



Ministerial Committee on Solid Waste

Recommendations for Action towards a Sustainable
Solid Waste Management System for Yukon

April 2018



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1.0. Executive Summary

The Ministerial Committee on Solid Waste (the Committee) is pleased to submit its final report to the Minister of Community Services (the Minister) for review. This report provides an evaluation, analysis and recommendations for Yukon's solid waste management system. Methods of evaluation and analysis included a community waste survey (*See Appendix I*) and a jurisdictional scan (*See Muniscope Jurisdictional Scan*), as well as utilizing historical, regional and national data to inform the Committee's recommendations.

The recommendations put forward center primarily on improving the current systems and creating efficiencies where possible. The *Executive Summary – Recommendations* table below provides a brief description of the Committee's prioritized recommendations with high level cost estimates for development of the required action plans or reports and/or implementing the action. These costs do not include existing (i.e. sunk) costs such as landfill liabilities, landfill closure costs or known operating costs. The theme throughout is to keep operating cost impacts to a minimum. These recommendations lead to a reallocation of existing costs with a focus on evidence based decision making. The committee finds that interim financing may be required by some municipalities to meet regulatory requirements such as groundwater monitoring. All data used to inform this report can be found in the appendices.

Results of the Committee's analysis show that while Yukon residents enjoy a high level of waste management services in many cases, the delivery of these services can generally be characterized as inconsistent and costly (on a per-capita basis) when compared to other jurisdictions in Canada.

This report finds that without changes to the ways in which waste management services are delivered in Yukon, there is significant risk to municipalities and the Yukon government in providing adequate and cost-effective waste services to residents in the long-term. The pressure of increasing costs, coupled with public and stakeholder demands for action, highlights the need for action.

1.1. Executive Summary - Key Findings

High Cost of Waste. Yukon currently has 14 unincorporated community landfills (three operated by Highways and Public Works, 11 by Community Services), five waste transfer stations (operated by Community Services), and eight municipally operated landfills, meaning Yukon operates 27 waste management facilities to serve 38,641 residents. The estimated operating and maintenance cost (not including landfill closure) of managing Yukon's waste streams which includes operating landfills, recycling depots and compost facilities, and transporting waste and recyclables is approximately \$10.5 million per year or \$275 per person per year (*See Appendix I - YG Costs*).

Rationalization of Services. Many jurisdictions have launched waste management strategies that have sought to improve their waste management facilities and services in rural and isolated communities. As a result of increasing awareness around environmental liabilities and the life-cycle cost of landfilling, landfills are being closed across Canada. Moreover, the majority of the landfills in operation in Yukon provide a wide-range of services and accept a variety of materials at little to no upfront cost to residents.

Regionalization. Several jurisdictions have opted to implement legislation that allows or facilitates regional cooperation for waste management. Three landfills in Yukon currently accept waste from areas outside their municipal boundaries through regional agreements: Dawson, Whitehorse and Watson Lake. Expanding upon this model for the rest of Yukon would provide support for regional (municipal) sites, while reducing the number of active landfills and associated long term environmental liabilities.

User Fees. The primary cost-recovery process for solid waste in Canada is currently taxation and utility fees. Growing regulatory requirements, increasing volumes of waste, and potentially toxic legacy waste has led to solid waste systems which can be considered underfunded. The Committee believes that adequately funding this system cannot be accomplished through transfer payments from the Yukon government alone. Users, industry, and governments, must pay a reasonable portion of the cost of the waste they generate if a sustainable system of management of solid waste is desired. In particular, this Committee believes that the timely implementation of the Designated Materials Regulation (DMR) is a critical action in relation to the financial sustainability of waste management.

Best Practices. The variety of ways in which solid waste is managed in Yukon presents a significant challenge in making improvements to the overall system. Implementing territory-wide service levels and new initiatives requires the support and buy-in of all of the operators and facilities. Solid waste systems have a great number of interdependences and to continually improve the system it is helpful for solid waste managers to be consistent in following best practices.

First Nations Participation in Solid Waste Management. Though many First Nations in Yukon do not have a role in waste management in the same way municipalities do, the Committee carefully considered the current and potential future role of First Nations. For example, the Committee sees significant economic development opportunities for both municipalities and First Nations in the regionalization of our solid waste system in handling and transporting solid waste. The Committee feels strongly that solid waste management is an issue which affects all Yukoners, including First Nations, and any solutions to be implemented should involve First Nations groups where possible.

