SM4RT LIVING

YORK REGION'S INTEGRATED WASTE MANAGEMENT MASTER PLAN

November 2013

Construction and Demolition Strategy

York Region

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REDUCE
REUSE
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RECOVER

Construction and Demolition Strategy

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York Region

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Objectives:

- Opportunity to influence the reduction and diversion of construction and demolition materials to the extent possible, without actually taking over the responsibility for their management.

Targets:

- To help monitor and measure future construction activities, the Region should work with industry (e.g. construction trade associations, BILD, BOMA, OWMA) to begin to assemble baseline data on current waste diversion activities occurring at construction sites in York Region.
- This data will be used to determine the extent to which construction waste is being diverted and managed by the construction industry.

Benefits:

- An increased emphasis (through both encouragement, incentive and policy instruments) to promote and ensure waste reduction and diversion;
- The potential for additional cost recovery at Regional facilities currently managing C&D Materials (see CEC Strategy);
- Greater awareness of the types and quantities of materials being managed and the method by which they are managed to inform future waste reduction and diversion program opportunities;
- Public Awareness and Recognition of builders and developers who incorporate waste reduction and diversion priorities.

1.0 Introduction

The Construction and Demolition Strategy is one component of York Region's first Integrated Waste Management Master Plan, also known as the SM4RT LIVING Plan, which establishes the planning framework and strategic direction in York Region for the next 40 years. The Master Plan builds on the Region's position as a waste management leader, by focusing on driving waste reduction and reuse, while maximizing recycling and energy recovery from the materials that remain.

Primary objectives of this strategy are to:

- Assist with increased diversion of construction and demolition (C&D) materials
- To increase cost recovery at municipal facilities managing C&D waste

2.0 Background

Construction and demolition waste has primarily been managed by the private sector waste management industry in Ontario. Municipalities managing a portion of this waste typically do so as a means to accommodate local businesses that may not have access to other alternatives, or in the case of municipalities with disposal capacity, as a means of revenue generation. York Region, through its network of Community Environmental Centres (CECs) has provided this service (in a limited fashion) to residents with renovation materials and small business contractors requiring a local waste management alternative. The Region, like its other GTA counterparts has not actively engaged in developing infrastructure to manage these materials in the past, nor has any consultation throughout the master planning process indicated that it should expand its management role in the future. However, consultation has, on numerous occasions, identified the need to influence the reduction and diversion of these materials without taking over the responsibility for their management.

According to Organization for Economic Cooperation and Development (OECD) figures, the building sector is responsible for approximately:

- 25-40 per cent of total energy use
- 30 per cent of raw material use
- 30-40 per cent of global greenhouse gas emissions
- 30-40 per cent of solid waste generation

Source: Why Buildings Matter, The Guardian Sustainable Business, 1 July 2011

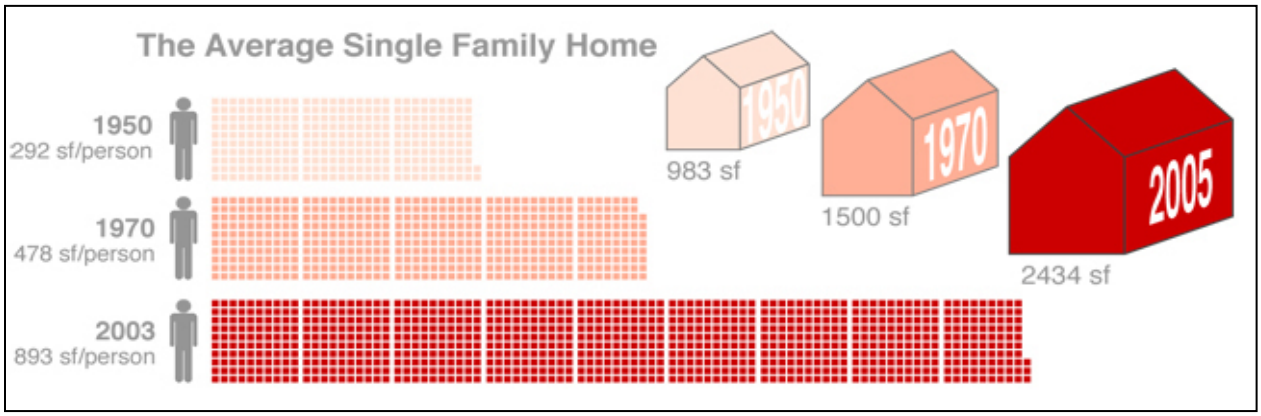
In the United States, it is estimated that construction and demolition waste comprise between 22 per cent to 33 per cent of the solid waste stream of which about 40 per cent is associated with residential construction and 60 per cent is associated with non-residential construction.[1]

Over the past decade, green building design and construction has gained momentum among North American municipalities and developers. Benefits gained through green building design include healthier living and working environments, reduced environmental impacts, more efficient use of natural resources, and promotion of sustainable material use.

Green construction techniques play a key role in green buildings as construction accounts for major use of energy and raw material use, as well as solid waste generation.

One of the drivers of the green building movement is that since the 1950s there has been a growing trend toward bigger homes with fewer occupants, putting even more pressure on energy and material resources. As shown in Figure 1, from 1950 to 2000, the average residential home in the United States has increased in size by more than 150 per cent while the number of occupants has decreased by 22 per cent. At the same time, the number of single homeowners has increased from nine per cent in 1950 to 26 per cent in 2000[2]. On average the current construction of just one single-family home consumes, three-quarters of an acre of forest in wood consumption.[3]

Figure 1: Single Family Home Size in the US from 1950-2005



Source: Minnesota Sustainable Housing Initiative. Materials: Background Information at http://www.mnshi.umn.edu/kb/et/materials2.html

1 Overcoming Barriers to P2 and Recycling for Construction Waste. Illinois Sustainable Technology Center, April 2010

[2] University of Michigan. Center for Sustainable Systems. Residential Buildings Fact Sheet. No date, and Small is Beautiful: U.S. House Size, Resource Use and the Environment. Journal of Industrial Ecology. 2005. Volume 9, Number 1–2

[3] Natural Resources Defense Council. How to Build a Better Home: A new approach to homebuilding saves trees and energy and makes for economical, comfortable homes. 2004

3.0 Waste Stream Composition

In 2006, CalRecycle conducted a comprehensive construction and demolition characterization study focusing on different construction and demolition projects, including:

- New residential construction
- New non-residential construction
- Residential renovation [4]

The California study showed the Construction & Demolition (C&D) sector produces a very different waste stream from the other IC&I sectors. The C&D sector typically produces a fairly homogeneous waste stream with the majority (more than 60 per cent) of the residential construction and renovation waste falling into four material categories:

- Drywall
- Clean wood
- Asphalt roofing
- Concrete and aggregates

Based on California's C&D Waste Characterization Study, the waste stream for new residential construction, residential renovation and non-residential construction is described below.

