

Construction, Renovation and Demolition Waste Materials: Opportunities for Waste Reduction and Diversion

Final Report



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Table of Contents

Index of Tables	5
Acknowledgements.....	6
Executive Summary	7
1 Introduction, Background and Context	9
2 Methodology.....	11
3 Program Guiding Principles.....	12
4 EPR Instruments for New Construction and Renovation Waste.....	13
4.1 Instruments Identified through the Research	13
4.2 Categorization of Instruments.....	17
Category 1: Voluntary Mechanisms	17
Category 2: Mechanisms That Influence Design (Upstream/EPR).....	17
Category 3: Financial Mechanisms	17
Category 4: Mechanisms Linked to Permitting.....	17
Category 5: Regulatory or Mandatory Mechanisms	17
5 Category 1: Voluntary Mechanisms.....	18
5.1 Building Green Programs.....	18
5.1.1 Description of Option.....	18
5.1.2 Case Studies and Other Examples	19
5.1.3 Pros and Cons of Building Green Programs	21
5.1.4 Lessons Learned.....	22
5.2 Green Procurement (requiring soft targets, or through specifications)....	24
5.2.1 Description of the Option.....	24
5.2.2 Case Studies and Other Examples	27
5.2.3 Pros and Cons of Green Procurement Specifications	27
5.2.4 Lessons Learned.....	28
5.3 Government Lead by Example	28
5.3.1 Description of the Option.....	28
5.3.2 Case Studies and Other Examples	28
5.3.3 Pros and Cons	29
5.3.4 Lessons Learned.....	30
5.4 Industry Self-Managed and Voluntary Levies	30
5.4.1 Description of the Option.....	30
5.4.2 Case Studies and Other Examples	30
5.4.3 Pros and Cons	32
5.4.4 Lessons Learned.....	32
6 Category 2: Mechanisms That Influence Design (Upstream/EPR).....	33
6.1.1 Description of Option.....	33
6.1.2 Case Studies and Other Examples	33
6.1.3 Pros and Cons	33
6.1.4 Lessons Learned.....	34
7 Category 3: Financial Mechanisms	35
7.1 Landfill Tax, Differential Tipping Fees and Landfill Levy	35
7.1.1 Description of Option.....	35
7.1.2 Case Studies and Other Examples	35

7.1.3	Pros.....	40
7.1.4	Cons.....	40
7.1.5	Lessons Learned.....	40
7.2	Green Procurement with Hard Incentives	41
7.2.1	Description of Option.....	41
7.2.2	Case Studies and Other Examples	41
7.2.3	Pros.....	43
7.2.4	Cons.....	43
7.2.5	Lessons Learned.....	44
8	Category 4: Mechanisms Linked to Permitting	45
8.1.1	Description of Option.....	45
8.1.2	Case Studies and Other Examples	45
8.1.3	Pros and Cons	48
8.1.4	Lessons Learned.....	48
9	Category 5: Regulatory or Mandatory Mechanisms	49
9.1	Mandated Standards and Regulations.....	49
9.1.1	Description of Option.....	49
9.1.2	Case Studies and Other Examples	49
9.1.3	Pros and Cons	52
9.1.4	Lessons Learned.....	52
9.2	Disposal Bans.....	53
9.2.1	Terminology	53
9.2.2	Description of Option.....	53
9.2.3	Case Studies and Other Examples	53
9.2.4	Pros.....	54
9.2.5	Cons.....	54
9.2.6	Lessons Learned.....	55
10	Stakeholder Feedback	57
10.1	Industry	59
10.2	Municipalities	59
10.3	Recyclers	59
11	Evaluation Criteria to Assess and Evaluate EPR Options	61
11.1	Environmental / Public Policy Benefits.....	68
11.2	Technical Viability	68
11.3	Political Viability	68
12	Viability of Construction EPR Programs for Alberta.....	71
12.1	Rural / Remote Locations	71
12.2	Low-Cost Landfill Disposal.....	71
12.3	Perception.....	73
12.4	Material Separation.....	73
12.5	Responsibility.....	73
12.6	Recycling Facilities	74
13	Proposed Approach.....	75
13.1	Potential Options for an Alberta Program for Construction, Renovation and Demolition Waste Reduction and Diversion	75



14	Program Details.....	76
14.1	Provincial Government Leadership.....	76
14.2	Imbed Waste Diversion Goals within Construction Permitting Process	77
14.3	Introduce Province-Wide Disposal Bans and Surcharges	79
14.4	C&D Environment Fund.....	80
14.5	Future Developments	81
	Appendix A: Case Studies	82
	Category 1: Voluntary Mechanisms.....	82
	Built Green™ Alberta, Go Green, Leadership in Energy and Environmental Design (LEED).....	82
	United States National Agreement on Carpet Recycling	94
	Carpet America Recovery Effort (CARE).....	96
	Portland, Oregon - Businesses and Multifamily Complexes Require to Recycle Ordinance	102
	Toronto, Ontario – Regent Park Development.....	106
	United Kingdom – Demolition Protocol	110
	Category 2: Mechanisms That Influence Design (Upstream/EPR)	119
	United Kingdom - Aggregates Levy	119
	Category 3: Financial Mechanisms.....	132
	Toronto, Ontario – Greater Toronto Airport Authority.....	132
	United Kingdom – Recycled Content Materials, Aggregates	136
	Category 4: Mechanisms Linked to Permitting.....	145
	San José, California – Construction and Demolition Diversion Deposit (CDDD) Program	145
	San Diego, California - Construction and Demolition Debris Diversion Program	156
	Oakland, California - Construction and Demolition Debris Waste Reduction and Recycling Requirements.....	164
	Chicago, Illinois - Construction or Demolition Site Waste Recycling Ordinance.....	172
	Category 5: Regulatory or Mandatory Mechanisms.....	178
	Ontario, Canada - 3Rs Regulations for Construction and Demolition Projects.....	178
	California - Assembly Bill 939 and Public Resources Code	185
	Massachusetts – Waste Disposal Ban Regulation, Construction and Demolition Materials	194
	Capital Regional District, British Columbia Waste Disposal Bans - Construction and Demolition Materials	199
	References	204

Index of Tables

Table 1: Extended Producer Responsibility Tools Summary	15
Table 2: LEED Adoption for Private New Construction Projects.....	21
Table 3: Lessons Learned from LEED Implementation	22
Table 4: Lessons Learned from Other Early Municipal/County LEED Certification Adoption	23
Table 5: Worldwide Ecolabeling Programs	26
Table 6: LEED Adoption for Municipal Projects	29
Table 7: Tipping Fees Cost Comparison at Miramar Landfill	36
Table 8: Francis Cooke Regional Class III (Dry) Landfill Disposal Rates Effective January 1, 2005.....	36
Table 9: Solid Waste (Commercial and Domestic Refuse) Excluding Controlled Waste Effective January 1, 2006.....	37
Table 10: Waste Management User Fee Schedule Effective July 1, 2005	38
Table 11: Permitting Administration Details	46
Table 12: Number of Building Permits Issued in 2005 in Selected Alberta Cities	47
Table 13: Waste Wood Recycling Options.....	52
Table 14: North American C&D Material Landfill / Transfer Station Bans.....	54
Table 15: Existing Markets for Alberta Asphalt and Concrete, Cardboard and Wood	55
Table 16: Barriers for Alberta Asphalt and Concrete, Cardboard and Wood Markets	56
Table 17: Importance of evaluation criteria (overall results)	62
Table 18: EPR Tools.....	69
Table 19: Tipping Fees Versus Percent Diversion and Ban and Recycling Program History in the Capital Regional District.....	72
Table 20: Go Green, Built Green Alberta and LEED (Canada & US) Recognition Programs Building Reuse/Waste Management/Recycling/Resource Reuse/Recycled Content/Business Practices Rating Points.....	83
Table 21: Built Green™ Alberta Ratings.....	85
Table 22: LEED Canada and LEED US Performance Rating.....	87
Table 23: United States Jurisdictions – LEED Adoption	88
Table 24: Eligible Calculation Rates for Oregon Sustainable Building Tax Credit.....	92
Table 25: City of Seattle Sustainable Building Outreach and Incentive Programs	93
Table 26: Summary of the Negotiated Outcomes for Carpet.....	95
Table 27: Sponsorship Contributions (minimum levels of contribution)	97
Table 28: Sponsorship Levels and Sponsoring Companies	98
Table 29: Post-consumer Recycling and Diversion, 2002-2004	99
Table 30: Sustainability Fund in England Objectives and Projects	125
Table 31: Pearson Terminal One Demolition Material Diversion	133
Table 32: San José CDDD Program Rate Schedule	147
Table 33: City of San Diego Construction and Demolition Debris Diversion Deposit Schedule	158
Table 34: Tipping Fees Cost Comparison at Miramar Landfill.....	161
Table 35: Estimated Statewide Diversion Rates	191
Table 36: CRD Construction and Demolition Related Hartland Landfill Bans.....	200
Table 37: Bans at Hartland and Tonnage Diverted.....	201



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Executive Summary

This project looks at a broad range of instruments that can be applied to the design and construction of new buildings and renovation projects in Alberta, with the ultimate aim of reducing the amount of construction waste disposed. The overall goal was the development of a program that incorporates immediate practical outcomes, including waste diversion and program funding, while maintaining an ultimate goal of improving building design to minimize environmental impacts. Although the project focus was construction and renovation materials, the proposed mechanisms can often apply also to materials resulting from demolition projects.

An Alberta program needs to adhere to the following guiding principles:

- The overall goal of the program is to maximize diversion and minimize environmental impact.
- Program must provide a level playing field
- Program administration to be assumed outside of the provincial government. The government's role will be to set the regulatory framework and provide enforcement.
- Funds generated by the program must be dedicated to the program.
- The program must be self-sustaining (i.e., internal funding of administration / resources).
- Administrative burden will be minimized, for all levels of government, as well as the private sector.
- Program outcomes must be measurable and transparent.
- The program must be enforceable.
- The program will be designed to reward good behaviour through links to performance.

Instruments identified through case study research, which are currently applied to construction waste, or which are applied to other materials at present, but could potentially be applied to construction materials and waste in Alberta, can be broadly divided into the following categories:

Category 1: Voluntary Mechanisms

- Building green programs, green procurement, government leadership, industry self-managed

Category 2: Mechanisms That Influence Design

- Levy on virgin materials, green procurement

Category 3: Financial Mechanisms

- Landfill taxes/ levies, differential tipping fees, green procurement



Category 4: Mechanisms Linked to Permitting

- Required diversion plans, targets backed by fees or deposits, performance reports

Category 5: Regulatory or Mandatory Mechanisms

- Mandated standards / regulations, disposal bans

A list of evaluation criteria was developed and refined through consultation with the Project Advisory Team and other stakeholders, and used in assessing and evaluating potential options and instruments. This assessment led to suggestions regarding elements that may be suitable to form a construction waste program in Alberta. This draft program proposal will form the basis of an expanded stakeholder consultation prior to program implementation.

Based on this research and stakeholder feedback, a framework for a Construction Waste Reduction Program for Alberta was developed. The framework consists of four integrated components:

1) Provincial Government Leadership

- Create a green building standard that makes waste diversion a 'mandatory / prerequisite' requirement
- Require waste diversion construction standard on all government construction projects
- Develop demonstration projects that maximize waste diversion.

2) Imbed Waste Diversion Goals within Construction Permitting Process

- Require that all provincial and local government agencies include requirement for waste diversion programs (backed by a refundable deposit) in all construction and renovation permitting

3) Introduce Province-Wide Disposal Bans and Surcharges

- Disposal bans for materials with established diversion opportunities
- Surcharge on all construction and demolition project waste loads that are not recycled
- Fines for improper disposal of materials

4) C&D Environment Fund

- Establish a C&D Environment Fund utilizing unredeemed deposits and surcharges
- DfE fund would be directed to promoting and developing programs and markets that increase diversion of construction waste

1 Introduction, Background and Context

The Construction and Demolition (C&D) sector makes up approximately 22% of the total mass landfilled at Class II and Class III landfills in Alberta. With a total generation rate of 677,395 tonnes per year, the amount of C&D waste disposed of in landfills is estimated to be 643,590 tonnes.

Alberta Environment has developed a C&D Waste Reduction Strategy, with the following desired outcomes:

- 1) By 2007, the Provincial and Municipal governments are recognized as leaders in C&D waste reduction, specifications, and procurement.
- 2) There are standard diversion practices in the C&D industry, including the implementation of a waste reduction plan for every project. All projects to achieve a minimum 50% diversion rate.
- 3) There are solid markets and an assured supply of C&D materials by 2008.
- 4) By 2008, infrastructure is in place to manage the waste reduction process.
- 5) The C&D industry is well-informed and educated to effectively reduce waste.
- 6) At least 60 kg per capita per year of C&D waste is diverted from landfill by 2010.

Stewardship, or Extended Producer Responsibility, has been identified as one of the strategies that could contribute to achieving these outcomes. In the Waste Strategy, the C&D Waste Reduction Advisory Committee has recommended that the government investigate the implementation of an "Extended Producer Responsibility" (EPR) concept for new construction projects.

The OECD defines EPR as *an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. There are two related features of EPR policy:*

- *Shifting of responsibility upstream toward the producer and away from municipalities*
- *Provide incentives to producers to incorporate environmental considerations in the design of their products (OECD, 2001)*

EPR has traditionally been applied to short-lifespan materials such as packaging. Recently, it has been applied to some longer life products such as electronics and vehicles.

However, new construction materials present a unique challenge to application of EPR principles, in that the end of life is in the distant future. Therefore EPR

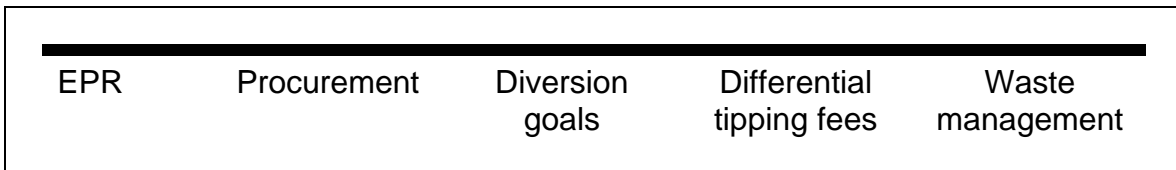


approaches need to be custom designed to suit the different nature of new construction and renovation projects and the materials that are used. If an approach similar to other Alberta stewardship programs were adopted, a front-end charge could be applied to pay for recycling of materials generated at the construction site. Such an EPR program would be the first in Canada to look at the construction of a building as a product.

This project looks at the feasibility of incorporating EPR principles into the design and construction of new buildings and renovation projects in Alberta, with the ultimate aim of reducing the amount of construction waste disposed.

In order to frame the project properly, it was necessary to establish whether the boundaries were to include a range of stewardship options, or focus entirely on “true” EPR, which would promote more sustainable design and construction practices. Discussions with the Project Advisory Team resulted in the approach outlined as follows.

The range of tools available to address construction waste could be seen to fall on a continuum, as shown below:



EPR approaches, with strong influence on Design-for-Environment (DfE), would fall on one end of the continuum, while tools addressing management of the material once it becomes waste, would fall on the other end.

It was determined that the project should consider all tools along the full range of the continuum, even though it can be argued that many of them do not meet the criteria of EPR. Looking at this broad range of instruments will allow for the development of a program that incorporates more immediate practical outcomes, including waste diversion and program funding, while maintaining an ultimate goal of improving building design to minimize environmental impacts through EPR mechanisms.

EPR, although seemingly a simple and intuitive concept, requires a level of complexity in implementation in order to actually affect DfE. For example, moving towards EPR implies that economic instruments not only fund waste diversion, but encourage design changes towards reduced environmental impacts. This requires differential fees based on the relative environmental costs of each material or product – a necessarily complex equation. Because of its nature, EPR also produces fundamental challenges in dealing with historical waste.

Based on the previous discussion, further references to EPR in this report will assume consideration of the full range of tools on the EPR continuum. Similarly, although the project focus was construction and renovation materials, the proposed mechanisms can often apply also to materials resulting from demolition projects.

2 Methodology

The overall project objective outlined in the proposal was to assess the feasibility and conditions under which an EPR program for new construction and renovation waste could be established in the province, and to identify any alternatives that would provide the same outcomes.

In order to meet this objective, the first step was to identify potential options for EPR for new construction through the investigation of case studies. This task was undertaken using a combination of Internet research and telephone interviews.

The programs researched during this stage allowed for the identification of a range of potential EPR options and instruments currently in use for construction waste, and mechanisms by which various options could be implemented. Program case studies were identified to cover the range of alternatives identified.

A list of evaluation criteria to be used in assessing and evaluating options and instruments was developed and vetted through the Project Advisory Team, as well as a variety of additional stakeholders at two consultation workshops. These criteria were incorporated into the analysis of each program case study.

Additional analysis and assessment of various program options occurred through the delivery of two stakeholder consultation workshops. The feedback received at these workshops was incorporated into the overall assessment of potential EPR instruments.

The assessment of EPR instruments led to suggestions regarding elements that may be suitable to form a construction waste program in Alberta. These elements were combined to create a draft program proposal that was subsequently reviewed by the Project Advisory Team through an iterative process. This process resulted in a draft program proposal that will form the basis of an expanded stakeholder consultation prior to program implementation.



3 Program Guiding Principles

During the consultation process, Alberta Environment provided input to establish a set of fundamental principles that should underscore the development of a program to divert construction waste. These program principles follow:

- The overall goal of the program is to maximize diversion and minimize environmental impact.
- Program must provide a level playing field
- Program administration to be assumed outside of the provincial government. The government's role will be to set the regulatory framework and provide enforcement.
- Funds generated by the program must be dedicated to the program.
- The program must be self-sustaining (i.e., internal funding of administration / resources).
- Administrative burden will be minimized, for all levels of government, as well as the private sector.
- Program outcomes must be measurable and transparent.
- The program must be enforceable.
- The program will be designed to reward good behaviour through links to performance.

These program principles were used to guide the development of potential options for an Alberta Construction Waste Reduction Program.

4 EPR Instruments for New Construction and Renovation Waste

4.1 Instruments Identified through the Research

A wide variety of C&D 'EPR' tools have been implemented to assist with C&D waste diversion. Table 1 summarizes the options applied in various case studies researched for this project. Detailed case study reviews are included in Appendix A.

The tool of choice for the United States National Agreement on Carpet Recycling is a joint Memorandum of Understanding between industry and government. Meanwhile, in the United Kingdom, an Aggregate Levy targets the use of primary aggregates in construction and is applied to commercial exploration of aggregate (e.g., sand, gravel, rock and some chalk).

