Executive Summary

BACKGROUND

The City of Winnipeg (the City) has retained Stantec Consulting Ltd. (Stantec) to work with the City Staff and Elected Officials, the Stakeholder Advisory Committee, and other stakeholders, to develop a Comprehensive Integrated Waste Management Plan (CIWMP) that will establish a long-term approach to manage the City's waste.

The purpose of the CIWMP will be to provide direction for the City's waste management system through recommendations to improve current waste diversion programs, to make progress towards zero waste and to address waste processing and disposal needs for the next twenty years. The goals and objectives for the CIWMP are discussed in Appendix A.

This report documents the recommended waste management system for the near term (implemented within the first 5 years) and longer term (in effect within 10 years). The twenty year planning timeline for the CIWMP covers the period from 2011 (Year 1) to 2031 (Year 20).

The CIWMP builds upon the current waste management system in the City (described in detail in Appendix B), which includes:

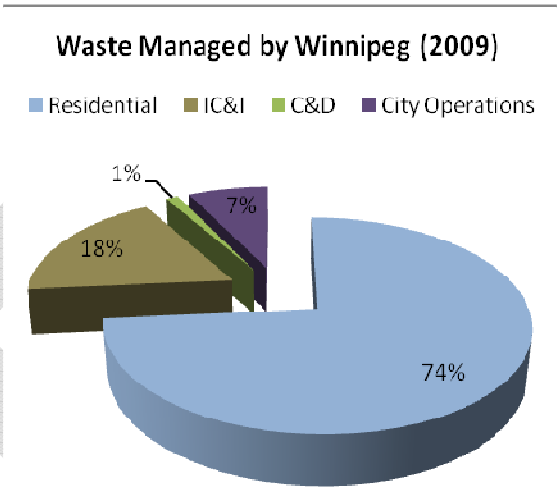
- Promotion and education for current City programs.
- Single stream recycling collection through curbside blue boxes, apartment recycling carts, depot collection and open space recycling containers.
- Leaf & yard waste collection and composting (including four (4) special collections for northwest Winnipeg residents and drop-off depots).
- Other diversion efforts such as Christmas tree chipping, promotion of backyard composting, grass-cycling, and 'Giveaway Weekends' for reusable items.
- A depot for scrap metal, automotive batteries, bicycles, tires, propane tanks, and appliances at the Brady Road landfill.
- Collection of garbage through a variety of methods across Winnipeg including automated carts, manual collection of garbage bags, Autobin or communal bin collection in back-lane collection areas, bin collection for multifamily dwellings, bulky waste collection and abandoned waste collection.
- Disposal of waste collected by the City and waste that is hauled to the landfill by City residents or commercial generators at the Brady Road Landfill.

The primary focus of the CIWMP is the residential waste management system, as residential waste makes up the majority of waste material managed by the City. City programs and facilities also manage some waste generated by the Industrial, Commercial, and Institutional (IC&I) sector, Construction and Demolition (C&D) sector and waste generated by City Operations.

The following table and chart, summarizes the current (2009) breakdown of the waste streams managed by the City. Information available regarding 2009 tonnages, indicates that the City was achieving 15% diversion of residential waste considering all residential waste streams (curbside and non-curbside) managed by the City. It should be noted however that the non-curbside materials managed at Brady Road are estimated and may include non-residential tonnages.

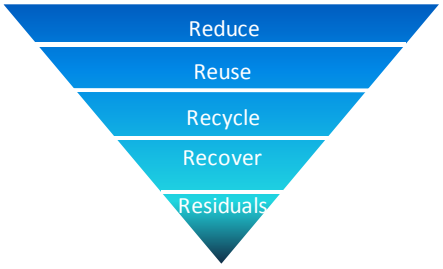
Summary of Waste Managed by Winnipeg in 2009 (tonnes)	
Residential	341,542
IC&I	83,099
C&D	5,310
City Operations	34,369
Total Tonnes of Waste Managed in 2009	**464,320**

2009 Tonnage Records indicate that the City diverted 53,800 tonnes of residential waste, achieving approximately 15% residential diversion through all programs (collection and depots).



FORMULATION OF THE INTEGRATED WASTE MANAGEMENT SYSTEM

The enhanced integrated waste management system developed for the City of Winnipeg reflects input from public involvement, the general principles of zero waste and a waste hierarchy that encourages and promotes efficient use of resources and waste[1] minimization, so that the primary waste management emphasis in Winnipeg switches from disposal to diversion. The components of the enhanced integrated waste management system as discussed in this section were presented and discussed in detail within the "Draft Task E Report, Identification of Waste Management Options" (Appendix C).



[1] The Federation of Canadian Municipalities, defined 'Zero Waste Communities' as:
A community that "has made a long-term commitment to reducing waste through measures such as extended producer responsibility programs, economic instruments to encourage waste reduction, green procurement and product design that includes end-of-life-management.

The enhanced integrated waste management system:

- Will improve Winnipeg's diversion rate by improving existing programs or adding new programs that address gaps in the existing waste management system;
- Uses a sequential approach which focuses on programs that offer cost effective improvements to the diversion rate in the near-term, while programs to be implemented in the longer term concentrate on restricting garbage and targeting additional materials for diversion such as source separated organics.
- Integrates a robust communications and education program to support overall program change and to encourage continuous dialogue with residents of Winnipeg. Program success is contingent upon the combined efforts of the City in providing service and the residents in effectively using these services.
- Strives for a balance between: a) environmental protection through increased diversion and decreased GHG emissions; b) program costs understanding that City residents are affected by the costs associated with all program changes; and c) social considerations understanding that waste management is a service fundamental to the needs of the community.

THE RECOMMENDED RESIDENTIAL WASTE MANAGEMENT SYSTEM

The following summary tables present the recommended near and longer term residential waste management system. Programs referred to as 'near term' would be implemented and in effect within the first five years of approval of the Strategy. Programs referred to as 'longer term' will take more time to implement and would generally be in effect within 10 years.

The cost assumptions for most components of the system discussed below are conservative trending to the higher end of potential cost ranges presented in the Task E Options Report (Appendix C).

The recommended near term residential system was developed by:

- Considering the initiatives that are possible for the City to implement within the next five years, given that for many of these initiatives additional infrastructure is required (e.g. composting, Community Resource Recovery Centres (CRRCs));
- Identifying how best to address the key problems/opportunities identified during the development of the goals and objectives for the CIWMP (e.g. need for a uniform system of collection from single family households);
- Considering program changes which would be accepted by the community, reflecting the dialogue with the public through the consultation process that has taken place since November 2010.

Comparative evaluation during development of the near and longer term residential system was only undertaken for system components where there were clear options such as alternative methods of collecting recyclables or garbage. In all other cases, the formulation of systems was based upon considering the most reasonable timeframe for implementation of the key initiatives.

