Solid Waste Master Plan | Plan directeur des déchets solides

Evaluation Process

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Disclaimer

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This technical memorandum was prepared by HDR Corporation.

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1 Overview of Methodology

A triple bottom line (TBL) evaluation framework is an effective tool for evaluating strategic options that have been developed to achieve a specific set of objectives. The framework takes into account environmental, social, and financial aspects of each option and uses a structured approach to compare different options based on a consistent set of criteria. At the same time, the hallmark of a good set of strategic options is that they already meet many, if not all of the objectives set out in the Master Plan and are expected to be favorable to some extent. As a result, the TBL evaluation framework has to be tailored to the context of the options being considered in order for the outcomes to be meaningful and actionable.

As a first step towards establishing a TBL evaluation framework, it is important to first understand the key benefits and limitations of the process and its outcomes. Some of the key benefits of a good TBL evaluation framework are that:

- It is transparent;
- It defines a comprehensive set of evaluation criteria that give structure to stakeholder discussions;
- It helps conceptualize the potential trade-offs associated with each option; and
- It allows less evident objectives, like social equity and long-term reliability, to be taken into consideration.

Its primary limitations are similar to that of any evaluation process that requires judgment based on qualitative information. Option assessments must take into account impacts that are difficult to quantify (e.g. reduction of greenhouse gas emissions from a new processing technology), as well as those that are challenging to quantify (e.g. social equity). Even once individual impacts are assessed, the relative importance of options is often difficult to gauge given the numerous potential groupings of individual options, the cumulative impacts on the system, and different levels of uncertainty related to performance once implemented.

This limitation is particularly applicable to options pertaining to policy, contracting, educational programs, and functionally similar processes where the relative benefits

to the system are difficult to gauge. Effectively, the decisions often come down to: what is the best set of options we can afford, given that they are all effective and aligned with our vision, guiding principles and goals.

For this reason, it is proposed that the evaluation framework be comprised of two steps: a screening process for all options, and a multi-criteria analysis (MCA) for only some of the options that pass through the screening.

1.1 Screening Process

As the first step, a screening process will be applied to all options to determine which options could benefit from a detailed evaluation process (Multi-criteria Analysis or MCA), and which would not. For instance, an outreach campaign to increase diversion and participation such as a “Gold Star” or Contamination Campaign or a Waste Diversion Education Centre/Tours are user engagement tools that would differ primarily on cost (within a relatively small order of magnitude) and expected level of engagement, and therefore only require screening.

Many of the other metrics in the MCA would be the same for each option under consideration or would be too similar to draw meaningful conclusions for decision making. As a result, putting these types of options through a full MCA process is challenging and has limited value as the outcomes still typically come down to relatively minor differences in costs and stakeholder preferences. For other options like an automated cart collection system, or a bulky item curbside waste collection program, an MCA can help evaluate and compare the options across complex criteria like resource efficiency, economic development, or risk and reliability.

During the screening process, each option will be assessed based on five questions:

1. Does the option have potential for positive social impacts?
2. Does the option have potential for an environmental benefit?
3. Is the option a relatively low order of magnitude cost (capital investment and/or staff time and/or other resources) and lower effort for the City to implement?

4. Is it difficult to reasonably quantify the individual contribution (e.g. increased diversion) of this option to the overall system?
5. Would further multi-criteria evaluation be expected to result in similar outcomes as other options in this category?

Any option where the answer to each question is 'yes' will not be evaluated further and will be grouped into one of two categories: implementation tools (e.g. outreach and educational program, marketing and communication tools, policies and by-laws) or programs (e.g. reduction and reuse and some recycling programs). Options from these categories will later be grouped to identify the implementation tools and supporting programs that would be included within the comprehensive waste systems based on budgetary constraints or other stakeholder preferences. Any option where at least one of the answers is 'no' will be evaluated further using the MCA approach as part of the second step.

The following Figure 1 presents a snapshot of how options may be grouped for the evaluation process (e.g. by category of waste management activity) and the anticipated outcome of the screening process (e.g. yes/no answers to screening questions). Please see worksheet 1A. Screening Sample in the accompanying Excel Workbook. Note that the narrative provided is for discussion only, it is only intended to give the reader an idea of the results of the screening processing for different categories.