Government leadership can be established in numerous ways. In September 2004, the City of Calgary passed a Sustainable Building Policy (#CE001) that requires new or significant renovations over 500 m² to achieve LEED Silver certification or higher, while the London Borough of Brent Council integrated the United Kingdom's Demolition Protocol into the demolition and new build phases of the Wembley Development. This acted as the catalyst for a number of successful outcomes involving the use of demolition material, the specification of recycled aggregates in the new build and the potential to specify recycled aggregates in structural concrete. Government leadership can also be portrayed by adopting a procurement policy that requires the purchase of eco-label products.

Green procurement can be as simple as a business purchasing approved eco-labeled products (e.g., products that have an EcoLogo^M, Green Dot or Green Seal symbol) or utilizing a specification to divert a minimum of 90% of the concrete from the demolition of old Terminal 1 and use it in the construction of new Terminal 1 as requested by the Greater Toronto Airport Authority.

Other tools relate directly to using recycled-content materials in building construction. The United Kingdom's Waste and Resources Action Programme Quick Wins initiative is a construction specification, product or material, that offers the opportunity to increase recycled content beyond current average practice, while numerous green building recognition programs, including Leadership in Energy and Environmental Design (LEED), Built Green Alberta and Go Green, have options to gain points when recycled-content materials are used, building reuse takes place and construction material is diverted.

Waste diversion goals at the national, province/state or municipal level are the backbone to many waste diversion programs. The state of California has imposed a 50% diversion target along with a penalty of up to \$10,000 a day if this goal is not achieved. This mandate has led to numerous municipalities and



counties developing C&D diversion programs which range from San Jose's and San Diego's deposit/refund system to Oakland's site waste management plan.

Even though the Ontario 3Rs Regulations were never enforced, they do show the importance of implementing waste reduction plans and audits. Additionally, demolition protocols have been developed in the United Kingdom.

In January 2006, Chicago, IL is implementing a fine-based program whereby a penalty will be charged per percentage point below the desired C&D diversion target, while in Portland, OR it is required that rubble (e.g., concrete, asphalt), land clearing debris, metals and wood are to be separated and recycled.

Financial tools include differential tipping fees imposed by the Bow Valley Waste Management Commission at the dry landfill in Canmore, AB, Denmark's landfill tax (money collected goes into general fund) and Southern Australia's landfill levies (money collected is used to fund material recovery initiatives).

Effective July 1, 2006, Massachusetts will be the first US State banning asphalt pavement, brick, concrete and metal from disposal, incineration or transfer for disposal at a solid waste facility. Wood will also be banned from disposal or transfer for disposal at landfills.

From these case studies, the following specific EPR tools have been identified (see Table 1), and ranked in a suggested order as they would fall on the EPR continuum:

- Industry / government MOU
- Construction specifications
 - Recycled content specifications
 - Reuse specifications
- Levy
- Requirement for job site recycling
- Required waste management plan
- Deposit / refund
- Demolition protocols
- Diversion goals
- Fines
- Differential tipping fees
- Landfill bans

Table 1: Extended Producer Responsibility Tools Summary

Case Studies	Extended Producer Responsibility Tools												
	Industry, Government MOU ²	Specs	Recycled Content Material	Reuse	Levy	Job Site Recycling	Waste Management Plan ¹	Deposit/Refund	Demolition Protocols	Diversion Goals ³	Fine	Differential Tipping Fees	Landfill Bans
Capital Regional District, BC										✓			✓
Chicago, IL Construction or Demolition Site Waste Recycling Ordinance							✓			✓	✓		
GBRP ⁴ -Built Green Alberta			✓	✓						✓			
GBRP ⁴ -Go Green										✓			
GBRP ⁴ -LEED			✓	✓						✓			
Massachusetts Construction and Demolition Landfill Ban													✓
Oakland, CA Construction and Demolition Debris Waste Reduction and Recycling Requirements							✓			✓			
Ontario, 3Rs Regulations							✓			✓			
Portland, OR Job Site Recycling Ordinance						✓	✓			✓			
San Diego, CA Construction and Demolition Debris							✓	✓		✓		✓	



Case Studies	Extended Producer Responsibility Tools												
	Industry, Government MOU ²	Specs	Recycled Content Material	Reuse	Levy	Job Site Recycling	Waste Management Plan ¹	Deposit/ Refund	Demolition Protocols	Diversion Goals ³	Fine	Differential Tipping Fees	Landfill Bans
Diversion Program													
San José, CA Construction and Demolition Diversion Deposit Program							✓	✓		✓			
Toronto, ON GTAA ⁵		✓								✓			
United Kingdom, Aggregate Levy					✓								
United Kingdom, Demolition Protocol								✓					
United Kingdom, Recycled Content			✓										
United States, National Agreement on Carpet Recycling	✓									✓			

¹Waste Management Plans are typically between one and three pages long

²MOU- Memorandum of Understanding

³This can be State mandated (e.g., California-50% diversion), a municipal target (e.g., Oakland, CA-75% diversion) or a program goal (e.g., LEED-50% construction diversion, Chicago-50% construction and demolition diversion)

⁴Green Building Recognition Program

⁵Greater Toronto Airport Authority

4.2 Categorization of Instruments

EPR instruments identified through the case study research, which are currently applied to construction waste, and EPR instruments which are applied to other materials at present, but could potentially be designed to be applied to construction materials and waste in Alberta, can be broadly divided into the following categories:

CATEGORY 1: VOLUNTARY MECHANISMS

- Building green programs
- Green procurement – soft targets, specifications
- Government lead by example
- Industry self-managed / voluntary levy / MOU

CATEGORY 2: MECHANISMS THAT INFLUENCE DESIGN (UPSTREAM/EPR)

- Levy on virgin materials
- Green Procurement – mandated performance

CATEGORY 3: FINANCIAL MECHANISMS

- Landfill tax, differential tipping fees and landfill levy
- Green procurement – preferential pricing

CATEGORY 4: MECHANISMS LINKED TO PERMITTING

- Required diversion plans
- Targets backed by fees or deposits
- Performance reports

CATEGORY 5: REGULATORY OR MANDATORY MECHANISMS

- Mandated standards / regulations
- Disposal bans

Each category of instrument is discussed in the following sections.



5 Category 1: Voluntary Mechanisms

Four broad types of voluntary EPR mechanisms with the potential to manage construction waste were identified:

- Building green programs
- Green procurement – soft targets, specifications
- Government lead by example
- Industry self-managed/voluntary levy

5.1 Building Green Programs

5.1.1 Description of Option

Green building programs require contractors, through contract documents, to meet certain (higher than average) standards for environment-related parameters such as the following:

- Waste efficiency
- Energy efficiency
- Indoor air quality
- Material use (e.g., recycled content, waste generation, durability)
- Tenant awareness

There are a number of different green building certification programs in place (e.g., Leadership in Energy and Environmental Design (LEED), Built Green™ Alberta, Go Green). Waste management and use of recycled content in building products is only one component of a green building certification program. Most green building programs are based on a scoring system where it is left up to the designer to decide how different levels (e.g., gold or silver) can be achieved. In fact, all of the score can be achieved by designing an energy efficient or water efficient building, without much attention to waste diversion or use of recycled content materials.

Green building programs may provide an advantage in the bidding process to companies who provide a green design. However, it can also be argued that these programs simply raise the overall standard of building design by requiring all bidders to meet a green standard. Recently, many government and municipal levels (e.g., Canadian Federal Government office buildings, City of Vancouver city owned buildings, Alberta Infrastructure) require contractors to meet standards such as LEED gold or silver for all construction and renovation projects above a certain square footage.

Green building programs can be voluntary, and are often adopted by, for example, development companies who want to differentiate themselves in the market as “green” or “environment friendly”, or can be mandatory (e.g., for city owned and financed buildings) in numerous jurisdictions including Dallas, Atlanta, Chicago and many other US cities.

Three green building programs are discussed in this section, and profiled in the case studies in Appendix A.

Built Green™ Alberta is administered by the Built Green™ Society of Canada, and administered by EnerVision. This program focuses on residential construction by combining elements of the R-2000 home and Energuide for Houses. It has become the environmental standard for residential construction in Alberta, and is widely embraced by Alberta’s home builders.

The BOMA (Building Owners and Managers Association) Go Green program applies to existing or occupied buildings. The Government of Canada announced in November 2005 that it would adopt Go Green Comprehensive to manage its office buildings, while Alberta Infrastructure and Transportation announced in March 2006 that Go Green would be the environmental standard for existing buildings owned by the Province of Alberta.

LEED has four performance rating categories (certified, silver, gold and platinum), based on points achieved for sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. There are Canadian and US versions of LEED, and separate rating systems for commercial interior (CI) and core and shell (CS) projects, as well as for existing building operations (EB) and new commercial construction (NC).

5.1.2 Case Studies and Other Examples

Many jurisdictions, including Alberta, have very recently adopted a requirement for LEED *Silver* or *Certified* status for city or state funded construction and renovation projects above a certain size or value. In 2005 alone, seven US states have adopted a requirement for LEED *Silver* certification for state funded construction (Arizona, Colorado, Connecticut, Maryland, Michigan, Rhode Island and Washington). While there is a strong trend in the direction to widespread mandatory LEED certification, there is virtually no evidence on the success of this measure, as all of the mandatory ordinances have been implemented in 2005.

The City of Seattle was the first city in the United States to formally adopt a sustainable building policy that used LEED as a standard. This policy called for new and renovated City projects with over 5,000 ft² of occupied space to achieve a LEED Silver Rating.



The original County of Arlington, VA, green building incentive program was adopted in October 1999 and implemented in April 2000. In December 2003 a revised and enhanced program was developed. This incentive program allows private multifamily residential and office building developers to apply for additional density if the project achieves LEED Certified or higher approval.

This program allows the County Board to consider a modification of use regulations for additional density between .15 and .35 floor area ratio (FAR - measurement of floor ft² space to ft² of site) and/or additional height up to three stories for special exception site plan requests. For instance, a 200,000 ft², 8 story office building that plans to meet LEED Silver requirements is given an additional .25 FAR which equates to 5% or 10,000 ft². The 10,000 ft² typically rents out at \$40/ft² annually so the owner can make an additional \$400,000 annually if they meet LEED requirements (Kelsch, 2006).

The site plan proposal must guarantee a LEED minimum rating of Certified. A bond is submitted at the beginning and if the building does not achieve LEED certification the bond becomes the property of Arlington County.

Austin Texas (*certified* in 2000), Boulder Colorado (*silver* in 2001) and San Mateo, California (*certified* in 2001) adopted mandatory requirements for LEED certification or LEED *Silver* certification in 2000 and 2001. Most other LEED requirements were adopted by states, cities and counties in 2004-2005. In Austin, the requirement applies to all public projects over 5,000 ft²; in Boulder it applies to all city facilities, and in San Mateo it applies to new county projects greater than 5,000 ft². In some cases, there are significant financial benefits to LEED certification. In Oregon, for example, LEED *Silver* rating is required to obtain a tax credit for sustainable buildings.

In the case of Oregon, the sustainable building tax credit (Business Energy Tax Credit) is a strong economic incentive motivator. Eligible project owners (e.g., trade, business or rental property owner who files taxes for a business site in Oregon or a non-profit organization, tribe, or public entity that partners with an Oregon business or resident who has an Oregon tax liability) can receive a sustainable building tax credit based on the square footage of the building if LEED certification (including specific energy related requirements) is achieved. For instance, a 100,000 ft² LEED-NC *Silver* certified building is eligible for a \$140,000 tax credit while a 100,000 ft² LEED-NC *Gold* certified building is eligible for a \$177,240 tax credit.

On March 18, 2002 the Town of Normal, Illinois passed Ordinance 4825, requiring LEED certification in the Central Business District for public or private new construction over 7,500 ft². With this example the local government has moved to the 'next level' by requiring private construction LEED certification.

5.1.3 Pros and Cons of Building Green Programs

Green building programs are relatively easy for governments to require for new construction or renovation projects that are government funded. LEED has the broadest application for commercial construction at this point, and is well understood and well recognized at this stage by most building and construction contractors and designers. At the same time, Built Green™ Alberta is very well understood and accepted within the residential building sector.

Requiring green standards for buildings drives environmental design considerations, and has strong potential to change the status quo of building construction.

It is somewhat more challenging for municipalities to require green building certification within their borders. Table 2 lists examples of private organizations that took their own initiative to achieve LEED certification requirements.

Table 2: LEED Adoption for Private New Construction Projects

Project	Location	Adopted	LEED Level
Bison Courtyard ¹	Banff, AB	Registered	
Eastern Village Cohousing Condominiums	Silver Springs, MD	Sep 2005	Silver
Haworth Corporate Headquarters	Holland, MI	Jun 2005	Gold
Mountain Equipment Co-op Store	Winnipeg, MB	Dec 2004	Gold
National Association of Realtors Headquarters	Washington, DC	May 2005	Silver
Nestle Pure Life Water Bottling Plant	Red Boiling Springs, TN	Jan 2005	Silver
St. John Ambulance Headquarters	Edmonton, AB	Feb 2005	Silver
Stantec Atrium Office Tower	Edmonton, AB	Aug 2005	Silver
Stratus Winery	Niagara-on-the-Lake, ON	May 2005	Silver
Winrock International Office	Little Rock, AK	Jul 2005	Gold

¹ Mixed use development with commercial space on the ground and second floors, and 2-storey residential units extending from the second to third floors, base building construction was completed in July 2005, building is almost fully occupied, awaiting final commercial tenant occupancy in order to verify building energy consumption before LEED-NC certification, anticipate Silver certification in 2006.

Contractors are quick to point out that LEED has its limitations, the most notable of which is the lack of focus on waste management, and more of a focus on energy conservation. For this reason, waste reduction requirements are important to include in any potential approach to address construction waste in Alberta through green building standards.

Built Green™ Alberta, on the other hand, has a strong emphasis on both recycling, as well as recycled content, making it a good potential model for the reduction of residential construction waste in Alberta.



5.1.4 Lessons Learned

There is not a significant amount of experience with the application of green building requirements, at the state, provincial or local level. Most of the green building requirements identified in this research have been applied recently, therefore there is no experience to draw on.

To date, most of the green building requirements are applied to buildings and construction projects over which the government has control (either a state or city funded project, or state or city buildings). Generally, the size limit where the LEED requirement applies is 5,000 ft² or greater (in many cases, 7,500 ft² or 10,000 ft² limits have also been applied).

Seattle's '5-Year Report – Building a Better City' (2005) outlines lessons learned from LEED implementation in Table 3:

Table 3: Lessons Learned from LEED Implementation

Positive Impacts	Challenges and Barriers	Suggested Resolution of Challenges
<ul style="list-style-type: none"> Construction cost savings for some projects 	<ul style="list-style-type: none"> Most projects experience incremental cost, averaging 2% or less¹. Some projects not able to meet incremental cost with existing budget 	<ul style="list-style-type: none"> Hire LEED-experienced design team to contain costs
<ul style="list-style-type: none"> Many projects have utilized incentive programs to cover a portion of incremental costs 	<ul style="list-style-type: none"> Not all projects have utilized incentives available 	<ul style="list-style-type: none"> Require maximum utilization of all city incentives for City Capital Improvement Project
<ul style="list-style-type: none"> New approaches to energy conservation are being tested 	<ul style="list-style-type: none"> LEED energy modeling requirement only budgeted for large projects 	<ul style="list-style-type: none"> Reassess budgeting of energy modeling for smaller projects
<ul style="list-style-type: none"> General Contractor/ Construction Manager contracting model seems to work well, due to early involvement and management 	<ul style="list-style-type: none"> Low-bid process may prevent procurement of services for non-standard practices and new materials 	<ul style="list-style-type: none"> Utilize General Contractor/Construction Manager process where possible
<ul style="list-style-type: none"> Staff champions have been designated at most departments where appropriate, increasing internal capacity/expertise 	<ul style="list-style-type: none"> Some departments lack dedicated staff resources for green building expertise 	<ul style="list-style-type: none"> Designate Green Building Team representatives from all appropriate departments
<ul style="list-style-type: none"> Some projects (e.g., Carkeek Park environmental Learning Center and Park 90/5 Bldg C) have exceeded the Silver certification by obtaining a LEED Gold rating 	<ul style="list-style-type: none"> Some projects have been unable to meet LEED Silver standard after going through the documentation process. Reasons vary from failure to document credits correctly to differing interpretation of credits to budget challenges 	<ul style="list-style-type: none"> Share lessons learned with other LEED projects, establish ad hoc green building assistance team for each CIP project to share knowledge, Have Green Building Team review LEED submittal packages prior to submission

¹As a percent of the Maximum Allowable Construction Cost, which includes all hard and soft (design-related) costs

(City of Seattle, 2005)

The Cities of Austin and Boulder, and San Mateo County are also early adopters of LEED certification for municipal/county projects.

Table 4 summarizes the lessons learned from each jurisdiction.

Table 4: Lessons Learned from Other Early Municipal/County LEED Certification Adoption

Jurisdiction	Adopted	LEED Level	Lessons Learned
Austin, TX	Jun 2000	Silver	<ul style="list-style-type: none"> • Ensure that Request for Proposal (RFP) states LEED requirement • Consider adding LEED accredited consultants as a requirement to RFP • Initially, consultants/contractors were not aware of product type and availability • Strong educational program needed (e.g., consultants, contractors, city staff, residents) • Initially, did not have internal department buy-in, education needed
Boulder, CO	2001	Silver	<ul style="list-style-type: none"> • Determine if going for LEED certification early in the process, the later the decision the more costly it gets • Hire a LEED certified architect • Consider hiring someone to collect data required for LEED certification and to prepare the submission • Consider over engineering the roof so that solar panels can be added at a later date • LEED is strict, submit complete package so that someone from the outside can understand the project • Do not go for minimum number for credits to achieve certification as you may loose a few points when the submission is reviewed • Purchase the LEED certification handbooks
San Mateo County, CA	Dec 2001	Certified	<ul style="list-style-type: none"> • Changed approach on building construction (e.g., must consider energy and water efficiency and material selection) • Determine if LEED certification is desired at beginning of project, not a end (difficult to achieve) • Develop integrated city/county team to discuss project before architect is hired • Hire architect with green building experience • State in policy that 'LEED Silver certification is required'; do not state that 'project must be built to a LEED Silver level' as cities/counties did when LEED was first adopted. Latter allows buildings without LEED certification.

(Boone, 2006; Boyes, 2006; Guerra, 2006; Scanlon, 2006)

Residential building certification is well established in Alberta through the Built Green™ Alberta program for homes. Since this program was developed and implemented by home builders, it is well accepted by the industry.