Near Term Residential Waste Management System (Over Next Five Years)

1. Reduction and Reuse

Prevents waste generation through behavioural change. Required to 're-think' wasteful behaviour.

Recommendations:	
Expanded Promotion & Education:	• Increase scope of activities and per household expenditures to support new programs. • Is the primary means of addressing reduction and reuse program elements. • Includes support for school programs developed by the Province.
Backyard and Community Composting	• Support and promote backyard and community composting.
Re-use Initiatives	• Work with existing community stakeholders and organizations • Develop City of Winnipeg 'Re-use' Guide, including 'take it back' options • Support Community Re-use Events • Develop drop-off locations for re-usable items at CRRCs, pending interest from community organizations to manage the material.
Per Capita Waste Reduction Target	• Set initial target: recommend a minimum of 1% per annum decrease in per capita waste generation (around 5 kg per person per year) • Promote the Per Capita waste reduction target. • Implement bi-annual residential audits to measure progress towards target and progress with other diversion plan components.
Grass-cycling	• Expand current promotion of grass-cycling. Share information on cost and environmental impacts of grass disposal with residents.
Community Based Social Marketing	• Use Community Based Social Marketing approach to support any desired changes in behavlour. This would include the implementation of significant program components such as the: - Transition to Uniform Garbage Collection - City-wide Leaf and Yard Waste Collection - Implementation of Community Resource Recovery Centre(s) (CRRC)
Support/Promotion of Waste Minimization Legislation/Programs	• Cooperate with the Province and Producers, supporting the development of Extended Producer Responsibility to other material streams

Potential Costs: **Capital:** Cost for re-use areas included in CRRC costs. **Net Annual Operating:** average $700,000 Increase	**Additional Staff Requirements:** • 2 Promotion & Education Staff
General Timelines: • Largely in effect by the end of 2013.	**Environmental Benefits compared to Status Quo:** • Diverts up to 7,000 additional tpy (2% Increase in Diversion) • Reduces GHG emissions and saves landfill capacity

Near Term Residential Waste Management System (Over Next Five Years)

2. Resource Recovery

Focus on recovery of materials through non-curbside programs.

Recommendations:	
Community Resource Recovery Centres (CRRCs)	• Develop two facilities, one at Brady Road and another in the northern portion of Winnipeg. Focus: to manage and divert materials not normally managed at the curb. • Develop drop-off locations for re-usable items, pending interest from community organizations to manage the material. • Cooperate with stewards of provincial programs to potentially host depots for various materials (e.g. HHW and electronic waste) at the CRRC's including household hazardous waste and electronic waste. Responsibility for funding and management would rest with Stewards.
Encourage Private Sector Initiatives	• Engage local marketplace to market materials recovered by CRRCs
Recycling in Public Spaces	• Engage in discussions with CBCRA and MMSM regarding implementation of program. • Continue work to audit garbage composition to determine potential range of material types and quantities for diversion. • Assess best types of containers and location in conjunction with other City departments. • Implement program in coordination with CBCRA.
Special Events Recycling Program	• Engage in discussions with CBCRA and potentially MMSM regarding implementation of program. • Undertake a pilot study to assess collection methods and City specific messaging in partnership with the organizers of one or more major events, CBCRA and MMSM.

Potential Costs: **Capital:** $2.7 million Brady Road CRRC (mid-2013) $3.4 million Northern CRRC (late 2014) **Total: $6.1 million** **Net Annual Operating Costs (including revenues and amortized capital) (as of 2015):** **Total: $1.7 million Increase**	**Additional Staff Requirements:** • Brady Road CRRC: Up to 7.5 FTE included under Brady Road staff noted below. • Northern CRRC: Up to 11 FTE, including both operating staff and drivers
General Timelines: • Brady Road CRRC, operating by mid-2013 • Northern CRRC, operating by late 2014	**Environmental Benefits compared to Status Quo:** • Diverts up to 17,000 tpy (5% Increase in Diversion) • Reduces GHG emissions and saves landfill capacity

3. Recycling

Builds on current program, by focusing on the capture and recycling of more materials.

Recommendations:	
Recycling Collection Program	• Move to automated curbside collection of Blue Carts. • Replace containers at existing seven recycling depots to facilitate continued operation. • Pilot program for improvements in MFD recycling.
Increase Processing Capacity	• Address short-term requirements for increased processing capacity. • Develop new longer term capacity for increased tonnes of materials before 2017.

Near Term Residential Waste Management System (Over Next Five Years)

Potential Costs (as of 2012, 2014):
Capital:
Recycling Carts: $9.35 million
Recycling Depots: $353,000
Processing: potentially $20.7 million for new MRF (2014)

Annual Operating (as of 2013):
Collection: $4.7 million
Depot: $63,000
Annual Cost of Carts: $1.5 million
Total Projected Collection Cost: $6.3 million
Less 2011 Collection Cost: $5.5 million
Change in Collection Costs from 2011: $800,000

Processing: $8 million
Revenues: ($7.2 million)
Total Projected Net Processing Cost: $750,000
Less 2011 Net Processing Cost: $390,000
Plus Est. Change in MMSM Funding: ($290,000)
Change in Processing Costs from 2011: $70,000

Total: approximately $870,000 increase

Additional Staff Requirements:
- Supported by existing recycling administration staff.

General Timelines:
- Cart Collection program phased in starting mid 2012
- Short-term additional processing capacity secured by mid 2012
- Long-term processing capacity secured before 2017

Environmental Benefits compared to Status Quo:
- Diverts up to 30,000 tpy (8% Increase in Diversion)
- Reduces GHG emissions and saves landfill capacity

4. Organics Diversion

Expands upon current leaf & yard diversion program, focusing on a material stream that is easy to manage and that should be diverted from disposal.

Recommendations:

Expand Leaf & Yard Collection	• Provide bi-weekly leaf and yard waste collection across Winnipeg from April to November. Materials would be set out in paper bags or approved hard wall containers.
Enhance Composting Area at Brady Road	• Develop upgraded leaf and yard waste composting facility at Brady Road, capable of managing up to 21,000 tpy of material.
Curbside Organics – Pilot Program	• Implement a trial curbside collection program (e.g. Green Bin) for household kitchen organics.

Potential Costs (as of 2012):
Capital (LYW Composting): $2.2 million
Annual Operating (as of 2013):
LYW Collection: $2.8 million
LYW Composting: $1.1 million
Amortized Capital: $0.2 million
SSO Pilot: $0.4 million
Total: $4.5 million Increase

Additional Staff Requirements:
- Collection support: included under garbage collection below.
- 1 Technologist III LYW Compost

Near Term Residential Waste Management System (Over Next Five Years)

General Timelines:

- Expanded leaf & yard collection in place by mid-2012
- Leaf and yard composting site operational by mid-2012
- Curbside SSO pilot in place by mid-2013

Environmental Benefits compared to Status Quo:

- Diverts up to 21,000 additional tpy (6% Increase in Diversion)
- Reduces GHG emissions and saves landfill capacity

5. Garbage Collection

Transition to uniform collection program for single family households, phasing out Autobin and manual garbage collection.