Implementation Working Group. A collaborative approach to improving waste management practices throughout Yukon requires that the Yukon government work closely with all affected First Nations and municipalities throughout the implementation of the following recommendations. In order for this working group to have the authority and capacity to make the changes suggested in this report, specific roles will need to be identified and positions will need to be funded for the short to medium term. This can either be done in a formal agreement between governments or by providing a clear mandate and resources to Community Services.

1.2. Executive Summary - Recommendations

The Committee is recommending the following actions (*See pages 5 – 11 for detailed activities*):

Theme	Recommendation	Timeframe	Priority¹	Capital Cost²
Regionalization	Review waste management costs and service levels for unincorporated areas	Short (2018)	1	*
	Develop and implement a solid waste regionalization strategy and framework	Short to Medium (2018-19)	1	***
	Develop a strategy for managing landfill liability responsibilities including legacy liabilities	Short to Medium (2018-19)	1	**
User Pay	Implement DMR as expediently as possible and explore Extended Producer Responsibility (EPR) with industry	Medium to Long (2018-2022)	1	**
	Implement a solid waste user fee pilot in Whitehorse periphery to explore potential user fees at all sites	Short to Medium (2019-20+)	1	**
	Continue to support diversion credit program in the short term as DMR is implemented	Short to Medium (2018-19+)	2	*
	Implement a coordinated communications strategy promoting stewardship programs and practices in Yukon	Short (2018)	2	**
Clear Standards	Establish a Solid Waste Implementation Working Group	Short (2018)	2	*
	Implement best practices for waste management facility operations	Medium (2019)	3	*
	Explore the role of social enterprise, entrepreneurship and local innovation in solid waste management across Yukon	Medium to Long (2019-2022+)	3	*

1. Priority 1: (critical), 2 (important) and 3 (beneficial).

2. Capital Cost: - No cost, * (\$10,000 or less) to ***** (\$1,000,000 or more)

2.0. Recommendations

The recommendations included in this section represent the Committee’s deliverable as per the mandate given by the Minister and as outlined in the Terms of Reference. The recommendations encompass three broad priority areas of solid waste management, which are (1) Regionalization, (2) User pay, and (3) Clear standards.

The actions contained within each of these areas are grounded in the key findings of the Committee and based on the primary and secondary research undertaken. The actions utilize the SMART (specific, measurable, achievable, relevant, and time-based) principle for strategic planning.

2.1. Reading the Recommendations

The recommendations are formatted into tables for clarity and readability. Below is a description of each column and how it should be interpreted:

Theme: This row describes the overarching priority area in which the recommendation/action fits					
Recommendation: This column describes the broad recommendation which the attached actions support					
Action	Timeframe	Cost	Deliverable	Outcome	Partners
This column describes the specific action being recommended	This column describes the estimated timeframe to initiate the action	This column describes the estimated incremental costs to implement on a scale of * (\$10,000 or less) to ***** (\$1,000,000 or more)	This column describes what the anticipated deliverable of the specific actions	This column describes the broader purpose of the action and what goal is trying to be achieved by the action	This column describes who should likely be involved in the action. This does not indicate who would be leading the implementation nor is an exhaustive list

2.2. Theme: Regionalization

The Committee’s vision for this theme centers on the efficient use of resources and support for enhanced municipal solid waste operations. The Yukon currently has 27 solid waste facilities, eight of which are municipally operated. Given the increasing pressure to mitigate environmental risk, improve monitoring and reduce waste management costs over the long term, it is essential that waste management facilities implement best operating practices and the number of active landfills in Yukon be managed.

Directing existing and new resources towards enhancing regional solid waste sites can help the Yukon government ensure that there is an appropriate level of service for the population served, as well as strategically prepare for the eventual closure of some solid waste facilities without a significantly reducing service.

Theme: Regionalization

Recommendation: Review waste management service levels for unincorporated areas

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Review levels of service and costs for unincorporated solid waste facilities	Short Term (2018)	*	Report and Action Plan	<ul style="list-style-type: none"> Service levels are cost-efficient through rationalization of Yukon government solid waste sites as part of regional strategy Possible introduction of a user pay system at Yukon government solid waste sites 	YG Municipalities LAC's First Nations

Theme: Regionalization

Recommendation: Develop and implement a solid waste regionalization strategy and framework