Similarly, the Go Green program for commercial building operations was developed by commercial building owners and operators (BOMA), and is likely to be well accepted within that industry.

5.2 Green Procurement (requiring soft targets, or through specifications)

5.2.1 Description of the Option

Green procurement is a way to require companies to purchase materials with recycled content, or require them, as part of a construction contract, to achieve particular diversion targets; the procurement specification or contract is the instrument used to force behavior change.

Procurement specifications are a very powerful tool to require green building practices, either through requirements for high diversion rates, or through the mandatory requirement to use recycled material. Specifications can range from the general to very specific. Certification programs such as LEED, and labeling programs can provide standards that are simple to incorporate into procurement policies or requirements.

Examples of eco-labeling programs are outlined below:

5.2.1.1 Environmental Choice Program^M

The Environmental Choice^M Program (ECP), established in 1988, is an Environment Canada's eco-labeling program that provides a market incentive to manufacturers and suppliers of environmentally preferable products and services, thereby assisting consumers to identify products and services that are less harmful to the environment.

The Program's official symbol of certification is the EcoLogo^M - features three stylized doves intertwined to form a maple leaf, representing consumers, industry and government working together to improve Canada's environment.

A key aspect of the certification process is the requirement for third party verification of compliance to ECP certification criteria as a condition for certification and licensing. This process ensures the Program's credibility and includes:

- a review of each applicant company's product and process information
- an examination of the company's quality assurance (QA) / quality control (QC) measures
- an audit of the company's facilities for purposes of initial certification (when determined by ECP officials).

Canada's Environmental Choice^M Program and its EcoLogo^M are internationally renowned because of the program's stringent certification process. EcoLogo^M is North America's most widely recognized and respected multi-attribute environmental certification mark with over 3000 product categories.

Building materials and grounds maintenance products are environmentally demanding in terms of the energy and resources that go into their manufacture, the volume of materials that are consumed in their use, and the large amounts of construction and demolition wastes that are generated at the end of their life. The Environmental Choice^M Program has a number of lower impact alternatives in this area, ranging from construction materials (e.g., raw materials, flooring, paints and finishing/treating products, and heating and cooling equipment/systems), to products and services that are used to maintain and enhance commercial or residential properties.

The certification criteria in this category include: aggressive rates of recycled content, reductions in a variety of undesirable chemicals, and the promotion of products that conserve resources. In addition to strict environmental requirements of the Program, these products and services must meet or exceed accepted industry performance and durability standards in their respective classes.

5.2.1.2 Green Seal

The Green Seal is awarded to products that have less impact on the environment and work well in the United States. To earn the Green Seal a product must meet the Green Seal environmental standard for the category (e.g., paints, windows, residential central air condition systems and air-source heat pumps, green facilities operation and maintenance criteria) as demonstrated by rigorous evaluation and testing and a plant visit. Green Seal standards are set so that they identify the most environmentally preferable products currently available and therefore leadership standards.

The Green Seal provides a marketing advantage, as it identifies products that are environmentally preferable, provides third-party corroboration of environmental claims, and distinguishes a product from competitors that cannot support their environmental assertions.

In developing environmental standards and certifying products, Green Seal follows the Guiding Principles and Procedures for Type I Environmental Labeling adopted by the International Organization for Standardization (ISO 14024). ISO standards are intended to harmonize standard-setting activities and to avoid international disagreements. ISO 14024 requires that reasonable efforts be made to achieve consensus, but consensus is not necessary to create a standard.



Once a standard has been established, Green Seal accepts applications for certification. Products are then evaluated for compliance with the applicable Green Seal standard. Test data is gathered for the environmental and performance requirements outlined in the standard. The manufacturing facility is then visited to evaluate quality control procedures. This ensures that the current product is representative of future production.

Once certified, products are subject to annual monitoring to ensure that the product offered for sale continues to meet the Green Seal standard. Any deviation is immediately brought to the manufacturer's attention and corrective action must be instituted within an appropriate time. Non-compliance may result in termination of the manufacturer's privilege to carry the Green Seal on its product.

5.2.1.3 Global Ecolabeling Network

The Global Ecolabeling Network is an international association of eco-labeling programs. There are now more than three dozen such programs worldwide. Table 5 lists existing ecolabeling programs.

Table 5: Worldwide Ecolabeling Programs

Country	Program	Website
Australia	The Australian Ecolabel Program	http://www.aela.org.au/
Brazil	Brazilian Ecolabeling	http://www.abnt.org.br/home_new.asp
Canada	Environmental Choice	http://www.terrachoice.com
Croatia	Environmental Label	http://www.mzopu.hr/
Czech Republic	Environmental Choice	http://www.cenia.cz/www/webapp.nsf/webitems/home_EkologickySetrneVyroby
European Union	European Union Ecolabeling	http://europa.eu.int/comm/environment/ecolabel/index_en.htm
Germany	Blue Angel	http://www.blauer-engel.de/willkommen/willkommen.htm
Hong Kong	Green Label Scheme	http://www.greencouncil.org/eng/index.asp
Hong Kong	Hong Kong Federation of Environmental Protection	http://www.hkfep.com/
Japan	Eco Mark	http://www.ecomark.jp/english
Korea	Environmental Labelling	http://www.koeco.or.kr/
New Zealand	Environmental Choice New Zealand	http://www.enviro-choice.org.nz/
Sweden	TCO	http://www.tcodevelopment.com/
Spain	AENOR-Medio Ambiente	http://www.aenor.es/desarrollo/inicio/home/home.asp?cambiodioma=s&pag=0

Country	Program	Website
Thailand	Thai Green Label	http://www.tei.or.th/
Ukraine	Living Planet	http://www.ecolabel.org.ua/
USA	Green Seal	http://www.greenseal.org/

(Global Ecolabeling Network, 2006)

Other ecolabeling programs include Austria's Eco Label Program, India's EcoMark, Nordic Countries (e.g., Denmark, Iceland, Finland, Norway, Sweden) Nordic Swan, Netherland's Stichting Milieukeur and Taiwan's Green Mark.

5.2.2 Case Studies and Other Examples

The Greater Toronto Airport Authority (GTAA) developed a specification for the demolition of the old Terminal 1 and the construction of the new Terminal 1 that requested as much concrete as possible to be reused on site.

This simple requirement changed the way in which companies bid the \$20 million project. Priestly Construction was the successful contractor. It moved an extensive amount of C&D material processing equipment on-site, and was able to salvage, crush and reuse over 200,000 tonnes (98%) of the material from the demolition project into road construction at the new terminal.

The US federal government has been encouraging states to make the incorporation of compost from municipal programs into road construction projects mandatory. Compost is very effective at fixing carbon, therefore this is being encouraged as part of the climate change policy. If successful, this one single requirement would dramatically alter the market for municipal compost by ensuring a stable end market.

5.2.3 Pros and Cons of Green Procurement Specifications

Green procurement specifications leave it up to the bidder or successful contractor to solve the problem or challenge presented by the construction project; the creative energy of the private sector is fully harnessed to innovate.

Green procurement specifications may disadvantage small companies, although many would argue that these are the most flexible and the quickest to innovate in a competitive market.

There is also a concern that the products specified are new, and may not stand the test of time. It is important to include performance standards in procurement specifications in order to address this barrier.



5.2.4 Lessons Learned

Green procurement specifications are a very powerful tool to drive market innovation. Educating and engaging procurement professionals can present a significant barrier to successful implementation of any procurement program, so focus on this area is critical. Buy-in from management at the highest level is also an important ingredient, as it provides leadership, while also developing a progressive organizational environment.

5.3 Government Lead by Example

5.3.1 Description of the Option

Governments (federal, provincial and municipal) have a great opportunity to lead by example, by specifying green building practices in projects that they finance and fund. Companies will adapt their construction practices to meet the requirements of government contracts, which are a significant source of business for many contractors. This can start with a requirement for a small percentage of recycled content building materials, and build up over time.

The purpose of governments leading by example is to demonstrate that green procurement requirements are achievable; it also encourages many companies to alter their business practices in order to compete in an advantageous way for government business.

Governments also have the option to develop demonstration projects that demonstrate outstanding performance in the area of building design and waste reduction. Demonstration projects can show the private sector that standards are achievable, while also providing valuable case studies and examples of best practices for other projects to model.

5.3.2 Case Studies and Other Examples

The federal government in the US has taken the lead on many fronts in this area. The US Army requires basic LEED certification for all new construction in 2004; LEED *silver* certification by 2005 and LEED *gold* certification by 2006; this will have a substantial influence on construction in the US, because of this high purchasing power of the US Army. A number of states, as previously discussed, require LEED certification for construction of state buildings, or state funded buildings which is another example of governments leading by example.

Table 6 lists examples of municipal initiatives that have achieved LEED certification requirements.

Table 6: LEED Adoption for Municipal Projects

Project	Location	Adopted	LEED Level
Carkeek Park Environmental Learning Center	Seattle, WA	Nov 2003	Gold
Civic Center	Canmore, AB	Jan 2005	Silver
Community High School	Banff, AB	Feb 2005	Certified
Country Hills Multi-Services Center	Calgary, AB	Oct 2005	Silver
North Boulder Recreation Center	Boulder, CO	Mar 2003	Silver
Nose Creek Recreation and Library Facility	Calgary, AB	May 2005	Gold
Operations Center	White Rock, BC	Jul 2003	Gold
Public Safety Facility	Santa Monica, CA	Aug 2004	Silver
Semiahmoo Library and Community Policing Station	Surrey, BC	Jan 2004	Silver
Spring Creek Fire Hall	Whistler, BC	Jan 2005	Silver
Transportation, Emergency and Communications Center	Austin, TX	Mar 2004	Silver
Works Yard	Vancouver, BC	Jun 2004	Gold

The London Borough of Brent Council integrated the United Kingdom's Demolition Protocol into the demolition and new build phases of the Wembley Development. The planning conditions, which established the requirement to adopt the Demolition Protocol, acted as the catalyst for a number of successful outcomes involving the use of demolition material, the specification of recycled aggregates in the new build and the potential to specify recycled aggregates in structural concrete.

5.3.3 Pros and Cons

It is considered preferable for governments to demonstrate that they are serious about green procurement and green building practices by first requiring these practices in all of their own construction projects. This allows the market to see that the requirements are not difficult to achieve. Products which meet the government specifications can be developed, and the fact that the government will require these products gives the marketplace sufficient confidence to start new businesses based on supply of the materials and services.



5.3.4 Lessons Learned

Government leadership can increase the likelihood of industry acceptance of waste reduction programs by showing the government's commitment and demonstrating success. Changes at the policy level can undermine this support if government initiatives are abandoned.

5.4 Industry Self-Managed and Voluntary Levies

5.4.1 Description of the Option

Industry self-managed and voluntary levies are in place for a number of materials (e.g., carpet, batteries, refrigerants). Industries voluntarily pay into a fund (usually based on sales of the units to be managed), and the money in the fund is used to pay for management of the material at end of life. Depending on the program, the collected funds can be used to simply pay for end of life management, or the scope can be expanded to fund market development, research and training also. The practice is well established and there is experience to draw on regarding the best way to establish these programs.

5.4.2 Case Studies and Other Examples

The US National Agreement on Carpet Recycling resulted in the establishment of CARE (Carpet America Recovery Effort), an industry self-managed program for the reuse and recycling of carpet, and reducing the amount of carpet landfilled.

CARE imposes voluntary sponsorship contributions on the carpet industry to manage carpet at the end of life – an example of an industry self-managed voluntary program. Three states (Minnesota and two others) started discussions with the carpet industry a number of years ago. The concept of the carpet industry taking responsibility for managing carpet at end of life gained momentum, and eventually twelve states became part of a voluntary agreement, which is outlined in a Memorandum of Understanding (MOU) between the carpet industry and the twelve state governments. The MOU sets out targets for reuse and recycling of carpet, as well as for diversion of carpet from landfill each year until 2012, when the diversion target is 40%.

The sponsorship contributions paid by manufacturers vary depending on the size of company; the highest being \$30,000 per year for a company with annual revenues of over \$3 billion. CARE currently has an Executive Director and one staff member and is located in Dalton, Georgia, which is the centre of the US carpet manufacturing industry. Considerable in-kind support is provided by the carpet manufacturing companies, but there is currently a concern that the annual budget is not sufficient, and that expectations of contributions by industry (voluntary, in-kind and other) need to be more clearly spelled out in the MOU.

Comments have also been received that the annual budget of \$350,000 is not sufficient to run an organization of this scope.

Although not a construction material, the management of refrigerants by Refrigerant Management Canada (RMC) is also a good example of an industry self-managed system. This system is effective as 7 of the 8 refrigerant manufacturers in Canada are members. RMC is funded by an environmental levy submitted by refrigerant manufacturers, importers and reclaimers on sales of hydro chloro fluoro carbons (HCFC) refrigerants (e.g., R-22). Submission of this levy commenced on January 1, 2001. The RMC fund finances all aspects of the program including collection, transportation, storage, disposal and technical extraction training. The levy is currently \$1.00 per kilogram.

Another example of a non-regulatory approach to program administration is the Safety Codes Council – a not-for-profit, non-government organization charged with the responsibilities of overseeing the Safety Codes Act. It represents the nine technical disciplines named in the Safety Codes Act – amusement rides, boilers and pressure vessels, building, electrical, elevators, fire, gas, passenger ropeways and plumbing.

The mission of the Safety Codes Council is to “work in partnership with industry, municipalities, labour, and government to provide Albertans with quality public safety systems for structures, facilities and equipment and provide competency-based training for Safety Codes Officers.” (Safety Codes Council, 2006).

The Council receives authority from the Safety Codes Act and the Minister of Municipal Affairs to:

- Recommend codes and standards to the Minister for the nine disciplines covered under the Act
- Develop and administer a system to accredit municipalities, corporations and agencies to carry out specific activities under the Act
- Develop and administer training, certification and designation programs for Safety Codes Officers
- Administer an appeals for decisions made in accreditation and certification programs, orders and written notices issued under the Act
- Promote uniform safety standards
- Provide support for partners

Funded safety associations are a unique Alberta approach to delegating to industry administration of occupational health and safety programming. Section 131 of the Workers' Compensation Act provides authority for the Alberta Workman's Compensation Board (WCB) to collect a mandatory levy ranging from \$0.01 to \$0.08 per \$100 of payroll from all designated WCB account holders for seven industry associations/organizations including construction, metal fabricators, hotels, trucking and the Petroleum Industry Training Service



(Wilson, 2006). This levy is returned back to the association/organization to provide health and safety training and education opportunities.

The governance of the funded safety associations rests with the industry, and the continued authority for receipt of the WCB levy rests with annual approval of industry stakeholders. For instance, the Alberta Construction and Safety Association sends the WCB a business plan requesting funds required for a portion of the following year's health and safety training and education activities, along with written confirmation from construction industry associations of their support for the plan and the amount of the levy. The WCB reviews and accepts the plan and determines the levy rate that must be collected to meet the requested funds. Typically, this levy is \$0.01 to \$0.02 per \$100 of payroll. The levy is added to the WCB premium rate, totaling \$3.25 - \$3.50 per \$100 of payroll. In 2005, the WCB returned approximately \$1.2 million of levies to the Alberta Construction Safety Association to help fund programs such as the Partners in Injury Reduction (Wilson, 2006). Industry leadership to constraining administrative costs and diversify revenues through additional fee for service has resulted in reduced levies that now fund approximately 50% of the Alberta Construction Safety Association's health and safety training and education programs. This unique industry administered program has led to impressive results. In the case of the Alberta Construction Safety Association, industry lost time claims have fallen more than 25% over the last several years, while the size of the workforce has increased by more than 10%.

5.4.3 Pros and Cons

The advantage of industry self-managed programs is that industry takes responsibility for their material, and designs the most efficient way to recover and divert the material from landfill.

It is virtually impossible to get all industry members to participate equally and fairly, particularly with regard to financial contributions and in-kind support. The free rider issue results in some industry members financing the whole program; this unfairness is one of the limitations of voluntary programs.

5.4.4 Lessons Learned

Industry often offers to set up an industry self-managed program, or institute voluntary levies, in an effort to avoid mandatory regulations. The fear of regulation often encourages industry to use their creative energy to solve waste management problems.

One of the lessons learned (and the jury is still out on the issue) is that it is very difficult, in fact impossible, to get all industry members to voluntarily agree to what the voluntary program should include. Therefore, some industries have actually asked for regulations to ensure a level playing field.

It has been suggested that industry funded programs are often underfunded.

6 Category 2: Mechanisms That Influence Design (Upstream/EPR)

6.1.1 Description of Option

One of the principles of EPR is Design for Environment (DfE). In its purest sense, DfE refers to considering the life cycle impacts of all products, so that their life cycle impacts are minimized by designing with minimal materials, using recycled materials when appropriate, and also that the products are easy to recycle at the end of their lives.

A second principle of EPR is market development: creating markets that can absorb recycled materials, so that there is a steady demand which can absorb materials collected in recycling programs.

This category of instrument applies various approaches to influence what materials are used in construction, and to incent designers to use recycled, rather than virgin materials, thus reducing the demand for virgin materials and increasing the demand for recycled materials (and reducing the amount going to landfill). There is overlap between this approach and some of the green procurement instruments described under the voluntary heading above.

6.1.2 Case Studies and Other Examples

The United Kingdom Aggregates Levy is an economic instrument designed to encourage the use of recycled aggregate rather than using new aggregate in construction projects. Aggregate companies pay a levy, approximately \$4.00 on each tonne of virgin aggregate sold. In the United Kingdom, where 200 million tonnes of aggregate are sold annually, the aggregate levy has generated roughly \$700 million/year. About \$85 million is directed to the Aggregates Levy Sustainability Fund which supports environmental programs and research and helps to stimulate the market for recycled and secondary materials (e.g., Waste and Resources Action Programme's (WRAP) Aggregates Programme – AggRegain); some of the remainder is applied to reduce worker insurance rates.

6.1.3 Pros and Cons

A levy provides a straightforward mechanism which is easy to understand. It also can be a good method of generating revenue to fund environmental programs.

Levies are most successful if the collected funds can be dedicated to program goals. In some cases, there may be a real danger of governments raiding the monies collected unless the funds are protected.



6.1.4 Lessons Learned

The United Kingdom aggregate industry reports that businesses still need to dig out poorer quality aggregate to access the high quality aggregate which is required for certain applications. Therefore, the levy has not met one of the objectives for which it was designed (to reduce the extraction of raw aggregate). It has, however, been successful at increasing the use of recycled aggregate.

