



Corporate Report

NO: R063

COUNCIL DATE: April 28, 2008

REGULAR COUNCIL

TO: Mayor & Council DATE: April 24, 2008
FROM: General Manager, Engineering FILE: 5360-19; 0450-01
SUBJECT: Update of the Regional Solid Waste Management Plan (SWMP) and
Metro Vancouver's Landfill Replacement Strategy

RECOMMENDATION

The Engineering Department recommends that Council:

1. Receive this report for information; and
2. Authorize staff to forward a copy of this report and the related Council resolution to Metro Vancouver as input from the City of Surrey into the development of a new SWMP for the Region.

INTENT

The intent of this report is to apprise Council about the process being followed in relation to updating the Regional Solid Waste Management Plan and the strategy for the replacement of the Cache Creek Landfill, which currently accepts solid waste from the Metro Vancouver Region.

BACKGROUND

Waste quantities in Metro Vancouver are increasing each year as the region's population expands, and particularly since 2004 when economic activity in the region increased sharply. Currently over 3 million tonnes of waste are generated annually in Metro Vancouver. Recycling rates have been improving steadily since the 1990s; however, waste generation has also been increasing. As the region's population increases from 2 million to 3 million by the year 2025, waste generation is anticipated to increase from 3 million to 4.5 million tonnes per year. Solid waste is managed in accordance with the Regional Solid Waste Management Plan (SWMP).

Under this Plan, the City of Surrey disposes of the majority of its solid waste at Metro Vancouver's Surrey Transfer Station (STS) located in Port Kells. A relatively smaller component of Surrey's solid waste is disposed of at the Vancouver Landfill located in Delta, B.C., and at the Metro Vancouver Waste-to-Energy (WTE) facility located in Burnaby, B.C. The majority of waste hauled to the Metro Vancouver transfer station facilities is hauled to a landfill located in Cache Creek, B.C. ("Cache Creek Landfill"). This landfill falls under a permit of, and is operated by, Metro Vancouver and its contractor(s). Metro Vancouver hauls a small percentage of waste from the regional transfer station facilities to the Burnaby WTE facility. At its current rate of filling, Metro Vancouver expects that the Cache Creek Landfill will be full by 2010.

Process for Replacement of Cache Creek Landfill

In April 2000, Metro Vancouver (formerly the GVRD) purchased a 4,200-hectare property (10,500 acre), called "Ashcroft Ranch", with the stated intention of initiating a process to site a replacement landfill for the Cache Creek landfill. The Ashcroft Ranch property is located in south-central B.C., near the municipalities of Ashcroft and Cache Creek.

This initiative was named the "Ashcroft Ranch Landfill Project". An amendment to the existing Regional Solid Waste Management Plan (SWMP) was necessary to reflect the proposed shift in location of waste disposal from the Cache Creek Landfill to the Ashcroft Ranch Landfill.

Metro Vancouver submitted an application for an environmental assessment certificate for the Ashcroft Ranch Landfill Project to the provincial Environmental Assessment Office (EAO) in August 2004. In June 2005, due to opposition to the development of the Ashcroft Ranch Landfill, primarily by First Nations, the Province informed Metro Vancouver of their decision to suspend their assessment of the application for the Ashcroft Ranch Landfill Project. The Province further directed Metro Vancouver to investigate alternatives for the replacement of the Cache Creek Landfill prior to amending the Regional Solid Waste Management Plan (SWMP).

In the summer of 2006, Metro Vancouver staff initiated an Expression of Interest (EOI) process for the replacement of the Cache Creek Landfill. While Metro Vancouver initiated the EOI process, they were also participants in this process and accordingly submitted a proposal outlining the Ashcroft Ranch Landfill site. In total, 23 proposals were received under this EOI process including Metro Vancouver's submission.

To ensure impartiality, the proposals were evaluated by a committee external to Metro Vancouver, comprised of several local government representatives from various Lower Mainland municipalities. The evaluation led to a recommendation of 3 to 5 preferred options, including Metro Vancouver's Ashcroft Ranch proposal. A consultant for Metro Vancouver further reviewed these proposals and made recommendations related to preferred options to an independent advisory panel for subsequent recommendation to the

Metro Vancouver Waste Management Committee. This advisory panel was comprised of three external members as follows:

- Metro Vancouver – John Bremner, P.Eng., who formerly served as Executive Director and Registrar for the Association of Professional Engineers and Geoscientists of B.C.
- First Nations Leadership Council – Douglas Lambert, who is the former Justice of the B.C. Court of Appeal and served as Chair of the Law Reform Commission.
- UBCM – Aaron Dinwoodie, an elected Regional Director from Westbank, B.C., and Chair of the Regional Engineering Committee. He has served as President of the UBCM, President of the Okanagan Mainline Municipal Association, and Chair of the B.C. Caucus of the Federation of Canadian Municipalities.

While this was in process, some First Nations groups objected to locating a new landfill in the Ashcroft Ranch area of the Province while other First Nations groups supported the landfill proposals. The objection was viewed by the Metro Vancouver Waste Management Committee as an impediment to the approval process that could not be overcome. As a result, the Metro Vancouver Waste Management Committee decided that a more sustainable approach be taken towards the management of the region's solid waste.

The key solid waste management decisions at this time are:

- Moving towards zero waste – setting new waste diversion targets.
- Recovering materials and energy from waste – waste to energy solutions.
- Obtaining landfill capacity for interim disposal and long term residuals management.

Update of the Solid Waste Management Plan

As stated previously, moving to new disposal options requires that the Solid Waste Management Plan be updated, which, in turn, requires acceptance by the member municipalities and approval by the Province.

While Metro Vancouver's goal is to fast-track the SWMP updating process, there is a requirement under the Waste Management Act to receive input from member municipalities, non-governmental organizations, businesses, residents and First Nations prior to the SWMP being submitted to the Province for approval. These steps will likely take a significant period of time to complete. Without the approval from the Ministry, Metro Vancouver is precluded from implementing new waste management technologies or siting and constructing new waste facilities for the purpose of managing the Region's solid waste.