Almost three quarters (72 per cent) of the new residential construction waste stream is comprised of five categories of materials:

- Drywall (18 per cent)
- Clean wood (28 per cent)
- Asphalt roofing (seven per cent)
- Concrete and aggregates (10 per cent)
- Paper (nine per cent)

Sixty-three per cent of the residential renovation waste stream is comprised of five categories of materials:

- Drywall (13 per cent)
- Clean wood (12 per cent)
- Asphalt roofing (11 per cent)
- Concrete and aggregates (22 per cent)
- Metals (five per cent)

[4] California Integrated Waste Management Board. June 2006. Detailed Characterization of Construction and Demolition Waste. Prepared by Cascadia Consulting Group

Seventy-eight per cent of the new non-residential construction waste stream is comprised of five categories of materials:

- Drywall (seven per cent)
- Dirt and gravel (11 per cent)
- Clean wood (24 per cent)
- Concrete and aggregates (31 per cent)
- Paper (five per cent)

4.0 Current Practices and Trends

Traditionally, construction and demolition waste has not been a priority in municipal waste management systems. Material management for this stream was considered the responsibility of the construction & demolition industry through contracts with private waste haulers. Market forces were assumed to ensure waste minimization would occur on construction sites. In reality, waste occurs and maximizing recycling is not a common practice in construction and demolition projects, which face space, resource, and time pressures that conflict with the additional effort required for reduction, reuse and/or recycling of on-site materials.

4.1 Ontario 3Rs Regulations

In an effort to combat the challenges facing construction and demolition projects, several initiatives were introduced in the 1990s. The Ontario Ministry of the Environment introduced legislation in 1994 requiring construction and demolition projects above a certain size to implement source separation strategies for designated materials. There are two regulations *Environmental Protection Act: Waste Audit and Waste Reduction Work Plan Regulation* (O. Reg. 102/94) and *Industrial, Commercial and Institutional Source Separation Programs* (O. Reg. 103/94), requiring the following activities for construction and demolition projects:

Waste Audits and Waste Reduction Work Plans - Waste audits and waste reduction work plans are required at the beginning of any construction and demolition project involving one or more buildings with a total floor area greater than 2000 m^2 (21,500 ft^2).

A typical house for a family of four (in York Region) ranges from 110 m^2 (1,200 ft^2) to 185 m^2 (2,000 ft^2) in size. The 3Rs Regulations do not apply to most residential housing and apply only to large multi-residential and commercial projects.

Regulation 102/94 requires the following:

- Completion of an onsite waste audit, identifying the amount and nature of the waste that will be generated
- Development of a waste reduction work plan, outlining specific achievable diversion options for reduction, reuse, and recycling
- Implementation of the waste reduction work plan

- Documentation of the waste audit and work plan results on forms provided by the MOE or forms that have been designed in the same general format
- Retention of a copy of the audit and work plan documents on file for five years from completion of the project

Regulation 102/94 requires that the waste audit be conducted and the work plan completed before the beginning of the project.

Source Separation - Source separation (recycling) programs are required for all construction and demolition projects involving one or more buildings with a total floor area greater than 2,000 m^2 (21,500 ft^2). Projects smaller than 2,000 m^2 are exempt from source separation requirements. The source separation program must be in place and ready for use before the start of the project. Materials that must be separated for recycling include: cardboard, brick and Portland cement concrete, steel, clean drywall (not painted), and wood (not including painted or treated wood or laminated wood).

Regulation 103/94 requires the following:

- Implementation of a source separation program for reusable and recyclable materials listed in Regulation 102/94[5]
- Specification of facilities sufficient for the collection, sorting, handling and storage of these materials
- Communication of the source separation program and its successes to employees, patrons, and tenants
- Reasonable effort in ensuring separated waste is reused or recycled.

Limited promotion and enforcement of these regulations has resulted in low awareness among construction and demolition site operators. Specific issues include:

- Lack of data collection – reporting is not required
- Lack of enforcement of the 3Rs Regulations – there are no enforcement requirements established by MOE
- Unclear responsibility for the 3Rs Regulations – it is not clear which government (provincial, regional, municipal) body is responsible for educating, enforcing, promoting the 3Rs regulations
- Building scale restrictions for the 3Rs Regulations – only applies to large projects[6]

5 Ontario Regulation 103/94 allows either the general contractor or a subcontractor who is implementing the general contractor's source separation program to remove mixed recyclables (co-mingled categories of waste as listed in Ontario Regulation 103/94) from the building site, providing it is removed to one of the following locations where it must be immediately separated (source: http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/stdprod_080794.pdf)

6 Tomo Saotome. Recycling in Ontario. School of Engineering Practice. 2007

4.2 York Region C&D Waste Diversion

York Region recognizes the need to address waste diversion during construction and has incorporated strong wording in several of its key official documents, such as its 2010 York Region Official Plan and its New Communities Guidelines. The Official Plan states:

7.4. Waste Management

14. To encourage the diversion of construction and demolition waste to meet or exceed the Region's diversion targets of policy 7.4.2.