In addition, the funds collected from the levy have not all been directed to improvements in the areas where quarries are located.

7 Category 3: Financial Mechanisms

7.1 Landfill Tax, Differential Tipping Fees and Landfill Levy

7.1.1 Description of Option

The intent of introducing a financial mechanism at disposal is to increase the cost of disposing of wastes to provide a financial incentive to increase recycling. The fee could be applied to all waste or can specifically target C&D waste as a priority waste stream.

Fees can be in the form of a tax, where funds go to general government revenues, or levies, where funds are dedicated to enhancing diversion options such as recycling. For optimal effect, funds collected from surcharges should be re-invested into alternative management options, education and enforcement. Fees can also be applied evenly across the board for all waste, or differentiated for various types of waste or levels of sorting.

7.1.2 Case Studies and Other Examples

7.1.2.1 Landfill Tax

The United Kingdom's Landfill tax is a tax on the disposal of waste. It aims to encourage waste producers to produce less waste, recover more value from waste, through recycling or composting and to use more environmentally friendly methods of waste disposal. This tax, effective October 1, 1996, applies to all waste disposed at a licensed landfill site unless the waste is an exempt material.

Two rates exist: the tax on inert or inactive waste is \$4.00 (£2) per tonne, whereas the tax on standard waste is \$36 (£18) per tonne. The latter rate will increase by \$6.00 (£3) per tonne in future years, on the way to a medium to long term rate of \$70 (£35) per tonne.

In 1987 Denmark introduced a landfill tax of \$7 (€5) per tonne of waste being incinerated or landfilled (European Environment Agency, 2002). In 2006, the landfill tax is \$70 (€50) per tonne for landfilling and \$62 (€44) per tonne for incineration (Harborg Larsen, 2006). This tax has assisted the nation in reaching its target construction and demolition diversion rate of 90% by 2004, compared to 25% in 1990. As of 2002 (newest recycling numbers), the construction and demolition diversion rests at 93%. The landfill tax created a market for construction and demolition material recycling and has contributed significantly to an increase in construction and demolition waste diversion.



7.1.2.2 Differential Tipping Fees

San Diego, CA has imposed 50%-80% reductions on tipping fees if separated recyclable loads of concrete and green waste are transported to the Miramar landfill (Table 7).

Table 7: Tipping Fees Cost Comparison at Miramar Landfill

Material Type	Fees
Mixed Waste	\$43/ton (average) - includes \$24/ton tipping fee, \$12/ton franchise fee, \$7/ton Assembly Bill 939 fee
Recyclable Concrete	\$10/ton (average)
Recyclable Green Waste	\$22/ton (average)

(City of San Diego, 2005b)

The Bow Valley Waste Management Commission operates a dry landfill in Canmore, AB that has a 43% reduction in landfill rates if acceptable dry and inert material is tipped with recyclable materials removed (see Table 8). It also offers a 55-84% reduction in tipping fee for construction and demolition recyclable materials (e.g., white wood, clean asphalt, broken concrete).

Table 8: Francis Cooke Regional Class III (Dry) Landfill Disposal Rates
Effective January 1, 2005

Item	Rate
Landfill	
Acceptable Dry & Inert (recycling 'not sorted')	\$74 / tonne
Acceptable Dry & Inert (with recycling 'sorted')	\$42 / tonne
Commercial Mattresses/Couches Surcharge	\$10 / item
Recycling	
Green Wood (scrub, brush & stumps)	\$33 / tonne
White Wood (kiln dried lumber)	\$33 / tonne
Yard & Garden Compost (leaves & grass)	\$33 / tonne
Metal and White Goods (incl. appliances)	\$12 / tonne
Clean Asphalt or Broken Concrete	\$12 / tonne
Clean Cover Material	\$1 / tonne
Other	
Minimum Fine for Illegal Material	\$100

Item	Rate
Minimum Charge	\$5 / scale ticket
Residential % Charities per Load	\$5.99 up to 227 kg (500 lb)
Surcharge for Freon Removal	\$25 / item
Special Handling Rate (e.g., PDF/CCA woods)	\$86 / tonne

(Bow Valley Waste Management Commission, 2005)

The Regional District of Kootenay Boundary, BC, has differential tipping fees (Table 9) in effect at the McKelvey Creek landfill.

Table 9: Solid Waste (Commercial and Domestic Refuse) Excluding Controlled Waste
Effective January 1, 2006

Item	Rate
Landfill	
Mixed Refuse	\$65 / tonne
Per Bag (4 bag limit)	\$1 / tonne
Tar, Gravel Roofing, Asphalt Shingles	\$10 / tonne
Concrete, Asphalt, Bricks	\$10 / tonne
Mixed Construction & Demolition Waste	\$130 / tonne
Less than 101 kg	Minimum charge: \$5
Mixed Construction Loads containing banned recyclable material ¹	\$650 / tonne
Recycling	
Cover Material	No charge
Yard or garden waste	No charge
Chipped Wood Waste	\$10 / tonne
Clean Wood Waste - All milled wood and/or branches over 15cm in diameter	\$30 / tonne
Stumps (60 cm or less in diameter)	\$20 each
Stumps - 60-90cm in diameter	\$40 each
Stumps - 90cm or greater in diameter	\$60 each
Scrap Metal (including white goods)	\$10 / tonne

¹Effective September 1, 2001, it is illegal to add beverage containers and yard and garden debris or any material accepted in the Regional District of Kootenay Boundary recycling programs (e.g., cardboard, glass, milk jugs, newspaper and tin) to garbage.

(Regional District of Kootenay Boundary, 2006)



The Region of Waterloo, ON, also applies differential tipping fees (Table 10) at their landfill and transfer stations whereby segregated loads of brick, concrete, rubble and yard waste receive a 43% reduction per tonne when compared to general refuse rates. There is no charge for the first 50 kg on all loads under 500 kg.

Table 10: Waste Management User Fee Schedule
Effective July 1, 2005

Item	Rate
General refuse/garbage	\$53 / tonne
Surcharge Loads (Waterloo Landfill Site ONLY) e.g., stumps, wire, styrofoam, asbestos, nuisance dusts	\$106 / tonne
Tires (max 16", rims removed)	\$100 / tonne
Segregated Loads <ul style="list-style-type: none"> • all regular blue box materials • compostable organics (e.g., leaves, yard waste, brush) • inerts (e.g., clean fill, bricks, concrete, rubble) • appliances (e.g., refrigerators, stoves, freezers) • scrap metal (e.g., bicycles) 	\$30 / tonne
Electronic Recycling <ul style="list-style-type: none"> • 1 to 4 items • each additional item 	\$10 / item \$25 / item
CFC removal charge for appliances <ul style="list-style-type: none"> • first unit • each additional unit 	\$10 \$25

(Region of Waterloo, 2006)

Meanwhile, Grande Prairie, AB utilizes differential tipping fees in the opposite direction. Normal refuse is \$52 per tonne whereas special handling material (e.g., large concrete or wooden objects, loads containing grass clippings, yard leaves or recyclable corrugated cardboard and any other material deemed difficult to handle) is \$104 per tonne (Aquatera, 2006).

7.1.2.3 Landfill Levy

7.1.2.3.1 California

In California, Assembly Bill 939 and Public Resources Code requires a per-ton fee to be collected at numerous landfills to provide funds to invest in increased diversion. See Appendix A for detailed case study information.

7.1.2.3.2 New Zealand

In 1998, Christchurch, New Zealand started charging a minimization fee on waste going to landfill, in addition to its standard waste disposal charges. City Council wanted to fund minimization initiatives by charging waste generators rather than through general rates. The fee is charged on all waste accepted at Council refuse stations, excluding green waste and separated recyclables and re-usable products dropped off at the refuse transfer station. In 2000/01 the fee raised \$4.5 million (\$3.4 million CDN), which financed Council waste minimization operations and provided services to residential and business communities, including curbside recycling, green waste composting, the Recovered Materials Foundation, the Business Enterprise Fund, recycling drop-off centers and the Target Zero Program which promotes waste reduction in businesses (Ministry for the Environment, 2002).

Auckland Region, Waitakere City, North Shore City and Rodney District are currently looking at waste levies on a regional scale. Following public consultation, waste levies are anticipated to be introduced in early 2006. All waste operators undertaking waste management activities will pay a levy on each tonne of waste collected to be landfilled.

7.1.2.3.3 Australia

In Southern Australia, a levy of \$10.50/tonne (\$9.01/tonne Cdn) of waste landfilled is applied and the rural levy is \$5.25/tonne (\$4.51/tonne Cdn). The levy generates roughly \$10 million (\$8.6 million Cdn) annually which funds Zero Waste Southern Australia activities including promotion, incentive programs, grants and infrastructure projects (Zero Waste, 2004).

Additionally, a landfill levy applies to waste generated in the Sydney Metropolitan Area (SMA) and the Extended Regulated Area (ERA, Hunter and Illawarra regions) for waste facilities anywhere in New South Wales, Australia. The waste levy also applies to waste generated outside the SMA and ERA that is disposed at facilities in the SMA and ERA. In 2005/06 levy rates are set at \$22.70/tonne (\$19.49/tonne Cdn) in the SMA and \$15.00/tonne (\$12.88/tonne Cdn) in the ERA. Government determined that waste levy rates would increase by \$1/tonne (\$0.86/tonne Cdn) annually up to and including 2009-2010 in the SMA and by



\$1.50/tonne (\$1.29/tonne Cdn) annually up to and including 2012-2013 in the ERA (Department of Environment and Conservation NSW, 2005).

Amendments to the New South Wales waste levy start on March 1, 2006. This includes the following waste levy changes: levy calculations, interest on unpaid waste levies, exemptions, rebates, volumetric surveys and weighbridges.

Landfill levies also exist in the states of Victoria and Western Australia.

7.1.2.3.4 Landfill Levies in Other Countries

Austria, Finland, France, Ireland, Netherlands and Sweden all have landfill levies in place.

7.1.3 Pros

Landfill levies rely on indirect market forces to create financial incentives to divert waste from disposal. This is achieved through an approach that is not prescriptive, instead providing flexibility to meet local circumstances.

Landfill levies also have the ability to capture both public and private sector generators.

7.1.4 Cons

Landfill levies may encounter government resistance to imposing what may be perceived as a new tax.

Levies may also encourage shipping of waste to other jurisdictions where levies are not in place, if this practice is economically advantageous (i.e., shipping cost less than difference in disposal cost). Similarly, if alternate waste disposal options exist and are readily available, they may be utilized instead of waste reduction.

There is also a concern that costs may simply be passed through by generators to their customers, instead of resulting in behaviour change.

7.1.5 Lessons Learned

If the levy fee is set too low, there is little incentive to divert waste, and the costs will simply be passed on to customers. At the same time, if the fee is set too high, it promotes trans-shipment of waste out of the jurisdiction or other avoidance behaviours such as illegal dumping.

Collected fees need to be dedicated to investment in alternative management options or there is a risk that they may be diverted to general revenues. This can

also have a positive effect on how the levies are publicly perceived. Political acceptability of new fees can also be enhanced by reducing other existing taxes commensurately (e.g. UK local employment taxes were reduced when the Aggregate Tax was imposed).

7.2 Green Procurement with Hard Incentives

7.2.1 Description of Option

This green procurement approach is similar to the voluntary option outlined previously, but with added incentives such as the following:

- Mandated performance – e.g., X% of designated material must be manufactured of recycled materials
- Preferential pricing – e.g., materials with minimum recycled content allowed a Y% increase in product price in competitive tendering evaluation

7.2.2 Case Studies and Other Examples

7.2.2.1 GTAA (Greater Toronto Airport Authority) Tender for New Terminal Construction at Toronto International Airport

Recently the GTAA launched its Airport Development Program which is a 10 year, \$4.4B redevelopment including major projects for terminals, airside, infield and air support. The first portion of the redevelopment involved the demolition of the old Terminal One building. Demolition specifications included the requirement to divert a minimum 90% of materials from landfill. This figure rose from 60% on earlier GTAA demolitions as an attempt to reduce project costs. Additionally, the GTAA retained ownership of the material so the crushed concrete could be reused in the new construction directly adjacent to the demolition site thereby virtually eliminating the transportation and disposal costs.

The result was that all concrete 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. Overall, 95% of the demolition wastes were diverted from landfill, while an estimated \$1,845,000 was saved by recycling concrete on site.

7.2.2.2 Olympics, Condominiums and Wal-Mart

Recycled content building materials were used in the construction of the three buildings for the Salt Lake City 2002 Winter Olympics. Salt Lake Olympic Committee recycled cardboard, wood and cabling materials and required carpet contractors to take back their carpets at the end of the event.



Meanwhile, high priority was given to using non-toxic, non-polluting and environmentally sustainable materials in design and construction, events management, maintenance, refurbishment and other operational activities at the Sydney 2000 Summer Olympics. The initial development of Sydney Olympic Park saw innovative waste management practices which led to waste being reduced, reused and recycled during the construction and the operation of venues/facilities and open space areas.

The Sydney Olympic Park Authority developed a Waste Reduction and Purchasing Plan (WRAPP) that aimed to:

- minimize the generation of waste
- separate the wastes generated by all activities for re-use and recycling
- purchase products with recycled and/or low waste content, wherever these products were cost and performance competitive

Tridel and the Tridel Group of Companies is Canada's largest condominium developer. Tridel introduced the 'Naturally Better' program in the Fall of 2003 to promote healthy, environmentally friendly, sustainable condominium living which includes the Verve and Element properties in Toronto, ON and Renaissance in Richmond Hill, ON.

Specifications for products and materials used during construction are designed to support green construction. Locally and regionally manufactured non-finishing products with higher volumes of recycled content (e.g., steel reinforcement and gypsum) are favored over products that need to be transported over long distances or that use a lot of virgin materials. Tridel also seeks to boost the levels of byproduct alternatives (e.g., fly ash from power plants or slag from steel plants) to reduce the cement content in the building's concrete as cement production is a major emitter of greenhouse gases. Additionally, during the construction phase, Tridel minimizes the amount of waste that goes to landfill by hiring haulers that separate materials in every bin in order to reuse as much material as possible.

On November 9, 2005, Wal-Mart opened its second Experimental Superstore in Aurora, CO. Wal-Mart's objective is to be a leader in corporate responsibility for the environment and shareholders by continuing efforts and education about environmental sustainability and how it applies to business.

The goals for both experimental stores, the first opened in summer 2005 in McKinney, TX, are to reduce the amount of energy and natural resources required to operate and maintain the stores, reduce the amount of raw materials needed to construct the facility, and substitute, when appropriate, renewable materials.

In Aurora, Wal-Mart took part in what has been labeled 'The World's Largest Recycling Project' in Colorado. They worked with a local company, Recycled Materials Company, to recycle 518 tons of material and concrete from the old Stapleton runways to build the foundation of the Aurora supercenter. Additionally, used vegetable oil from the store's Deli and used motor oil from the store's Tire and Lube Express help heat the store.

Wal-Mart is committed to building a new prototype that will be 25-30% more efficient and produce 30% less greenhouse gas emissions than current stores within the next four years. The Aurora store will carry out over 50 different experiments to help evaluate some technologies that will help Wal-Mart achieve that goal. Key experiments include solar and wind power, waste oil boilers, porous pavements, radiant floor heating that will help keep pedestrian areas clear of snow, and unique fabric duct air systems to heat and cool the building efficiently.

7.2.3 Pros

One of the advantages of this approach to green procurement is the use of market forces to provide incentives for achieving a policy goal. It requires only modification of existing procurement practices, rather than developing a new construction waste management program.

This approach has demonstrated success on government-influenced and public sector initiatives such as the Toronto Airport, the Olympics, and various venues where initiatives have been undertaken by private sector companies.

7.2.4 Cons

While there are leading company examples of successful green procurement approaches, the private sector is focused primarily on cost and is performance driven. Green procurement with hard incentives has not been widely adopted in any jurisdiction to date.

This approach depends on indirect market signals, which take a long time to work through the economy.

A considerable level of effort is required to educate and engage procurement professionals who must meet a wide range of exacting (and sometimes competing) standards, therefore a concerted effort to educate these important players, and understand their language and barriers, is required.



7.2.5 Lessons Learned

This is a practical tool by which government can show leadership. Despite the significant purchasing power represented by government, the majority of purchasing remains in private sector contracting, which emphasizes lowest cost purchasing. However, there appears to be a move towards some green building initiatives to secure a market advantage.

8 Category 4: Mechanisms Linked to Permitting

Development and building permits offer an ideal opportunity to trigger construction waste reduction activities. Permitting mechanisms can vary from requiring waste management plans or mandatory material separation to targets backed by fees or deposits.

8.1.1 Description of Option

This approach requires all new building construction or demolition projects to undertake waste diversion activities or achieve minimum waste diversion targets as an integral component of existing permitting practices.

Variations could include the following:

- A requirement for contractors to provide plans for approval which specify how they will achieve a specified diversion target.
- As above, with the addition of refundable fees (in whole or in part) after targets are achieved, or alternatively linking achieving targets to granting occupancy permits.
- Requiring contractors to pay a deposit fee linked to achieving waste specified diversion targets
 - structured simply as a refundable deposit when a specified target is met, or
 - by linking the refund to the actual percentage of diversion achieved
- Increasing the permitted density of new construction projects linked to waste diversion or green procurement goals

8.1.2 Case Studies and Other Examples

The City of San José's Construction and Demolition Diversion Deposit Program, an incentive program implemented in 2001, encourages the recovery of C&D debris. Deposits are based on the type of construction, alteration or demolition, as well as project size and value, ranging from \$0.10 per ft² to \$1.16 per ft². Additionally, a flat rate for roof tear-off projects is set at \$100. Partial refunds may be authorized when less than 50% by weight of the waste generated by project is diverted from landfill. San José receives roughly 7,000 deposits each year or on average 26 permits a day which equates to approximately \$4 million annually.

Meanwhile, the City of San Diego's Construction and Demolition Diversion Deposit Program will likely be effective in the Fall of 2006. Deposits are based on the type of construction, as well as project size and value, and range from \$0.10 per ft² to \$0.35 per ft². Additionally, a flat rate for roof tear-off projects and residential alterations have deposits set at \$100 and \$500 respectively. Partial refunds may be authorized when less than 50% (ramping up to 75%) by weight of the waste generated by project is diverted from landfill.



Chicago's fine based approach starts January 1, 2006 with 25% recycling of all C&D debris, measured by weight, increasing to 50% recycling of all C&D debris, measured by weight, effective January 1, 2007. Fines for construction projects or demolitions greater than 10,000 ft² of renovated, newly constructed, or demolished space are \$1,000 for each percentage point of difference between the amount to be recycled and the amount actually recycled. For projects less than 10,000 ft², the fine is \$500 for each percentage point of difference between the amount required to be recycled and the amount actually recycled.