Action	Timeframe	Cost	Deliverable	Outcome	Partners
a) Develop and implement a solid waste regionalization strategy and framework which includes: operating boundaries, service levels, base infrastructure (gates, electricity, scales, monitoring wells etc.), best practices, and population based funding	Short to Medium Term (2018-19)	***	Regional Waste Management Strategy and Framework	<ul style="list-style-type: none"> Defining criteria for regional solid waste sites Establishing evidenced based funding criteria for regional sites Implementation of regional agreements Identifying economic development opportunities for local governments, non-profits and private sector 	YG First Nations Municipalities AYC Unincorporated Communities
Establish "Solid Waste Management for Northern and Remote Communities" document as best practices for solid waste operations	Short Term (2018)	-	All waste managers adopt guidance document as applicable to the individual site	<ul style="list-style-type: none"> Best practices for solid waste are consistent at all sites across Yukon Environmental risk is minimized 	YG Municipalities

Theme: Regionalization					
Recommendation: Develop a strategy for managing landfill liability responsibilities including legacy liabilities					
Action	Timeframe	Cost	Deliverable	Outcome	Partners
a) Develop a territorial understanding of landfill liability responsibilities and processes, including costs for monitoring wells, closure and post-closure costs.	Short Term (2018)	**	Workshop and report	<ul style="list-style-type: none"> All municipalities and YG understand process and responsibilities should environmental contamination occur at a landfill General understanding of the costs and responsibilities with ongoing landfill liability 	YG Municipalities
b) Determine historic use of all landfill sites in Yukon	Medium Term (2018-19)	*	Report	<ul style="list-style-type: none"> Determine if landfills were active prior to municipal operations in order to clarify responsibilities 	YG Municipalities

2.3. Theme: User Pay

The Committee’s vision for this theme centers on acknowledging the need for additional resources to address new and existing challenges. In some cases, there may be an adequate amount of resources directed to a particular asset or service, but it may not be being used efficiently. In other cases, there may not be an adequate amount of resources in place to deal with the issue at hand in the manner specified.

The Committee recognizes that a sustainable solution to funding solid waste operations requires a combination of approaches, including transfer payments, taxes and user fees. Increased funding for solid waste is necessary, but this funding should not come solely from Yukon government.

Theme: User Pay					
Recommendation: Implement DMR as expediently as possible and explore EPR with industry					
Action	Timeframe	Cost	Deliverable	Outcome	Partners
Continue with a phased-in approach to implementation of designated materials regulations including items commonly identified as household hazardous waste	Medium to Long-term (2018/19 to 2020+)	**	Inclusion of relevant materials in DMR as per YG commitment to CCME Canada Wide Action Plan on EPR	<ul style="list-style-type: none"> Increasing funding for Yukon waste management systems Ongoing support for already adopted CCME Action Plan Addition of key materials on the DMR list such as oil and waste oil containers 	YG Municipalities
Examine and report on EPR feasibility in Yukon	Short Term (2018)	*	Report	<ul style="list-style-type: none"> Understanding the feasibility of EPR in Yukon 	YG

Theme: User Pay

Recommendation: Implement a solid waste user fee pilot in Whitehorse periphery and phase in fees throughout Yukon

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Initiate consultation with Whitehorse periphery on proposed fees	Short Term (2018)	*	Engagement and Action Plan	<ul style="list-style-type: none"> Understand public opinion of user fees at Yukon government solid waste sites in the Whitehorse periphery Develop a user fee pilot implementation plan 	YG Unincorporated Communities Local organizations
Implement a solid waste user fee pilot project in the Whitehorse periphery	Medium Term (2019)	**	User fees in place in Whitehorse periphery	<ul style="list-style-type: none"> Establish a user fee model to increase cost efficiencies Reduce waste flows to Whitehorse peripheral sites 	YG Unincorporated Communities Local Organizations
Evaluate impact and based on results, determine potential for a territory-wide roll out	Medium to Long-Term (2019 to 20)	**	Report and Action Plan	<ul style="list-style-type: none"> Determine the effectiveness of pilot including potential implementation of user fees at all municipal and YG sites 	YG Municipalities Unincorporated Communities Local Organizations

Theme: User Pay

Recommendation: Continue to support the diversion credit program in the short term and assess the program for accountability and financial sustainability

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Assess and modify the diversion credits program for accountability and financial sustainability	Short (2018)	*	Program review report	<ul style="list-style-type: none"> Accountable funding program in the short term 	YG City of Whitehorse Recycling Processors
Ensure diversion credits are fully funded until such time that DMR offsets this funding system	Short to Medium-term (2018/19 to 2020+)	*	Strategy for diversion credits	<ul style="list-style-type: none"> Secure funding for processors in the short term until DMR is fully developed 	YG Municipalities

Theme: User Pay

Recommendation: Implement a coordinated communications strategy promoting stewardship programs and practices in Yukon

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Implement a coordinated strategy promoting stewardship programs, practices and innovation in Yukon	Short Term (2018)	**	Ongoing collaborative Communications Strategy	<ul style="list-style-type: none"> Ensuring awareness of existing programs and practices Establishment of long term communications strategy around key solid waste initiatives 	YG Municipalities Non-profits Business Sector Yukon College/Research Centre

2.4. Theme: Clear Standards

The Committee’s vision for this theme centers on the ability for all solid waste operators and managers in Yukon to deliver services in a consistent manner and to become more efficient in the delivery of these services through standard approaches and use of best practices.