Figure 1: Sample Screening Process

Promotion and Education Tools	**Outreach Programs**	**Educational Programs**	**Marketing and Communication Tools**
Description	City develops outreach programs for waste awareness and reduction	City develops and implements educational programs	City develops and implements marketing and communication tools.

Promotion and Education Tools	Outreach Programs	Educational Programs	Marketing and Communication Tools
Examples	MR Ambassadors, use of local celebrities, recognition events, competitions, challenges, international/national certification programs (e.g. for City facilities), waste events (drop-off events), MR RFID System and Report Card.	Education Centre, presentations/workshops /courses, online waste sorting game, waste reduction strategy (Love Food, Hate Waste)	Green events planning guide, mobile apps, newsletters, TV/Video series
Assumptions	City staff develop and deploy programs which are physical programs and people-oriented.	City staff develop and deploy programs which provide information and education. May be media oriented.	City staff develop and deploy tools for promotion.
1. Does the option have potential for positive social impacts?	**YES**	**YES**	**YES**
	Provides additional educational opportunity for residents. Residents may be rewarded for positive behaviour. Provides learning opportunities and face-to-face interactions with residents. Can provide opportunities to reach school children and other interested parties.	Provides opportunities to educate residents through fun and interactive programs. Food waste reduction strategies can save residents money.	Provides opportunities for residents to learn about recycling.
2. Does the option have potential for an environmental benefit?	**YES**	**YES**	**YES**
	Programs operate more efficiently with reduced contamination. Reduces littering if materials sorted properly.	Residents learn about how to use City programs properly. More materials may be diverted from disposal.	Residents learn about how to use City programs properly. More materials may be diverted from disposal.
3. Is the option a relatively low order of magnitude cost (capital investment and/or staff time and/or other resources) and lower effort for the City to implement?	**YES**	**YES**	**YES**
	Requires some staff time to develop programs/campaigns and materials, and to implement program(s).	Requires some staff time to develop programs/campaigns and materials, and to implement program(s).	Requires some staff time to develop tools and materials, and costs to produce materials.
	YES	**YES**	**YES**

Promotion and Education Tools	Outreach Programs	Educational Programs	Marketing and Communication Tools
4. Is it difficult to reasonably quantify the individual contribution (e.g. increased diversion) of this option to the overall system?	Results in overall awareness of programs/services provided by the City which may or may not result in resident behaviour changes.	Results in overall awareness of programs/services provided by the City which may or may not result in resident behaviour changes.	Results in overall awareness of programs/services provided by the City which may or may not result in resident behaviour changes.
5. Would further multi-criteria evaluation be expected to result in similar outcomes as other options in this category?	**YES** Environmental, social and financial scores likely to be very similar to other options in this category.	**YES** Environmental, social and financial scores likely to be very similar to other options in this category.	**YES** Environmental, social and financial scores likely to be very similar to other options in this category.
Recommended to be Screened-in for System Development, Detailed MCA not Required?	**YES, the option will be screened in and carried forward for consideration in waste management system development**	**YES, the option will be screened in and carried forward for consideration in waste management system development**	**YES, the option will be screened in and carried forward for consideration in waste management system development**

The following Figure 2 presents an example of the screening process for two options in the categories of Collection and Drop-off including narratives. Please see worksheet 1A. Screening Samples in the accompanying Excel Workbook.

Note that the text in these tables would be fleshed out further as the screening is completed – these tables are intended only to give the reader an idea of how the process would be conducted and how options would be identified for further evaluation using the MCA analysis.

In Figure 2, all options received at least one “no” answer to the screening questions and those would be subject to further evaluation through the MCA process.