Another permit related C&D diversion program is from Oakland, California. Building permit applicants are required to develop a recycling plan for all project waste to assist in achieving the city's goals of reducing construction and demolition debris sent to landfills by 50% or greater. This program is extremely hands-on by nature and detailed plans must be submitted at the time of permit application. A Waste Reduction and Recycling Plan was the selected construction and demolition waste diversion tool as City Council had pressure to minimize financial constraints on local businesses or those potentially relocating to Oakland.

One of the issues raised in relation to permitting requirements is the additional administrative time associated with additional paperwork. Comments received from program managers regarding permit administration are outlined in Table 11 below:

Table 11: Permitting Administration Details

City / Population	Tools	Annual Permit Dollars	Number of Permits Processed Annually	Employees		Other
				Building Permits Division	C&D Diversion Program	
San Diego, CA 1,200,000	-D/R -WMP	Yet to determine	Anticipate 7,000-8,000	Numerous employees collect deposit, not FT job	<ul style="list-style-type: none"> 1 FT to review refund applications 1 FT accountant 	C&D Diversion Deposit Program pays Building Permits Division \$15-\$25 per transaction
San Jose, CA 904,522	-D/R -WMP	Approx. \$4 million	Approx. 7,000 (roughly 26 permits per day)	Numerous employees collect deposit, not FT job	1 FT to process refunds	Do not pay Building Permits Division for transactions, considered part of their internal service

D/R-Deposit/refund

FT-Full time

WMP-Waste management plan

Table 12 provides information on the number of building permits issued for some Alberta cities.

Table 12: Number of Building Permits Issued in 2005 in Selected Alberta Cities

City	Population	New Construction		New Construction Subtotal	Additions, Alterations, Improvements ² , Renovations		AD, AL, I ² , R Subtotal	Total
		Residential ¹	ICI		Residential ¹	ICI		
Calgary MA ⁴	933,495	13,667	440	9,640	4,444	2,404	6,848	16,488
Edmonton MA ⁴	666,104	13,294	1,497	10,349	2,848	698	3,546	13,895
Grande Prairie	40,226	1092	59	527	716	95	811	1,338
Lethbridge	72,717	768	1,391 ³	2,093	650	-	650	2,743
Medicine Hat	51,249	831	34	557	636	159	795	1,352
Red Deer	75,923	1270	56	664	1,845	240	2,085	2,749
St. Albert	54,588	465	16	481	427	117	544	1,025

¹Residential includes, single family dwellings, duplex/triplex/fourplex, apartments, mobile homes, townhouses

²Improvements include garages, decks, sheds, basements

³Includes ICI new construction and additions/alterations/improvements/renovations

⁴Residential permits include metropolitan area

AD – Addition I – Improvement R – Renovation
AL – Alteration ICI – Industrial, Commercial and Institutional

(City of Calgary, 2006; City of Edmonton, 2005; City of Grande Prairie, 2005; City of Lethbridge, 2005; City of Medicine Hat, 2006; City of Red Deer, 2005; City of St. Albert, 2005; CMHC, 2006)



8.1.3 Pros and Cons

An approach linked to permits is congruent with existing business practices, therefore not requiring significant changes. As a result, this approach is relatively quick to implement and achieve results, as long as alternative facilities and infrastructure are in place to recycle the diverted material.

This approach uses market forces to achieve policy goals. Permitting mechanisms have the potential to recognize and reward good performers, while internalizing costs to poor ones. At the same time, this approach may not influence design if fees are just passed on to customers

Additional administrative requirements for contractors and enforcement responsibilities for government are a necessary consequence of implementing a permitting mechanism.

8.1.4 Lessons Learned

Approaches linked to permitting have proven effective in diverting materials from disposal, but have not yet been applied to procurement and design aspects of construction projects.

A greater impact is seen when the percentage of fees returned is linked to the percentage of diversion achieved. Program fees and diversion targets may also need to be material specific over time to achieve policy goals in the most efficient manner.

Low fee rates are more politically acceptable, but may simply be passed through to building owners as nuisance costs.

9 Category 5: Regulatory or Mandatory Mechanisms

9.1 Mandated Standards and Regulations

9.1.1 Description of Option

Various regulatory mechanisms have been implemented at European Union, country and provincial/state levels, setting the stage for the development of diversion programs in order to meet goals. One option is to mandate a diversion goal with a penalty to stress the importance of achieving the target. Another option is to set the ground work for waste management plans and give guidance on how to complete plans to achieve the goal.

9.1.2 Case Studies and Other Examples

3Rs Regulations from 1994 are still on the books in Ontario, although not enforced. Regulation 102/94 required construction projects of at least 2,000 m² in Ontario to carry out waste audits and develop waste reduction plans. Additionally, Regulation 103/94 stated that brick and Portland cement concrete, cardboard, drywall (unpainted), steel and wood (not including painted or treated wood or laminated wood) from construction projects greater than 2,000 m² must be source separated. Meanwhile for demolition projects, brick and Portland cement, steel and wood (not including painted or treated wood or laminated wood) must be source separated.

In 1989, California State mandated 25% diversion by 1995 and 50% diversion by 2000, and gave the California Integrated Waste Management Board (CIWMB) the option to impose administrative civil penalties of up to \$10,000 per day for continued failure to comply. Through the Public Resources Code, cities and counties are given the power to collect fees sufficient to pay the costs of preparing, adopting, and implementing a countywide integrated waste management plan. Additionally, the CIWMB is allowed to collect fees for an Integrated Waste Management Fund that assists with subsidizing CIWMB programs.

The European Union Landfill Directive [1999/31/EC] (Official Journal of the European Union, 1999) was adopted on 16 July, 1999. The Directive aims to improve standards of landfilling across Europe, through setting specific requirements for the design, operation and aftercare of landfills, and for the types of waste that can be accepted in landfills. The deadline for implementation of the legislation by Member States was July 16, 2001.



Successive targets are outlined in the Directive for reducing biodegradable municipal waste (by weight) being landfilled. Based on the implementation deadline, biodegradable municipal waste must be reduced to:

- 75% of that produced in 1995 by 2006 (5 years after implementation)
- 50% of that produced in 1995 by 2009 (8 years after implementation)
- 35% of that produced in 1995 by 2016 (15 years after implementation)

Thirteen initial European Member States (Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden) have adopted the Directive with its original targets. Meanwhile, Greece and the United Kingdom requested postponement of the targets by four years. Their biodegradable municipal waste must be reduced to 75% (by weight) of the 1995 baseline by 2010, 50% by 2013 and 35% by 2020.

The Directive also requires Member States to set up a national strategy for the implementation of the targets. As of 2004, the Commission received the national strategies from Austria, Denmark, Finland, France, Germany, Italy, Greece, Luxembourg, Netherlands, Portugal, Sweden as well as regional plans for England, Wales, Scotland, Northern Ireland, Gibraltar, the Flemish Region (Belgium) and the Walloon Region (Belgium). Ireland and Spain have not submitted their strategies (European Commission, 2005). The 10 new Member States (Czech Republic, Cyprus, Estonia, Hungary, Lithuania, Slovak Republic, Slovenia, Malta, Poland and Latvia) must submit their national strategies after accession.

In Germany, C&D waste recovery is a targeted initiative. Two ordinances assist with C&D waste diversion:

- 1) Ordinance on the Management of Municipal Wastes of Commercial Origin and Certain Construction and Demolition Wastes, enforced January 1, 2003 (otherwise known as the Commercial Wastes Ordinance)
- 2) Ordinance on the Management of Wood Waste, enforced as March 1, 2003.

The Commercial Wastes Ordinance (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2002a) essentially determines requirements for the separation of wastes and their pre-treatment, stipulating in particular that a recovery quota of at least 85% must be achieved, and also stipulating requirements for the necessary control.

Generators of the following C&D wastes must store, collect, transport and commit to recovery of glass, plastic, metals (including alloy), concrete, bricks, tiles and ceramics if they are produced separately. Generators have the option of either recycling these materials, or sending them for energy recovery.

The Management of Wood Waste Ordinance (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2002b) addresses the proper use, handling and disposal of wood wastes in Germany.

The ordinance is aimed at most waste wood, including furniture, packaging and wastes from the construction industry. Exceptions include tie-in products and by-products such as wood chips. Specifically, the ordinance is designed to identify:

- Recovery procedures for waste wood
- Processing of waste wood for the manufacture of products
- Energy recovery of waste wood

As stated in the Ordinance, wood wastes are assigned to one of four waste categories:

- AI:** Waste wood in its natural state or only mechanically worked which, during use, was not contaminated with substances harmful to wood.
- All:** Bonded, painted, coated, lacquered, or otherwise treated waste wood with no halogenated organic compounds in the coating and no wood preservatives.
- AIII:** Waste wood with halogenated organic compounds in the coating, with no wood preservatives.
- AIV:** Waste wood treated with wood preservatives, such as railway sleepers, telephone masts, hop poles, vine poles, as well as other waste woods which, due to its contamination, cannot be assigned to the wood categories (above), with the exception of wood wastes containing polychlorinated biphenols (PCBs).

The assignment of wood to these categories is in line with strict requirements for keeping wastes separate, and prohibitions on mixing. This way, the wood is allocated to given recovery paths where it can be processed accordingly. The entire process is subject to monitoring and inspections by officials familiar with the ordinance.

There are obligations incumbent upon the producer to help ensure that the separation process is being followed. Namely, there are notifications and labelling requirements for wood wastes weighing over 100 kg, and a facility logbook requirement for documenting proper wood waste management.

Table 13 summarizes waste wood recycling options outlined in the ordinance.

**Table 13: Waste Wood Recycling Options**

Recovery Method	Permissible Waste Wood Categories				Special Requirements
	A I	A II	A III	A IV	
Processing of waste wood-to-wood chips for the manufacture of derived timber products	Yes	Yes	Yes		The processing of waste wood from category A III is only permissible if varnishes and coatings have been largely removed during processing
Production of synthetic gas for further chemical use	Yes	Yes	Yes	Yes	Recycling is only permitted in installations licensed for this purpose under Article 4 of the Federal Emission Control Act
Manufacture of active carbon/industrial charcoal	Yes	Yes	Yes	Yes	Recycling is only permitted in the installations licensed for this purpose under Article 4 of the Federal Emission Control Act

(Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2002b)

9.1.3 Pros and Cons

Regulated diversion goals require strong and continuous enforcement to ensure that goals are being met. Considerable measurement and tracking is required to determine if goals are met, and to take corrective action if they are not.

A means of funding is also necessary for diversion programs to be developed as a result of regulated goals.

9.1.4 Lessons Learned

This type of instrument requires a lot of enforcement. It does not work unless the government who enacts the legislation is committed to enforcement, and also has the resources to enforce it effectively.

9.2 Disposal Bans

9.2.1 Terminology

For clarity, the following outlines the terminology used in this section:

Landfill prohibition (ban) – designated material is directly restricted from being received at a landfill for disposal.

Disposal prohibition (ban) – restricts materials received at a landfill from being disposed at the landfill face. The landfill facility may receive material and either store it for processing or process and reuse the materials through approved facilities.

A disposal prohibition (ban) is the preferred tool, as this provides flexibility for landfill operators regarding management, operations, and partnership arrangements.

9.2.2 Description of Option

Landfill disposal bans are typically implemented at the provincial/state, regional or municipal level ensuring that specified materials (e.g., asphalt, wood, concrete, metal) are diverted from disposal. This tool assists with significant landfill diversion and helps to meet waste diversion goals.

Bans are most effective as a complementary tool, where they are part of a coordinated approach that combines a suite of policies and mechanisms.

9.2.3 Case Studies and Other Examples

To assist in achieving the Solid Waste Master Plan goal of 88% reduction in C&D waste by 2010, effective July 1, 2006, the State of Massachusetts is banning asphalt pavement, brick, concrete and metal from disposal, incineration or transfer for disposal at a solid waste facility. Additionally, wood will be banned from disposal or transfer for disposal at landfills.

The Capital Regional District, BC, has banned the following C&D materials: aggregate, asphalt, clean soil, concrete, corrugated cardboard, drywall, rubble and scrap metal. Effective April 3, 2006, yard and garden waste will be banned.

In Orange County, NC, non-residential cardboard is banned from landfill disposal and loads that do not follow this rule may have financial penalties imposed. If a load contains cardboard, it is subject to a penalty equivalent to doubling the tipping fee. For example, a load of waste that incurs a \$75 tip fee will be assessed an additional \$75 penalty for containing cardboard. Loads of more than 50% cardboard pay an additional penalty of \$400 (Orange County, 2006).



Loads containing clean wood waste, yard waste and scrap metal may also incur a similar penalty.

Table 14 summarizes several existing landfill/transfer station C&D material bans in North America.

Table 14: North American C&D Material Landfill / Transfer Station Bans

Location	Banned C&D Related Materials
Cowichan Valley Regional District, BC	Asphalt roofing, cardboard, gypsum board/drywall, scrap metal, yard and garden waste
Greater Vancouver Regional District, BC	Cardboard, drywall, sod, yard trimmings
King County, WA	Wood, roofing, sheetrock, concrete, brick, masonry, rocks, large stumps, brush and trees not accepted, except for small (10%) amounts
Lloydminster, AB	Cardboard
North Bay, ON	Cardboard
Nova Scotia	Cardboard, combustible organic matter (e.g., food and yard waste)
Regional District of Kootenay Boundary, BC	Cardboard, yard waste
Regional District of Nanaimo, BC	Cardboard, gypsum, metal and organic waste from commercial sources

9.2.4 Pros

Disposal bans reduce the amount of material requiring transportation to landfill, thereby also reducing the need for new landfills and other disposal facilities. Likewise, bans also reduce the quantity of material required to be handled by municipalities.

Bans can be very effective in diverting material from disposal. By driving diversion, they also support the recycling industry, and can lead to economic development in this area.

9.2.5 Cons

Prior to implementing bans, markets and handling facilities for banned materials must be available. Enforcement is also required for bans to be effective.

9.2.6 Lessons Learned

Secure markets for materials should exist prior to bans being introduced. Existing markets researched by EBA Engineering Consultants Ltd. (2006), for Alberta asphalt and concrete, cardboard and wood are summarized in Table 15.

Table 15: Existing Markets for Alberta Asphalt and Concrete, Cardboard and Wood

Material	Existing Alberta Markets
Asphalt and Concrete	<ul style="list-style-type: none"> • Crushed concrete and asphalt used in place of new aggregate in asphalt pavement, new concrete productions, road base and as backfill
Cardboard	<ul style="list-style-type: none"> • Fibre recycling, including boxboard • Feedstock for roofing materials • Cardboard shred for compost amendments • External markets
Wood	<ul style="list-style-type: none"> • Fuel source for power generation plants • Landscape mulch • Erosion control on construction sites • Compost amendment • Livestock bedding • Fibre stock for the production of roofing materials • Re-milled wood beams can be used in structural and aesthetic applications • Framing wood, flooring and cabinets can be recovered for resale

In cases where markets are technically feasible, but don't exist for marketing reasons, a compromise approach can be adopted by announcing an impending ban. This approach allows the recycling industry the assurance of market security, and has the added benefit of providing a program development period for material diversion. If adopting this approach, it is critical that announced bans are subsequently implemented as scheduled.

Additional barriers researched by EBA Engineering Consultants Ltd. (2006), for Alberta asphalt and concrete, cardboard and wood markets are summarized in Table 16.



Table 16: Barriers for Alberta Asphalt and Concrete, Cardboard and Wood Markets

Material	Barriers
Asphalt and Concrete	<ul style="list-style-type: none">• Lack of awareness of the opportunity for recycling• Lack of awareness that the product is not inferior to new product• Perception that natural aggregate sources are cheaper when a more detailed cost analysis may result in cost savings for most projects• Cost of crushing concrete with large re-bar components
Cardboard	<ul style="list-style-type: none">• Low landfill tipping fees allow for cheap disposal of cardboard• Lack of commitment to recycle• No urgency• Time and labour needed to sort waste
Wood	<ul style="list-style-type: none">• Low landfill tipping fees allow for cheap disposal of wood waste• Lack of public awareness about available markets• Lack of education about the uses of salvaged wood and the false perception that recycled products are inferior• Lack of commitment to source separation on the job site

10 Stakeholder Feedback

Stakeholders that included industry, municipal governments, landfill operators, waste haulers, recyclers, and associations attended workshops, held in Edmonton on November 29, 2005 and Calgary on December 1, 2005, to provide feedback on some of the potential EPR tools that were identified in the project research.

Participants were presented with an overview of a variety of case study examples, and asked for their feedback on the following questions:

- Which approaches could work in Alberta?
- Are there specific elements with merit for Alberta?
- Suggested modifications or additional concepts.
- Overall recommendations or comments.

Stakeholders provided diverse feedback, often noting potential barriers and opportunities associated with different approaches. The workshop format provided for general discussion, as well as breakout group discussions divided generally by industry sector.

Participants were asked to complete a comment form that would help clarify how each industry sector would be impacted by the proposed changes and if they would be supportive of various approaches. Potential obstacles and elements of concern were also identified on the comment form.

General comments received from the group as a whole, pertaining to presented EPR tools, include the following issues:

- Infrastructure is necessary to support any program.
- Rural areas may lack the sophistication and access to markets to effectively participate in some aspects. It was further suggested that differential program funding rates may be required for rural areas.
- A program that combines approaches may be most effective.
- Advance announcement of any proposed program would provide time to plan participation and establish infrastructure.
- An effective tracking system must be developed as part of any program to monitor results.
- Any program should include mechanisms to reward good design – i.e. projects with less waste, or that utilize environmentally-preferable materials.
- Waste management plans need to address waste reduction, not just management.
- It was generally felt that incentives are preferred, but disincentives may be more effective.



- Deposit / refund scheme was preferred to a structure of fines or penalties.
- It was suggested that deposits be based on a scale of 0 to 100% diversion, with refunds pro-rated based on performance. This would encourage performance, while also providing program funding.
- Need level playing field between regions for approaches like landfill bans, otherwise the result can be to just drive material from one region to another.
- Education in trade institutions is important.
- The funding model utilized in the program is important – it needs to be sustainable, and ensure an appropriate use of funds.
- Markets will respond to financial incentives.
- There is a role for both regulations and incentives, with a combined approach most effective.
- During hot economic times, financial incentives may be less effective, as business may perceive they can just buy their way out.
- Time could be considered as a potential penalty, as well – penalties need not always be financial.