7.4 2. To surpass waste management regulatory requirements by:

a. achieving at least 80 per cent diversion from landfill by 2010;

b. achieving over 90 per cent diversion from landfill by 2016; and,

c. eliminating the disposal of unprocessed waste in landfill by 2020.

The New Community Guidelines were endorsed by Regional Council on June 27, 2013. The Guidelines refer back to goals in the York Region Official Plan to guide future community development.

York Region currently manages C&D materials that are brought to the Region's Community Environment Centres and the Georgina Transfer station. This is likely only a small portion of the C&D waste generated in the Region and is mostly comprised of waste generated through home and perhaps small business renovations. It is expected that the majority of the C&D materials generated at large residential and non-residential construction sites, is managed outside of the Region's system.

The Region and local municipal partners have started requiring their new municipal facilities meet LEED® (Leadership in Energy and Environmental Design) requirements. York Region currently requires minimum LEED® Silver for new Regional facilities. Other local municipalities with similar requirements (LEED® Silver) include East Gwillimbury, Richmond Hill, and Markham. In Newmarket LEED® silver is encouraged for new municipal facilities.

Under the Materials and Resources category, LEED® Canada for New Construction and Major Renovation (LEED® NC) requires contractors to allow for storage and the collection of recyclables as a baseline component of the LEED® standard. Optional waste-related credits can be earned to improve overall score, including:

- Building / building material reuse (e.g. one point for using five per cent salvaged, refurbished or reuse of building structure and shell and two points for using 10 per cent salvaged, refurbished or reused materials)
- Construction waste management plan required
- Construction and demolition waste diversion - one point received for achieving 50 per cent diversion, two points received for achieving 75 per cent diversion and three points for achieving 95 per cent diversion or higher

The Materials and Resources LEED® category encourages the efficient use of materials and selection of environmentally preferable materials. This includes credits for using recycled content, onsite reuse of scraps and end cuts, design that reduces material use, using salvaged or recycled material, and onsite composting. Environmentally preferable materials are also eligible for points in this category. Examples include recycled paint, countertops with no added urea-formaldehyde resins and FSC Certified wood products. [7]

Despite the effort of LEED® NC to promote best practices in environmental standards with regard to construction, it has been critiqued for not placing more emphasis on waste diversion and reuse efforts.[8] More effort is required to acquire the LEED® points associated with achieving 50 per cent and 75 per cent construction and demolition waste diversion, than the effort involved to acquire other LEED® points; consequently, builders will forego the diversion-related points and go after easier points (e.g. providing bike racks).

Some communities have by-passed LEED® and have set their own construction waste diversion requirements; for example, a green development standard and check list were developed by East Gwillimbury Council in February 2012 and are beginning to be used for new developments. East Gwillimbury's Thinking Green Development Standards and Site Plan Check List establish stringent waste diversion requirements and optional requests during construction and demolition as follows:

REQUIRED:

49. A construction waste management plan is submitted and implemented to demonstrate diversion of approximately 50 per cent or more of construction, demolition and land clearing waste from landfill.

51. At least one recycling or reuse station is provided during construction, dedicated to separation, collection and storage of materials for recycling (at a minimum, wood and gypsum board, paper, corrugated cardboard, glass, plastics & metals).

52. At least 75 per cent of non-hazardous construction & demolition debris is recycled.

OPTIONAL:

50. The construction waste management plan required demonstrates diversion of at least 75 per cent of construction, demolition and land clearing waste from landfill.[9]

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[7] LEED Analysis: Habitat for Humanity 2009. http://cas.illinoisstate.edu/sites/gmklass/?page_id=102

8 "The LEED (Leadership in Energy and Environmental Design) rating system for buildings awards points for energy-saving features, but it has been criticized in the past by those who consider some features (like bike racks) superficial add-ons. Referring to the certification system, Gehry said: "A lot of LEED is given for bogus stuff." One example sited is that installing a bike rack is worth the same under the LEED checklist system as installing a million dollar environmentally sensitive heating system. Source: http://inhabitat.com/frank-gehry-calls-sustainable-design-political/

[9] East Gwillimbury Thinking Green Developmental Standards, Site Plan Check List

East Gwillimbury's Economic Development Office consulted with staff from a variety of Regional departments (i.e. Finance, Planning, Engineering and Environmental Services, Operations) to provide input and feedback on developing the Thinking Green Standards. They also consulted with a stakeholder group comprised of landowners, developers, and planners.[10]

[10] Communication with Dan Stone, Manager of Economic Development & Sustainability, East Gwillimbury, November 20, 2012

East Gwillimbury's Thinking Green Developmental Standards

The Site Plan Check List includes additional construction and demolition related 3Rs including:

REQUIRED:

39. A minimum of 75 per cent of all building materials (based on cost) are harvested and recovered, manufactured, extracted within an 800km radius of the project site, subject to availability.
40. A minimum of 25 per cent of wood-based materials and products used are certified in accordance with the Forest Stewardship Council's (FSC) principles and criteria, if available.
41. At least 45 per cent of materials used are low-emitting/low VOC (including adhesives, sealants, paints and coatings, carpets, composite wood and agrifiber products).
42. At least 5 per cent of the building materials (based on total material cost) are comprised of recycled content.
46. At least 10 per cent (by volume) of the aggregate base and sub-base utilized for roadways, surface parking lots, sidewalks and curbs consists of recycled aggregate materials.

OPTIONAL:

25. Recycled content roofing material is used (that contains at least 50 per cent post-consumer material) for residential development.
43. At least 10 per cent of the building materials (based on total material cost) are comprised of recycled content.
44. At least 5 per cent of the building materials (based on total cost) are comprised of salvaged, refurbished or reused materials.
45. At least 10 per cent of the building materials (based on total cost) are comprised of salvaged, refurbished or reused materials.
47. Any asphalt concrete pavement is minimum of 15 per cent (by volume) recycled asphalt pavement; Where possible, hot mix asphalt pavements should include recycled crumb rubber modified asphalt cement to maximum allowable according to current industry standards, and minimum 5 per cent (total weight) pre-consumer or postconsumer asphalt roofing shingles.
48. Concrete pavement is used that contains recycled mineral and mixtures (such as coal fly ash) to reduce by at least 25 per cent the concrete mix's typical content of aggregate and a minimum of 10 per cent (by volume) reclaimed concrete mineral aggregate.

