

Unique Challenges to Siting a New Landfill in Old Crow, Yukon





Agenda

1. Introduction
2. Background and Current Site Overview
3. Project Overview
4. Site Information
5. Refined Evaluation



Introduction

- **Elise Duma, P.Eng.**
- Solid Waste Engineer based out of Edmonton
- B.Sc. Chemical Engineering, University of Calgary (2013)
- Environmental Technology Diploma, SAIT (2017)
- Consulting since 2017, started in Contaminated Sites Management, moving into solid waste engineering since 2021.
- Experience has included a mix of northern and remote solid waste sites.

- Other team members on the project: Nathalie Marble P.Eng. And Forest Pearson P.Eng.





Background and Site Overview





Current Site Operations

- Vuntut Gwitchin First Nation (VGFN) ~ 236 people. Ice road (some years) and fly-in only.
- Site operates under a 10-year Waste Management Permit, amended in 2018. Solid Waste Management Plan Completed for 2023-2033
- Municipal Solid Waste (MSW) and Construction and Demolition (C&D) accepted at the site.
 - C&D is landfilled
 - Divertible materials are segregated and stored for backhaul
 - MSW is currently thermally oxidated
- The site is reaching capacity and has limited expansion options.





Solid Waste Mana

Old Crow Existing Site



SEGREGATED DIVERTIBLE MATERIALS





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Household Hazardous Waste

ALL MATERIALS MUST BE

SEPARATED SEALED LABELLED

HOUSEHOLD CLEANERS
DETERGENTS
BLEACH
DISINFECTANTS
RUBBING ALCOHOL

AEROSOL CANS
SPRAY PAINT
HAIRSPRAY
SUNSCREEN
AIR FRESHENERS

BATTERIES
VEHICLE BATTERIES
HOUSEHOLD BATTERIES

CHEMICAL LIQUIDS
ANTYWEAR PAINT / THINNER
STAINS & SEALANTS
GASOLINE / DIESEL
MOTOR OIL

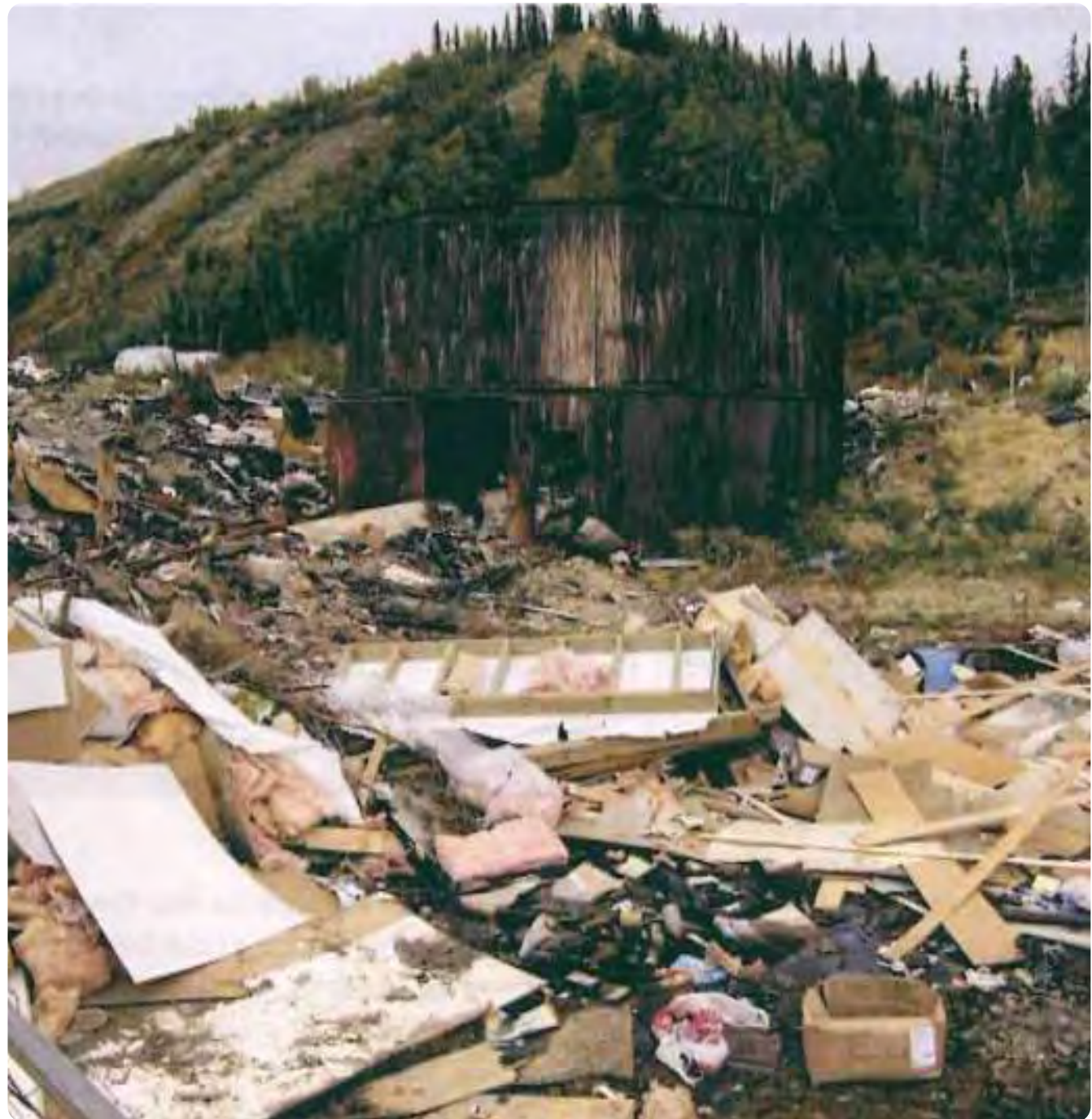
Ewaste
Electronics & small appliances
Anything with a cord!