At the same workshops, EBA Engineering Consultants Ltd. (2006) noted the following comments and concerns:

- Concrete and asphalt recycling is already taking place throughout the province, a ban relating to these materials may assist with developing more sustainable markets by increasing diversion.
- Wood source separation is already taking place in Alberta; it is likely that a ban would increase diversion as source separation would be mandated. Wood is difficult to separate from other materials such as plaster, stucco and nails at demolition sites. Some sites burn clean wood waste as other options are not viable.
- Loads containing cardboard already charge higher tipping fees in numerous areas and cardboard recycling facilities are typically readily available. A ban on this material would assist with increased diversion.
- The responsibility of waste diversion needs to be a shared endeavour between municipalities, landfill operators/owners, haulers and contractors who generate waste.
- Concerns about lost revenues for landfill owners in rural areas where C&D waste is a large portion of the waste received.
- Comments support a legislated approach for mandatory diversion of wood, concrete, asphalt and cardboard with a non-compliance fine. Others prefer market based solutions versus regulations so that industry has the freedom to determine the best approach.

Additional comments were also received from specific sectors:

10.1 Industry

- Concerned with increased administrative requirements (e.g., paperwork, tracking difficulties), especially for small projects.
- A program should drive design, rather than just be a fee that is passed onto the consumer.
- Need to address the potential to “cheat” through on-site disposal, or other avoidance activities like illegal dumping.
- Increased material values are already driving waste reduction, but this countered by high labour costs.
- Level playing field, preferably combined with opportunity for competitive advantage for good performance, is more important than absolute cost.
- Large industry may only respond to regulations – otherwise, they may just absorb any fees as a cost of doing business.
- Smaller industry is more likely to respond to financial incentives.
- Program fees need to be material-specific to provide accurate price signal.
- It is important to recognize and reward good performers.
- Different approaches may be required for different sectors and projects.

10.2 Municipalities

- There need to be financial incentives for waste reduction
- Increased tipping fees offer the quickest approach to divert waste.
- There will be increased administrative requirements for municipalities, as well as business.
- Expressed a preference for a province-wide program, rather than regionally-specific.
- There is a need for an inventory of infrastructure for the diversion of construction materials.
- Public education is an important program component.

10.3 Recyclers

- Deposits must be large enough to drive change, rather than just be a “nuisance” fee.
- Destinations of materials need to be approved, e.g., there needs to be some kind of standard for diversion.
- Need to define diversion – what counts and what doesn’t.
- Some materials should have higher diversion targets, e.g., 100% for concrete / asphalt, 50% for other.
- Relative costs of recycling, program fees, tipping fees must be correct to drive and sustain the program.



- Programs could provide an opportunity for entrepreneurs to develop specialized services – this would remove some of the burden from construction companies.
- Bans could be part of a combined program.
- Source separation challenged by lack of space. The alternative is to send material to a Material Recovery Facility for separation.
- Up-front waste management plan combined with incentives / disincentives to follow plan was suggested as a reasonable approach.
- Public demand is not sufficient to drive a program on its own.

These comments were incorporated into the overall analysis of program options.

Additional focused discussions with individual industry stakeholders will also be held to obtain additional input on the likely impacts of various instruments, as well as barriers and opportunities associated with program strategies.

11 Evaluation Criteria to Assess and Evaluate EPR Options

The following list of evaluation criteria was developed and refined through consultation with the Project Advisory Team and other stakeholders. These criteria were used in assessing and evaluating potential options and instruments.

- Potential to influence Design-for-Environment
- Environmental impacts
 - Waste diversion potential
 - Material substitution (i.e., durable, recyclable)
- Provides level playing field
- Jurisdiction responsible
- Regulatory requirements
- Administrative burden
- Cost
- Program sustainability
- Market disruption
- Industry acceptance
- Ease of implementation
- Ease of monitoring
- Enforceability
- Enforcement requirements
- Previously implemented
 - Measured success in other jurisdictions
 - Initiated, but no measurement of impacts
- Reinforces or complements other instruments
- Novel / unique approach
- Other potential negative side-effects (i.e., illegal dumping)
- Applicability to Alberta



These criteria were subsequently rated by participants in two stakeholder consultation workshops. Participants provided the following overall feedback, based on their perceived level of importance, on a scale of 1 to 5 (with 5 being very important):

Table 17: Importance of evaluation criteria (overall results)

Evaluation Criteria	Result
Waste diversion potential	4.3
Provides a level playing field	4.3
Industry acceptance	4.3
Enforceability	4.2
Administrative burden	4.2
Cost	4.2
Applicability to Alberta	4.2
Program sustainability	4.2
Ease of monitoring	4.1
Regulatory requirements	3.9
Ease of implementation	3.9
Enforcement requirements	3.9
Reinforces or complements other instruments	3.8
Other environmental impacts	3.8
Potential negative side-effects	3.8
Potential to influence Design-for-Environment	3.7
Proven success	3.6
Jurisdiction responsible	3.2
Market disruption	3.2
Novel/unique approach	2.3

This criteria rating is also represented in Figure 1. Various sectors had different input into the relative importance of the various evaluation criteria, however, as shown in Figure 2 to Figure 4.

Understandably, the Construction Industry rated level playing field and cost as the most important criteria, while Municipal Government representatives were concerned with administrative burden. Recyclers placed the most priority on level playing field and sustainability – a reflection of the need for market certainty prior to making investments in recycling infrastructure.

All criteria appeared to be relatively important to participants (above a rating of 2.5), with the exception of novel or unique approach. Based on this feedback, all criteria were retained in the analysis of program options. This also reinforces the concept that there are many factors that must be considered when developing a program.

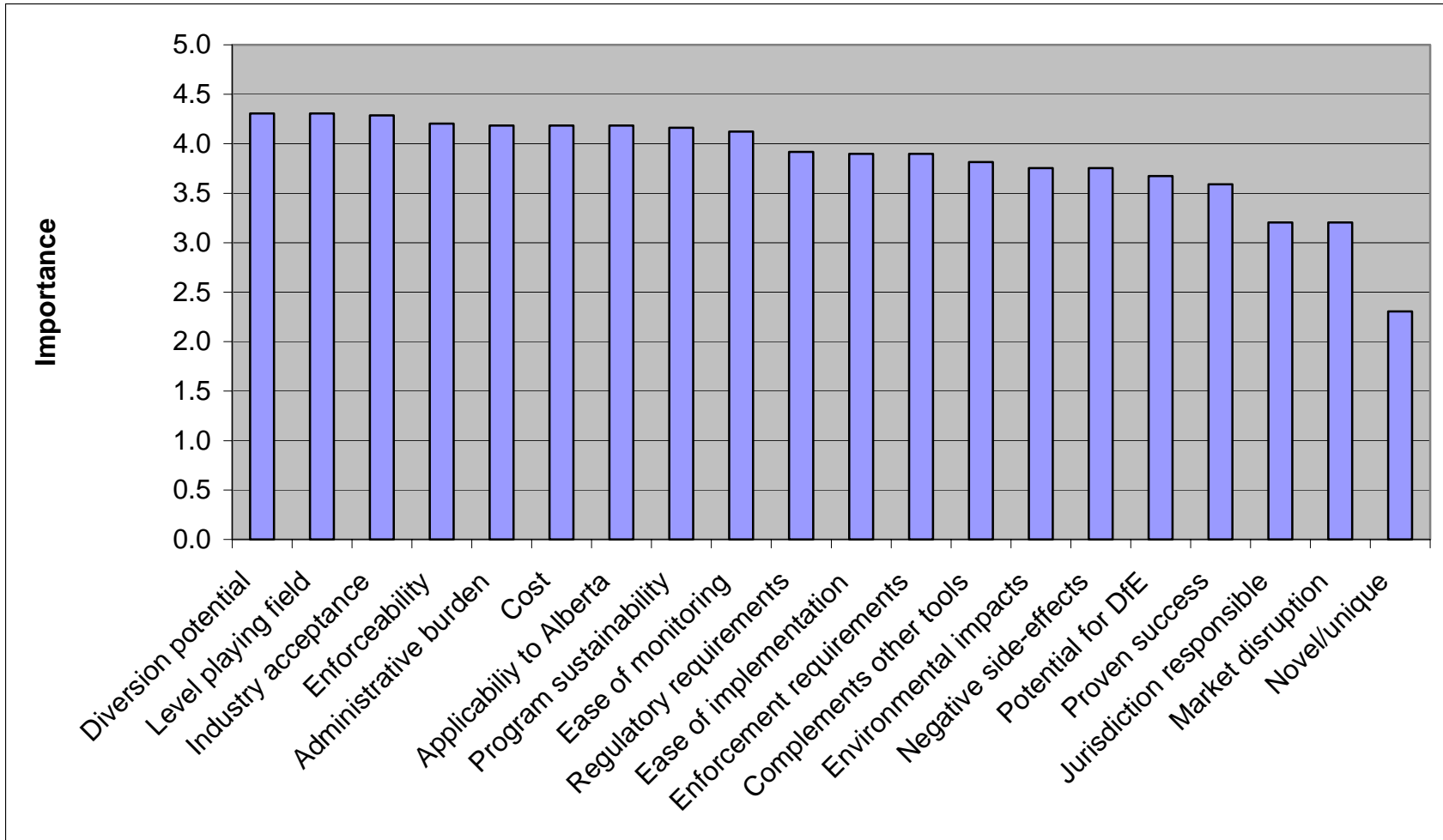


Figure 1: Overall Importance of Evaluation Criteria

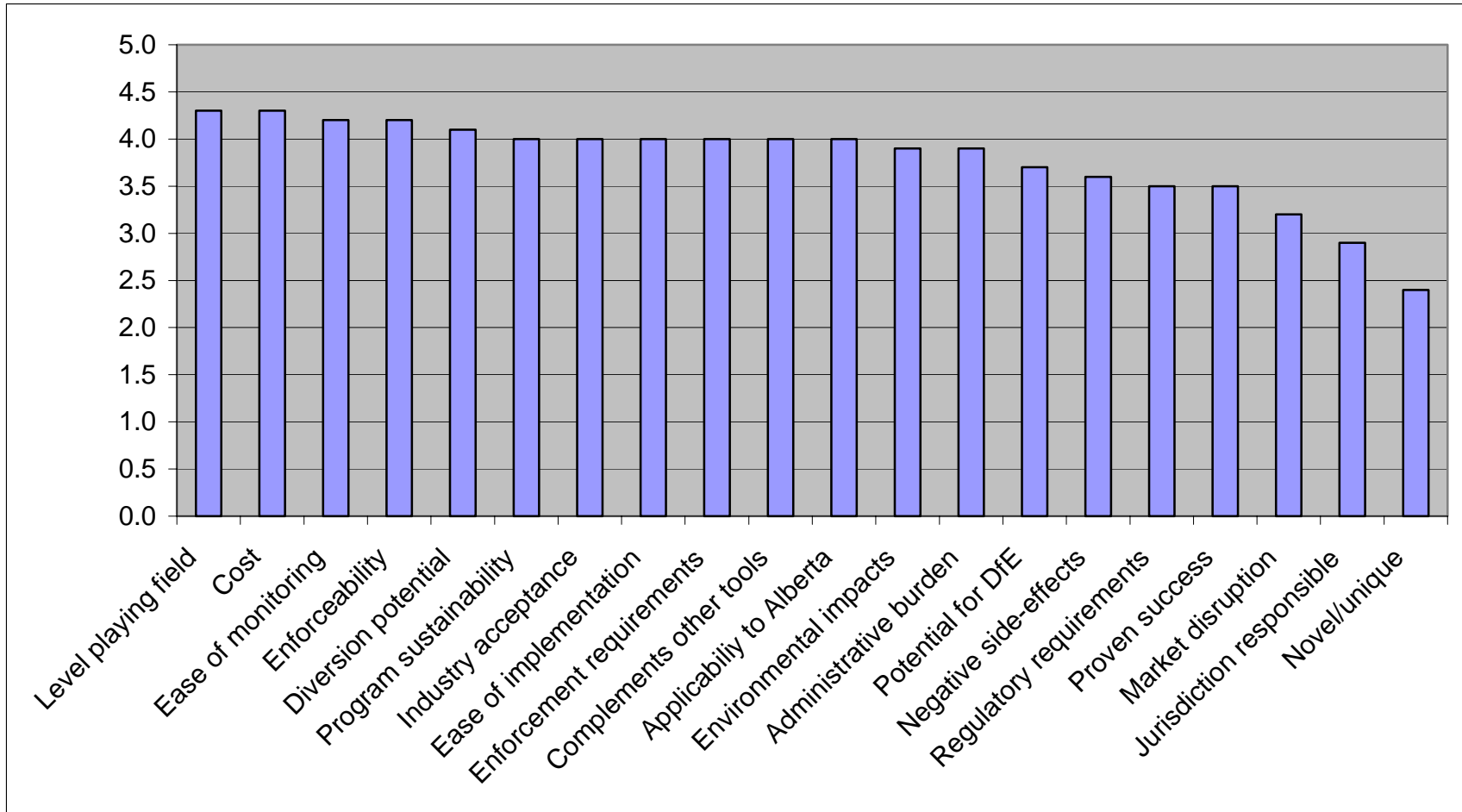


Figure 2: Importance of Evaluation Criteria – C&D Industry

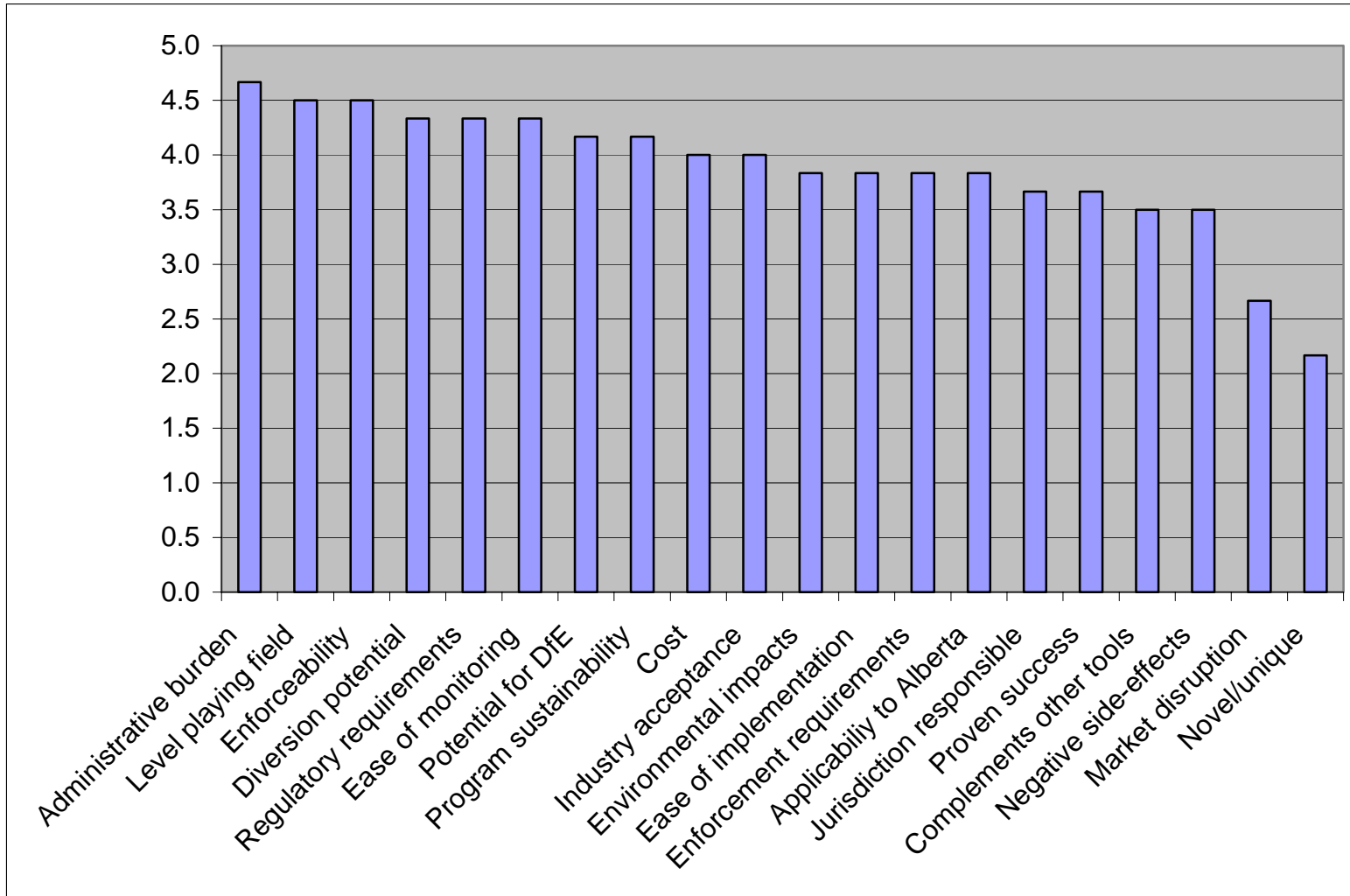


Figure 3: Importance of Evaluation Criteria – Municipal Government

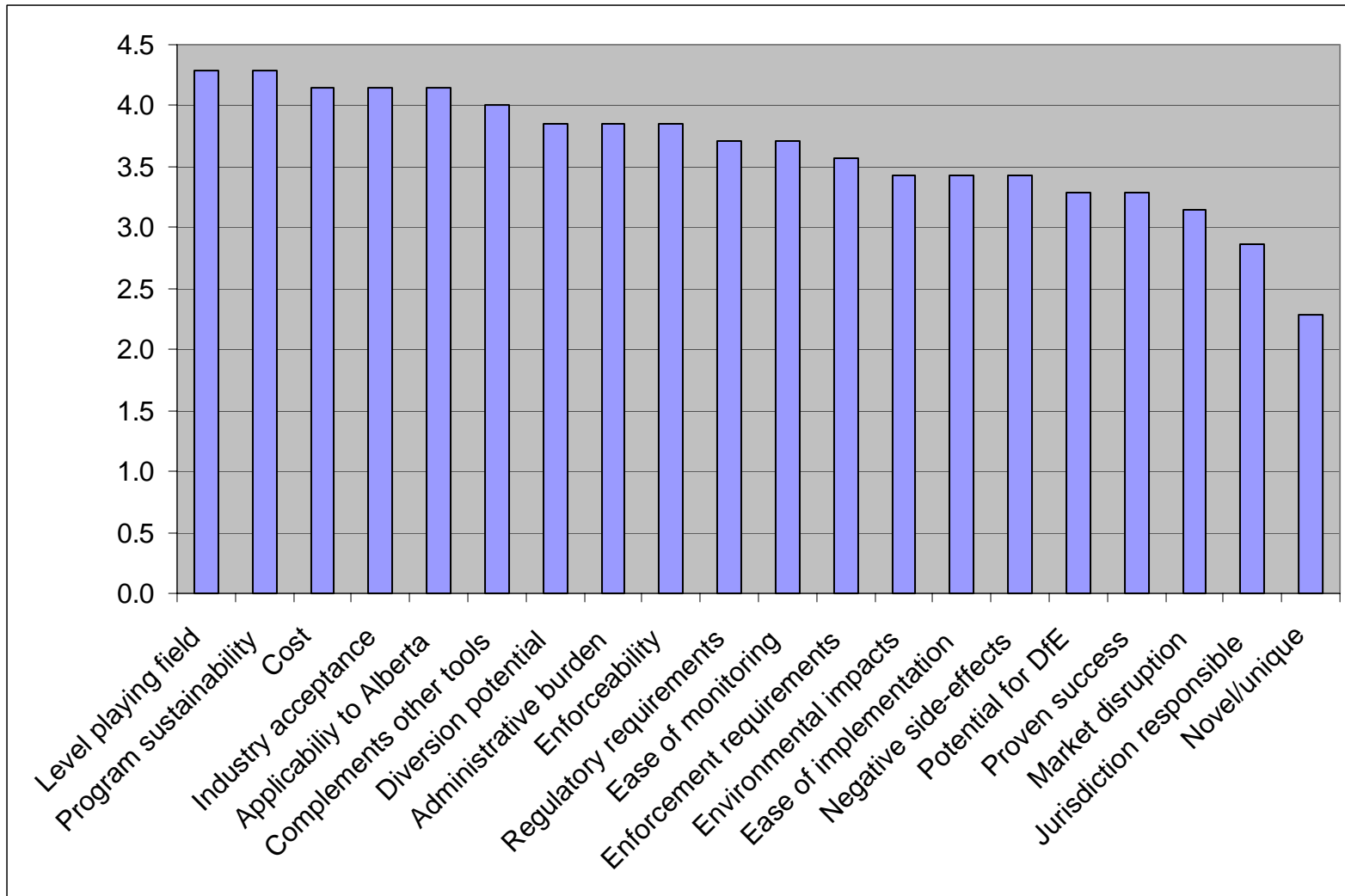


Figure 4: Importance of Evaluation Criteria – Recyclers



The evaluation criteria were incorporated into an evaluation matrix, and subsequently utilized to frame the analysis of each program case study (see Appendix A).

