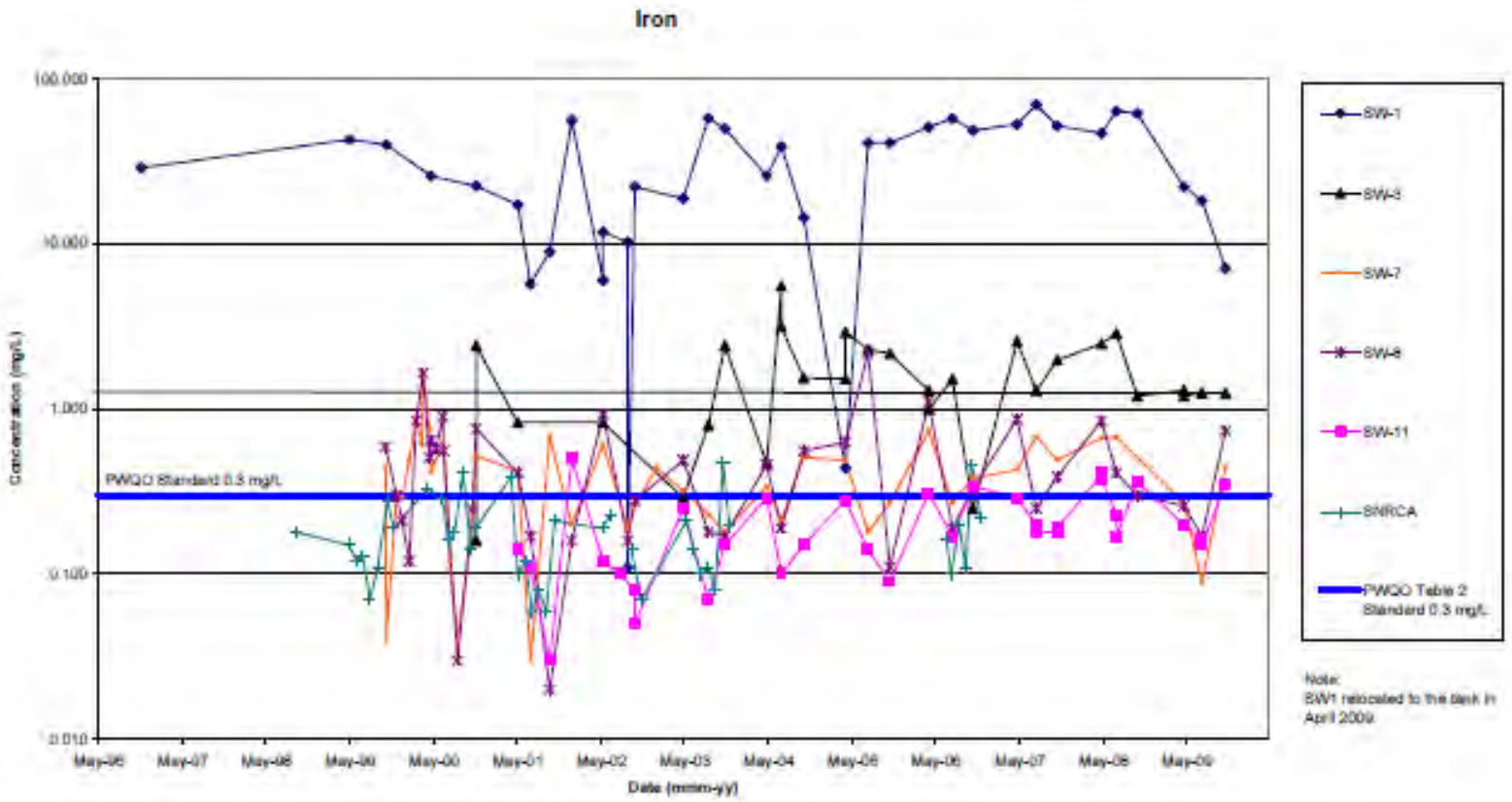


Monitoring Locations

QUANTITY	PARAMETER	UNIT PRICE	EXTENDED COST
66	Package Price, Includes:	172.00	11,352.00
66	ICP 28 Element Scan		
66	Cr(VI) - water		
66	ANION Scan - 6		
66	Alkalinity		
66	Hardness - Calculation		
66	BOD5		
66	COD		
66	DOC		
66	TKN - water		
66	N-NH3 - water		
66	TDS - (COND-CALC)		
66	TSS		
66	Hydrogen Sulfide		
66	Turbidity		