WTEC – Mobile Batch Oxidation System (mBOS)

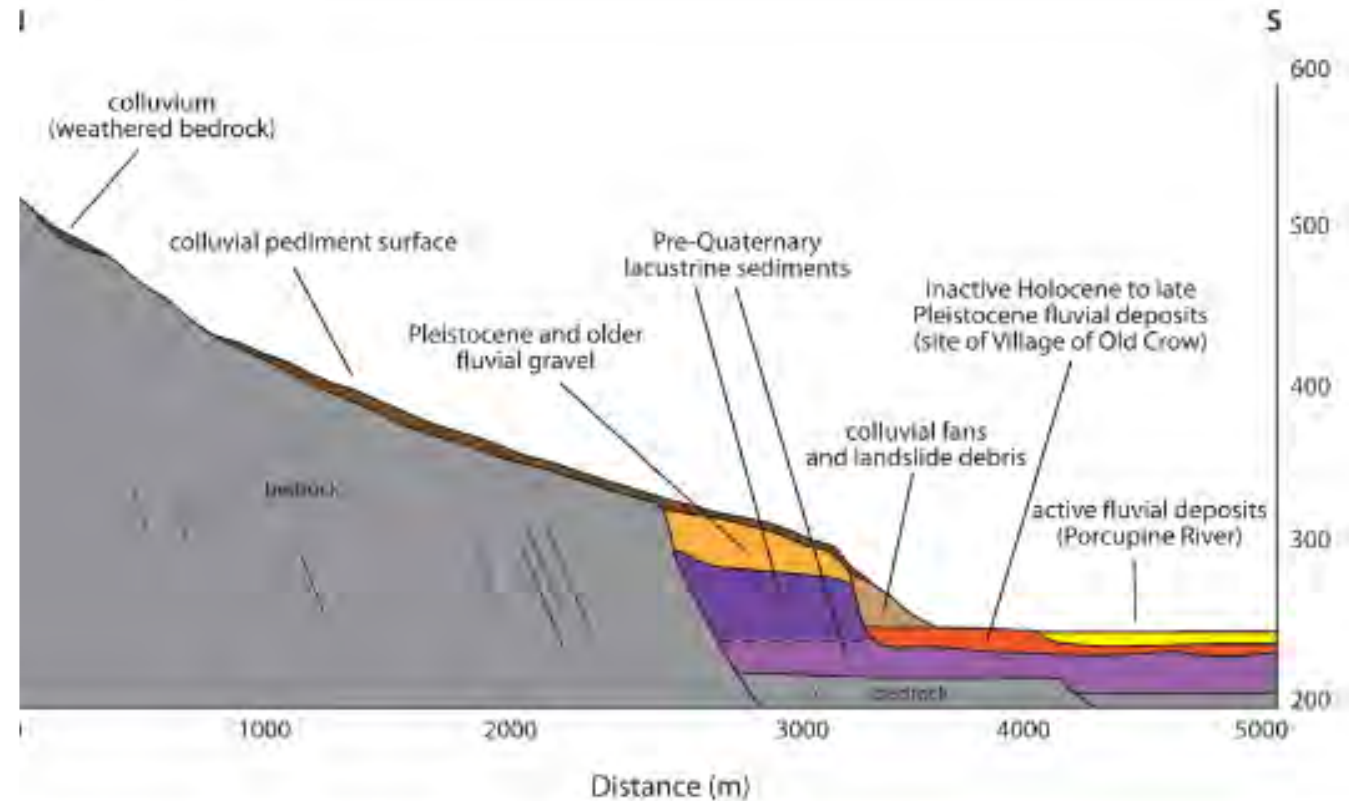
- Thermal Oxidation System was commissioned in 2012, to replace the open burning operations. A full-time attendant was hired in 2014
- “A proven gasification technology that provides a clean, smart, and affordable method to deal with batches of 20 – 360 mtpd”
- Not an incinerator – uses gasification/oxidation technology that cleanly burns gas from the waste in an enclosed system and produces 5% or less inert ash.
- System broke down in 2017 – an explosion took out a burner. Complicated system, with service options limited especially with WTEC went out of business
- Specialized service technicians, brought the system back online mid-2023.