Based on interviews with local member municipalities, East Gwillimbury is the only local municipality within York Region to mandate that waste diversion targets be met during construction and demolition.

4.3 C&D Diversion Activities in North America

4.3.1 Mandatory C&D Waste Diversion Targets

Other communities throughout North America have started requiring construction and demolition projects achieve waste diversion targets.

State of California - Beginning January 1, 2011, all new construction within the State of California is required to conform with green construction requirements under the California Building Code, dubbed "CalGreen". The code requires that:

- 50 per cent of construction waste be diverted from the landfills and lists higher, voluntary diversion amounts of 65 per cent to 75 per cent for new homes, and 80 per cent for commercial construction.[11]

City of Portland, Oregon - In 2001, the City of Portland was one of the first municipalities in the United States to adopt a green building policy for its own facilities. In 2009, the City mandated that all new construction of city-owned facilities must certify for the LEED® NC at the Gold level and achieve additional performance levels, including:

- Recycle at least 85 per cent of all construction, remodeling and demolition waste[12]

In addition, all building projects $50,000 or greater in value must meet the requirements to maximize reuse and recycling of construction and demolition waste, as follows:

- Provide a trash receptacle on the job site for disposal of food waste (e.g., lunch waste) to prevent contamination of recyclables
- Clearly label all recycling containers on the job site regarding acceptable materials
- A construction and demolition debris management form must be completed and returned within one week of permit application[13]

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[11] California's Building Code Turns a Deeper Shade of Green. January 13, 2010. *GreenBiz.com*

[12] City of Portland Green Building Implementation Guide 2010

[13] City of Portland - Construction and Demolition debris http://www.portlandoregon.gov/bps/55396

City of Chicago, Illinois - In December 2004, the Chicago City Council passed the Construction or Demolition Site Waste Recycling Ordinance. The ordinance requires that all non-residential construction and demolition projects greater than 4,000 square feet in size or residential construction projects with four or more units, must:

- Recycle 50 per cent of all C&D debris, measured by weight[14]

In the City of Chicago, the construction and demolition sector has achieved a 65 per cent diversion rate with over 90 per cent of concrete, asphalt and metal being diverted

Source: 2009 Chicago Waste Characterization Study and Waste Diversion Study Results

The City of Chicago has set out sorting and report requirements in its *Construction or Demolition Site Waste Recycling Rules and Regulations*, which includes:

- The materials may be:
  a) Sorted on site and separated by C&D debris type into designated containers, in compliance with the Construction Site Cleanliness Ordinance

  b) Placed for collection in a designated container for mixed recyclables on site and sorted off site at a properly permitted recycling facility

- Each contractor must report and certify the weight of construction and demolition debris produced on site, the weight of C&D debris disposed, and the weight of C&D debris that has been recycled or reused for every project subject to the recycling requirements.[15]

4.3.2 Incentive Programs

Some jurisdictions, such as San Diego and San Jose, California, Port Moody, British Columbia, East Gwillimbury, Ontario use the building permitting process as a way to leverage waste diversion during construction and demolition by tying in waste diversion targets to refundable deposits during the early stages of the permitting process.

East Gwillimbury, Ontario

East Gwillimbury's Thinking Green Development Standard and Site Plan Check List requires construction and demolition projects achieve 50 per cent diversion. In order to ensure that developers achieve the waste diversion target, the municipality requires the applicant submit a deposit based on a formula of $5/square foot up to a maximum of $500,000. The deposit is refunded only after proof of diversion is provided.

[14] City of Chicago Construction and Demolition Site Waste Recycling Ordinance
[15] City of Chicago, Department of the Environment. Construction Or Demolition Site Waste Recycling Rules And Regulations

The developer will receive a pass/fail in meeting all Green Development requirements (including waste diversion) and if the developer goes beyond the standards then the developer will receive priority in the development approval process and density bonus benefits. [16]

City of San Diego, California

Introduced in 2005, the City of San Diego's Construction and Demolition Diversion Deposit (CDDD) Program is an incentive program to encourage the recovery of C&D debris. The City collects a deposit prior to any construction, renovation or demolition project, which is fully refunded if the contractor can prove that 50 per cent of the C&D debris was diverted from landfill. Partial refunds may be authorized when less than 50 per cent by weight of the waste generated by project is diverted from landfill.

When applying for a permit, all applicants must complete a Waste Management Form Part I with the Building Permit or Demolition/Removal Permit application. At the same time, all applicants, including the City of San Diego, submit a refundable deposit based on a number of factors, including type of construction/renovation/demolition, project size and project value. The deposits are calculated based on a price schedule range from \$0.20 per ft^2 to \$0.70 per ft^2. Additionally, a flat rate for roof tear-off projects is set at \$200. The deposit is listed on the permit receipt. In the first three years of the program, San Diego receives roughly 6,500 deposits, which equated to approximately \$15 million annually. Almost 70 per cent of deposits were fully refunded at the end of the project and 32 per cent were partially refunded.[17]

Applicants must provide proof that the construction and/or demolition material was diverted using one of three methods: on-site reuse, transport to a certified C&D recycling facility, donation of reusable materials to an organization/company acceptable to the director.

This program provides an incentive to generators of C&D waste to recycle or reuse materials rather than dispose of them. The intent of the deposit is to equalize the financial costs to contractors and developers between diverting and landfilling the C&D materials. It is estimated that the City can achieve its 50 per cent diversion target by diverting half of C&D materials currently going to landfill.