Several municipalities have expressed a concern that the process to update the SWMP is not following the requirements of legislation (regulations) with respect to consultation (i.e., due process). While "due process" and consultation may at times seem like an impediment to progress, a more thorough review process complete with stakeholder

consultation normally leads to better results and a more effective solution than one that does not follow that path.

A discussion document has been prepared by Regional staff regarding the SWMP update, a copy of which is attached to this report (Appendix I). The following sections of this report list the issues identified in the discussion document and following each issue are some comments:

Zero Waste

Over the past decade the Region's recycling program has been based on the 3Rs of "reduce", "reuse" and "recycle". As part of the movement towards zero waste – Zero Waste Challenge, Metro Vancouver has set a 5Rs hierarchy, which builds on, reduce, reuse, recycle (3Rs) by adding "recover" and "residuals".

"Recover" means the recovery of either materials or energy from the solid waste stream. Material recovery would involve a variety of mechanical or biological processes to remove materials from the solid waste stream that would then be converted to electrical or heat energy. There are a variety of processes and technologies used worldwide to turn municipal solid waste into energy.

"Residuals" refers to the materials that are left over after the previous Rs have been completed. The "residuals" also need to be managed in a sound manner.

Metro Vancouver statistics show the overall waste diversion rate is presently at 52%. Waste diversion rates by sector are as follows:

Single Family	52%
Apartments	25%
Commercial / Industrial	39%
Construction / Demolition	71%

The new Solid Waste Management Plan calls for overall waste diversion rates to increase to 70%.

Current waste diversion for single-family households is achieved through municipal recycling and yard waste collection services. The City of Surrey and a number of other municipalities within the region carry out recycling collection services for the multi-family apartment sector (Surrey has been providing these services since 1998). However, a significant number of Lower Mainland municipalities have not yet initiated recycling collection services for the multi-family residential sector. In addition, a very limited number of Lower Mainland municipalities, not including Surrey, have initiated these services for the Industrial/Commercial/Institutional (ICI) sectors. Increasing diversion rates from these sectors will require the implementation of new programs, which will likely include some degree of municipal involvement. Metro Vancouver regulates the multi-family and ICI sectors and the recently imposed disposal bans should help increase

annual recycling diversion rates in these areas. The disposal ban, which commenced January 1, 2008, includes household recyclable plastics, metal and glass food and beverage containers, mixed waste paper (including cardboard, newsprint, etc.), household hazardous waste, tires, electronic waste, yard waste, gypsum and lead-acid car batteries.

Metro Vancouver is also completing pilot projects for combined composting of food and yard waste. Should these pilot projects be successful, Metro Vancouver proposes that as an initial phase, food waste collection from restaurants and food stores will be carried out where source-separated materials will be composted with yard waste. Following successful implementation of this initial phase, municipalities within the region will be able to expand their existing yard waste programs to include food waste.

Metro Vancouver proposes that further waste recycling be required through municipal regulation of building demolition, deconstruction and wood waste recycling, with processing of these materials to be carried out primarily through partnerships with the private sector. Other management methods include further material disposal bans, increased plastics recycling and extended product responsibility programs for manufacturers and distributors.

Recovery of Materials and Energy (4th R)

The Province has announced several plans that address climate change and energy management. The Throne Speech (February 2007), B.C. Energy Plan (March 2007) and the Premier's speech at the Union of British Columbia Municipalities (September 2007) set out the province's plans and strategies. These include reducing British Columbia's greenhouse gas emissions by 33 percent by 2020 from current levels, requiring that B.C.'s electricity generation be clean and self-sufficient by 2016, requiring greenhouse gas reduction targets in regional growth strategies, and encouraging local governments to commit to a goal of carbon neutrality by 2012. These strategies and plans are consistent with the Principles and Priorities of Metro Vancouver's Sustainable Region Initiative (SRI), specifically related to waste recovery and conversion to energy.

"Recovery" is considered the 4th R, which consists of two basic options. Processes such as magnetic separation, screening, air pressure separation, composting or digestion may be used in various configurations to recover materials. The most significant feature of these types of systems is that they eliminate the need to source separate (curbside recycling collection) recyclables and may be seen by residents as a step backwards.

Recovery of energy from waste can be achieved by way of various technologies. A current example is Metro Vancouver's waste to energy facility (Burnaby Incinerator) where steam generated as part of the incineration process is used to both produce electricity and in the processing of cardboard at an adjacent mill. Other technologies include:

- Anaerobic digestion – which involves the biological conversion of high moisture organic biomass to biogas, which is then used as a fuel;

- Gasification – thermal conversion of any low moisture carbon based waste to syngas, which is then used as a fuel;
- Gasification and biocatalytic process – converts syngas from a gas to a liquid fuel (i.e. ethanol).

These three technologies are evolving but are not yet operating at a commercial scale in North America.

Metro Vancouver's currently stated goal is to implement additional waste to energy technologies with sufficient scale to end disposal of untreated waste by 2020. Accordingly, Metro Vancouver staff has developed two scenarios based on the recovery of energy from the waste stream. These scenarios are based on commencing energy recovery operations by 2015 by one of the following means:

1. A "distributed system" which replaces all existing Metro Vancouver transfer stations with six (6) waste to energy facilities; or
2. A "centralized system" which would see the construction of three (3) larger regional waste to energy facilities located on the North Shore, North of the Fraser River and South of the Fraser River, respectively.

A final decision on technology and location will be part of the future public consultation process relating to these new facilities.

Cost of New Solid Waste Management Strategy

Metro Vancouver estimates that the capital cost related to implementing either of the above options will be similar at approximately \$1 billion.

Both scenarios have been reviewed using a Triple Bottom Line analysis (i.e., taking into account the financial, environmental and social effects) of the projects. While Metro Vancouver's analysis reflects that the difference between the two scenarios in capital costs and environmental and social performance is minimal, the difference in the long term costs of operating and maintaining the distributed system (scenario 1) is significantly higher than the larger capacity, centralized system (scenario 2).

Regional tipping (disposal) fees would be expected to rise to between \$105 and \$130 to support either of the options from the current rate of \$68/tonne. Based on this range of increases, the annual single-family rate for solid waste disposal service would increase in Surrey from \$197/year (2008 rate) to a range of between \$223 to \$240/year. This is the equivalent of a 2% to 3% property tax rate increase. In addition, there would be extra costs in the form of solid waste disposal fees per single-family residence for the. There is the potential for cost recovery for the operational costs of the plants, depending on the technology chosen and the resource (i.e., end product produced).