Extra Considerations

- Gravel deposits are expected in the area. Current gravel deposits are becoming depleted. Hoping to develop the landfill and future gravel source at the same time
- The Porcupine Caribou herd is one of the largest migratory barren ground caribou herds in North America (~200,000). Important part of ecology of the Western Arctic and of profound significance and importance to the community
- Current available cover material is limited
- Flooding in the area and experience from evacuations influences decision making



Old Crow Landscape Hazards Report (Benkert et al, 2016)



Climate Change Considerations

- Increased Instances of Flooding – Last flood in 2025.
- Evacuation orders start with Zone 1
- “Dump Road” closes due to flooding, restricting access to the lagoon as well, causing restrictions to sewage pickups





Project Overview





Methodology

- Background Review
 - Gather input with working group through site visit
- Develop Siting criteria and GIS map
- Preliminary Results
- Site Visit to further narrow down options
- Site Recommendations and Cost Estimate
- More consultation, presenting results to the community
- Final Report





Waste and Recycling Management Options

Option	Longevity / Reliability	Economic Impact	Environmental Impact
Gasification	↓	↓↓	↓
Waste and Recycling Transport out of Old Crow	↓	↓↓↓	↓↓↓
Expanding the Existing Landfill	↑	↓	↓
Siting a New Landfill	↑↑	↓	↓



Landfill Siting – Opportunity Mapping

- Opportunity mapping: highlights the areas that meet the most criteria.
- Based on Yukon and BC landfill siting guidelines.
- Each criteria has 2 or 3 classifications:
 - preferred (1 - green),
 - moderate (0.5 - yellow), &
 - less desirable (0 – red)

Example landfill siting criteria: distance from roads:





Opportunity Mapping

The best sites meet the most criteria

Yukon Landfill Siting Criteria

Surface Water Buffer

Topography

Drinking Water Wells

Depth to Groundwater

Land Use (Occupied Buildings / Food Storage)

Soil Suitability

Public Roads / Railways / Rights-of-Way

Permafrost & Climate Change Considerations

Floodplains

Vegetated Buffer Zones

Distance to Other Waste Facilities

Airports

Unstable Areas (e.g., Faults, Slides, Avalanches)

Environmentally Sensitive Areas

Heritage and Archeological Sites?



Old Crow Landfill Site Opportunities

- | | |
|-----------------------------|----------------------------------|
| Landfill Site Opportunities | Waterbody |
| Community Boundaries | Landfill Site Opportunity Rating |
| Land Parcel | 0 - 6 - Least Desirable Areas |
| Yukon Road Network | 6.5 - 8 |
| Road | 8.5 - 10 |
| Local Street | 10.5 - 12 - Best Areas |
| Watercourse | Extent of Permafrost Data |



Site Investigations























Summary Slide

- Western Site
 - Used for dog mushing, skiing, access route up gully is community ski trail. Due to added complexity, larger footprint, and cultural practices, unlikely candidate for development.
- Eastern Site
 - Highest general ranking. Good location while providing the benefits of a potential gravel source. Est. cost \$7.4M, assuming \$9M in gravel
- Northeastern Site
 - Lowest cost, although not significantly (7.1M) but no source of gravel. Great drainage, but high winds and visibility.
- Central Site
 - Good location, but more drainage considerations. Terrain slightly less favorable. Gravel source potential. Similar costs - \$7.5M. Potential \$8.3M gravel revenue.

Thank you





Preliminary VGFN Meeting Summary

The northwest area of Old Crow emerged as the most preferred site by VGFN due to its accessibility and lower environmental impact.

However, accessibility to this area is limited.

Other viable options included the plateau and areas east of Mountain Road, though VGFN indicated that the latter may be affected by high winds.

Locations near waterways or with limited access—such as south of the community—were ruled out due to flooding risks and infrastructure limitations.