City of Port Moody, British Columbia

The City of Port Moody requires that C&D projects achieve 70 per cent waste diversion on designated materials. Building permit applicants must complete a waste management plan, as part of the building permit application, identifying which materials will be reused, recycled or disposed from the project and are required to submit a refundable deposit. The deposit is based on the size of the C&D project and ranges from \$1,000 to \$20,000. The Waste

[16] Communication with Dan Stone of East Gwillimbury's Think Green Development Standards Economic Development Office , November 9th, 2012

[17] Construction and Demolition Debris Recycling in San Diego. MWMA Fall Summit October 25, 2011. Presented by Ken Prue Environmental Services Department, San Diego

Management Plan form states "In order to receive the maximum refundable amount of the waste management fee at least 70 per cent of recyclable or reusable project waste must be recycled or reused."[18] The City requires the applicant to complete a compliance report and provide receipts of all recycling and disposal must be submitted within 90 days after project completion in order to receive a refund.

4.3.3 Differential Tipping Fees and Diversion Stations

Some communities have chosen to include C&D diversion requirements as part of the site plan and permitting process. Other communities address C&D diversion by placing financial disincentives through differential tipping fees.

York Region operates the Georgina Transfer Station and two Community Environmental Centres (CEC), where residents and small businesses can recycle or dispose of construction and demolition waste (see Table 1).

Table 1: Materials Accepted for Diversion at York Region Facilities

Materials Accepted	McCleary Court CEC	Elgin Mills Road CEC	Georgina Transfer Station
Blue Box Recyclables	✔	✔	✔
Electronics	✔	✔	✔
Household Hazardous Waste			✔
Small Household Batteries	✔	✔	
Compact Florescent Bulbs	✔	✔	
Tires	✔	✔	✔
Drywall	✔	✔	
Metal Appliances	✔	✔	✔
Scrap Metal	✔	✔	✔
Clean Fill			
Shredded Paper	✔	✔	
Clean Wood Waste	✔	✔	

[18] City of Port Moody Waste Management Plan, Building Division

Materials Accepted	McCleary Court CEC	Elgin Mills Road CEC	Georgina Transfer Station
Concrete	✔	✔	
Polystyrene	✔	✔	
Used building materials*	✔	✔	
Yard Waste			✔
Garbage	✔	✔	✔

*donated to Habitat for Humanity. This partnership is ending in April 2014.

York Region's Community Environmental Centres (CECs) offer diversion opportunities for high volume construction and demolition waste and there are financial incentives to divert the wastes materials. The same is true at the Georgina Transfer Station, which also provides diversion opportunities.

Other communities have introduced aggressive C&D diversion programs (such as Oxford County, Ottawa Valley Waste Recovery Centre, Waterloo Region and Simcoe County), which provide a wide range of waste diversion opportunities supported by differential tipping fees to promote waste diversion of C&D materials. These differential tipping fees will be implemented at York Region Community Environmental Centres to encourage greater diversion of C&D materials brought there with the implementation of weigh scales at the facilities (refer to the Community Environmental Centre Strategy for additional detail). Unfortunately, York Region does not have control of the major transfer stations in the Region and, therefore, could not impose differential tipping fees at the transfer stations, only encourage their adoption.

Ottawa Valley Waste Recovery Centre (OVWRC), Ontario - located near Pembroke, Ontario, the OVWRC serves the waste management needs of a population of nearly 40,000 comprising of five municipalities in the Ottawa Valley – City of Pembroke, Town of Petawawa, Township of Laurentian Valley, Township of North Algona Wilberforce, and Sebastopol Ward of Bonnechere Valley. The OVWRC operates a Material Recovery Facility, a Centralized Composting Facility, an Outdoor Composting Area, a Construction and Demolition Waste Recycling area, a permanent Household Hazardous Waste Depot, a waste oil transfer station and a landfill.

In an effort to maximize diversion of construction and demolition waste, the OVWRC implemented a pilot project (June to end of October, 2013) to promote C&D diversion by setting up diversion containers for brush, concrete/bricks, drywall, shingles, clean wood, cardboard, and scrap metal and by setting strongly motivational differential tipping fees, see Table 2.

Table 2: OVWRC Tipping Fee Rates for the C&D Waste Separation Pilot Project

Material Types	Tipping Fee (per tonne)	Flat Rate (200 kgs & under)
Separated Construction & Demolition Materials Each material type below received source separated by customer. Includes: brush, concrete/bricks, drywall, shingles, clean wood (Not painted, pressure treated or stained wood)	$62.00	$15.00
Mixed Construction & Demolition Material Approved loads containing a minimum of 70 per cent co-mingled C&D materials. Includes: brush, concrete/bricks, drywall, clean wood (may include cardboard and/or metal) Materials must not be attached to each other; *no shingles*	$175.00	$35.00
Mixed Loads - C&D Material mixed with significant landfill material (More than 30 per cent) or C&D material that cannot be separated.	$200.00	$40.00

4.3.4 C&D Recycling Facilities

Communities are beginning to address C&D diversion through the use of designated C&D recycling facilities, supporting their use through differential tipping fees, material bans and/or flow control. Some communities, including Halifax, Prince Edward Island, Metro Vancouver, and Calgary have chosen to direct C&D materials to privately owned and operated C&D processing facilities. In other instances, the community has chosen to partner with the private sector to provide processing capacity for the banned C&D material, as in the case of San Francisco, which works closely with its waste hauler to operate the facility.

Other communities have developed municipally owned facilities within their community, such as Edmonton, Alberta.

> In Alberta, construction and demolition waste make up about one quarter of all municipal solid waste sent to landfills in Alberta, according to Alberta Environment. At the same time, it is estimated only 10-15 per cent of such waste is currently recycled.
>
> Source: Recycling Council of Alberta newsletter Connector Spring 2012

Edmonton, Alberta – In January 2012, the City of Edmonton opened its new construction and demolition (C&D) waste recycling facility at the Edmonton Waste Management Centre. The

$4.3 million facility uses both mechanical and manual sorting to separate loads of mixed material and is expected to process 100,000 tonnes of mixed construction and demolition material per year, recovering up to 70 per cent of the material for recycling.

To qualify as a dedicated mixed load, at least 75 per cent of an individual load must be made up of wood, metal, drywall, asphalt/concrete, asphalt shingles, cardboard and paper. The 2012 rate for mixed construction and demolition loads at the C&D recycling facility was $60 per tonne, compared with $75 per tonne charged at the landfill for commercial waste.