Residuals Management (5th R)

“Residuals” refers to materials that cannot be diverted and/or reused or recycled or recovered either before or after treatment processing. Residuals are generally disposed through landfilling.

Should Metro Vancouver decide that waste-to-energy technologies are the preferred disposal method, the overall quantity of solid waste residuals, which require management by landfill disposal, will be reduced considerably. However, there will still be an ongoing requirement to dispose of the residuals to a landfill even after alternative disposal technologies have been implemented.

Interim Landfill Capacity

Metro Vancouver requires replacement capacity for Cache Creek Landfill both as an interim means of disposal of the Region’s solid waste and on a much smaller scale on a permanent basis for the disposal of residuals from an enhanced waste management system. The use of the Vancouver Landfill would require the support of the City of Vancouver, Delta and the Ministry of Environment, which, at this time, appears unlikely. Metro Vancouver, as part of the 2006 RFP process, received several proposals for the disposal of the Region’s solid waste at out-of-province landfills, including one in Washington State. They continue to investigate these sites for both interim disposal and long-term disposal needs. It is unknown at this time what impacts an interim landfill facility would have on the region’s current tipping fee rate of \$68/tonne.

The SWMP discussion document also proposes that the Vancouver Landfill stop accepting unprocessed waste by 2020. This would have a significant financial impact on Vancouver and, consequently, Vancouver is opposed to the region carrying out public consultation on a plan that calls for, what that City sees as, an early closure of their landfill.

Overall Regional Financial Impacts

It is important to note that there are a number of significant regional services that are all experiencing a need for new infrastructure. These are:

- Sanitary sewer trunks and treatment plants (the subject of this report);
- Water supply, treatment and trunk delivery;
- Solid Waste management; and
- TransLink (major road network and public transit).

Decisions and the related financial requirements related to any one of these areas of service should not be made in isolation of an understanding of the needs and financial requirements in the other areas of service since it is the same rate/tax payer that is footing the collective financial impacts in all of these areas. Likewise, any increases that the Region imposes on the property tax bill will tend to limit the ability of local governments to increase property taxes to fund needed local services. It would be prudent for the

Region to prepare an overview of the expected infrastructure needs and related financial requirements in each of the above-referenced service areas with a view to ensuring that decisions in each of these areas is made with a full understanding of the broader regional needs and potential financial impacts on the Region's property tax/rate payers.

CONCLUSION

Based on the above discussion, it is recommended that Council authorize staff to forward a copy of this report and the related Council resolution to Metro Vancouver as input from the City of Surrey into the development of a new SWMP for the Region.

Paul Ham, P.Eng.
General Manager, Engineering

PH/GMc/RAC:ajs/brb

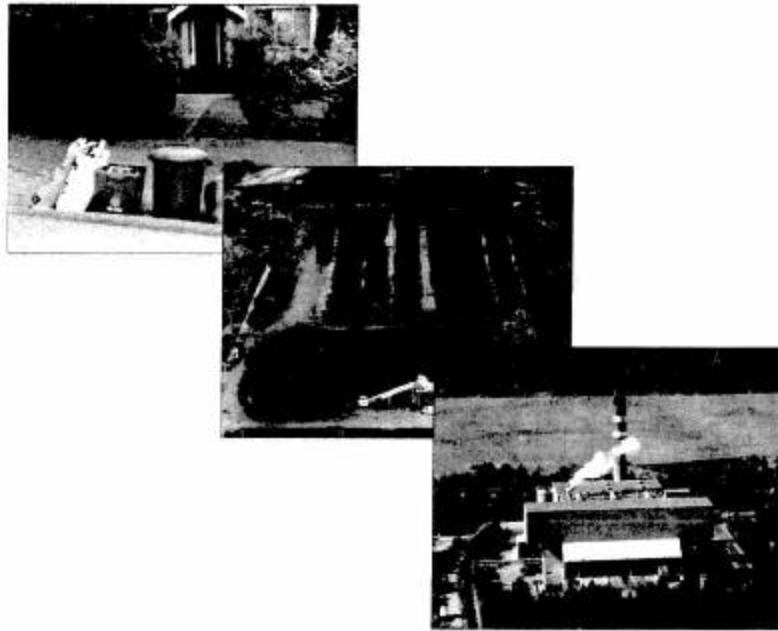
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Appendix I - Strategy for Updating the Solid Waste Management Plan

Strategy for Updating the Solid Waste Management Plan

February 2008
(Revised March 15th, 2008)

Discussion Document



The purpose of this document is to review the opportunities for diversion of solid waste from disposal and outline the estimated costs associated with these opportunities such that Metro Vancouver can set the strategic direction for the preparation of an updated Solid Waste Management Plan.

The key solid waste management decisions required at this time are:

- Moving towards Zero Waste – setting a new waste diversion target
- Recovering materials and energy – how much, how fast?
- Landfill capacity for interim disposal and long term residuals management

These decisions will set the overall direction for a new Solid Waste Management Plan and will set the commitment level of Metro Vancouver and its member municipalities for the future management of solid waste in the region.

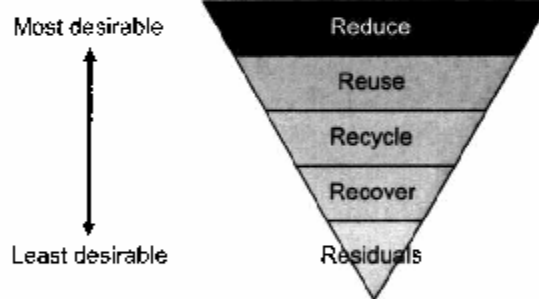
1. The 5Rs Hierarchy of Solid Waste Management

The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste management strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from materials and to generate the minimum amount of waste. Figure 1 illustrates the elements of the 5Rs Hierarchy.