Through reviewing the results of the Committee’s 2017 Community Waste Survey, it became apparent that there are a number of disparities among communities and municipalities in how they deliver services, how those services are funded, and how the costs and services are tracked and accounted.

The Committee acknowledges the limitations of the Yukon government to impose new regulations on municipalities in how they operate solid waste facilities, so the recommendations and actions contained under this priority are based primarily in leadership, data collection and reporting, and promotion of best practices.

Theme: Clear Standards

Recommendation: Establish an Implementation Working Group

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Establish a Task Specific Implementation Working Group	Short Term (2018)	*	Establishment of task specific working groups	<ul style="list-style-type: none"> Ongoing oversight and guidance for the implementation of the report’s recommendations 	YG Municipalities First Nations

Theme: Clear Standards

Recommendation: Implement best practices for waste management operations

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Standardize reporting practices for solid waste facilities	Short Term (2018)	*	All facilities separating waste costs by functional area	<ul style="list-style-type: none"> Solid waste managers are utilizing best practices to guide operations 	YG Municipalities First Nations
Review the efficiency of the movement of solid waste and recyclables	Medium Term (2018)	*	Report	<ul style="list-style-type: none"> Evidence based decision making on the transportation of waste 	YG Municipalities First Nations
Assess the production, transportation, processing and handling of non-refundable materials for the economic, social and environmental value	Short Term (2018)	*	Report	<ul style="list-style-type: none"> Clear understanding of the economic, social and environmental value of recycling 	YG

Theme: Clear Standards

Recommendation: Explore the role of social enterprise, entrepreneurship and local innovation in solid waste management in Yukon

Action	Timeframe	Cost	Deliverable	Outcome	Partners
Explore the role of social enterprise and entrepreneurship and local innovation in solid waste management in Yukon	Medium to Long-term (2019 to 2020+)	*	Report	<ul style="list-style-type: none"> Gaining an understanding of the potential of non-profits, private industry and mining sector and its roles in solid waste management 	YG Municipalities First Nations

2.5. Theme: Local Initiatives: Organics and Compost

Theme: Local Initiatives					
Recommendation: Continue to encourage compost programs to be developed and delivered at the discretion of communities					
Action	Timeframe	Cost	Deliverable	Outcome	Partners
Continue to encourage the development and delivery of local compost programs at the discretion of communities	Short Term (2018)	*	Nil	<ul style="list-style-type: none"> Enhanced local organics diversion programs 	YG Municipalities First Nations

3.0. Next Steps

In order to move forward with the recommendations in the report, the Committee recommends that an implementation working group be formed as soon as possible. Dependent on the recommendations selected for implementation, the implementation group can begin to work with various partners to determine project scope, budgets, resources needed, and so on, to ensure that initiatives are moving forward.

The Committee believes that working towards a robust, modern and sustainable territory-wide solid waste system is an iterative process that will require ongoing dialogue and participation of stakeholders. The implementation working group will be vital in ensuring we have the appropriate mechanisms in place for that feedback and communication.

Beyond forming an implementation group, next steps will depend on which recommendations the Minister feels are feasible to implement. Although the mandate of this Committee has concluded, there is high interest from members to continue this conversation and help support implementation.

4.0 Background

The Ministerial Committee on Solid Waste was struck in October of 2017 and tasked with developing recommendations to the Minister of Community Services on improving solid waste management in Yukon.

Members of the committee were as follows:

Ian Davis Co-Chair (YG), Bev Buckway Co-Chair (AYC), Ian Dunlop (AYC), Cam Lockwood (AYC), Cole Hunking (AYC), Bryna Cable (City of Whitehorse), Todd Powell (YG), Damien Burns (YG), Dave Albisser (YG).