The General Manager of Infrastructure Services with the City of Edmonton states that "the C&D recycling facility makes it much easier for industry to divert waste from the landfill and to meet the waste diversion credits for LEED® projects."[19]

Waste Management Inc. promotes C&D diversion. - In January 2012, Waste Management Inc. announced it would open its most technologically advanced C&D recycling facility in the City of Toronto. Expected to open by 2013, the semi-automated single stream recycling plant will process an estimated 87,000 tonnes of mixed C&D waste.

In addition, Waste Management has launched an online tool to help building planners and contractors measure their C&D recycling, calculate total diversion rates and generate documentation to support LEED® certification. The online tool is called the Diversion and Recycling Tracking tool (DART), and is available to customers across the US and Canada.

Sources: Waste Management Launches Leading Edge C&D Recycling Facility, Tracking System. Rick LeBlanc, About.com Guide and Waste Management to establish Toronto's most advanced facility for processing construction and demolition waste materials. Canada Newswire, January 26, 2012

Countrywide Recycling, Hamilton, ON – In operation since April 2011, Countrywide Recycling is a private company based in Hamilton, Ontario, specializing in recycling of construction and demolition waste at its 60,000 square foot enclosed facility. The company accepts mixed construction and demolition waste and pulls out recyclable materials such as cardboard, wood, metal, plastics and aggregate. The facility uses both high end equipment and hand sorting to separate out the materials. Employing up to 68 sorters working on three sort lines, the facility is approved to process up to 800 tonnes of C&D material per day.

[19] Mike Koziol, General Manager of Infrastructure Services with the City of Edmonton at http://www.edmonton.ca/city_government/news/2012/new-recycling-facility-cuts-construction-waste.aspx

4.3.5 Supporting Tools

Some municipalities provide incentives such as free consultation and technical assistance to help educate contractors about green building design standards and establishing onsite waste diversion programs.

Metro Vancouver, British Columbia introduced a number of initiatives to promote green building construction and demolition activities and waste diversion. Some of the initiatives include:

- The Metro Vancouver's *LEED® for Contractors* training program helps builders grasp LEED® concepts, reducing the risks associated with new practices
- BuildSmart Website acts as the information portal for the Green Building Program; the site contains information on design practices, design best practices, operations and maintenance, modeling and software tools, product directories, incentives and funding.
- Build Smart Program encourages sustainable waste management and diversion activities during construction, renovation and demolition activities and features a number of activities and programs to encourage C&D waste diversion including the following:
    - Contractors are provided with Metro Vancouver's "3Rs Code of Practice for the Building Industry," which was introduced in 1997 to encourage industry to reduce, reuse and recycle construction and demolition waste
    - Information on construction and demolition best practices are provided including "Job Site Recycling: A Guide for Builders and Developers" and "Demolition & Salvage: A Guide for Developers and Renovators"
    - Job site technical assistance is offered free of charge to show how demolition and construction materials can be recycled and money saved; some of the services offered include setting up recycling programs, auditing waste generated, identifying salvage and recycling opportunities and providing on-site education of employees
    - "Construction Waste Management and Disposal Model Specification" encourages contractors to prepare and submit a waste management plan containing an analysis of the proposed job site waste to be generated, including identification of the types of recyclable and waste materials (by volume or weight); in the case of demolition, a list of each item proposed to be salvaged during the course of the project is suggested. The Specification is available as a template for contractors to adopt.

Dockside Green is a sustainable mixed-use community development in Victoria BC. During construction, the developers were able to achieve the following waste reduction successes:

- 90 per cent of construction waste was recycled or reused.
- Wood, concrete, masonry, gypsum and tiles were ordered in specific quantities to avoid waste
- Concrete used contained 35-40 per cent fly ash from coal fired power plants, resulting in reduced cement use and greenhouse gases associated with cement production

Source: Dockside Green Commercial Tenant's Guide Prepared by Sustainability Solutions Group. No date

Greater Toronto Airport Authority, Ontario - The Greater Toronto Airport Authority (GTAA) manages, operates and controls Toronto's Pearson International Airport. The GTAA's Airport Development Program is a 10-year, $4.4 billion redevelopment project including major projects for terminals, airside, infield and air support.

The first portion of the redevelopment project involved the demolition of the old Terminal One building. Demolition specifications included the requirement to divert a minimum 90 per cent of materials from landfill. This figure rose from 60 per cent on earlier GTAA demolitions as an attempt to reduce project costs. Additionally, the GTAA chose to retain ownership of the material so the crushed concrete could be reused on-site in the new construction directly adjacent to the demolition site, thereby virtually eliminating the transportation and disposal costs.

All concrete (205,000 tonnes) generated from the demolition was reused and nearly all other demolition wastes were reused and recycled, including asphalt and brick rubble. All metals were separated for individual recycling including copper from electrical wiring. More than 95 per cent waste diversion (mostly reuse) was achieved during the demolition of the old Terminal One building. An estimated $1,845,000 was saved by recycling concrete onsite alone.[20]

5.0 Construction and Demolition Diversion Strategy

It is estimated that up to one-third of the solid waste stream could be comprised of construction and demolition (C&D) waste. Unlike other waste streams, the C&D waste stream is more standardized in its composition, with about 70 per cent of residential and non-residential construction, demolition and renovation waste consisting of five materials - paper, drywall, clean wood, asphalt roofing, concrete and aggregates.

While York Region does not control the flow of C&D waste through most Regional transfer

[20] Let's Climb another Molehill. July 2005. Recycling Council of Ontario.

stations and private sector hauling activity, there still remains an opportunity for York Region and local municipal partner municipalities to influence the amount of C&D waste sent for disposal through initiatives and pilot projects. The Region and municipal partners need to understand the leverage points where they can have the most influence on C&D waste diversion, including those discussed below.