In an effort to provide a more succinct evaluation of the individual EPR instruments, the criteria were divided into groups, as follows:

11.1 Environmental / Public Policy Benefits

- Waste diversion potential
- Material substitution (e.g., durable, recyclable)
- Potential to influence Design-for-Environment (DfE)

11.2 Technical Viability

- Provides a level playing field
- Jurisdiction responsibility
- Regulatory requirements
- Administrative burden
- Ease of implementation
- Ease of monitoring
- Enforceability
- Enforcement requirements
- Program sustainability

11.3 Political Viability

- Market disruption
- Industry acceptance
- Previously implemented – measured success in other jurisdictions
- Previously implemented – initiated, but no measurement of impacts
- Reinforces or complements other instruments
- Novel/unique approach
- Other potential negative side-effects (e.g., illegal dumping)
- Cost
- Applicability to Alberta

These groupings were used to present an overall evaluation matrix of EPR tools, as shown in Table 18. Tools were rated on a scale of 1 to 3 for each category, with 3 being the highest, using rationale as outlined. This approach provides a “snapshot” review of the various tools available.

Table 18: EPR Tools

Tool	Environmental	Technical Viability	Political Viability
Voluntary Mechanisms			
Building Green Programs	2 Strong link to DfE; potential to divert waste depends on application	3 Once program established, minimal administrative burden	3 Well-accepted by industry; good complementary tool
Government Leadership	2 Impact limited to government projects	2 Varies by program type	2 Important complement to any program. Dependent on government buy-in.
Industry Voluntary	1 Involvement of industry important link to DfE. Voluntary programs often lack effective DfE driver/linkage.	2 No administrative burden to government. Level playing field issue serious impediment.	3 Well-received approach by all sectors. Acceptance dependent upon performance.
Mechanisms that Influence Design			
Levy on Virgin Materials	3 Offers DfE link, can deliver strong results.	1 Regulatory/ administrative requirements; issues of jurisdiction.	1 Industry resistance; provides ongoing funding source.
Green Procurement	2 Strong link to DfE; impact dependent upon range of implementation	3 Can be applied at multiple levels; accesses industry innovation	3 Accepted by industry; opportunity for government leadership
Financial Incentives			
Landfill Levy	2 Can drive diversion; no direct link to DfE	2 Administrative burden on landfills	2 Illegal dumping concerns
Differential Tipping Fees	2 Can drive diversion; no direct link to DfE	2 Administrative burden on landfills; enforcement issues.	3 Sends strong message re: behaviour.



Tool	Environmental	Technical Viability	Political Viability
Mechanisms Linked to Permitting			
Waste Diversion Plans and Performance Reports	2 Can drive diversion. Small link to DfE.	2 Administrative burden on municipality and industry.	2 Requires builder to consider waste. Resistance from industry.
Deposit/refund	3 Incentive drives high diversion. Minimal link to DfE.	2 Funds provide stability. Administrative burden.	3 Proven approach. Industry more accepting of reward for performance.
Fines	2 Disincentive can drive diversion. Minimal link to DfE.	2 Fines provide program funds. Administrative and enforcement burden.	1 Punitive approach resisted by industry.
Regulatory or Mandatory Mechanisms			
Mandated Standards	2 Impact dependent upon enforcement.	2 Enforcement burden at all levels.	2 Can provide political message. Complementary to other tools.
Disposal Bans	3 Strong diversion potential. Hard to link to DfE.	2 Enforcement required at landfill.	1 Potential resistance. Concerns of illegal dumping. Sends strong political message.

As can be seen in the matrix, different tools have varying strengths and weaknesses in the different categories. The relative importance of the different categories is also an important consideration when choosing an appropriate instrument.

The evaluation matrix shows that no single tool provides a complete solution. A complementary suite of instruments offers the strongest potential for a comprehensive program to tackle construction waste.

12 Viability of Construction EPR Programs for Alberta

When considering an EPR program for construction materials, the following issues and solutions have been identified (EBA, 2006):

12.1 Rural / Remote Locations

Some smaller communities in remote locations may find it difficult to generate enough construction material to produce viable markets, while the cost of transportation to get materials to processors in larger centres could be a barrier. Possible solutions may include the following:

- Stockpiling material until enough volume is generated to justify the cost of transportation.
- Creating regional programs that bring together multiple communities in joint efforts, such as using shared equipment (e.g., portable tub grinder)
- Providing subsidies to smaller communities to offset costs of shipping materials to markets.
- Implementing varying levels of required diversion for varying size of community and volumes of material produced in that community.

12.2 Low-Cost Landfill Disposal

Currently, low tipping fees at Alberta landfills (e.g., \$46/tonne in Calgary and \$42/tonne in Edmonton) provide little economic incentive for C&D contractors to recycle materials. A common trend of Canadian landfill prohibitions (e.g., Nova Scotia, Capital Regional District) involved increasing tipping fees, at landfills owned by one entity, so that recycling C&D materials is a more economical option.

Table 19 summarizes tipping fee increases related to percent diversion and recycling and ban programs for the Capital Regional District, B.C. It can be seen that, as the tipping fee increases and more recycling programs and bans are introduced, the percent diversion tends to rise.

**Table 19: Tipping Fees Versus Percent Diversion and Ban and Recycling Program History in the Capital Regional District**

Year	Tipping Fee	Percent Diversion	Ban and Recycling Program History
1985	\$8.50	-	-
1986	\$9.50	-	-
1987	\$10.50	-	-
1988	\$13	-	-
1989	\$16	6%	<ul style="list-style-type: none"> •Blue Box collection (glass bottles and jars, tin and aluminum cans, newspaper) began in the four core municipalities (Oak Bay, Saanich, Victoria and Esquimalt) •Launch of apartment recycling program
1990	\$30	9%	•Blue Box collection expanded to Saanich Peninsula, Western Communities, Sooke and Salt Spring Island
1991	\$55	15%	•Drywall landfill ban introduced
1992	\$70	22%	•Municipal depot program introduced
1993	\$75	28%	•Corrugated cardboard, metal appliances, telephone directories and tire landfill bans introduced
1994	\$75	32%	
1995	\$75	33%	<ul style="list-style-type: none"> •Mixed paper was added to the blue box and apartment recycling programs •Scrap metal, asphalt paving, concrete, aggregate, clean soil and rubble were banned from the landfill
1996	\$75	38%	
1997	\$75	34% ¹	
1998	\$75	42%	•Paper banned from the landfill
1999	\$75	41%	
2000	\$75	41%	<ul style="list-style-type: none"> •Blue Box expanded to include corrugated cardboard and rigid plastic containers •Blue Bags distributed and 4,000 homes added to program resulting in region-wide service •Municipal depot program was discontinued •Apartment recycling program was replaced with funding program
2001	\$75	41%	•Participation rate survey of the curbside program showed that nearly 90% of eligible households use the service
2002	\$75	39%	
2003	\$75	38%	
2004	\$79	36%	
2005	\$82		•Blue Box program expanded to include pizza boxes and rigid plastic packaging
2006	\$85		•Effective April 3, 2006, yard and garden waste will be banned from the landfill

¹ The 1997 reduction in diversion rate was due to an increase in general refuse as a result of a the winter blizzard in December 1996

(Capital Regional District, 2004, 2005, 2006)

12.3 Perception

Negative perception of recycled materials is a definite barrier for creating markets for recycled products. Possible solutions include the following:

- Increasing awareness and education programs targeting consumers, designers and engineers of recycled products.
- Amending building specifications and codes to include recycled products.
- Increasing research into the applicability and viability of using recycled products and the environmental gains achieved through the recycling of each product.

12.4 Material Separation

Implementation of prohibitions on specific materials requires that the materials be separated from the waste stream, which can be time consuming and expensive, and transported prior to disposal. Possible solutions include:

- Providing economic incentives to assist contractors offset increased labour costs due to on-site separation.
- Establishing centralized drop-off facilities that will accept all materials.
- Establishing mixed waste processing facilities to reduce on-site separation.
- Increasing landfill tipping fees which results in diversion being a more economical option.

12.5 Responsibility

More end-of-life tools, such as landfill prohibitions, do not have a strong potential to produce change at the project design stage. Haulers often assume responsibility for dealing with the repercussions should a load contain a banned material, and may find it difficult to pass the financial burden back to the generator. Municipalities may also assume too much burden in regulations such as landfill prohibitions, with little responsibility falling on the waste generator. Possible solutions include the following:

- Using a broad waste diversion strategy to combine landfill bans with other tools to achieve goals.
- Utilizing economic incentives, such as lower tipping fees or subsidies for waste diversion efforts.
- Requiring waste diversion strategies prior to issuing building permits.
- Implementing a pay-as-you-throw accounting system.



12.6 Recycling Facilities

A look at the markets around Alberta indicates Edmonton and Calgary should have sufficient facilities for processing and recycling of asphalt, concrete, wood and cardboard.

A lack of facilities or markets for recycled material is a concern for the smaller, more remote centres. This issue leads to the debate of which should come first, implementation of diversion regulations or the establishment of facilities and markets for these materials.

Nova Scotia implemented material bans without guaranteeing viable markets beforehand. In this case, the regulations were implemented years in advance of enforcement, allowing time for recycling facilities and markets to develop. Meanwhile, the Capital Regional District, BC, implemented restrictions on specific waste material once viable recycling options for materials were identified.

Allowing lead time for introduction of regulations requiring diversion of materials without secure markets would provide industry with the time to develop recycling infrastructure, as well as an assurance of market stability.

13 Proposed Approach

13.1 Potential Options for an Alberta Program for Construction, Renovation and Demolition Waste Reduction and Diversion

Based on research and stakeholder feedback, a framework for a Construction Waste Reduction Program for Alberta was developed. The framework consists of four integrated components:

1) Provincial Government Leadership

- Create a green building standard that makes waste diversion a 'mandatory / prerequisite' requirement
- Require waste diversion construction standard on all government construction projects
- Develop demonstration projects that maximize waste diversion.

2) Imbed Waste Diversion Goals within Construction Permitting Process

- Require that all provincial and local government agencies include requirement for waste diversion programs (backed by a refundable deposit) in all construction and renovation permitting

3) Introduce Province-Wide Disposal Bans and Surcharges

- Disposal bans for materials with established diversion opportunities
- Surcharge on all construction and demolition project waste loads that are not recycled
- Fines for improper disposal of materials

4) C&D Environment Fund

- Establish a C&D Environment Fund utilizing unredeemed deposits and surcharges
- DfE fund would be directed to promoting and developing programs and markets that increase diversion of construction waste

These components are further outlined in the following section.



14 Program Details

This section provides detail of the proposed program framework, including suggestions for implementation.

14.1 Provincial Government Leadership

- Create a green building standard that makes waste diversion a 'mandatory / prerequisite' requirement, including the following:
 - mandatory Waste Minimization Plans prior to construction
 - minimum 50% material diversion from disposal
 - minimum recycled content

As the Alberta government, through Alberta Infrastructure, has adopted a LEED Silver standard for government construction projects, it seems logical to build upon this foundation. At the same time, although waste diversion is addressed within the LEED evaluation criteria, these elements are not required for certification (see Table 20 in Appendix A). In order to address construction waste within the context of building standards, it is suggested that the government develop a standard that utilizes LEED criteria, but makes additional waste reduction components mandatory requirements.

This same standard could use Built Green™ Alberta as the foundation for residential building standards in a similar manner.

- Require waste diversion construction standard on all government construction projects.
 - extend to all provincially-funded agencies (e.g., MUSH sector – municipalities, universities, schools and hospitals)
 - extend as a requirement for all projects funded or partially funded by government grant programs

It is proposed that the previous standard be applied immediately on all government construction projects, and subsequently extended to all projects that receive provincial funds. Although LEED would be utilized as the foundation for this standard, the intention is to support the principles provided through a "LEED-plus" standard, rather than necessarily require LEED certification. This is an important distinction, as equivalent standards that meet the same criteria need to also be accepted.

- Develop demonstration projects that maximize waste diversion.
 - follow up with education program

As part of its leadership role, the government should work to develop projects that demonstrate outstanding performance in the area of waste reduction. This will serve to show the private sector that the standards are achievable, while also providing valuable case studies for other projects to model. This component should also include a mechanism to communicate the results and best practices to industry.

14.2 Imbed Waste Diversion Goals within Construction Permitting Process

- Require that all provincial and local government agencies include requirements for waste diversion programs (backed by a refundable deposit) in all construction and renovation permitting.

Research and stakeholder consultation have suggested that linking waste reduction to the construction permitting process through a refundable deposit is an effective approach. In order to establish the program across the province and ensure a level playing field, a regulatory framework would need to be provided through provincial legislation. This framework would outline the mechanism, as well as the roles and responsibilities of the various participants.

In order to incorporate signals to the building owners and design team, it is suggested that the program be initiated at the development permit stage, where documentation of intentions to meet green building standards would be requested, and recognized through decreased fees or other advantage. This would serve to raise awareness of the program at this level, while also encouraging increased design-for-environment in building design.

At the building permit stage, a project waste management plan would be required, including estimates of tonnages that will be produced, as well as proposed destination of waste materials. At this point, a financial deposit would also be submitted by the applicant, with the value based on the square footage of the project. This criteria was chosen, as it is suggested that size provides a stronger link to waste volume than would be provided by project value.

Upon project completion, the builder would submit documentation of total waste generated and diverted to receive a refund. It is suggested that this refund be based on a sliding scale for diversion rates above a minimum requirement of 50%. Disposal and diversion numbers would require documentation through scale tickets, with diverted material received by a certified processor / recycler. The potential for a dividend to be paid to high performers could also be considered.



Spot audits of construction sites may be a useful monitoring tool, however, a requirement for notarized weigh bills should minimize the necessity for on-site enforcement. Similarly, certification of processors and recyclers who provide verifiable diversion will be an important enforcement element.

To reinforce the importance of green building design, it is suggested that projects meeting the green building standard outlined previously (built upon LEED for commercial buildings and Built Green™ Alberta for home construction) be rewarded through a reduced deposit or a higher refund.

Unredeemed deposits would be retained for program funding. However, to provide initial funding, as well as ongoing program sustainability, it is suggested that a separate administration fee also be charged on each permit. This fee could provide funds for overall program administration, while unredeemed deposits could be targeted to the Design-for-Environment Initiative outlined below.

Comprehensive financial modeling will be required to determine the appropriate level of deposits and administration fees. As funding provides program sustainability, it is critical that this step be given its due attention.

Consideration should be given to initiating the program in larger communities, such as Edmonton and Calgary, that have established diversion infrastructure. This would provide for staged implementation throughout the province, allowing time for smaller communities to develop the required infrastructure.

As outlined previously in the program guiding principles, the provincial government prefers program administration to be assumed by an outside agency. The government's role would be limited to setting the regulatory framework and providing enforcement. Therefore, program administration would need to be assumed by an external program agent in cooperation with the local permitting authority. It is also important to minimize any additional administrative burden to local governments. At the same time, the permit office is the logical place to initiate paperwork and collect the fee. One potential solution would be for the local permitting authority to initiate the process and forward paperwork and fees to an agency responsible for program administration. This agency would be responsible for approving project waste management plans, verifying diversion and delivering refunds. This could minimize additional administrative burden for the municipality, while retaining a one-step permitting process for the applicant.

14.3 Introduce Province-Wide Disposal Bans and Surcharges

- Disposal bans for materials with established diversion opportunities

Disposal bans would provide a strong element to the suite of tools making up an Alberta construction waste material diversion program. Bans send a strong policy message that government is serious about diverting material from disposal. They also provide a mechanism that encourages the participation of generators who may otherwise simply absorb or pass on any additional costs imposed through incentive programs.

Bans are only appropriate for materials with established diversion options. It is suggested that bans initially be considered for aggregate materials, including asphalt and concrete. These materials would provide a strong regulatory foundation on which to build additional prohibitions, and also represent significant volumes within the construction waste stream.