The Minister provided initial guidance through a Terms of Reference and asked the Committee to provide their recommendations on the following:

- Developing a user fee pilot at YG and municipal waste management sites;
- Exploring improved HHW and waste oil collection programs/service levels;
- Exploring organics diversion and composting programs in communities;
- Exploring waste transportation and collection efficiencies; and
- Advising the Minister of Community Services on solid waste, specifically focusing on solid waste governance models, stewardship, funding models and service objectives.

Based on guidance from the Minister, the Committee established the following goals for developing this report:

- To produce a short and simple report with recommendations that are clear and easy to understand;
- To help quantify and provide context to the different solid waste systems in Yukon;
- To have a clear understanding of shared solid waste issues;
- To better define the roles and responsibilities of solid waste managers in Yukon;
- To help inform citizens on the true costs associated with operating solid waste services;
- To put forward pragmatic actions that support a structured and shared vision for waste management; and
- To provide recommendations that, as much as possible, work within existing resources.

The Committee approached all of its recommendations utilizing the vision of the previous 2017 Solid Waste Working Group. The vision of that group and this Committee is as follows:

“A standardized waste management system for the Yukon that is based on: shared responsibility for waste management and waste reduction; financial sustainability; collaboration; environmental health; and economic benefit.”

Solid waste management in Yukon has been an increasing topic of interest for governments over the past number of years. There has been an equivalent amount of resources and research directed towards understanding how Yukon can overcome some of its unique challenges in order to develop a sustainable and effective territory-wide solid waste system.

In order to provide context to the findings in this report, it is important to acknowledge the important and valuable work that has preceded the Committee’s recommendations. It is appropriate to say that the findings and recommendations of this Committee are a continuation of previous reports such as AYC’s *Solid Waste Management: Vision for a Sustainable Model for Yukon Communities* (2016) (See AYC Report) and Government of Canada’s *Solid Waste Management for Northern and Remote Communities* (2016) (See Government of Canada’s Report) (a full listing of resources utilized to inform the

Committee's recommendation can be found in the bibliography Appendix III). The Committee recognizes the work of these groups and this work has informed the recommendations of this report greatly.

To summarize, the findings of the aforementioned reports make similar recommendations for solid waste management in northern and remote communities. Vast land masses and relatively sparse populations distributed across these areas present significant challenges for effective management of solid waste. Collecting and processing waste efficiently and in a cost-effective manner is greatly dependent on volumes. As well, providing the infrastructure and human resources to meet current environmental regulations, while simultaneously providing a high level of service to residents, has become a significant task in Yukon.

Adding pressure to the need to develop solutions for solid waste in northern communities is that the operation, maintenance and eventual closure of landfills is only getting more expensive as time moves on. Yukon's relatively small tax base means that paying the full cost of landfill operations and closure under the current system, through the use of taxes or subsidies by the Yukon government, will likely never lead to a truly sustainable solid waste system. The research to date has concluded that funding sustainable landfill operations must include a robust user-pay component, including multiple revenue streams such as tipping fees, providing value-added services (e.g., household hazardous waste) and progressive systems such as the Designated Material Regulation (a stewardship model) and Extended Producer Responsibility.

The need to develop solutions is apparent and has been well articulated in past studies. It is important to note that the Committee wholly supports and recognizes the need for solutions and hopes that the recommendations contained in the balance of this report will move Yukon towards a more sustainable, effective and efficient solid waste system.

The methodology used to create this report was to analyze past research and customized survey data to quantify and contextualize the state of Yukon's current solid waste systems. Through this research and survey, the Committee's goal was to develop evidence-based recommendations which related directly to the present challenges being faced to solid waste managers and that could be implemented effectively and quickly. Throughout the process the Committee worked closely with municipalities (directly and through AYC) to ensure that relevant data were being sought and that it reflected the current realities of solid waste managers.

The Committee collected primary data through two sources: the *2017 Community Waste Survey (See Appendix I)* and *2017 Waste Management Jurisdictional Scan (See Muniscope Waste Management Jurisdictional Scan)*.

The 2017 Community Waste Survey asked a series of questions to municipalities regarding municipal waste management operations. Including landfilling, recycling, compost and household hazardous waste. The results of the survey were helpful in understanding the challenges of municipal solid waste operations, and more importantly, where those challenges aligned or diverged. The intent of the survey was to determine current costs and service levels in municipal waste management systems.

The 2017 Waste Management Jurisdictional Scan was undertaken by Muniscope for the Committee in order to better understand the various governance structures, service levels and funding models to waste management throughout Canada. Understanding the various solid waste regimes and how they are operated and funded provided valuable context for the Committee and ensured that all possible models were considered in the recommendations of this report.