Figure 2: Sample Screening Process – Example of Screening Process for Collection and Drop-off

Collection & Drop-off	Mobile MHSW Home Collection	Collection of More Materials at the Curb	Separate Bulky Waste Recycling
Description	MHSW is collected from residences by appointment.	City offers curbside collection of batteries and electronics, scrap metal, light bulbs, wood, wood pallets. May be a fee.	City collects bulky waste separately. May separate some items for recycling (e.g. mattresses, scrap metal, bulky plastics, clean wood, windowpanes). May be a fee.
Assumptions	City provides collection of MHSW, with permitted vehicle, to residences by appointment.	City allows residents to place more materials at the curb for collection. City may charge a fee for collection of additional materials.	Bulky waste is no longer part of the garbage set out limits and is collected separately. May be a fee for collection of bulky waste.
1. Does the option have potential for positive social impacts?	YES	YES	YES
	Provides an opportunity for residents with limited mobility, or no transportation to dispose of MHSW safely and conveniently.	Provides a convenient method for residents to divert more materials responsibly and safely.	May be ability to divert some bulky waste for reuse and made available to residents.
2. Does the option have potential for an environmental benefit?	YES	YES	YES
	Potential to keep MHSW from landfill or in waste water.	Potential to keep some items from disposal and avoid emissions from landfill.	Potential to keep some items from disposal and avoid emissions from landfill.
3. Is the option a relatively low order of magnitude cost (capital investment and/or staff time and/or other resources) and lower effort for the City to implement?	NO	NO	NO
	Requires staff and one or more dedicated vehicles to collect materials on a regular basis.	Requires more or additional trucks to collect waste depending on how collected. Need to identify ways to process, and divert waste for recycling. If charging a fee, City needs to develop a system for administering fees.	Requires more trucks to collect waste . Need to identify ways to process and divert waste for recycling. If charging a fee, City needs to develop a system for administering fees.

Collection & Drop-off	Mobile MHSW Home Collection	Collection of More Materials at the Curb	Separate Bulky Waste Recycling
4. Is it difficult to reasonably quantify the individual contribution (e.g. increased diversion) of this option to the overall system?	YES May be difficult to quantify how much material may be managed by this system instead of residents transporting waste themselves (on behalf of someone else) or by putting them in the garbage.	NO City should be able to track quantities collected and diverted.	NO City should be able to track quantities collected and diverted.
5. Would further multi-criteria evaluation be expected to result in similar outcomes as other options in this category?	NO Anticipate there would be significant differences under the financial category compared to similar options.	NO Anticipate there would be significant differences under the financial category compared to similar options.	NO Anticipate there would be significant differences under the financial category compared to similar options.
Recommended to be Screened-in for System Development, Detailed MCA not Required?	**NO, further analysis is required, and the option would be carried forward into detailed MCA analysis to determine if it should be carried forward for further consideration by the City**	**NO, further analysis is required, and the option would be carried forward into detailed MCA analysis to determine if it should be carried forward for further consideration by the City**	**NO, further analysis is required, and the option would be carried forward into detailed MCA analysis to determine if it should be carried forward for further consideration by the City**

1.2 Multi-criteria analysis (MCA) Process

In general, an MCA approach is particularly useful for evaluating options related to collection, drop-off/transfer, processing, materials recovery, and residual processing. These options generally are functionally different, with different ranges of effects. For these segments of the waste management system, there is value in applying a more rigorous evaluation process to determine which ones offer greatest value to the City.

An MCA framework has been developed to holistically assess the environmental sustainability, social implications, and financial viability of the options based on a set of nine criteria (three in each TBL category) that reflect stakeholder objectives and priorities. Criteria and indicators have been identified, based on our technical knowledge and professional experience. The criteria and indicators selected for this process are those that are commonly used in similar evaluation processes. The indicators are the specific considerations or measures that are proposed to be applied where appropriate to identify the potential effects related to the respective criterion.

Each criterion will be assigned a score of one to five (with one being the lowest/worst and five being the highest/best). The process is kept simple and transparent so that stakeholders can understand how the outcomes were arrived at.

In general, the MCA framework is intended to:

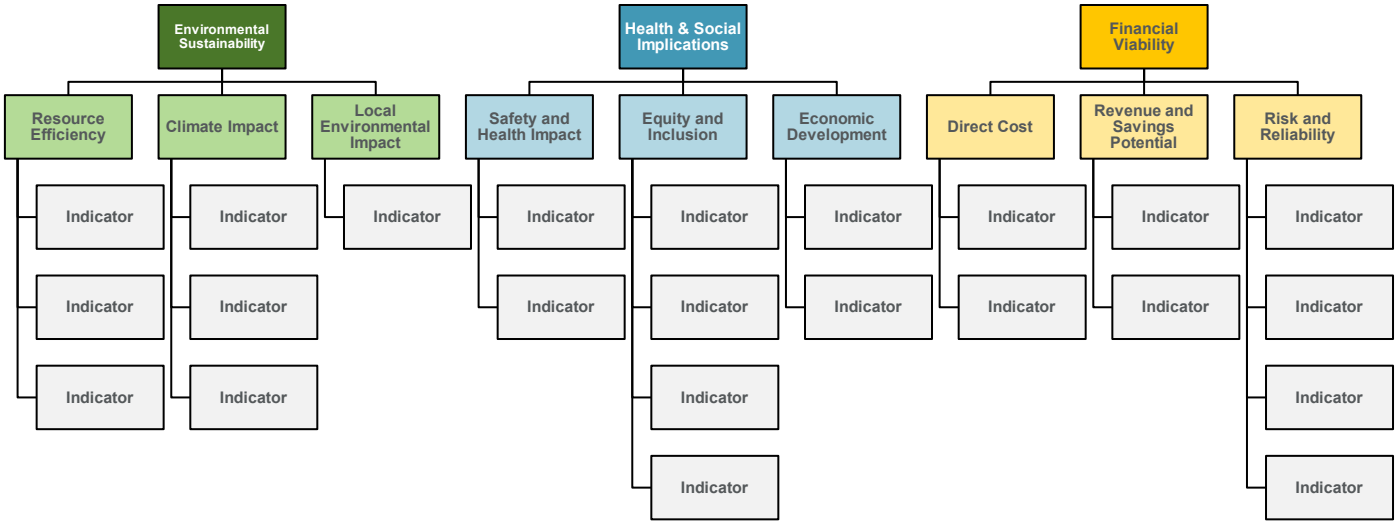
- Facilitate and reflect meaningful collaboration through transparency in all assumptions and without the use of “black-box” processes where it is unclear how conclusions have been reached;
- Enable consideration of matters such as climate impact, social equity and inclusion, health, reliability, regulatory changes, and others as determined by the overall project objectives;
- Be consistent across options;
- Be as simple as is reasonably possible – too many individual criteria or indicators can result in overlap between individual criteria elements as well as making straightforward communication and understanding of outcomes more difficult. Too many individual

criteria and indicators can often result in imbalance where one small consideration is treated the same as something else that is more significant. It is important to have enough to have a fulsome evaluation, without complicating the process; and,

- Accommodate quantification where possible.

The process for developing the MCA framework and evaluation tool is as follows:

- Develop an initial set of categories, criteria, and indicators in line with the City's vision, guiding principles and goals;
- Establish relative importance and assign weights to each TBL category;
- Ensure that each criterion is clear and well defined, can be applied based on the information that is available, and does not overlap with any other criterion; and,
- Determine how each indicator will be evaluated and how the combination of the indicators will determine the rating of each criteria.



The following Figure 3 presents the MCA Framework being proposed. It includes:

- Weightings – based on feedback received by the City, equal weighting will be given to all categories (i.e. 33.3% each).
- Categories, Criteria and Indicators – selected based on professional judgement and experience with other evaluation processes.

- Assessment and Colour Coded Rating – Each criterion would have an overall rating of 1 (worst/lowest) to 5 (best/highest) and would be colour coded to reflect the rating (red = worst, green = best).
- Overall category score and weighted score – for each category, an overall rating will be calculated and weighted (if applicable).

Please see worksheet 2A. MCA Framework in the accompanying Excel Workbook to see the framework and how it would apply to options in a category.

Figure 3: Proposed MCA Framework

General Framework				Option Name	
Weight Overall Score, 100 Max	Categories & Criteria	Indicators	Notes	Assessment and Colour Coded Rating (see below)	
33%	**Environmental Sustainability**			**Assessment**	**Rating 1-5**
	Resource Efficiency	Potential to avoid/reduce/reuse waste	Potential to avoid/reduce/reuse waste will depend on type of option and materials considered.	• Assessment	#
		Potential to increase diversion of materials from landfill	Potential to recover additional materials will depend on type of option and materials considered.	• Assessment	
		Potential to recover additional reusable, recyclable, organic, or other marketable materials	Potential to divert materials will depend on type of option and materials considered.	• Assessment	
	Climate Impact	Potential to reduce GHG emissions (e.g. from facility operations / material transportation or material recovery/energy offset)	Does not include emissions from manufacturing or production. May include potential to consolidate facilities/vehicles, reduce vehicle usage. May consider ability to divert methane generating materials from landfill.	• Assessment	#
		Potential to reduce energy consumption (transportation fuel, electricity, etc.)	The ability to recover/generate energy may offset any fuel/energy used. May include changes in distances travelled (e.g. fuel use), number of vehicles required, change in power consumption.	• Assessment	