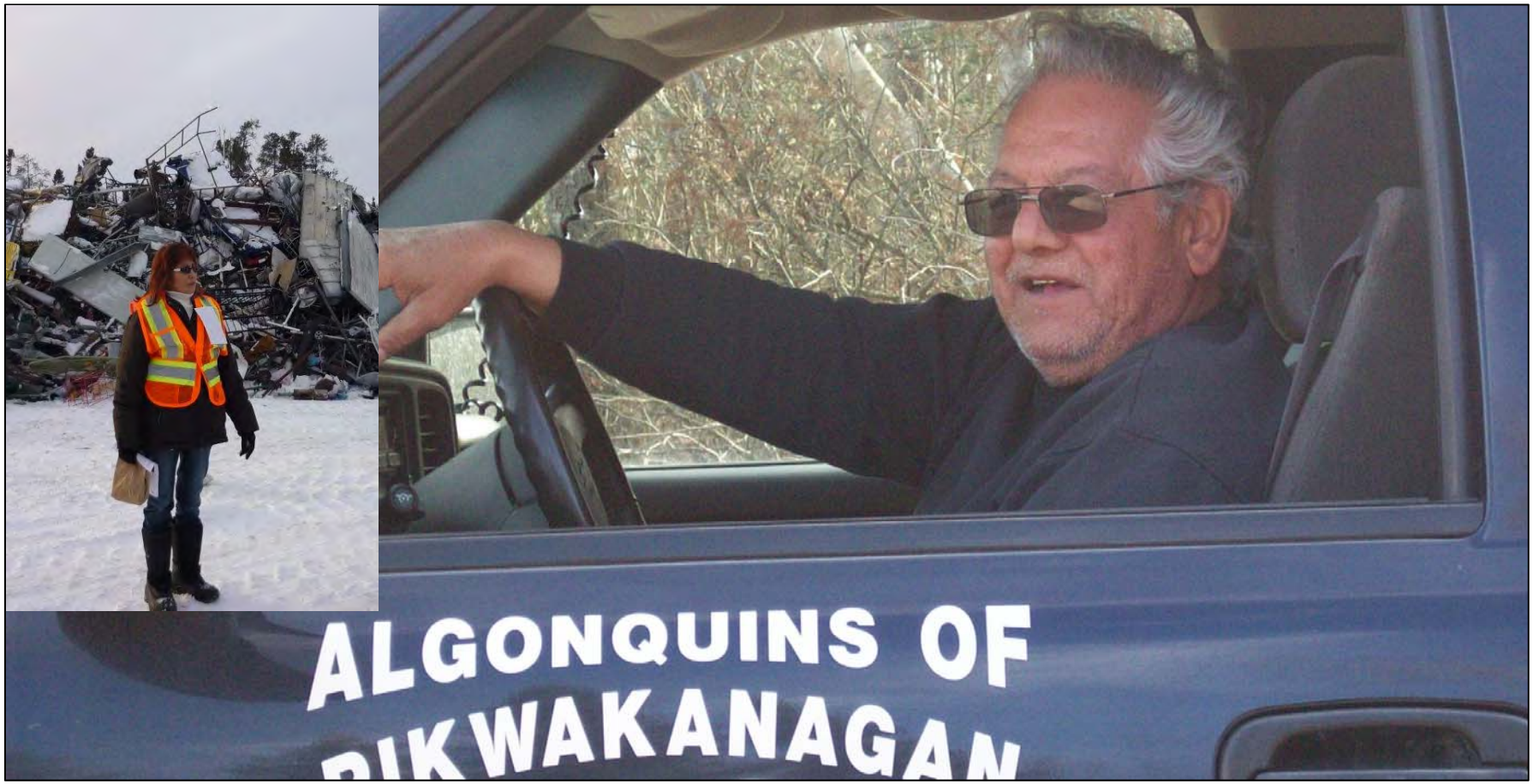
Sub Total:	11,352.00
GST (7%):	794.64
Total Cost:	12,146.64