APPENDICES

Appendix I – Community Waste Survey Results

	Faro	Whitehorse	Carmacks	Watson Lake	Teslin	Haines Junction	Mayo	Dawson City	
General Info									
Population	397	28,577	540	1464	514	909	499	2226	<- Based on 2016 YBS census data
Number of Households	N/D	5,850	N/D	374	N/D	262 (excl. CAFN)	150	700	
Tonnage (internal)	280	17,709	486	755.6	390	N/D	N/D	N/D	<- N/D - No Data
Tonnage (external)	75	1,424	45	154.2	198	N/D	N/D	N/D	
Annual Tonnage (approx.)	360	19,133	496	910	488	818	449	2,003	<- Where N/D (no data) available, total tonnage was calculated at .9T per year, per person
Waste Streams									
MSW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	R = Recycling
C&D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	PB/NP = Private Business/Non-Profit
Metals	Yes	Yes - R	Yes	Yes	Yes	Yes	Yes	Yes	
HHW, other toxics	No	Yes - PB/NP	No	No	No	Yes - R	Yes	No	<- Mayo checked both "landfill" and "not accepted"
Tires	Yes	Yes	Yes	Yes	Yes - R	Yes	Yes	Yes	
E-waste	PB/NP	Yes - R, PB/NP	Yes	Yes - R	Yes - R	Yes - R	Yes - R	Yes	
Recycling	PB/NP	Yes - R	Yes-R	Yes - R	Yes - R	Yes - R, PB/NP	Yes - R	Yes - R	
Organics	Yes	Yes	Yes	No	Yes - R	Yes - R	Yes	Yes	
Reuse Facility	PB/NP	No	Yes	Yes - R	Yes - R	Yes - R	Yes - R	Yes	
Vehicles	Yes	Yes - PB/NP	Yes	Yes	Yes - R	Yes	Yes	Yes	
Bulky Items (mattresses, etc)	Yes	Yes	Yes	Yes	Yes - R	Yes	Yes	Yes	
WMF Operations									
Is the Facility Gated?	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Facility Open Hours	Daily	Daily	MWFS 8am-7pm	Daily	Daily	Daily	Daily	Daily	<- Daily means 5+ days per week.
Is an Attendant present during working hours?	No	Yes	No	Yes	Yes	Yes	No	Yes	
Facility Attendant hours/wk	0	80	0	80	40	40	0	40	
Operator/Attendant Training (courses)	Landfill Ops	SWANA+	SWANA	SWANA+	None	SWANA	SWANA	SWANA	
Who maintains Facility?	Municipal	Municipal	Municipality	Municipal	Municipal	Municipal	Municipal	Municipal	
Annual WMF Operating Expense	\$ 78,704.11	\$ 1,669,906.00	\$ 94,243.00	\$ 359,945.00	\$ 136,150.00	\$ 177,880.00	\$ 215,940.00	\$ 114,640.00	<- Includes maintenance, wages, landfilling and operations expenses
Annual groundwater monitoring cost	\$ 15,200.00	\$ 65,000.00	\$ 17,100.00	\$ 19,360.00	\$ 12,300.00	\$ 10,400.00	\$ 16,100.00	\$ 20,000.00	<- Whitehorse includes this in the above WMF cost
Recycling Operations									
Cardboard	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Paper/boxboard	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	
Beverage containers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Plastics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Tin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Glass	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	
Non-Ferrous Metals	Yes	Yes	No	Yes	Yes	Yes	No	Yes	