General Framework

Weight Overall Score, 100 Max	Categories & Criteria	Indicators	Notes	Option Name: Assessment and Colour Coded Rating (see below)	
	Local Environmental Impact	Impact on land and water quality	Impact to air is considered under "criteria air contaminant emissions" so as to avoid double counting. May include potential for litter or discharge to land or water or improvements.	• Assessment	#
	Overall Category Score	Rounded average of criteria ratings.		Narrative and Rank	
	Weighted Score	Multiply overall category score by 6 (each point in the 5 tier point system is worth 6.66 weighted points to equal a total of 33.3 points out of 100).		Weighted Score	
33%	**Health and Social Implications**			**Assessment**	**Rating 1-5**
	Safety and Health Impact	Potential for impacts to public and staff safety	May include impacts to the public and to staff (e.g. collection staff), including number and type of safety issues, including improvements to community safety.	• Assessment	#
		Potential for impacts to public health from criteria air contaminant emissions	Primarily from emissions to air, including vehicle emissions.	• Assessment	

General Framework

Weight Overall Score, 100 Max	Categories & Criteria	Indicators	Notes	Option Name: Assessment and Colour Coded Rating (see below)	
		Potential for impacts to public health from noise, vibration, odour and ground water contamination	Assesses the potential impact to human health as opposed to the environment.	• Assessment	
		Risk of increased litter and vector / vermin	May include risk to the public and to collection staff.	• Assessment	
	Equity and Inclusion	Potential issues with stakeholder acceptance	May include nuisance factors, equity, affordability, complexity, level of behaviour change required.	• Assessment	#
		Potential level of effort for stakeholders to use the option. Consider any physical or design impediments that may inhibit use or understanding of a program.	May include convenience, accessibility, level of effort to use.	• Assessment	
		Risk of community interruption from increased traffic, odour and noise	May include potential for increase or decrease in traffic, odour, noise.	• Assessment	
	Economic Development	Potential to create new local jobs (development and operations)	May include short term or long-term jobs, use of volunteers, reduction in jobs.	• Assessment	#
		Potential to support economic growth and innovation	May include ability to apply innovation to derive a beneficial use from the recovered materials, potential for local or regional economic growth, market creation, requirement for further	• Assessment	

General Framework

Weight Overall Score, 100 Max	Categories & Criteria	Indicators	Notes	Option Name: Assessment and Colour Coded Rating (see below)	
			processing and marketing and social enterprise opportunities.		
	Overall Category Score	Rounded average of criteria ratings.		Narrative and Rank	
	Weighted Score	Multiply overall category score by 6 (each point in the 5 tier point system is worth 6.66 weighted points to equal a total of 33.3 points out of 100).		Weighted Score	
33%	**Financial Viability**			**Assessment**	**Rating 1-5**
	Direct Cost	Initial and future replacement capital costs for City	In general, assessed relative to other options in the same category.	• Assessment	#
		Annual operating and maintenance costs for City (including contract costs, administrative costs and city staffing needs)	Potential to increase or decrease operating costs.	• Assessment	
	Revenue and Savings Potential	Potential cost savings to other components of the integrated waste management system	May include collection, processing or disposal costs.	• Assessment	#
		Potential to generate revenue from sale of recovered materials	May include number and type of materials which could be sold.	• Assessment	