Recommendations:

Consistent level of single family garbage collection City-wide	• Run automated cart demonstration in a group of Autobin zones, to test communication plan to support roll-out across Winnipeg. • Phase in automated cart collection of garbage for remaining areas of Winnipeg.
Consistent level of bulky collection	• Implement a minimum charge per bulky item (e.g. $5 per item) and for excess set-outs.
Examine collection system efficiencies	• Rationalize collection cycle and areas as part of new collection contract(s)

Potential Costs:
Capital (automated carts, as of 2012): $7.2 million
Annual Operating:
Collection: $6.5 million
Annual Cost of Carts: $1.1 million
Total Projected Cost: $7.6 million
Less Collection cost (2011 Budget): $7.5 million
Net Change in Collection Costs: Increase of $100,000
Plus Increase in fees from Bulky Collection: ($700,000)
Total: ($600,000) decrease

Additional Staff Requirements:
Collection Support:

- 1 Technologist III Collection
- 4.5 Technical Assistants - Temporary

General Timelines:

- Pilot in Autobin areas fall 2011
- Uniform service for garbage and bulky collection phased starting in mid-2012

Environmental Benefits compared to Status Quo:

- Supports increased diversion for above programs.
- Supports GHG emission reductions for above programs.
- Proposed collection approach has most efficient fleet compared to other SFD collection options, reducing fleet emissions.

6. Brady Road

Transition Brady Road Landfill to a resource management facility where the bulk of materials received are diverted, not buried.

Recommendations:

Design and operational improvements	• Redirection of residential traffic from tipping face to CRRC. • Operational improvements to active tipping face.

Near Term Residential Waste Management System (Over Next Five Years)	
	• Improvements in leachate and landfill gas management.
New diversion infrastructure	• Rebrand Brady Road as being a "Resource Management Centre" • Develop CRRC as discussed above. • LYW composting discussed above. • Potential site for new Materials Recovery Facility (MRF) and Centralized Compost Facility. • "Green Park" for private enterprise which would encourage the development of industrial and/or commercial enterprises to establish diversion efforts on site to focus on recovering value from various waste streams.
Potential Costs: **Capital: noted above** **Annual Operating: noted above**	**Additional Staff Requirements (including CRRC and LYW facility):** • 7.5 FTE for CRRC • 1 FTE for LYW Composting
General Timelines: • CRRC in place by 2013 • LYW facility in place by 2012 • Other facilities potentially by 2016/2017	**Environmental Benefits:** • Supports increased diversion for above programs • Reduces GHG emissions and saves landfill capacity

Near-Term Residential System Summary

Total New Capital:	Approximately $45.9 million
Total Additional Annual Operating Cost (including amortised capital, net of known revenues, including all potential permanent staff and compared to 2011 budget):	Up to $7.3 million
Additional Diversion (Compared to Status Quo):	75,000 tpy
Increase in Residential Diversion rate:	Increase of 20%

Program	Component	Capital Cost	Change in Net Annual Operating Cost (Compared to 2011 Budget)	Diversion increase
Reduction and Reuse		Included in CRRC costs	Average of $700,000	2%
Resource Recovery		$6.1 million	Up to $1.7 million	5%
Recycling	Collection	$9.35 million	$700,000	8%
	Depots	$350,000	$100,000	
	Processing	$20.7 million	$70,000	
Organics Recovery	Collection	$0	$2.8 million	6%
	Processing	$2.2 million	$1.7 million (includes SSO pilot)	
Garbage		$7.2 million	($600,000)	Supports increased diversion
Additional Staff (not included in above totals) and external implementation support			Up to $630,000	Supports program implementation
Total		**$45.9 million**	**Up to $7.3 million**	**20%**

Note: numbers may not add correctly due to rounding.

The following figure illustrates the proposed implementation schedule for the near term residential system and the correlation between program implementation and increases in diversion.

Proposed Implementation Schedule for the Near Term Residential System

Longer-Term Residential Waste Management System

The longer term residential system expands upon the near term system through program improvements and targeting additional material streams. Incremental program improvements are proposed to build on the success of the near term programs and to encourage further progress in diversion. New programs are identified that target additional material streams for diversion (e.g. source separated organics) within a reasonable timeframe that allows for the success of the near term programs to be assessed (e.g. success in collecting and processing LYW) and new infrastructure to be developed (e.g. processing capacity for organics).

Longer-Term Residential Waste Management System (in place within 10 years)

1. Reduction and Reuse

Prevents waste generation through behavioural change. Required to 're-think' wasteful behaviour.

Recommendations:

Continue with approach applied in the near term implemented largely through expanded promotion and education including:

- Promotion of backyard and community composting,
- Re-use initiatives,
- Per capita waste reduction target,
- Encouraging grasscycling, potential implementation of a grass ban,
- Implementing community based social marketing approaches, and,
- Promotion of waste minimization.

Potential Costs:

- Annual Operating: $700,000 continues, increasing over time based on increase in households served

General Timelines:	**Environmental Benefits compared to Status Quo:**
• On-going	• Diverts up to 12,000 additional tpy (3% Increase in Diversion) • Reduces GHG emissions and saves landfill capacity

2. Resource Recovery

Identify additional sources of material for diversion.

Recommendations:

Durable (Bulky) Goods Processing	• Conduct audits of bulky items at curb and CRRCs. • Determine potential for local partnerships for operations and local markets for recovered materials. • Consider processing centre at Brady Road and possible other CCRCs or direct bulky material for shredding/grinding and recovery of metals.
Two New Community Resource Recovery Centre(s)	• Pending performance of first CRRC's and community demand, develop two additional CRRCs in the eastern and western areas of Winnipeg.

Potential Costs:
Capital: $3.4 million or more per additional CRRC.
Net Annual Operating Costs (incl. revenues and amortized capital) per CRRC: $750,000 per additional CRRC
Costs for Durable (bulky goods) processing to be determined.

General Timelines:	**Environmental Benefits compared to Status Quo:**
• Both new CRRCs operational by end 2019.	• Diverts up to 43,000 additional tpy (10% Increase in Diversion) • Reduces GHG emissions and saves landfill capacity

Longer-Term Residential Waste Management System (in place within 10 years)

3. Recycling

Further expand recycling program.