Annual Recycling Operating Expense	\$ 6,193.00	\$ 150,000.00	\$ 27,000.00	\$ 225,000.00	\$ 37,000.00	\$ 88,442.85	\$ 88,970.00	N/D	\$ 622,605.85
Annual Recycling YG Contribution (Diversion Credits in Whse)	\$ 14,700.00	\$ 612,692.00	\$ 18,300.00	\$ 40,800.00	\$ 19,700.00	\$ 31,500.00	\$ 14,700.00	\$ 40,800.00	\$ 793,192.00
									\$ 1,415,797.85
Compost Operations									
Compost (Y/N)	Yes	Yes	No	No	Yes	Yes	N/D	Yes	
Annual Compost Operating Expense	\$ -	\$ 424,178.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Waste Collection									
Waste Collection Provided (Y/N)	Yes	Yes	No	Yes	Yes	Yes	No	Yes	
Annual Waste Collection Expense	\$ 12,666.51	\$ 797,798.00	\$ -	\$ 53,394.00	\$ 15,500.00	\$ 19,968.00	\$ -	\$ 290,000.00	
Waste Administrative Support									
Estimated Weekly Hours	2	138.75	N/D	10	10	N/D	12	9	
Annual Waste Administrative Cost	\$ -	\$ 348,743.00	N/D	\$ 15,600.00	\$ -	\$ -	\$ 21,840.00	\$ -	
Landfill Closure Liability									
Annual Landfill Liability Cost	N/D	\$ 173,352.00	\$ 18,000.00	N/D	N/D	\$ 3,500.00	\$ 36,000.00	N/D	
Years of life left in current landfill	>50	35	>50	>50	>50	>50	>50	>50	<- From MH 2013 Report
landfill reserve value	\$ 48,000.00								
Total Estimated Waste Management Expense									
Total Annual Estimated Expense	\$ (100,097.00)	\$ (2,163,379.00)	\$ -	\$ (414,445.00)	\$ (188,650.00)	\$ (270,002.85)	\$ (362,750.00)	\$ (378,912.00)	<- Dawson Data Inconsistent
<i>*note: As reported by communities; does not include waste collection costs. Waste collection costs are reflected in per capita calculations below.</i>									
Revenue Streams									
Operational Funding for Recycling Depot	\$ -	\$ -	\$ -	\$ 40,800.00	\$ 11,400.00	\$ -	\$ -	\$ -	
Total Annual Tipping Fee Revenue	\$ -	\$ 1,828,253.00	\$ -	\$ 141,945.00	\$ 5,700.00	\$ 8,085.00	\$ 1,000.00	\$ -	
Total Annual Permit/Utility Fee Revenue	\$ 29,875.28	\$ 537,302.00	\$ -	\$ 88,100.00	\$ 27,000.00	\$ -	\$ 28,000.00	\$ 166,347.00	
Annual Regional Waste Facility Operational Funding	\$ -	\$ -	\$ -	\$ 75,000.00	\$ -	\$ 31,500.00	\$ -	\$ 95,000.00	
Total Estimated Waste Management Revenue									
Total Annual Revenue	\$ 29,875.28	\$ 2,209,290.00	\$ -	\$ 380,845.00	\$ 53,100.00	\$ 99,585.00	\$ 78,000.00	\$ 261,347.00	
Total Estimated Waste Management Surplus (Deficit)									
<i>*note: does not include waste collection expense</i>									
	\$ (70,221.72)	\$ 45,911.00	\$ -	\$ (33,600.00)	\$ (135,550.00)	\$ (170,417.85)	\$ (284,750.00)	\$ (117,565.00)	
Waste Management Cost /Capita									
Waste Management Cost /Capita	\$198	\$58	\$175	\$246	\$265	\$196	\$433	\$52	
Waste Collection Cost/Capita	\$32	\$28	\$0	\$36	\$30	\$22	\$0	\$130	
Annual Landfill Liability/Capita	-	\$6	\$33	-	-	\$4	\$72	-	
Recycling Cost/Capita (municipal funding only)	\$16	\$5	\$50	\$154	\$72	\$97	\$178	-	