The first R "Reduce" implies that consumers should be making wise choices that reduce the amount of waste generated and industry should be looking at their processes and reducing materials. "Reuse" can apply to using a material again in the same function, or using it for a new function. "Recycling" is the reprocessing of materials into new materials. Recycling can decrease the consumption of new raw materials, but will

often save on the energy required to process raw materials into a product. "Recover" applies to the recovery of either materials or energy from a mixed waste stream. Material recovery involves a variety of mechanical or biological processes that remove a variety of materials from the waste stream. Sometimes this material is used to make a fuel that is then burned for energy. Energy recovery can skip the mechanical or biological processes and thermally treat the material to recover energy. "Residuals" refers to residuals management or the management of materials which remain after the previous four Rs have been applied. This is often in the form of landfill disposal but beneficial uses of residual material can sometimes be available.

Figure 1: Waste Hierarchy showing 5 Rs



1.1 Zero Waste Challenge

The Zero Waste Challenge specifically addresses the following goals:

- Goal 1: Minimize waste generation
- Goal 2: Maximize reuse, recycling and material/energy recovery

2. Waste Quantities

The waste quantities in Metro Vancouver are increasing every year as the population expands and particularly since 2004 when the economic fortunes of the region improved. Currently over three million tonnes of waste are generated annually in Metro Vancouver. Recycling rates have been improving steadily since the 1990s, however waste generation has also been increasing. Figure 2 illustrates the trends in waste generation, recycling and disposal while also showing how the population has increased. Figure 3 illustrates this waste generation rate per capita, with the current generation rate being approximately 1.5 tonnes per person. As the population increases from 2 million to 3 million waste generation is anticipated to increase from 3 million to 4.5 million tonnes per year. Figure 4 illustrates this projected growth in overall solid waste generation.

The region's solid waste may be categorized into four sectors – that which is generated from single family housing units (SF); multi-family housing units such as condominiums and townhouses (MF); commercial, industrial and institutional facilities (CI); and demolition, land clearing and construction (DLC). Figure 5 shows the overall waste generated by each sector, detailing the proportions which are recycled and disposed. The focus of an updated Solid Waste Management Plan is to review the current disposal stream and identify and target components that can be diverted. Figure 6 illustrates the composition of municipal solid composition disposed in Metro Vancouver. This is a "snapshot" of the composition based on a number of different waste characterization studies of the source sectors

Figure 2: Trends in Waste Management 1994-2006

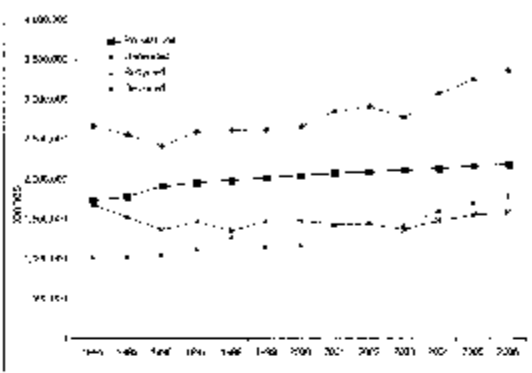


Figure 3: Waste Generation Rate

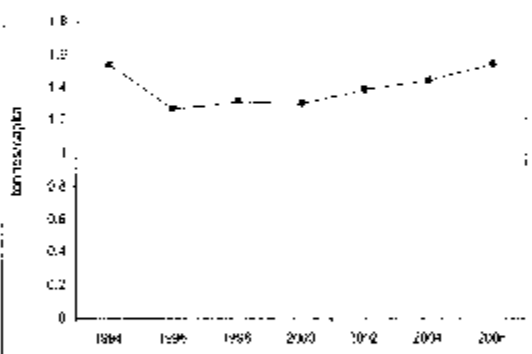
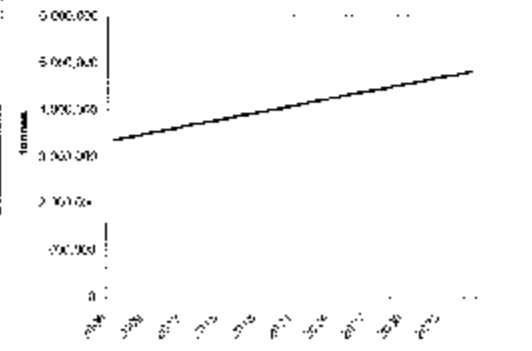


Figure 4: Waste Generation Growth based on Population Projection



It clearly identifies several materials including wood, paper and paperboard and food waste as potential materials that should be targeted for diversion.

Figure 7 illustrates how significant these materials are in the context of the overall waste stream. To strategize on the best method of targeting these materials it is important to also know the source sector.