Recommendations:

Expand range of recyclable materials collected.	• Continue to assess markets for potential expanded material streams. Dialogue with MMSM regarding potential additional material types. • Ensure sufficient capacity to manage additional materials at longer-term MRF.

Potential Costs:
Cost to collect and process expanded range of recyclable materials is to be determined.

General Timelines:	Environmental Benefits compared to Status Quo:
• Ongoing: assess changes in potential materials markets • By 2017, sufficient processing capacity available	• Diverts up to 40,000 additional tpy (9% Increase in Diversion) compared to the Status Quo • Reduces GHG emissions and saves landfill capacity

4. Organics

Confirm implementation of a City-wide source separated organics (SSO) collection and processing program.

Recommendations:

Develop and implement organics collection and processing system	• Pending outcome of Near Term pilot, implement weekly organics collection, using a 'Green Bin' for single family residential households. • Collection approaches for multi-family households are to be determined.

Potential Costs:
Capital:

- Organics Processing: Ranges from $45 million to $65 million depending on technology. Could be included in per tonne operating contract cost.
- Organics Carts: in the order of $11 million based on current pricing.

Annual Operating:

- Collection cost: in the order of $4.2 million annually for single family households. $1.7 million annually for organic carts.
- Processing cost: in range of $130 per tonne for SSO (contract cost including capital). $10 million annually

Note: allocation of tonnages between LYW and SSO programs will affect overall processing costs.

General Timelines:	Environmental Benefits compared to Status Quo:
• 2013/2014: organics pilot • 2017: earliest date for organics program implementation	• Diverts up to 97,000 additional tpy (22% Increase in Diversion) • Reduces GHG emissions and saves landfill capacity

5. Garbage Collection

As new diversion programs are implemented (e.g. organics diversion), implement further restrictions on garbage collection.

Recommendations:

Examine collection system efficiencies	• Coordinate and optimize collection to enable co-collection of materials and/or other collection system efficiencies.
Implement garbage	• Consider bi-weekly garbage collection or other measures to encourage use of diversion programs.

Longer-Term Residential Waste Management System (in place within 10 years)	
restrictions	
Potential Costs: Potential to decrease single family garbage collection costs by $1.7 million per year through bi-weekly garbage collection compared to current collection costs.	
General Timelines: • Implement concurrently with SSO collection (2017 earliest date for implementation)	**Environmental Benefits compared to Status Quo:** • Supports increased diversion for above programs.

6. Brady Road

Continue to shift focus of Brady Road from Disposal to Resource Management.

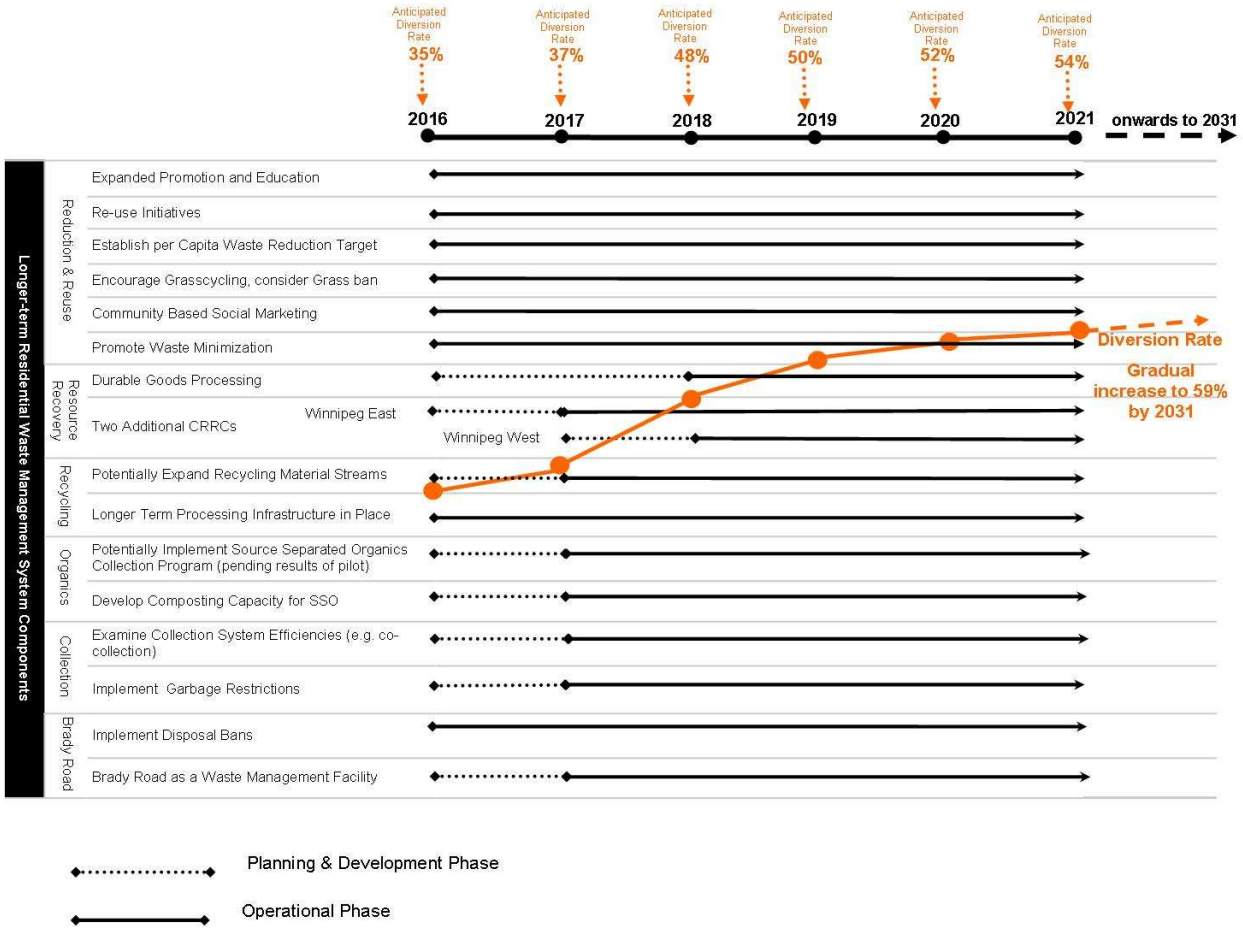
Recommendations:	
Implement Disposal Bans	• As programs are implemented to divert materials, ban them from disposal at Brady Road. 'Ban' implemented through punitive tipping fees.
Brady Road as a Regional Waste Management Facility	• Dialogue with the Province, Capital Region Rural Municipalities, Towns and Cities interested in sharing services offered at Brady Road (both diversion and disposal).
Potential Costs: **Capital:** Some capital expense may be incurred – to be determined. Should be financed on cost recovery model. **Annual Operating:** Additional labour required to implement ban – cost recovery through tipping fees.	
General Timelines: • Implement Disposal Bans for materials when mature diversion plans are in effect • Pursue Regional role for Brady Road facilities when diversion infrastructure is in place	**Environmental Benefits:** • Supports diversion through other programs

Longer Term Residential System Summary

Total New Capital:	Full range to be determined
Total Additional Annual Operating Cost (including amortised capital, net of known revenues, including potential change in staffing complement and compared to 2011 budget):	Up to $23 million
Additional Diversion (compared to Status Quo):	192,000 tpy
Increase in Residential Diversion rate:	Up to 59%

The following figure illustrates of the proposed implementation schedule for the longer term residential system. It also shows the correlation between program implementation and projected increases in diversion.