5.1 Initiatives

The following initiatives have been identified as having the potential for successful implementation in York Region. These initiatives enable York Region, working with local partner municipalities, to implement pilot programs and policies to drive waste diversion in construction and demolition projects, targeting both municipal and private sector projects. The strategy focuses on front-end initiatives associated with development standards, site plan checklists permitting and deposits. York Region, in partnership with other Greater Toronto Area (GTA) jurisdictions, could work together to advocate and lead change in the way C&D waste is managed as well as advocating for policy change at the provincial level.

1. **Encourage adoption of consistent Waste Management Development Standards, including C&D diversion requirements –** York Region and its local municipalities can lead by example by specifying high diversion targets on all of their construction and demolition projects (including private sector projects) and also use these projects to both track and demonstrate the potential impacts by specifying these higher diversion targets.

   As discussed in the multi-residential waste diversion strategy, Richmond Hill is pursuing a project to develop revised Waste Management Development Standards. Once complete, York Region and local municipal partners should adopt a consistent design standard and incorporate this into existing sustainable development requirements. Adoption of consistent standards by all local municipalities and York Region would provide a message to developers about the importance of effective waste management and diversion. It would also help developers by establishing reasonable,consistent expectations and requirements throughout the Region. The development standard should incorporate relevant elements from East Gwillimbury's Thinking Green Development Standard and Site Plan Check List as it pertains to diversion of construction and demolition waste, adopting the 50 per cent diversion requirement and over time, increasing the requirement to 75 per cent diversion.

   The Regional Official Plan (2010) sets ambitious waste diversion targets of 90 per cent diversion from landfill by 2016 and virtual elimination by 2020. These targets will need to be addressed in the development standards to ensure consistency with York Region goals.

2. **Advocate for a comprehensive C&D diversion strategy in the Greater Toronto Area (GTA**)– York Region could advocate for all GTA municipalities to develop a comprehensive C&D diversion strategy emphasizing use of C&D recycling/reuse

facilities, development standards associated with minimizing C&D waste and potentially including material disposal bans and/or differential tipping fees to maximize diversion of C&D materials and minimize flow of materials across municipal boundaries. Adoption of a GTA-wide strategy would support the development of private sector infrastructure, required to address the processing and diversion of C&D materials by providing greater assurance regarding material flows and greater economy of scale. While development of a consistent approach for C&D diversion across the GTA could be feasible if focused on development standards for example, it is likely unfeasible in regards to common material disposal bans and/or differential tipping fees, as the municipal infrastructure across the GTA for C&D materials varies. It is uncertain if municipalities in Ontario have the same legislative authority as jurisdictions such as Halifax Regional Municipality to enact similar C&D Licensing Bylaws.

A GTA Steering Group would be established featuring all GTA regions and interested partner municipalities. Members could also include organizations such as Habitat for Humanity, authorities such as Greater Toronto Airport Authority and associations such as Building Industry and Land Development Association.

The GTA steering group established to pursue this initiative could also advocate the province to improve construction and demolition regulations and enforcement.

The strategy should feature a study to better understand the quantities and composition of construction and demolition waste generated within the GTA, including residential, commercial and institutional. This knowledge will help to develop a strategy that best meets the needs and conditions of the C&D industry and achieves the greatest success in the most cost and resource effective manner.

3. **C&D Working Group** – The Region has an opportunity to provide a supportive role to C&D waste generators by bringing together leaders in the C&D industry and waste haulers to discuss waste diversion needs and opportunities. This working group, either led by the Region or, more likely, in partnership with an industry organization such as OWMA, could provide input to the content of electronic communications provided through the C&D website and would assist in developing guidance on better practices for diversion by C&D generators based on their experience in handling these materials. The Strategic Economic Initiatives Office of York Region is pursuing opportunities to work with the Toronto Region Conservation Authority (TRCA) to deliver some of their programs in the York IC&I community, such as extending the Waste Exchange Program to York Region and helping to host a Zero Waste Consortium, procurement tools and case studies. These efforts could be adapted for the C&D sector as well.[21] This group could target renovation waste for small and medium contracting (involved in home renovation and small commercial renovations) to help them develop cost

[21] Communications with Chris Rickett, Manager, Strategic Economic Initiatives, Office of the Chief Administrative Officer, Economic Strategy, The Regional Municipality of York on February 15, 2013

effective waste diversion opportunities.

4. **Expand the List of C&D Materials that can be Diverted** –The Region could provide opportunities to divert other materials at its existing facilities, depending on the availability of space to accommodate separating these materials and sustainable, financially viable markets to ensure diversion of these materials. Potential target materials could include asphalt shingles, porcelain toilets, and "dirty" wood as currently there are some market opportunities for these material streams in Ontario. This option is further discussed in the separate Community Environmental Centre strategy document.

5.2 Pilots to Promote C&D Waste Diversion

With up to 33 per cent of the solid waste stream comprised of waste generated by the C&D sector, much of which has viable end markets, there should be clear objectives targeting the diversion of this waste stream. York Region could work with local municipal partners and become actively involved in implementing a series of pilots to promote waste diversion for the full range of construction and demolition projects. These pilots provide a way to demonstrate the viability of C&D waste diversion and the opportunities to divert large volumes of material from disposal. The pilots also provide the necessary tools to the C&D industry to establish successful cost-effective waste diversion programs and to showcase what can be accomplished to other developers.

Pilot 1 – Develop a Green Building Technical Assistance Program and work with a number of developers to test it. The program could be developed to promote many environmental benefits such as source reduction, the purchase of recycled content/lower content building materials (e.g. pre-engineered joists) and end market development. It could also help raise the awareness of other greening opportunities such as water and energy conservation. Other communities, such as the City of Vancouver, have successfully developed similar programs that could be used as a template for developing a York Region-tailored program. The technical assistance program would provide the information and support needed to help developers establish onsite waste diversion programs during construction and demolition projects and to realize the benefits associated with diversion programs.