Appendix I – Community Waste Survey Results (YG Figures)

Solid Waste Operational Costs to Yukon Government in Fiscal Year 2017/18

Note that the table below does not include recycling costs

Location	Population*	Regular Maintenance	Site Attendant	Transfer Waste	HHW	Tipping Expenses	Groundwater Monitoring**	Maintenance Beyond Scope	Utilities	Other	Gasifier	Forecast Total	Waste Management Cost per Capita	Annual Landfill Liability***
Silver City	10	\$0	\$0	\$15,610	\$0	\$15,403	\$17,779	\$0	\$0	\$0	\$0	\$48,792	\$4,879	\$7,395
Keno	20	\$0	\$0	\$1,200	\$0	\$17,494	\$28,248	\$2,030	\$0	\$0	\$0	\$48,972	\$2,449	\$13,660
Swift River	20	\$0	\$0	\$5,069	\$0	\$4,850	\$23,500	\$0	\$0	\$0	\$0	\$33,419	\$1,671	\$14,145
Braeburn	25	\$0	\$0	\$18,356	\$3,010	\$17,494	\$18,640	\$550	\$0	\$0	\$0	\$58,051	\$2,322	\$7,644
Johnson's Crossing	25	\$10,601	\$0	\$31,525	\$0	\$9,978	\$22,800	\$0	\$0	\$0	\$0	\$74,904	\$2,996	\$11,685
Stewart Crossing	30	\$0	\$0	\$21,396	\$3,437	\$0	\$21,483	\$5,830	\$0	\$0	\$0	\$52,146	\$1,738	\$17,690
Champagne	50	\$31,336	\$60,580	\$24,080	\$12,884	\$15,403	\$17,779	\$16,575	\$253	\$2,090	\$0	\$180,980	\$3,620	\$17,857
Deep Creek	70	\$32,620	\$51,075	\$15,278	\$15,965	\$35,067	\$25,285	\$32,411	\$278	\$3,920	\$0	\$211,899	\$3,027	\$21,127
Beaver Creek	110	\$60,352	\$0	\$0	\$4,010	\$0	\$17,779	\$4,000	\$0	\$1,841	\$0	\$87,983	\$800	\$25,632
D-Bay/Burwash	163	\$19,550	\$64,948	\$23,875	\$11,328	\$15,403	\$17,779	\$5,330	\$1,218	\$3,372	\$0	\$162,803	\$999	\$19,513
Old Crow	259	\$23,300	\$192,500	\$0	\$0	\$0	\$62,993	\$1,582	\$27,262	\$5,069	\$26,720	\$339,426	\$1,311	\$23,201
Tagish	264	\$23,917	\$60,568	\$13,473	\$24,359	\$12,437	\$21,191	\$36,070	\$2,782	\$1,870	\$0	\$196,667	\$745	\$16,410
Pelly Crossing	390	\$79,310	\$0	\$34,313	\$12,872	\$17,494	\$24,825	\$2,800	\$0	\$3,590	\$0	\$175,204	\$449	\$17,282
Ross River	395	\$69,690	\$51,777	\$0	\$3,750	\$0	\$21,794	\$700	\$479	\$3,978	\$0	\$152,167	\$385	\$37,445
Mount Lorne	437	\$104,760	\$0	\$5,005	\$15,574	\$23,037	\$18,363	\$18,539	\$2,826	\$1,870	\$0	\$189,974	\$435	\$15,420
Carcross	504	\$23,317	\$62,936	\$35,485	\$14,645	\$35,583	\$18,363	\$48,562	\$2,822	\$3,370	\$0	\$245,082	\$486	\$22,629
Marsh Lake	696	\$53,856	\$147,125	\$7,525	\$54,771	\$28,169	\$18,363	\$37,825	\$8,387	\$4,603	\$0	\$360,624	\$518	\$14,315
Faro	397	\$0	\$0	\$0	\$0	\$0	\$12,700	\$0	\$0	\$0	\$0	\$12,700	\$32	\$37,655
Mayo	507	\$0	\$0	\$0	\$0	\$0	\$12,892	\$0	\$0	\$0	\$0	\$12,892	\$25	\$27,379
Teslin	514	\$0	\$0	\$0	\$0	\$0	\$12,300	\$0	\$0	\$0	\$0	\$12,300	\$24	\$42,460
Carmacks	548	\$0	\$0	\$0	\$0	\$0	\$13,399	\$0	\$0	\$0	\$0	\$13,399	\$24	\$20,543
Haines Junction	914	\$0	\$0	\$0	\$0	\$0	\$10,261	\$0	\$0	\$0	\$0	\$10,261	\$11	\$27,142
Watson Lake	1,471	\$75,000	\$0	\$0	\$0	\$0	\$29,040	\$0	\$0	\$0	\$0	\$104,040	\$71	\$70,338
Dawson	2,229	\$66,140	\$0	\$0	\$0	\$0	\$19,896	\$0	\$0	\$0	\$0	\$86,036	\$39	\$70,339
Burwash							\$17,779	\$850	\$0	\$0	\$0	\$18,629		\$6,703
Canyon Creek														\$10,276
Horsecamp Hill														\$4,124
Upper Liard														\$20,861
Territory Wide		\$0	\$0	\$14,300	\$35,074	\$0	\$0	\$21,753	\$0	\$76,217	\$0	\$147,344		
Total		\$673,749	\$691,509	\$266,489	\$211,678	\$247,814	\$525,231	\$235,408	\$46,306	\$111,791	\$26,720	\$3,036,695		

¹ Population is estimated

*YBS Population Report, Third Quarter, 2017 OR 2016 Census, OR estimate

**Projections not actuals. Do not include ~75k for PM and ~25K for SARU travel

***Maximum 50 year landfill life. Morrison Hershfield 2013. Environmental Liability Assessment for Municipally Operated Landfills AND Morrison Hershfield 2017. Environmental Liability Assessment for Selected Yukon Government Landfills

Site closed

Municipality

Appendix II – Bibliography

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