General Framework

Weight Overall Score, 100 Max	Categories & Criteria	Indicators	Notes	Option Name: Assessment and Colour Coded Rating (see below)	
		(plastics, metals, compost, etc.) or from generated energy			
	Risk and Reliability	Cost and schedule implications associated with implementation, approvals and permit complexity	May include number of suppliers/parties, complexity of approvals process, schedule implications with multiple parties and type of technology, reliance on third parties, use of City staff to reduce risk., ease of implementation.	• Assessment	#
		Risk of issues with reliability or availability of facilities/vendors/technology	May include number of steps involved (e.g. collection, processing, disposal), number of facilities/vendors available, familiarity of process/option to Ottawa/other municipalities, scale of option.	• Assessment	
		Impact to system complexity and flexibility	May include ability to site or relocate, specificity to certain feedstocks, modularity/ability to expand, number/type of end products and ability to market.	• Assessment	
		Risk of contractual issues and liability	May include number of suppliers/parties, reliance on implementation or operation by third parties, contractual risk.	• Assessment	
	Overall Category Score	Rounded average of criteria ratings.		Narrative and Rank	

General Framework

Option Name

Weight Overall Score, 100 Max	Categories & Criteria	Indicators	Notes	Assessment and Colour Coded Rating (see below)
	Weighted Score	Multiply overall category score by 8 (each point in the 5 tier point system is worth 6.66 weighted points to equal a total of 33.3 points out of 100).		Weighted Score

2 Application to Potential Options

2.1 Screening Process Only

Given the limitations in fundamental differences across strategic options from the standpoint of quantifiable system benefits relative to costs, some options will be evaluated through a screening process only (as described above and presented in Figure 1). The process will take into account the categories for the evaluation process (broadly environmental, social and financial considerations) to align with the guiding principles for the project. Those options for which only the screening process applies (and do not undergo the full MCA process), are screened in for further consideration in the development of future waste management systems.

It is anticipated that the types of options that would only undergo the screening process would include:

- Promotion and Education Tools (e.g. Educational/Outreach/Marketing and Communication Tools);
- Regulations, Policies, By-laws (e.g. set-out limits, material bans); and,
- Waste Avoidance, Reduction/Reuse/Recycling Programs (e.g. community and corporate strategies and opportunities).

All of these types of options would have environmental and social benefits and in general, have a low order of magnitude cost (compared to options that require significant capital costs and operational staff requirements) and involve a lower level of effort for the City to implement.

2.2 Screening Process + MCA

The focus of the comprehensive MCA evaluation is anticipated to be on the options related to collection, transfer/drop-off, processing, materials recovery and residual processing that have been identified through the screening process as being appropriate to take through the MCA (see examples presented Figure 1). The process entails:

- Applying the framework to each of the options to derive scores for each of the criteria based on expert judgment and quantitative evidence, where available;
- Establishing a scoring system where each criterion receives a maximum score of five points (i.e. the highest/best) and a minimum score of one (i.e. the lowest/worst) based on an assessment of the criteria indicators; and
- Applying weights to the criteria scores to generate "category" level weighted scores and a total score value that can be compared across various options, or groups of options.

An assessment of each indicator specific to each option, and sometimes, relative to other options in the same category, will be undertaken. The assessment will be based on a number of factors including professional judgement, experience in other jurisdictions, research and City-provided data. For example, audit results may be used to develop estimates of diversion potential. A scoring guide will be developed to assist with consistency in assessing options and assigning scores. Scores will be assigned on a 1-5 basis to the indicators, with 1 representing the lowest or "worst" score and 5 representing the highest or "best" score. Scores are rolled up to the criterion level, averaged and rounded to provide an overall category score. The category score is multiplied by the applicable weighting for each point based on the category to give an overall weighted score. Based on the recommended equal weighting for each of the MCA categories, each point in the 5-tier point system is worth 6.66 weighted points, to equal a total of 33.3 points out of a 100. Lastly, a total unweighted and weighted score for the option is calculated. The total weighted score provides a score out of 100, for ease of comparison and to assist reviewers in understanding the outcome of the MCA evaluation process.

The quantitative values derived through this process will help the City make a more informed decision on the various strategic options and add the level of transparency and rigor necessary for stakeholder understanding and support.

The types of options that would undergo the MCA evaluation process would include:

- Collection Approaches (clear bags, automated cart collection, bulky item collection, mobile collection of MHS, collection containers (in-ground), colour coded sorting bags);
- Organics Management (aerobic, anaerobic, animal feed production);

- Recovery technologies (mixed waste processing, alternative technologies (e.g. gasification), landfill mining); and
- Residual options (landfill optimization/expansion, use of alternate landfills, development of new engineered landfill).