Proposed Implementation of the Longer Term Residential System



The recommended residential system does not include options that either do not fit within the system based on other recommended components, or where the viability of pursuit of the option was uncertain.

Certain disincentives applicable to garbage collection, such as bag limits or a transition to clear bags, were not considered as reasonable longer term system components given the near term recommendation to transition the residential sector to automated carts. Once an automated cart system is in effect, it would be difficult to change back to a bag-based collection system. There are other disincentives related to garbage collection that are viable with a cart based system as included in the longer term system recommendations noted above.

Alternative technologies such as conventional and emerging waste to energy approaches were not carried into the residential system. The Brady Road landfill has significant remaining capacity, and the life of the landfill would be extended through implementation of the recommended diversion programs. There is also a significant difference in waste disposal costs between continued operation of Brady Road and the reported costs for alternative technologies. Reported capital costs for alternative technologies that are used to recover energy and materials from the solid waste stream that remains after diversion, range from $775 to $1,300 per annual design tonne. Reported net operating costs (costs less revenues) for these technologies range from $75 to well over $100 per annual design tonne. The potential role of alternative technologies can be reassessed over the longer term through the CIWMP review process, which would allow for new developments or concepts to be reviewed.

CONCEPTUAL IC&I AND C&D SYSTEM

The City provides curbside collection services to a small portion of the IC&I sector and accepts IC&I and C&D waste at the Brady Road Landfill. In addition, waste generated by City operations is also managed at the Brady Road Landfill.

It is estimated that in total, 350,000 tonnes of IC&I waste and 125,000 tonnes of C&D waste is generated each year within Winnipeg. C&D material quantities are difficult to estimate as they are often generated periodically based on construction starts and as much of this material is not tracked. The majority of the IC&I and C&D materials are managed at private sector facilities and operations outside of the City's system. It is estimated that the City manages around 20% of the IC&I and C&D waste generated. The options considered for diversion of IC&I and C&D materials acknowledge that the majority of these materials are managed outside the City's system. The City can encourage and support diversion but is not in the position to control the level of diversion by these sectors.

The potential near and longer term IC&I and C&D system components that have been identified below form the basis of a diversion concept that would be complementary to the residential system, and would support the transition of Brady Road from a disposal to a resource management facility. These program components would not compete with the private sector system that manages the majority of IC&I and C&D materials, rather they would serve to complete the IC&I and C&D system by providing equivalent support for waste avoidance and resource recovery as is planned for the residential sector.

Potential Near Term IC&I and C&D Waste Management System (Over Next Five Years)	
Conceptual Programs:	
Development of Green Procurement Guide	• Develop a Green Procurement Guide specific to the IC&I and C&D sectors.
Support for Commercial Re-use Programs	• Develop a waste exchange website.
On-going Diversion	• On-going dialogue with the IC&I sector concerning waste diversion. • Voluntary certification program for businesses that meet specific waste reduction and

Potential Near Term IC&I and C&D Waste Management System (Over Next Five Years)	
Dialogue with IC&I Sector	diversion standards set by the City.
Encourage LEED ® Standards	• In the near term, encourage new facilities built within City boundaries over a certain size to achieve LEED® certification.
Strategic Partnerships	• Provide assistance to and support for entrepreneurs by providing a location for developing new diversion facilities.
IC&I and C&D Materials Depot at Brady Road Landfill	• Develop an area for the diversion of IC&I and C&D materials at Brady Road Landfill; could be in the form of a re-use area (specifically for C&D materials) and a recycling station for divertible materials. Could be integrated with the Brady Road CRRC.
Research Partnerships with Post-Secondary Institutions	• Research partnerships with local post-secondary institutions to investigate different methods to re-use different materials and establish end markets for hard to recycle materials.
Expand IC&I Curbside Recycling	• Expand curbside recycling collection eligibility for small businesses.
Support and/or Expand School Recycling and Curriculum	• Support in-school recycling. • Cooperate with both Multi Material Stewardship Manitoba (MMSM) and the School Boards to develop appropriate curriculum for students.
Differential Tipping Fees	• Variable tipping fees on incoming IC&I and C&D loads depending upon the type of acceptable recyclable material in the load and whether materials are separated or mixed.

Conceptual Near Term IC&I and C&D System Summary

Total Additional Capital:	up to $4.5 million
Annual Operating Cost (some additional costs and revenues to be determined, should aim for full cost recovery from system users, initiatives designed on cost-recovery basis):	up to $2.5 million
Potential Diversion (if just targeting current generators using the City's system):	24,000 tpy
Increase in IC&I Diversion rate (compared to Status Quo):	Up to 31% of IC&I managed by the City
Increase in C&D Diversion rate (compared to Status Quo):	Up to 25% of C&D managed by the City

The concept for the longer term IC&I and C&D system expands upon the near term system, including additional measures to discourage waste disposal.

Potential Longer Term IC&I and C&D Waste Management System	
Conceptual Programs:	
Incentives and Social Marketing	• Expansion of P&E and social marketing to the IC&I and C&D sectors as appropriate.
City Advocates for IC&I Diversion Regulations/Policies	• Dialogue with Province regarding potential IC&I diversion regulations/policies
Mandatory Diversion By-law	• Implement a mandatory diversion by-law for IC&I and C&D generators that use the City's system for collection, processing, or disposal. • Could see changes to building code that would require diversion of C&D materials coupled with LEED
Process Commercial Food Waste	• Provide capacity to process and divert commercial food waste provided there is a residential SSO program.
Disposal Ban	• Prohibit the disposal of designated materials at the point of disposal at Brady Road Landfill. Loads of material exceeding permitted levels of banned material would be rejected or subject to a surcharge ▪ Would require change in operation of Brady Road Landfill including load inspections and additional area for diverting banned materials.
Expand "Green Park" for Private Enterprise	• The City should actively seek opportunities to engage the private sector in order to expand the Green Park.