Figure 5: Recycling & Disposal Rates by Sector

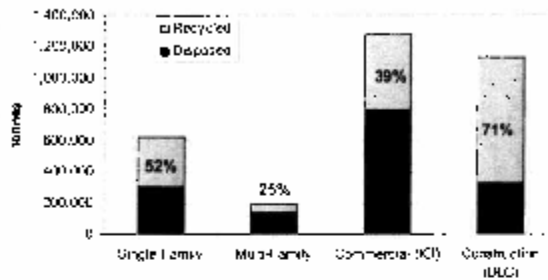


Figure 6: Composition of Waste Disposed

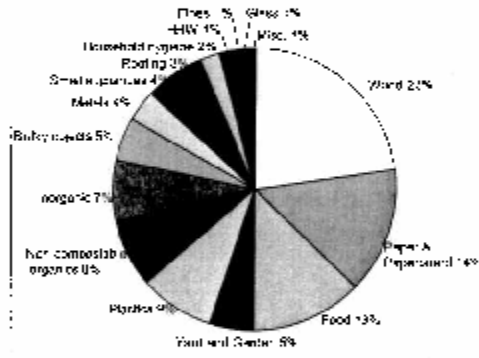


Figure 7: Overall Waste Composition

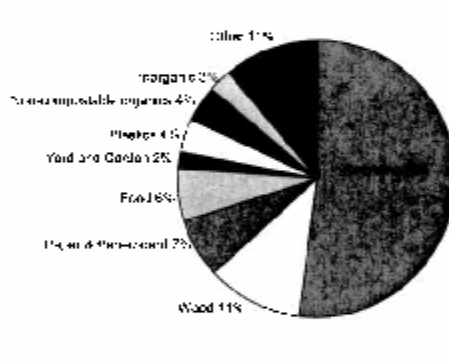
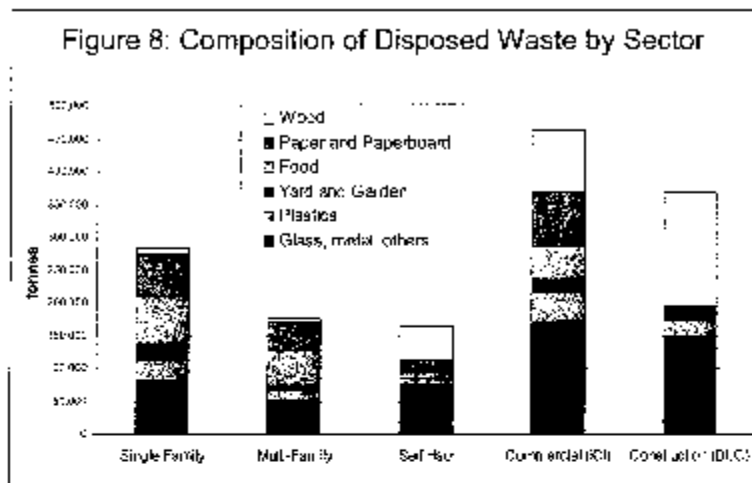


Figure 8 shows the breakdown of waste disposed into the source sectors. The self haul category has been added because this has been a major growth sector in recent years. This is due to the current economic prosperity in Metro Vancouver, although it is primarily from the single family housing sector and to a lesser extent from the commercial sector. Restriction on garbage can numbers and sizes (i.e. ‘can limits’) and restrictions on bulky waste collection at the curbside have effectively somewhat restricted residential garbage collection.



3. The First 3 Rs

The first 3 Rs are intrinsically linked as they all relate to restricting and removing materials from entering the waste stream. As they relate to residential waste, commitments made towards the first three Rs will require strong municipal involvement since they are the primary collectors of these materials. Diverting solid waste from the (garbage) disposal stream into recycling or composting may involve significant changes to collection systems in some cases. Targeting sectors which are currently under-performing on diversion goals will also require commitments to change how these sectors are managed and/or licensed.

Currently Metro Vancouver is operating at an overall diversion rate of 52 percent. The Zero Waste Challenge has identified options to increase waste diversion in the region. Following an evaluation of these options Metro Vancouver has determined how these efforts can alter future waste diversion figures. The primary target materials for increasing diversion are as follows:

- Wood Waste
- Fibre products
- Food Waste
- Plastics
- Yard Waste
- E-waste and Small Appliances

These materials have been analysed to determine the preferred program to allow for the diversion of the material that is currently going for disposal. The capture rates for these materials have been estimated on the basis of experience in other progressive jurisdictions. Table 1 presents the disposed quantities of these materials and the estimated method and rate of capture by the initiation of new diversion programs. The table also outlines the potential benefit such programs would have on the overall diversion rate if the anticipated capture rates are achieved.

Table 1: Materials Disposed, Diversion Programs and Diversion Potential

	Disposed from all Sectors (tonnes)	Diversion Program	Estimated Capture (tonnes)	Potential Additional Diversion
Wood Waste	350,000	Modifications to Demolition and Building Permit Process	120,000	4%
		Provide Wood Drop Off Facilities at Transfer Stations	100,000	3%
Paper and paperboard	215,000	Enhanced Disposal Bans	80,000	2%
		Composting	35,000	1%
Food Waste	188,000	Composting	95,000	3%
Plastic Waste	130,000	Expansion of Plastics Recycling	20,000	1%
Yard Waste	70,000	Disposal Bans	52,000	2%
E-Waste and Small Appliances	50,000	EPR* - E-Waste	20,000	1%
		EPR* - Small Appliances	20,000	1%
	Total		542,000	18%

* Provincially mandated Extended Producer Responsibility program (EPR).

It may appear that the estimated capture rate for some of these materials seems low. However, as a basis of comparison it may be worth considering that if a particular recycling or diversion program has a relatively successful 70% participation rate (i.e. 70% of individuals participate) and those participants are diverting 70% of materials from disposal, then a capture rate of 50% is achieved (i.e. $0.7 \times 0.7 = 0.49 = 49\%$).

Diversion rates of greater than 70% can only be achieved through higher participation rates.

3.1 Diversion Programs

Composting

Composting is the decomposition of organic material to produce a nutrient rich, soil-like substance. Diverting organic material such as food waste and yard waste from landfill disposal reduces the production of green house gases (GHG) from the landfill. Large-scale composting can be very effective when carried out under controlled conditions with a high quality feedstock or source material.

The focus of a successful food waste composting program must be to produce a high quality product. The best way to produce a high quality product is to start with a high quality material and for this reason it is recommended that only source-separated compostable organic materials be targeted for composting. Programs that start with a mixed solid waste material inevitably have problems with contamination at the product stage.

Metro Vancouver is currently working with the City of Vancouver on a demonstration food waste composting project at the Vancouver Landfill. Depending on the success of this demonstration project, the Vancouver Landfill could be considered as a potential site for a regional composting facility and discussions have commenced with Vancouver and Delta. The facility could then be expanded as the food waste capture volume grew. Other locations could also be considered for siting a regional composting facility.

The first target can be the commercial sector such as food stores and restaurants. Although this is not the largest overall source of food waste, it is the most concentrated and therefore the most effective place to start. Following on from this, municipalities that can readily adapt their current system to collect food waste along with their yard waste would be the next focus for composting. Over time, more municipalities can change their system to allow for food waste collection from single family units and the composting operations can be expanded to accommodate this growth in feedstock volume.

Table 2 below outlines the costs and capture rates associated with a staged approach to composting. These costs do not include the change in costs to the municipalities as a result of collecting food waste. Additional tonnes of contaminated fibre and yard waste have been included. Timelines for 2nd and 3rd phases are dependant on the ease with which municipalities can establish food waste collection programs.