The following Figure 4 presents the outcome of the evaluation process for three options in one category (Expanded Curbside Collection) and three options in another category (Collection Systems). The rationale and scoring for each option can be found in 2B MCA Expanded Curbside Collection and 2C MCA Collection Systems in the accompanying Excel Workbook.

Note that this is draft/preliminary text intended to give the reader an indication of how the evaluation process would be conducted.

The colour coding allows for a visual representation of the differences between options in a category on a criterion and category level which may be easier for readers to understand. For discussion would be whether or not scores at a criterion level would be presented or just the colour coding.

Figure 4: Outcome of MCA Analysis

		Expanded Curbside Collection			Collection Systems		
	Comparison	Mobile MHSW Home Collection	Collection of More Materials at the Curb	Separate Bulky Waste Recycling	Clear Bags	Automated Cart Collection for Garbage	Colour-Coded Sorting Bags
Weight	Categories & Criteria						
33%	**Environmental Sustainability**						
	Resource Efficiency	2	2	1	2	2	1
	Climate Impact	2	2	2	1	1	2
	Local Environmental Impact	5	5	5	5	5	5
	Overall Category Score[1]	3	3	3	3	3	3
	Weighted Score	**20**	**20**	**20**	**20**	**20**	**20**
33%	**Health and Social Implications**						
	Safety and Health Impact	3	3	3	4	5	4
	Equity and Inclusion	5	5	4	4	4	2
	Economic Development	2	3	3	2	2	2
	Overall Category Score[1]	3	4	3	3	4	3
	Weighted Score	**20**	**27**	**20**	**20**	**27**	**20**

5-Tier Colour Rating / Ranking System

WORST	1 to 20
	21 to 40
	41 to 60
	61 to 80
BEST	81 to 100

	Comparison	Expanded Curbside Collection			Collection Systems		
		Mobile MHSW Home Collection	Collection of More Materials at the Curb	Separate Bulky Waste Recycling	Clear Bags	Automated Cart Collection for Garbage	Colour-Coded Sorting Bags
33%	**Financial Viability**						
	Direct Cost	4	3	3	5	3	1
	Revenue and Savings Potential	2	2	1	2	2	2
	Risk and Reliability	5	4	4	5	4	2
	Overall Category Score[1]	4	3	3	4	3	2
	Weighted Score	27	20	20	27	20	13
Total Weighted Score out of 100		67	67	60	67	67	53

[1]Rounded average of criteria ratings

3 Outcome of Evaluation

Following the completion of the screening and evaluation process, options would be grouped into the following categories to identify the different comprehensive waste management systems:

a) All implementation tools / programs / policies identified and screened-in, applied to all comprehensive systems.

b) Recycling, collection and organics management options that come out of the MCA will be evaluated to determine which offer the most benefit to the waste management system, and those options would be carried forward to all comprehensive systems.

c) Functionally different recovery technologies and residual disposal options that are identified as having potential for benefits to the waste management system as a result of the MCA would be carried forward and applied to identify systems with different outcomes for final comparative analysis.

Examples of comprehensive waste management systems could include:

- Implementation tools + programs (e.g. reduction/reuse) + textile recycling + clear bags + mixed waste processing facility + continued use of Trail Road Landfill
- Implementation tools + programs (e.g. reduction/reuse) + mixed waste processing facility + use of a private landfill
- Implementation tools + programs (e.g. reduction/reuse) + Aerobic Composting facility + continued use of Trail Road Landfill

Within each system, the options would be identified for implementation, grouped by sector and by planning period (Short (1-5 years), Medium (6-15 years) and Long (16-30 years)) to correlate with available budget, availability of facilities, advancement of technologies etc. See worksheet 4A. Systems in the accompanying Excel workbook.