Pilot 2 – York Region should work with East Gwillimbury and the other local municipalities to monitor and showcase its check list and refundable deposit approach used to achieve 50 per cent diversion of C&D waste. Once the approach is fully understood and workable, it should be showcased to the other partner municipalities then adapted to work in the permitting process of the other York Region partner municipalities and demonstrated in one of the southern three municipalities (Markham, Richmond Hill or Vaughan). At the same time, York Region should explore the benefits of other incentive approaches, such as density bonuses and fast tracking of development review, to reward additional waste diversion activities (e.g. exceeding diversion targets, finding new uses for waste materials, etc.) possibly in association with other sustainable activities undertaken as part of the development standards. Over time, these C&D waste diversion goals will need to be

increased to achieve those stated in the Regional Official Plan of 90 per cent by 2016 and virtual elimination of waste by 2020. These goals have also been adopted by the Region's New Community Guidelines.

Pilot 3 - The Region could establish an award program promoting recognition of achievements in C&D waste diversion. The awards could focus on waste diversion and other green building achievements for large, medium and small residential and non-residential projects. The award program will help in demonstrating that diversion can be successfully achieved in a variety of C&D projects and sets the bar for others to try and achieve and even surpass the level. This program could also be an opportunity to showcase a number of C&D diversion demonstration projects. These projects could be monitored and measured and have the opportunity to be recognized. The awards could also focus on renovation projects by small contractors to encourage greater awareness and participation in diversion opportunities.

6.0 Implementation

The following provides an overview of the approach to implementation of this strategy.

6.1 Partnerships

The Region will need to work closely with local municipalities (including planning departments, building departments, economic development departments) in pursuing waste diversion initiatives impacting projects in the design phase, during site plan development and throughout construction/demolition and renovation activities. Richmond Hill is currently involved in the development of waste management development standards in co-operation with the Region. The standards could incorporate the best practices required by East Gwillimbury through its Thinking Green Development Standards and Site Plan Check List. At the same time, the Region could help local municipalities support waste diversion and green design activities through the establishment of a Centre of Excellence and pilot projects. All of the local municipalities could benefit from Regional support to develop and implement effective C&D waste diversion measures.

The Region could support the development and distribution of information and knowledge regarding better practices to divert C&D materials, through activities such as the establishment of a Centre of Excellence offering a range of services to developers, builders, and contractors to encourage both green building design and waste diversion as noted above.

The Region's role as an 'enforcer' of diversion initiatives after generation, is relatively limited, given that only a portion of the C&D waste generated in the Region is managed at Regional facilities. However, various incentives/disincentives implemented at the Regional level, would demonstrate the Region's commitment to diversion and should have some effect on C&D generators. The Region will need to work with affected stakeholders (developers, waste haulers, builders, contractors) to encourage adoption and transition to new policies and programs.

It would be helpful if York Region builds a relationship with the Building Industry and Land Development Association (BILD), which represents land development, home building and professional renovation industry in the Greater Toronto Area. BILD sponsors university courses in planning, as well as works with community colleges to foster careers in building trades. York Region could work with this organization and the Canadian Green Building Council (GTA Chapter) to have waste diversion incorporated into member communications, university and college course design, and other member programs and activities. Partnerships with BILD presents an excellent opportunity for the Region to work with its developers in identify and reducing barriers to C&D diversion. The Region should also work with organizations such as OWMA to work on the waste management side to identify potential partnerships with the industry managing C&D waste materials.

6.2 Resources, Timeline and Targets

The following provides on outline of the resources (staff and financial) required as well as performance targets and monitoring.

Roles and Responsibilities

The proposed arrangement for implementation of this strategy is as follows:

York Region:	Lead and/or Supporter Depending on Initiative/Pilot
Local Municipalities:	Lead and/or Supporter Depending on Initiative/Pilot
Community Partner:	Stakeholder and/or Participant
Other:	Stakeholder and/or Participant

Resources

Based on the review of existing resources and potential resource requirements for other components of the long-term waste management system, it is possible that an additional staff position(s) may be needed to oversee the development and implementation of the proposed C&D strategy within the Environmental Services department. These requirements will be subject to further review as the resourcing strategy for the master plan is developed.

Targets

One of the key issues with C&D materials is that York Region only manages a portion, most likely a small portion of largely residential materials at its existing facilities. It is expected that the majority of the C&D materials generated at large residential and non-residential construction sites, is managed outside of the Region's system. The challenge for the Region is the lack of ability to track and report on diversion that occurs outside of the Region's system. Despite this challenge, the Region has set ambitious goals as part of its York Region Official Plan and its draft New Community Guidelines requiring 90 per cent of construction waste be diverted from landfill by 2016 and virtual elimination by 2020. Targets for waste diversion through development standards and planning process will need to have a workable monitoring, reporting and enforcement process in place to measure the success of the targets.

To help monitor and measure future construction activities, the Region should work with industry (e.g. construction trade associations, BILD, BOMA, OWMA) to begin to assemble baseline data on current waste diversion activities occurring at construction sites in York Region. This data will be used to determine the extent to which construction waste is being diverted and managed by the construction industry and to establish appropriate mechanisms for monitoring future new construction activity. This information will also help in providing case studies and economic proof that waste diversion benefits construction projects.

Performance Metrics

For each new initiative there are specific performance measurements identified (see Attachment A), however, there are several overarching metrics to measure the performance of the construction and demolition strategy as a whole, including:

- Increase in tonnes of C&D materials diverted through municipal facilities
- Decrease in tonnes of C&D sent to disposal (requires co-operation from private sector service providers and/or voluntary reporting measures)
- Reduction in net cost per tonne to manage C&D materials diverted through municipal facilities
- Annual number of developments completed to which the consistent design standard has been applied
- Receipts from recycling companies showing diverted materials by weight

7.0 Benefits of this Strategy

The following provides a summary of the key benefits of this strategy:

- An increased emphasis (through both encouragement, incentive and policy instruments) to promote and ensure waste reduction and diversion
- The potential for additional cost recovery at Regional facilities currently managing C&D Materials (see CEC Strategy)
- Greater awareness of the types and quantities of materials being managed and the method by which they are managed to inform future waste reduction and diversion program opportunities
- Public awareness and recognition of builders and developers who incorporate waste reduction and diversion priorities