Table 2: Phased Sequence for Composting Operations – Decision Point

Action	Tonnes of Previously Undiverted Materials			Estimated Cost	Additional diversion % of Total Waste Stream	Commitments Required
	Food	Contaminated Fibre	Yard Waste			
Build a composting facility for commercial food waste and contaminated paper	50,000	20,000	20,000	\$15M	3%	<ul style="list-style-type: none"> • Metro Vancouver to build a composting facility • Metro Vancouver to set composting rate so as to encourage facility use
Increase composting capacity to service single family homes	50,000	12,000	25,000	\$15M	3%	<ul style="list-style-type: none"> • Metro Vancouver expands composting facility and potentially builds a second • Municipalities to establish food waste collection programs
Aggressively target and accommodate multi-family units	15,000	3,000	7,000	\$5M	1%	<ul style="list-style-type: none"> • Metro Vancouver to expand regional composting facilities • Municipalities change business model for MF collection and mandate food waste collection from MF units

Modifications to Demolition and Building Permit Process

Demolition regulations, which require building permit applicants to divert at least a portion of their waste from landfills have been implemented in other jurisdictions. Table 3 outlines two options to be considered as part of a revamping of the building permit process.

Table 3: Modifications to Demolition and Building Permit Process – Decision Point

Action	Tonnes of Previously Undiverted Woodwaste	Estimated Cost	Additional Diversion from Total Waste Stream	Commitments Required
Require waste management plans with all applications for retrofits and new construction	60,000	\$1.8 million	2%	<ul style="list-style-type: none"> Municipalities revamp permit process to include a waste management plan Municipalities educate and promote new permit process Municipalities provide enforcement of new permit process
Require disposal deposits on all demolition and construction applications to ensure that plans are followed	60,000	\$1 million	2%	<ul style="list-style-type: none"> Municipalities revamp permit process to include a disposal deposit Municipalities educate and promote new permit process Municipalities develop a mechanism for managing deposit system

Wood Waste Drop-off Facilities

There are several existing private-sector processing facilities that accept wood waste for recycling. However, there are no facilities for the acceptance of segregated wood waste at Metro Vancouver transfer stations, nor are there significant financial incentives for the separation of wood waste. Many of the existing transfer stations are space restricted and due for upgrade. The upgrading plans should include an area for the collection and transfer of segregated wood waste. Private facilities should also be approached as possible locations for wood waste drop-off. Retail centres where wood products are sold are also potential candidates for establishing partnerships allowing for the drop-off of wood waste for recycling. Both of these initiatives are identified in Table 4.

Table 4: Capture of Wood by Providing Wood Drop-Off Facilities at Transfer Stations – Decision Point

Action	Tonnes of Previously Undiverted Wood Waste	Estimated Cost	Additional Diversion % of Total Waste Stream	Commitments Required
Develop partnerships with the private sector to collect and process wood waste	20,000	\$200,000	1%	<ul style="list-style-type: none"> Metro Vancouver and municipal staff work together on developing these partnerships
Develop space at transfer stations for drop off of wood	90,000	\$2.2 million	2%	<ul style="list-style-type: none"> Metro Vancouver commit capital for the establishment of wood waste drop off areas Metro Vancouver commit to buying additional property where necessary Metro develop a separate wood waste tipping rate to drive use of drop off facilities

Material Disposal Bans

Material disposal bans work by compelling generators within each sector to discontinue the disposal of mixed waste and use existing diversion infrastructure. Disposal bans allow for the application of punitive penalties to offenders that continue to dispose of banned materials. Enforcement and education are the largest public costs associated with the implementation of material disposal bans. An early outcome of the Zero Waste Challenge was the implementation of several new enhanced material disposal bans on January 1, 2008. Metro Vancouver anticipates that these bans will increase diversion rates by approximately 2%.

Plastics Recycling

Much of the plastic that is disposed is film plastic which has low potential for recycling. Reduction in the number of plastic bags being consumed would not yield a significant increase in diversion. Management options by local governments for plastic bag reduction are under consideration. In the meantime however, many retailers are moving away from plastic bags at checkouts and offering alternatives to consumers. There is, however, potential to capture more plastic if all municipalities expand their recycling collection to include all plastics.

Table 5: Expand Plastics Recycling to Include All Plastics— Decision Point

Action	Tonnes of Previously Undiverted Plastics	Estimated Cost	Additional diversion % of Total Waste Stream	Commitments Required
Expand collection of plastics recycling	20,000	TBD	1%	<ul style="list-style-type: none"> Municipalities commit to promoting the expansion of plastics collection Municipalities develop strategies in their collection system for the additional recycling volumes

Extended Producer Responsibility (EPR)

A Provincially mandated extended producer responsibility (EPR) program for the management of electronic waste was formally established on August 1, 2007. New initiatives to include small appliances would potentially reduce the amount of electronic waste disposed by an additional 20,000 tonnes per year.

The opportunities for a packaging EPR program could have an impact on diversion rates in Metro Vancouver. The authority to regulate packaging is with senior governments. Metro Vancouver will continue to work with the Province and the Federal Government on the packaging issue.

Table 6: Expand EPR for E-Waste and Small Appliances– Decision Point

Action	Tonnes of Previously Undiverted E-waste and Small Appliances	Estimated Cost	Additional diversion % of Total Waste Stream	Commitments Required
Expand EPR for E-Waste	20,000	-	1%	<ul style="list-style-type: none"> Province to expand EPR program
Expand EPR for Small Appliances	20,000	-	1%	<ul style="list-style-type: none"> Province to expand EPR program

4. The 4th R - Recovery of Materials and Energy

4.1 Provincial Greenhouse Gas Reduction Strategy and the Provincial Energy Plan

The Province of British Columbia announced several plans that address climate change and energy management. The Throne Speech (February 2007), BC Energy Plan (March 2007), and the Premier's speech at the Union of British Columbia Municipalities (September 2007) set out the province's plans and strategies. These include reducing British Columbia's greenhouse gas emissions by 33 percent by 2020 based on current levels, requiring that B.C.'s electricity generation be clean and self-sufficient by 2016, requiring greenhouse gas reduction targets in regional growth strategies, and encouraging local governments to commit to a goal of carbon neutrality by 2012. These strategies and plans are consistent with Metro Vancouver's Sustainable Region Initiative Principles and Priorities.