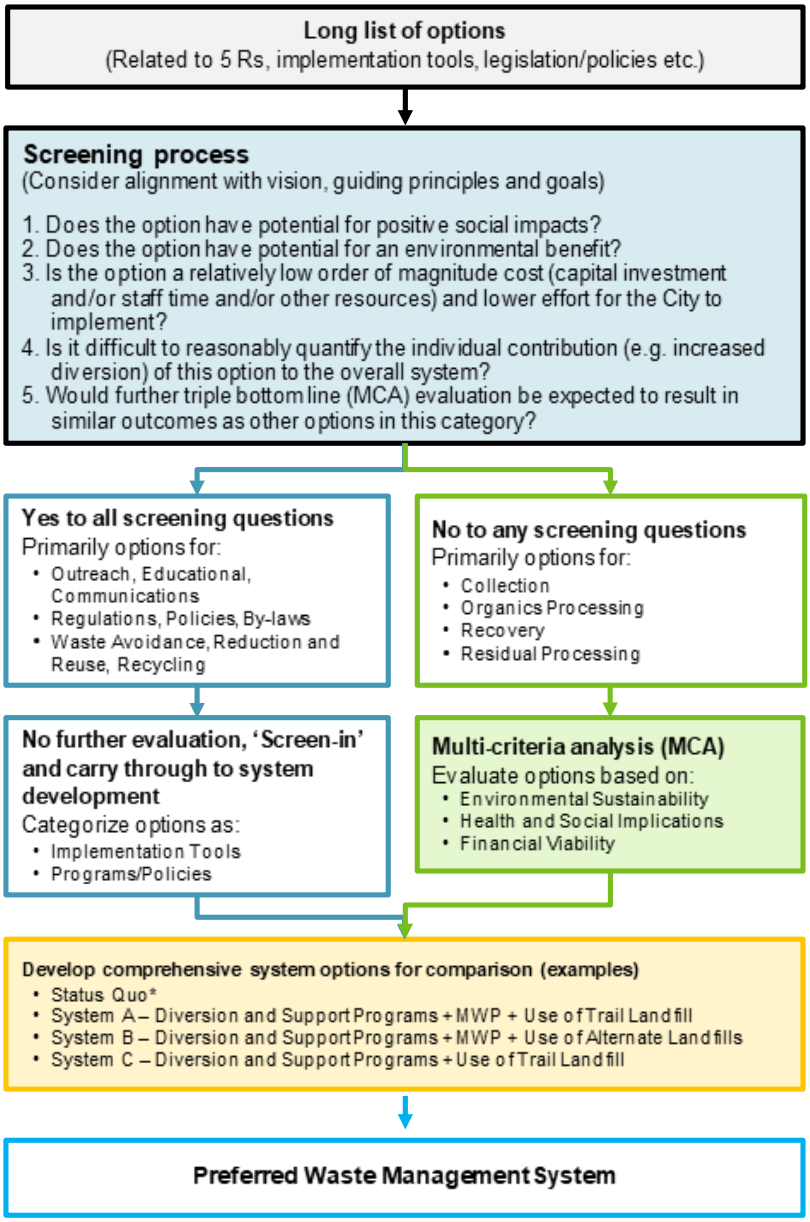
These systems would undergo a high-level comparison against each other and to the Status Quo, particularly with respect to considerations such as risk, cost, timing, diversion potential, GHG emissions reduction potential etc. and based on the City's short, mid and long-term needs. This comparison would identify the preferred system to be carried forward from the SWMP.

4 Consideration of Stakeholder Feedback

The City conducted consultations in late Spring/ Summer 2020 on the Vision, Guiding Principles, and Goals for the Master Plan. The City also conducted specific consultations on the proposed evaluation framework with a number of stakeholder groups in Summer/Fall 2020. Based on the feedback received from the consultations, the weighting across categories was made equal (i.e. no category was more important than another) and some small adjustments made to the wording of some indicators and locating within categories. A lot of the feedback received will be addressed as key implementation considerations and would be brought forward for consideration either as general overarching principles or as specific considerations for program design (e.g. design of public facilities to address accessibility).

5 Outline of Evaluation Methodology

The following flowchart depicts this proposed evaluation methodology with draft screening questions.



*Note: The Status Quo waste management system, wherein no program improvements or changes would be implemented beyond those which are needed to sustain existing programs, would be

carried through for comparison to the comprehensive system options at this stage of the evaluation process.

6 Next Steps

This evaluation methodology will be used to screen and evaluate the long list of options that have been identified by the Project Team and that have been identified as a result of the consultations and engagement done during Phase 2.