Laboratory Parameters for Surface and Groundwater



Iron as a Leachate Indicator

Supervision & Staffing



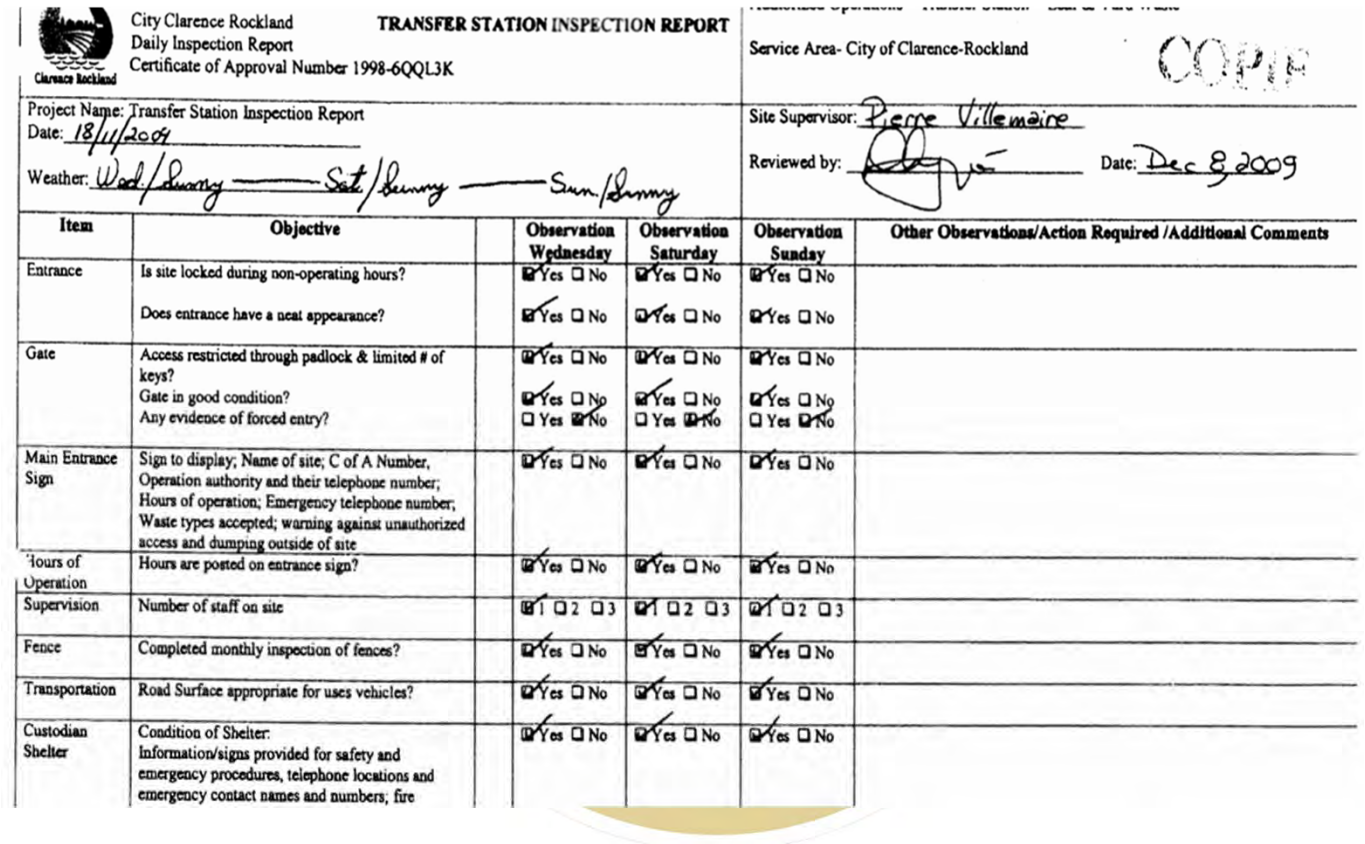
Facilities

Hours of Operation

Gating

Unacceptable Waste

Daily Site Inspection



City Clarence Rockland
Daily Inspection Report
Certificate of Approval Number 1998-6QQL3K