4.2 End the Disposal of Untreated Waste

The European model for waste management in recent years has been to move towards the treatment of all waste prior to disposal, either through a materials recovery facility, compostor or thermal treatment facility. Only residuals require disposal. In keeping with goals of the Zero Waste Challenge and the Sustainable Region Initiative, Metro Vancouver should move in this direction and eventually phase out the disposal of untreated waste.

4.3 Today's Technologies

When considering the 4th R there are two alternatives. The first is focusing on materials recovery from a mixed waste stream and the second is energy recovery. Material recovery from a mixed waste stream can involve both biological and mechanical processes. Processes such as magnetic separation, screening, air blowing, composting or digestion are commonly used in a variety of configurations in a materials recovery facility (MRF). These systems have the advantage of being able to remove the need for source separation of recyclables but since Metro Vancouver already has a sophisticated system in place for the collection of recyclables at the curbside, it would not likely get any significant benefit relative to the cost of these types of facilities.

Energy recovery can also be undertaken in a number of ways. Traditional thermal treatment technologies include that used at the Metro Vancouver waste-to-energy (WTE) facility in Burnaby. An energy recovery technology has not been decided. Metro Vancouver is open to consideration of all energy recovery technologies and prepared to proceed with any technology that proves to be cost effective and achievable within the required timeframe.

With a growing need for energy in Metro Vancouver, and the Provincial Energy Plan that mandates clean and self-sufficient energy by 2016, the need for additional, non-fossil based energy should take precedent over the recovery of low value recyclable materials. For this reason, two scenarios have been developed for Metro Vancouver based on the recovery of energy from the material that remains in the waste stream.

4.4 Scenarios for Metro Vancouver

Two possible scenarios are presented:

- Distributed System: Replace transfer stations with WTE facilities (8 facilities required)
- Centralized System: Build up to three larger regional WTE facilities (located on the North Shore, North of Fraser, South of Fraser)

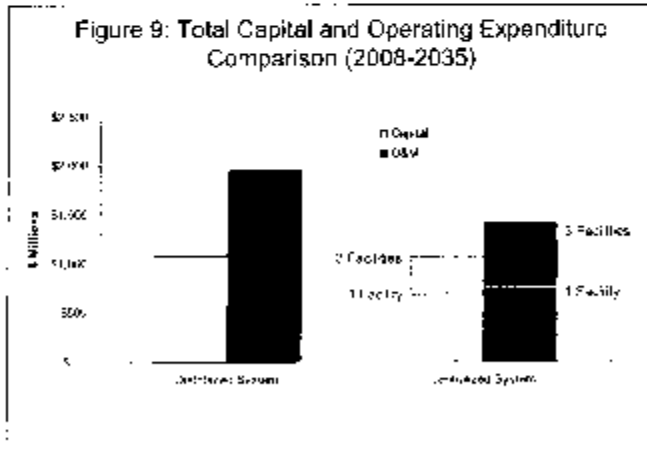
These scenarios have been reviewed using a Triple Bottom Line analysis which is consistent with the principles of the Sustainable Region Initiative (SRI) and comprises an analysis of the financial, environmental and social effects of a project or projects. Analysis was done assuming two different rates of waste diversion: 52% (the status quo) and 70%.

The analysis assumes that all facilities are built at the same time (in operation by 2015) and will accept waste flows from all the existing transfer stations, with the exception of the Vancouver South Transfer Station which will continue to send material to Vancouver Landfill for disposal. Table 7 shows the projected tonnes of waste diverted to the WTE facilities for a 70% diversion rate.

Table 7: Tonnes of Waste Diverted to WTE Facilities

Tonnages to WTE	2015	2020	2025	2030	2035
70% Diversion	680,000	730,000	790,000	850,000	910,000

Financially, the centralized system is less expensive. The difference in cost is attributable to the higher per tonne capital and operating costs of smaller facilities relative to larger facilities. For example, a 500,000 tonne per year waste-to-energy facility will have capital costs of about \$750/tonne of installed capacity while a facility under 150,000 tonnes per year will have a capital cost of about \$1,500/tonne of installed capacity. The difference



in operating costs is even more dramatic. A 500,000 tonne per year WTE facility has operating costs of about \$35/tonne of throughput while a 150,000 tonne per year WTE facility has operating costs of about \$125/tonne of throughput.

Figure 9 shows the cumulative capital and operating expenditures for the two systems at 70% diversion. The difference in capital costs is small although the operating costs differ considerably.

Tipping fees would be expected to rise to between \$105 and \$130 to support the schemes.

The difference in environmental performance between the two systems is not likely to be significant. Best available control technology would be utilized to control air emissions at all facilities. Both scenarios significantly reduce overall trucking as there is no long-haul to landfills.

Waste-to-energy would generate enough electricity for 40,000 to 50,000 homes. Opportunities would also exist to offset the use of fossil fuel for heating by developing district heating loops.

The difference between the two systems in environmental and social performance is small while the difference in financial performance is quite large.

Table 8: Expand Waste-to-Energy – Decision Point

<i>Action</i>	<i>Commitments Required</i>
Expand Waste-to-energy	<ul style="list-style-type: none"> • Metro Vancouver secures sites • Metro Vancouver proceeds with procurement for design-build-operate
End disposal of untreated waste by 2020	<ul style="list-style-type: none"> • Vancouver to phase out disposal of untreated waste at Vancouver Landfill by 2020

The 5th R - Residuals Management

Should Metro Vancouver transition towards the pre-treatment of all waste, then the overall quantity of solid waste residuals which require management by landfill disposal will ultimately be reduced considerably. Nevertheless, there will still be a requirement to dispose of residuals from treatment processes to landfill. Interim landfill capacity will also be needed for the period preceding the establishing of new waste-to-energy facilities.