Conceptual Longer Term IC&I and C&D System Summary

Full Costs: :	To be determined – Programs to operate on a cost recovery basis
Potential Diversion from Current Generators using the City's system:	Up to 76,000 tpy of IC&I and C&D waste currently managed by the City
Increase in IC&I and C&D Diversion rate (compared to Status Quo):	Up to 80%

DIVERSION PERFORMANCE AND PROJECTIONS – RESIDENTIAL DIVERSION

Based on the recommended system, it is expected that in the near term the City's residential diversion rate can be increased from 15% to approximately 35%. Note: these diversion rates reflect the full system used to manage residential materials (curbside and non-curbside programs). The following table summarizes the increase in tonnage recovered for each major component of the recommended near term residential system.

Near-Term Increase in Residential Tonnes Recovered

Component	Estimated Increase in Diversion (compared to 2009)	Estimated Increase in Tonnage Recovered (rounded)
Reduction & Reuse	2%	7,000
Resource Recovery	5%	17,000
Recycling	8%	30,000
Organics	6%	21,000
Collection	Supports Above Programs	n/a
Brady Road	Supports Above Programs	n/a
Total	**20%**	**75,000**

Note: numbers may not add correctly due to rounding.

Based on the recommended system, it is expected that in the longer term the City's residential diversion rate can be increased to approximately 59%. This projected diversion rate assumes full implementation of all of the recommended system components.

Municipalities that are currently achieving similar diversion rates (including the Halifax Regional Municipality, and the Region's of Halton and York), have implemented waste management systems very similar to that proposed for Winnipeg.

The following table summarizes the estimated increase in tonnage recovered for each major component of the longer term residential system.

Longer Term Increase in Residential Tonnes Recovered

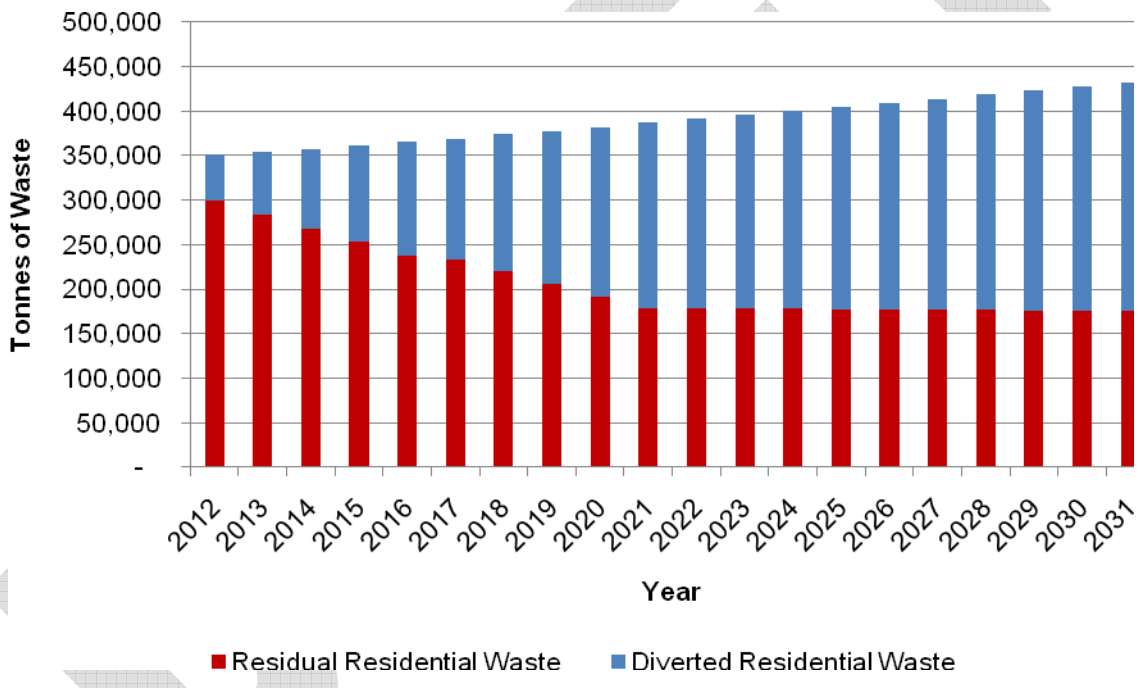
Component	Estimated Increase in Diversion (compared to 2009)	Estimated Increase in Tonnage Recovered (rounded)
Reduction & Reuse	3%	12,000
Resource Recovery	10%	43,000
Recycling	9%	40,000
Organics	22%	97,000
Collection	Supports Above Programs	n/a
Brady Road	Supports Above Programs	n/a
Total	**44%**	**192,000**

Several environmental benefits will be realized at Brady Road Landfill due to the implementation of the recommended options over the planning period, including:

- The life of Brady Road will be extended as less airspace will be consumed. It is estimated that landfill airspace consumption could be reduced by 50% by 2031.
- Brady Road will be more stable as less biodegradable material will be landfilled.
- Less GHG emissions, odour, and nuisance effects will be appreciated because less biodegradable material will be landfilled.
- The potential for harmful leachate production will be reduced.
- One tipping face will be able to be closed, reducing various impacts from landfill operations (odour, litter etc.).

Overall, the recommended system would result in a substantial increase in residential diversion over the 20 year planning period, as demonstrated in the figure below.

Estimated Residential Residual Waste Disposed and Waste Diverted Year-by-Year over the Planning Period (2012-2031)



FINANCING THE CIWMP

The following table summarizes the total expenditures and revenues identified in the 2011 solid waste budget. Major revenue sources within the solid waste budget include tipping fees, sale of recyclables and recycling program support funding through MMSM.

The net cost for waste management services ($18 million after other revenue sources) is funded through the levy (property taxes). Based on the 2011 budget and allocation of the budget based on the tax rates, the portion allocated to the various sectors in Winnipeg, and average SFD property values, the 2011 waste services levy per SFD was on average $59 per household.

Total 2011 Budget Expenditures	$ 45 million
Total 2011 Budget Revenues	($27) million
Net System Cost	$18 million
2011 Solid Waste Portion of the Levy per Average Single Family Dwelling	$59

On a preliminary basis, it is anticipated that implementation of the recommended residential system could increase program costs in the near term by up to $24 per residential household as of 2015 if all of the additional costs were allocated to the residential sector in Winnipeg. If the increase in program costs were allocated just to the SFD sector which would be the prime beneficiary of the changes in service, the cost increase would be $37 per SFD.

Residential program costs could increase by up to $73 per residential household or up to $113 per SFD in the longer term (year 2019), if the increase in longer term system costs were allocated only to the residential sector in Winnipeg. Potential changes in program costs to reflect the recommended IC&I and C&D diversion initiatives are not included in this analysis as the preferred approach would be to seek full cost recovery from the users of the IC&I and C&D components of the system.