TRANSFER STATION INSPECTION REPORT

Service Area- City of Clarence-Rockland

Project Name: Transfer Station Inspection Report
Date: 18/11/2009

Site Supervisor: Pierre Villemaire

Weather: Wed/Sunny — Sat/Sunny — Sun/Sunny

Reviewed by: [signature] Date: Dec 8, 2009

Item	Objective	Observation Wednesday	Observation Saturday	Observation Sunday	Other Observations/Action Required /Additional Comments
Entrance	Is site locked during non-operating hours?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
	Does entrance have a neat appearance?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
Gate	Access restricted through padlock & limited # of keys?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
	Gate in good condition?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
	Any evidence of forced entry?	☐ Yes ☑ No	☐ Yes ☑ No	☐ Yes ☑ No	
Main Entrance Sign	Sign to display; Name of site; C of A Number, Operation authority and their telephone number; Hours of operation; Emergency telephone number; Waste types accepted; warning against unauthorized access and dumping outside of site	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
Hours of Operation	Hours are posted on entrance sign?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
Supervision	Number of staff on site	☑ 1 ☐ 2 ☐ 3	☑ 1 ☐ 2 ☐ 3	☑ 1 ☐ 2 ☐ 3	
Fence	Completed monthly inspection of fences?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
Transportation	Road Surface appropriate for uses vehicles?	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	
Custodian Shelter	Condition of Shelter: Information/signs provided for safety and emergency procedures, telephone locations and emergency contact names and numbers; fire	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	

Daily Operations Checklist

Litter Control

Uncontrolled Dumping

Burning

Why Garbage Should Not Be Burned

Safe Burning Practices

- Avoid burning during periods of dry or windy weather
- Supervise fire until extinguished
- Have the correct equipment to extinguish fire should weather conditions change
- Fire should only be done in small manageable stockpiles and setback from trees (30m or more)
- Do not burn over previous waste
- Schedule burning when landfill is closed
- Have a contingency plan for emergency assistance
- Inspect all wood before burning to ensure there are no containers that can explode are hidden

Vermin

Do you have issues with vermin at your site?

Best Practices for Controlling Vermin

- Cover waste at least weekly – schedule covering to follow days when site is open
- Maintain fences in good condition to keep large (wild or domestic) animals away
- Encourage residents to do backyard composting to minimize organics at the landfill
- Bury dead animals (most sites prohibit dead animal carcasses)

Contingency Planning

Do you have one in place?

Types of Contingency Plans

Report to Council/Community

- Monthly summary of operational issues at the landfill
- Prepared by the person responsible for waste management
- Should include any of the following:
  - Labour problems with employees
  - Incidents where an injury occurred
  - Mechanical breakdown with equipment
  - Issues with suppliers of material (daily cover)
  - Significant improvements needed to building
  - Complaints or illegal dumping

Health and Safety

Training

Workplace Hazardous Materials Information System (WHMIS), First Aid and CPR training, site specific Health and Safety training, and be current with their tetanus vaccine

Site Closure

Best Practices for Site Closure

- Follow guidelines for final slope
- Close progressively
- Apply a final cover
- Continue to monitor

Summary

- ✓ Managing the Fill Area
- ✓ Monitoring and Reporting
- ✓ Staffing and Supervision
- ✓ General Practices: burning, gating, hours of operation, vermin
- ✓ Contingency Plans
- ✓ Health and Safety
- ✓ Site Closure

Equipment

Cell, Compaction and Cover Equipment


Crawler Tractor Specifications

Compactor Specifications

Type of equipment	Function	Cost
Landfill compactor	Spreading and compacting solid waste, moving waste into the active cell, and applying daily cover. Most efficient when on flat surface Should not be operated on a slope steeper that 4H:1V for safety	New $500,000
Crawler tractor or Bulldozer	Same functions as compactor but tracks of dozer used instead of steel wheels . Most common equipment at most sites. More versatile than compactor and is readily available from any excavation company.	New $ 275,000
Track loaders	Best suited to trench method because it can excavate daily cover.	New $200,000
Excavators/backhoe	Used for reshaping waste sideslopes, drainage ditches, moving material stockpiles.	New $150,000

The “END”

For more information contact either:

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