5.1 Cache Creek Replacement Process

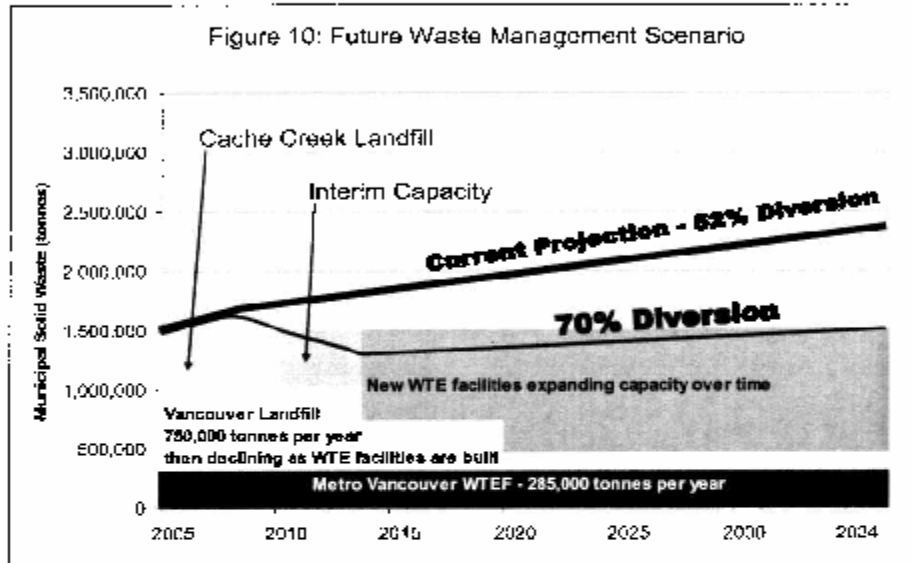
Dillon Consulting Ltd. has submitted a letter report on the status of their independent review. The Commissioner will report to the Board on the status of the process.

5.2 Interim Landfill Disposal Capacity

At its current rate of filling, the life of Cache Creek Landfill is expected to expire in early 2010. Interim disposal capacity will be required from this point until the establishment of sufficient solid waste pre-treatment capacity. At present, this could involve either Vancouver Landfill or export to a landfill outside the region.

Use of Vancouver Landfill as the interim facility will require Board direction, the support of the City of Vancouver, the Corporation of Delta and the Ministry of Environment.

Figure 10 provides a visual summary of how the Zero Waste Challenge, energy recovery and residuals management could combine together in the future. For this illustration it is assumed that by 2020, the Vancouver Landfill will also be replaced by WTE and the landfill will be used into the future for residuals disposal. With no unprocessed waste deposited in Vancouver Landfill after 2020 the life of the landfill could be extended considerably beyond its current projected 2038 closure.



Draft Solid Waste Management Plan Goals, Strategies and Action Categories

Goal 1: Minimize Waste Generation

Strategy #1: Foster a Zero Waste Ethic through Metro Vancouver information, education, communication and community-based social marketing programs.

The amount of waste we produce is directly linked to how many goods and services we consume. The public and businesses must be made aware of the consequences of unsustainable behaviour and be provided with tools and incentives to change

- Metro Vancouver actions centre around Zero Waste messaging (leading by example and being an on-line resource for the public).
- Member municipalities to support the Zero Waste Challenge.

Strategy #2: Advocate that senior governments transfer additional waste management responsibilities to producers and consumers.

The costs and responsibilities of waste management are borne by local governments and taxpayers. The costs and risks to manage end-of-life should be the responsibility of manufacturers of goods and the consumers that use them – not the local taxpayer.

- Metro Vancouver to be a strong advocate and participate in forums relating to these issues.

Goal 2: Maximize Reuse, Recycling and Material/Energy Recovery

Strategy #3: Reduce wood waste being disposed

Increase the opportunity and incentives for wood waste recycling by changing the demolition and building permit process and providing wood waste drop-off facilities at the transfer stations.

- Metro Vancouver to provide wood waste recycling facilities at upgraded transfer stations pursue opportunities for other drop-off locations.
- Member municipalities to work with Metro Vancouver to develop and then implement a new system for demolition and building permits that requires recycling.

Strategy #4: Reduce Paper and Paperboard Being Disposed

14% of the disposed waste stream is made up of paper and paperboard, much of which should be included in the existing recycling programs. Contaminated paper which cannot be recycled can be composted along with other organics to produce a reusable and beneficial product.

- Metro Vancouver to develop composting facilities that can accommodate contaminated paper and work to reduce paper consumption.

As of February 27th 2008

Draft Solid Waste Management Plan Goals, Strategies and Action Categories

- Member municipalities to enforce disposal bans, develop organics collection and target programs to recycle more paper and paperboard.

Strategy #5: Target Organics for Recovery

Food waste comprises 13% of the waste disposed. This, along with yard and garden waste and some paper and paperboard can be composted together in a source separated stream to produce a beneficial and marketable product.

- Metro Vancouver to build composting facilities that will accommodate commercial, then single family residential and then multi-family residential.
- Member municipalities to develop an organics collection system for single family residents and work to develop systems that can capture multi-family food waste.

Strategy #6: Target Plastics for Increased Recycling

Expand the collection of recyclable plastics from residential customers and encourage more plastics recycling from the commercial sector.

- Metro Vancouver to enforce disposal bans and review options for a reduction in plastic bag consumption.
- Member municipalities to expand their residential recycling collection to capture all plastic types.

Strategy #7: Target Multi-family and ICI Sectors to Improve Diversion Rates

Multi-family residences along with the commercial sector are under-performing with respect to recycling, in part because many premises do not have adequate facilities to accommodate recycling.

- Metro Vancouver to work to make commercial and multi-family recycling mandatory and develop programs to encourage recycling.
- Member municipalities to implement new programs targeting multi-family and commercial recycling.

Goal 3: Extract maximum benefit from the disposed waste stream**Strategy #8: Expand the Waste-to-Energy Infrastructure**

Build new waste-to-energy (WTE) facilities within Metro Vancouver so that the disposal stream is treated locally in a sustainable manner that provides benefits in the form of energy and district heating to the region.

- Metro Vancouver to build WTE facilities such that by 2020, no unprocessed waste will be disposed of in landfills.

Strategy #9: Develop a system for recycling bottom ash.

It has been determined that bottom ash, following crushing, sizing and screening and the removal of metals and other debris, can be recycled into a uniform, consistent aggregate product.

- Metro Vancouver to develop opportunities for the utilization of bottom ash as a beneficial aggregate product.

Strategy #10: Dispose of any remaining residuals to landfill and minimize the environmental impact.

- Metro Vancouver to seek the best option for interim disposal capacity and ultimately use a designated landfill only for the disposal of processed waste that have no further beneficial use.