The potential change in residential program costs over the near and longer term, are summarized briefly below. The changes in costs are discussed in terms of allocation to single family dwellings, in that the majority of new program components affect the programs offered to SFDs. The near term costs identified are those for 2014, as 2012 and 2013 represent transition years; many of recommended program components would be phased-in beginning mid-2012 through to mid-2013. 2014 represents the first full year in which the majority of the recommended near term system would be in effect.

	Potential Increase in Net Expenditures	Increase if allocated only to Single Family Residential Dwellings	Total Net Expenditures (if increase allocated to Single Family Residential Dwellings)
Current (2011)	2011 Solid Waste Portion of the Levy per Average SFD		$59
Near Term (2014)	$7 Million	$37.	$96
Longer Term (2021)	$23 Million	$113.00	$169.00

Two options for recovery of net system costs have been assessed as part of the planning process. Others were initially considered (e.g. charge per bag of waste), however, they were not reasonable to carry forward given that it is recommended that the City move to a uniform residential collection system that collects garbage in automated carts. The remaining options are discussed below.

In addition to examining mechanisms to recover net system costs, the potential for reserve fund development was also examined. A solid waste reserve fund could be established through a number of mechanisms, for the purpose of funding future capital costs for waste management. This would reduce the year –to-year fluctuation in taxes and could reduce the overall costs of implementing the recommended system through reducing borrowing costs.

Examining the potential capital budgets identified to support the transition to an enhanced waste management system, indicates that there are a number of periodic capital investments that could be financed through reserves. In the order of $20 million, would finance the cost of organic carts or replacement of the kitchen. For both options for net cost recovery, there are means of setting aside reserves these are also discussed below.

Concept 1: Continue to Finance Net Costs (after all other revenues) through the Solid Waste Portion of the Levy. Additional tax support of up to $7.3 million (year 2015) annually in the near term.

Currently, the net costs of waste management (i.e. the net cost of $18 million in the 2011 budget), is recovered through municipal taxes (otherwise referred to as the levy). Based on review of the 2011 short-form taxation information provided by the City, in the order of 59% of the overall amount levied in 2011 will be recovered from the single family residential portion of the tax base. In regards to the allocation of the 2011 net waste management costs, this would involve recovery of $10.6 million from single family residential property owners.

The following table briefly summarizes the allocation of 2011 waste costs to the residential tax base, and the estimated proportion of 2011 costs included within the solid waste portion of the levy for an average single family dwelling including an annual contribution to reserves of approximately $1.9 million annually (resulting in a cumulative reserves of $20 million as of 2021). Assuming that there is no change in the mill rate or portioned assessment, it is estimated that the potential change in the levy for a typical single family dwelling to recover waste management costs as of 2014 would increase by approximately $29, a 2% increase in the overall levy for a typical household.

Municipal Taxes Allocated per Typical Household

Average Home Assessment (2010)	$207,548
Portioned at 45%	$93,396.60
Calculated Levy 2011	$1,429
Solid Waste Portion of the Levy (2011)	**$59**
Calculated tax impact - Increase in Waste Management Costs (2014)	**$29**
Waste Management Cost per Typical Household (2014)	**$89**
Percent Increase in overall Levy	2%

Should the City choose to recover the net costs of the recommended system from the solid waste portion of the levy, this would:

- Recover the net costs of the system from the entire tax base, from all sectors, such that the single family residential sector would be levied in the order of 60% of the net change in program costs.
- Not be directly reflective of the costs of providing services to each sector, as this would allocate a portion of the additional program costs to the multi-family sector, institutions and other portions of the property tax base.
- Allocate the program costs to the residential sector using a process that is reflective of property value, not the cost of providing service to each residential property. Thus, residents in a higher value property would generally pay more than the actual cost of providing service to that property, while residents in lower value properties would generally pay less than the cost of providing waste services to that property.
- Result in an increase in the solid waste portion of the levy of up $7.3 million as of 2016, an increase of 50% in the waste portion of the levy compared to 2011. Overall, the increase in waste management expenditures is estimated to increase the overall levy by 2% compared to 2011.
- Would involve setting aside approximately $1.9 million to reserves, resulting in an accumulation after 10 years of approximately $20 million, which could be used to fund future capital investment.

Concept 2: Applying a "Flat Rate" per Single Family Residential Household to recover a portion of system costs. Charge each single-family residential premise a flat rate reflective of the cost of garbage collection and including provisions for reserve fund development.

Another approach would be to recover the majority of the change in program costs directly from the residential sector, through the application of a 'flat rate'.

In most jurisdictions that use a "Flat Rate", it is used to recover a portion of the solid waste system costs. Generally it is used to recover costs for garbage collection and disposal from the residential sector, so that the residential sector pays a cost that is reflective of the cost of providing garbage collection service and disposing of the waste.

In many jurisdictions this "Flat Rate" is presented as a 'pay as you throw' approach for cart collection, as it reflects the annual cost for collection of a standard-sized cart for garbage. Households that choose additional carts or larger sized carts than the standard, would pay a higher rate for garbage collection.

In regards to implementation of a "Flat Rate" in the City of Winnipeg to finance the CIWMP:

- The projected cost of garbage collection for the single family sector would reach up to $7.6 million during the near-term period. If a flat rate were used to recover the cost of garbage collection from this sector, it would be in the order of $40 per household.

- The projected cost of garbage collection for the multi-family residential sector would be in the order of $3.4 million during the near-term period, and would be allocated to that sector based on portioned assessment.
- The cost for diversion would remain on the tax supported portion of the budget. The philosophy is that all sectors of the City benefit from increased diversion, through the savings of landfill capacity and the avoided impacts to the environment.
- If a flat rate were set to recover the cost of single family residential garbage collection, there would be no increase in the Levy as a result of implementing the recommended CIWMP in the near term.
- Setting the rate at an amount higher than the projected cost of garbage collection, would provide an alternative means of generating reserve funds that would be used to finance future changes to the waste management system.

  Setting the rate at $50 per household for the first five years of the implementation period and an escalated rate in the next five years (2017 to 2021) to reflect implementation of organics collection, could generate reserves of approximately $20 million over the first 10 years of implementing the plan.

The following table briefly summarizes the allocation of projected waste costs to the residential tax base, and the estimated proportion of 2014 costs included within the levy for an average single family dwelling, assuming that there is no change in the mill rate or portioned assessment. It is estimated that the potential change in waste management costs for a typical single family dwelling to recover waste management costs as of 2014 would increase by approximately $37, a 3% increase in the overall levy for a typical SFD. Under this scenario, the solid waste portion of the levy would decrease, as the levy would not be used to recover the cost of collection from SFD and as the cost of collection from multi-family households would be allocated just to that sector.

Municipal Taxes Allocated per Typical Household

Average Home Assessment (2010)	$207,548
Portioned at 45%	$93,396.60
Calculated Levy 2011	$1,429
Solid Waste Portion of the Levy (2011)	**$59**
Estimated Solid Waste Portion of the Levy (2014) (net expenditures for all services except for garbage collection)	$46
Flat Rate: Annual Waste Management Charge for Collection (2014)	$50
Waste Management Cost per Typical Household (2014)	**$96**
Percent Increase in cost per Household (Levy plus Flat Rate)	3%

Financing the CIWMP through a “Flat Rate” offers the following advantages, and thus is recommended as the most reasonable financing approach for the City:

- It allocates the costs for garbage collection services provided to the residential sector, to this sector of the tax base which received and benefits the most from this service.

- It allocates the costs for diversion services to the full tax base, which all benefit from the reduced consumption of airspace at the Brady Road landfill and avoided impacts to the environment.
- It would result in an increase of approximately $37 annually for a typical residential household (around 10 cents per day), while financing significant improvements in service offered to the residential sector including provision of two new collection carts to the majority of residential households as well as two new diversion facilities.
- Based on setting the rate at $50 in the near term and increasing over the longer term, it would generate reserve funds of around $20 million, which could be used to finance new infrastructure such as new composting or recycling facilities.

IMPLEMENTATION OF THE CIWMP

Organization and Staffing Complement

The current staffing complement of the Solid Waste Services at the City of Winnipeg includes in the order of 48 full time equivalents (FTEs), and is reflective of the current status of the waste management system. The current staffing complement, particularly in regards to administration, promotion & education and operational program support is low for a City of this size in Canada and is considerably less than the staff complement fulfilling these roles in municipalities with programs similar to those proposed for the City. The difference in staffing complement is primarily in that these jurisdictions have a larger complement of planning & implementation staff allocated to assessing current program performance and supporting change, and dedicated communications specialists to support the promotion and education programs.

In order to implement the recommended system in the near term the City will require additional resources including:

- A dedicated implementation team that includes Solid Waste administrative and program management staff. Given the complexity and scope of the plan, external support through consultation services is recommended. This will be of critical importance to support the bid opportunities for the potential new MRF and composting facility, where detailed technical specifications will be required.
- Operational staff to manage and operate a number of the new facilities included in the system. Note: the estimates below do not include a full staff complement for City management of any new MRF or centralized composting facility, as it is more likely that the City would contract the operation of these facilities.
- Administrative staff and by-law enforcement staff, to administer and support the new programs.
- Dedicated communications resources, to support the proposed promotion and education and community based social marketing components.

The permanent staffing increase would be in the order of 24.5 positions. Four and a 1/2 (4.5) temporary positions have been identified to support implementation of new programs in 2012 /

2013. Any longer term staffing needs would be reported on separately prior to completion of near term projects and after detailed planning for the longer term projects is completed.

Administration:	Brady Road and New Facilities at the landfill (CRRC, LYW composting etc.):
• 2 Communication Assistants • 1 By-law Constable dedicated to Solid Waste Services Division. • 1 Technical Assistant – Compliance and Reporting • 1 Project Engineer - Coordinator	• 1 Technologist III – LYW composting • 1 Technologist III – CRRC • 1 Technologist II - CRRC • 3 Operator IV - CRRC • 2.5 Technical Assistant - CRRC
Stand-alone CRRC (per facility):	**Collection:**
• 1 Technologist III – CRRC • 1 Technologist II - CRRC • 3 Operator IV - CRRC • 6 Technical Assistant - CRRC	• 1 Technologist III • 4.5 Technical Assistants - Temporary

Monitoring and Reporting

The monitoring of system performance is an important aspect of ensuring the proper functioning of the overall waste management system and ensuring CIWMP goals are achieved. The CIWMP recommends that the City monitor system performance through regular waste auditing (i.e. residential, bulky waste, material brought to CRRCs, City operations waste).In addition to auditing there are a number of other indicators that can be measured and tracked.

It is recommended that the results of monitoring initiatives be reported on a regular basis internally within the City and externally to outside stakeholders. Primarily, this would take the form of an annual report on the CIWMP. This annual report should provide an overview of the applicable objectives for that year and documentation on how the City reached these goals. It should also include a list of issues that arose during the year and how these issues were mitigated. Finally, the report should include a section regarding the planned CIMWP implementation activities for the following year.

It is also recommended that City conduct periodic reviews and updates to the CIWMP at various times throughout the planning period (2011-2031). The recommended schedule for the review of the CIWMP is based on accommodating a reasonable cycle of contracts and the election cycle of council as follows: Review 1, 2016; Review 2, 2020; Review 3, 2024; Review 4, 2028; Review 5, 2031.

Communications, Promotion & Education

Communications are a vital component of the CIWMP implementation plan. A communications plan will ensure a coordinated approach for the implementation of the reduction, diversion and disposal initiatives. Without a communications plan, messages may be released to the public in a piecemeal fashion, which will not have as great of an effect as a coordinated outreach

program. Effective communications plans contain four primary elements: design, funding, deployment, and monitoring and evaluation.[2] Once a campaign is designed and funded, its deployment should use a mix of media including strategies such as radio or TV, calendars, websites, public relations, and other interactive methods including social marketing approaches. Sustained programs, with year-round exposure are identified as a best practice and are preferable to one-time blitz campaigns.

SUMMARY OF RECOMMENDATIONS

The recommendations identified in the CIWMP can be summarized as follows:

1. Implement improvements to the residential waste management system in the near-term to increase diversion to 35% with an increase in net waste management costs of up to $7.3 million that includes: expanded promotion and education programs; drop-off centres to recover resources from the waste stream; improvements to recycling collection; expanded leaf & yard waste collection and processing; a uniform approach to collecting garbage; and, improvements at the Brady Road landfill.
2. Consider further expansion of the residential diversion program in the longer-term to increase diversion to 59%, with an increase in net waste management costs of up to $23 million, that includes additional resource recovery centres and diversion of kitchen organics.
3. Consider near and longer term IC&I and C&D diversion programs that are complementary to the residential system, and support the transition of Brady Road from a disposal to a resource management facility.
4. Finance the CIWMP through a 'Flat Rate' per single family residential household set at $50 annually for the first few years of implementation, which would be sufficient to cover the net change in waste management costs in the near term and that would be used to set aside reserves to fund future changes.
5. Adjust the staffing complement for solid waste services, to administer, support and operate the programs included in the CIWMP.
6. Regularly report on progress in implementing the CIWMP and review the plan at least every five (5) years.
7. Support implementation of the CIWMP with a comprehensive approach for communications, promotion and education that includes social marketing.

[2] KPMG, R.W. Beck. 2007. *Blue Box Program Enhancement and Best Practices Assessment Project – Volume 1.*