If these initial bans prove effective, then the incorporation of additional materials should be reassessed annually, based on market feasibility. This assessment should include current infrastructure, as well as potential market development. In cases where markets are technically feasible, but have not been developed for economic reasons, announcement of pending bans should be considered to allow time for infrastructure development. In these cases, solid timeframes should be announced and followed.

- Surcharge on all construction and demolition project waste loads that are not recycled

As a complement to disposal bans, a surcharge on all construction and demolition waste destined for disposal should be considered. This surcharge would provide an additional financial incentive to divert material where possible. Surcharges could be directed to local infrastructure development, and providing incentives for local authorities to reduce C&D waste. The level of appropriate surcharge should be addressed during the financial modeling stage of program development.

In order to accurately track construction waste, there would need to be a requirement to document all materials leaving the construction site. This requirement would also facilitate the deposit-refund mechanism outlined previously.

It is important to define disposal and diversion in the context of bans or surcharges, to provide fair treatment to all disposal options, rather than isolating



landfill. Enforcement of both bans and surcharges would also require significant fines for improper disposal of materials on-site or illegal dumping off-site.

Introduction of provincial bans or surcharges would require new regulations. These regulations would need to be applied to all landfills, including private and reserve landfills, in order to provide a level playing field. Legal advice would also need to be sought on issues such as whether a designated fund definition would be sufficient for municipalities that subsidize landfills costs through their tax base (Eurig decision).

14.4 C&D Environment Fund

- Establish a C&D Environment Fund utilizing unredeemed deposits and surcharges

Un-redeemed deposits and collected surcharges would form a C&D fund for construction material education, research and development. This fund would be utilized to facilitate increased reduction of construction waste and improved building design. Examples of topic areas that may be appropriate for funding follow:

- eliminating toxic material from materials and products in new construction
- minimizing materials and energy use
- facilitating disassembly and recovery of materials
- reuse/ recyclability of materials
- development of local infrastructure
- market development
 - green procurement specifications and sourcing
 - equipment and facilities for increasing recovery of materials from construction and demolition (C&D) wastes
 - research on advanced materials design
 - increasing the quantities of recovered C&D wastes in the manufacture of construction materials
- focus on design improvements

The fund could also be applied to program education, including opportunities such as broad education of the construction industry, and working with existing awards programs to recognize public and private sector initiatives in this area.

Regardless of the ultimate specific application of the C&D fund, it is critical that all program funding be protected and dedicated to construction materials.

14.5 Future Developments

It is anticipated that the program will evolve with time, and additional elements that would be worthwhile to consider incorporating at a future date as the program develops include the following:

- Provide tax credits or incentive payments for private sector construction projects that meet LEED-plus standard.
- Elimination of provincial subsidies to virgin materials extraction industries in the province.
- Levy on virgin materials, both Alberta-origin and imports

These suggestions are broad in nature, and would require the involvement of Alberta Finance. A multi-departmental initiative, and serious political will, would likely be necessary to further the causes of these potentially progressive approaches.



Appendix A: Case Studies

Category 1: Voluntary Mechanisms

BUILT GREEN™ ALBERTA, GO GREEN, LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

Two national and one Alberta based recognition programs exist for identifying green building and green operational management of buildings in Alberta:

- Built Green™ Alberta
- Go Green
- Leadership in Energy and Environmental Design

These voluntary programs encourage builders and owners/managers to use technologies, products and practices that will:

- Provide greater energy efficiency and reduce pollution
- Provide healthier indoor air
- Reduce water consumption
- Preserve natural resources
- Improve durability and reduce maintenance

Each program has a rating section addressing waste management and recycling. Table 20 summarizes the rating points as applicable for each program based on:

- Building / site reuse
- Waste management / recycling
- Resource reuse
- Recycled content
- Business practices

**Table 20: Go Green, Built Green Alberta and LEED (Canada & US) Recognition Programs
Building Reuse/Waste Management/Recycling/Resource Reuse/Recycled Content/Business Practices Rating Points**

Requirements	Programs			
	Go Green – BOMA ¹	Built Green Alberta – CRHBA	LEED – CaGBC ²	LEED – USGBC ²
Building/Site Reuse				
1) Building reuse: maintain 75% of existing walls, floors and roof			1 point	1 point
2) Building reuse: maintain 95% existing walls, floors and roof			1 point in addition to #1	1 point in addition to #1
3) Building reuse: maintain 50% of interior non-structural elements			1 point in addition to #1 & #2	1 point
4) Trees and natural features on site protected during construction		1 point		
Waste Management/Recycling				
5) Construction waste management: no diversion % defined	Required ³			
6) Construction waste management: divert 50% from disposal/landfill			1 point	1 point
7) Construction waste management: divert 75% from disposal/landfill			1 point in addition to #6	1 point in addition to #6
8) Minimum 25% (by weight) of waste materials collected from construction site are diverted from waste stream		2 points		
9) Minimum 50% (by weight) of waste materials collected from construction site are diverted from waste stream		4 points		
10) Comprehensive recycling program for building site including education, site signage and bins		2 points		
11) Collection of waste materials from site by a waste management company that will verify a complete sort of all materials collected ⁴		4 points		
12) Trades working on construction site remove all their own waste materials and recycle a minimum of 10% (1 point per trade for a maximum of 4 points)		1 point		
13) Storage and collection of recyclables for building occupants	Required		Required	Required
14) Install built-in recycling center in kitchen, laundry or garage with two or more bins		3 points		
15) Provide composter to homeowner		1 point		
16) Install trash compactor		1 point		
Resource Reuse				
17) Resource reuse: 5%			1 point	1 point
18) Resource reuse: 10%			1 point in addition to #17	1 point in addition to #17
19) Reusable bracing is used for framing		1 point		
Recycled Content				
20) Recycled content: 7.5% (post-consumer + ½ post-industrial)			1 point	
21) Recycled content: 10% (post-consumer + ½ post-industrial)				1 point
22) Recycled content: 15% (post-consumer + ½ post-industrial)			1 point in addition to #20	
23) Recycled content: 20% (post-consumer + ½ post-industrial)				1 point in addition to #21
24) Recycled concrete or glass cullet for aggregate in concrete mix		1 point		
25) Steel studding (minimum 75% recycled) to replace a minimum of 15% of wood studs in the home		1 point		
26) Recycled and/or recovered content gypsum wallboard (minimum 15%)		1 point		
27) Recycled content exterior wall sheathing (minimum 50% pre- or post- consumer)		2 points		
28) All insulation used in home is certified by a third party to contain at least 40% recycled content		1 point		
29) All insulation used in home is certified by a third party to contain at least 50% recycled content		2 points		



Requirements	Programs			
	Go Green – BOMA ¹	Built Green Alberta – CRHBA	LEED – CaGBC ²	LEED – USGBC ²
Recycled Content cont'd				
30) 100% recycled or recovered content underlayment		1 point		
31) Exterior doors with a minimum of 15% recycled and/or recovered content		1 point		
32) Interior doors with a minimum of 15% recycled and/or recovered content		1 point		
33) Exterior window frames contain a minimum of 10% recycled content		1 point		
34) Recycled and/or recovered content siding (minimum 50% pre- or post-consumer)		4 points		
35) Recycled and/or recovered content fascia and soffit (minimum 50% pre- or post-consumer)		1 point		
36) Exterior trim materials have recycled and/or recovered-content (minimum 50%)		3 points		
37) Deck or veranda surfaces made from 100% recycled materials		3 points		
38) Deck or veranda surfaces made from 75% recycled materials		2 points		
39) Deck or veranda surfaces made from 50% recycled materials		1 point		
40) Minimum 25% recycled content roofing material		3 points		
41) Install carpet that has a minimum of 50% recycled content		2 points		
42) Paints or finishes with minimum 20% recycled content		1 point		
43) 100% agricultural waste or 100% recycled wood particle board used for shelving		2 points		
44) Use of recycled materials derived from local construction sites. 1 point for each different product used		1 point		
Regional and Renewable Materials				
45) Regional Materials: 10% extracted, processed and manufactured regionally			1 point	1 point
46) Regional Materials: 20% extracted, processed and manufactured regionally			1 point in addition to #45	1 point in addition to #45
47) Rapidly Renewable Materials			1 point	1 point
48) Certified Wood			1 point	1 point
Business Practices				
49) Durable Building Plan			1 point	
50) Require sub-contractors to participate in waste reduction or recycling program (sub-contractor agreement)		2 points		
51) Require manufacturers to use reusable, reduced, or recyclable packaging		1 point		

¹BOMA has a general overall Material Selection requirement that states 'Building management must have a written policy for the selection of building materials that attempts to reduce any potential negative impact on the environment'. This can include reusing original products or materials (e.g., returnable pallets, toner cartridges), selecting post-consumer recycled materials with the highest content possible (e.g., carpet, paper products) and a reduction in the amount of material or product consumed (e.g., paperless communications, elimination of packaging)

²LEED Green Building Rating System for New Construction and Major Renovations, CaGBC LEED-NC Version 1.0, USGBC LEED-NC Version 2.2

³Building management must have a written policy that is intended to minimize construction waste being sent to landfill'

⁴Company must be a current member of the Recycling Council of Alberta and verify that a minimum of 10% of the materials collected from the construction site have been recycled

BOMA – Building Owners and Managers Association of Canada	LEED – Leadership in Energy and Environmental Design
CaGBC – Canada Green Building Council	USGBC – U.S. Green Building Council
CRHBA – Calgary Region Home Builders Association	

(Built Green™ Alberta, 2005; Go Green, 2005; Canada Green Building Council, 2004; United States Green Building Council, 2005)

BUILT GREEN™ ALBERTA
www.builtgreenalberta.com

Built Green™ Alberta is an industry-driven initiative launched in October 2003 by the Calgary Region Home Builders Association Built Green™ Volunteer Committee which included representatives from member builders, manufacturers, developers, supplier and trade representatives, government, educational institutes and provincial program delivery agents.

This is a voluntary program that benefits the homebuyer, the community and the environment that is administered by the Built Green™ Society.

Built Green™ Alberta is modeled on a combination of the R-2000 training and the EnerGuide for New Houses program administered by Natural Resources Canada, and delivered in Alberta by Enervision (Alberta Home Builders Association non-profit corporation) and the Built Green™ Colorado program. Consumers and builders have the flexibility of choosing their level of participation, thereby offering broader appeal.

Built Green™ Alberta focuses on four areas of environmental concern:

- Energy efficiency
- Indoor air quality
- Resource use (including waste management)
- Overall environmental impact

Built Green™ Alberta program has three levels of achievement, bronze, silver and gold. Points are awarded based on a minimum EnerGuide rating with additional points selected from seven other categories (e.g., waste management, building materials, and exterior and interior finishes) to give a cumulative total. Additionally, each category has a minimum number of points that must be selected. For instance, with waste management, a minimum of seven points must be obtained out of 23+ points available and for building materials, a minimum of 15 points must be selected from 50 points available.

Table 21: Built Green™ Alberta Ratings

Level	EnerGuide Rating ¹	Category Points	Total Points
Bronze	72	75	95
Silver	75	80	105
Gold	77	85	115

¹A 72 EnerGuide rating for bronze equates to 20 points for Built Green™ Alberta, a 75 rating for silver is 25 points and a 77 rating for gold is 30 points.

Members of Built Green™ Alberta include, but are not limited to, All Weather Windows, Beaver Plastics, City of Red Deer, Jayman Master Builder, Signature Lighting and Fans and Westridge Cabinets. A complete members list can be found at <http://www.builtgreenalberta.com/directory.htm>.



GO GREEN

www.bomagogreen.com/gg.html

The Building Owners and Managers Association (BOMA) Go Green Environmental Certification program is a voluntary program designed for existing or occupied buildings.

This program started in January 2005, it is not intended to direct building owners on how to manage their buildings, but simply to recognize those buildings where environmental best practices have been implemented into the operations.

Requirements for Go Green certification include:

- Resource consumption
- Waste reduction and recycling
- Building materials
- Interior environment
- Tenant awareness

In November 2005 the Government of Canada announced the adoption of the Go Green Comprehensive program to manage its office buildings in a more environmentally friendly manner.

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

Canada Green Building Council

www.cagbc.org/building_rating_systems/leed_rating_system.php

United States Green Building Council

www.usgbc.org

On December 1, 2004, LEED Canada was officially launched. The Canada Green Building Councils 'LEED Canada for New Construction and Major Renovations version 1.0' is an adaptation of the US Green Building Councils (USGBC) Leadership in Energy and Environmental Design Green Building Rating System (LEED), tailored specifically for Canadian climates, construction practices and regulations.

The LEED Canada-NC 1.0 Rating System recognizes leading edge buildings that incorporate design, construction and operational practices that combine healthy, high-quality and high-performance advantages with reduced environmental impacts. They provide a voluntary, consensus-based, market-responsive set of criteria that evaluate project performance from a whole-building, whole-life perspective, providing a common understanding for what constitutes a 'green building' in the Canadian context.

The principal LEED Canada categories include:

- Sustainable sites
- Water efficiency
- Energy and atmosphere
- Materials and resources
- Indoor environmental quality

Designers can pick and choose the credits most appropriate to their project to achieve a rating. LEED has four performance ratings available (Table 22).

Table 22: LEED Canada and LEED US Performance Rating

Level	LEED Canada Points	LEED US Points
Certified	26 to 32	26 to 32
Silver	33 to 38	33 to 38
Gold	39 to 51	39 to 51
Platinum	52 to 70	52 to 69

In April 2005, the Government of Canada stated that new federal office buildings would be built to meet the LEED Gold standard. In September 2004, the City of Calgary passed a Sustainable Building Policy (#CE001) that requires new or significant renovations over 500 m² to achieve LEED Silver certification or higher. Additionally, in July 2004 the City of Vancouver adopted LEED for British Columbia (LEED-BC) for all new civic buildings greater than 500 m². New public buildings must achieve LEED Gold certification and the city mandated specific energy points in the LEED Rating System to ensure a 30% reduction in all new civic buildings. LEED is also being used as the standard for all new venue construction for the 2010 Vancouver Olympic and Paralympic Winter Games.

Jurisdictions in the United States that have adopted US LEED requirements are viewed in Table 23.

**Table 23: United States Jurisdictions – LEED Adoption**

Jurisdiction	Adopted	LEED Level	Projects
Federal			
Army		Bronze in 2004 Silver in 2005 Gold in 2006	New construction
Department of State		Certified	New embassy construction worldwide for next ten years
Environmental Protection Agency	2005	Silver	All new construction over 20,000 ft ²
General Services Administration	2003	Certified, Silver goal	New construction
State			
Arizona	Feb 2005	Silver	All state-funded buildings
California	Dec 2004	Sliver	All new and renovated state owned facilities
Colorado	July 2005	LEED-EB and LEED-NC	State buildings
Connecticut	Jan 2005	Silver	New state-funded construction
Maryland	Apr 2005	Silver	State capital projects
Michigan	Apr 2005	Certified	All state-funded new construction and major renovation projects over \$1,000,000
Oregon		Silver	Oregon's 35% Business Energy Tax Credit for sustainable buildings is tied to the LEED certification level achieved
Rhode Island	Aug 2005	Silver or higher	All new constructions and renovations of public buildings
Washington	Apr 2005	Silver	State-funded projects over 5,000 ft ² , including school district buildings
County			
Alameda, CA	Jul 2003	Silver	All new county projects
Arlington, VA			Allows commercial projects and private developments earning LEED Certified and higher to develop sites at a higher density than conventional projects
King, WA		Certified	New public construction projects
San Mateo, CA	Dec 2001	Certified minimum	New county projects and additions greater than 5,000 ft ²
Sarasota, FL	Mar 2005	Certified	All government county buildings, county is providing a fast-track building permit incentive and a 50% reduction on building permit fees for private contractors who use LEED

Jurisdiction	Adopted	LEED Level	Projects
City			
Albuquerque, NM	Mar 2005	Silver or higher	City-funded projects 5,000 ft ² and or using 50 KW electrical demand. Includes LEED-NC, -EB, -CS, -CI
Arlington, MA	May 2003	Silver	New building and major renovation projects
Atlanta, GA	Dec 2003	Silver	City-funded projects over 5,000 ft ² or costing \$2 million
Austin, TX	Jun 2000	Silver	Municipal buildings over 5,000 ft ²
Berkley, CA		Certified in 2004 & 2005, Silver in 2006	Municipal buildings over 5,000 ft ²
Boulder, CO	2001	Silver	All new or significantly renovated city facilities
Calabasas, CA	Jan 2004	Certified, Silver or higher	All non-residential, city and privately owned buildings between 500ft ² and 5,000ft ² be LEED Certified. Buildings over 5,000 ft ² be LEED Silver or higher
Chicago, IL	Jun 2004	Certified	New city-funded construction and major renovation projects
Dallas, TX		Silver or higher	City buildings larger than 10,000 ft ² Exploring ways to encourage LEED in the private sector
Eugene, OR	Feb 2000		LEED-NC is a guideline for all new city construction
Frisco, TX	Sept 2004	Checklist	Effective for one year, all non-single family residential developments over 10,000 ft ² to submit a LEED checklist
Gainesville, FL		Certified	All government county buildings be LEED certified
Houston, TX	Jun 2004	Silver Goal	All city owned buildings and facilities over 10,000 ft ² shall use LEED to the greatest extent practical and reasonable with a target of Silver certification
Kansas City, MO	2004	Silver	New city buildings
Long Beach, CA		Certified, Silver goal	New municipal construction over 7,500 ft ²
Los Angeles, CA	Jul 2003	Certified	Public works construction projects 7,500 ft ² or over
New York, NY	Sep 2005	Silver	New construction, additions and substantial reconstruction of all city-owned buildings with a construction cost of \$2 million or more
Omaha, NE		Certified	New Metropolitan Community College construction projects
Portland, OR	Jun 2005	Gold and Silver	New public projects (Gold) and all city-owned, occupies, existing buildings achieve LEED-EB (Silver)
Sacramento, CA	Sep 2004	Certified, Silver goal	All city projects require LEED Certification, projects over 5,000 ft ² have a goal of LEED Silver



Jurisdiction	Adopted	LEED Level	Projects
Salt Lake City, UT	Jul 2005	Certified	New city construction and major renovations over 10,000 ft ²
San Diego, CA	2002	Silver	New municipal buildings and significant remodels larger than 5,000 ft ² and above
San Francisco, CA	May 2004	Silver	New municipal constructions, additions and major renovations over 5,000 ft ²
San José, CA	2001	Certified	Municipal projects over 10,000 ft ²
Santa Monica, CA	2000	Silver	New city projects
Scottsdale, AZ	Mar 2005	Gold	New city buildings of any size
Seattle, WA	Feb 2000	Silver	All city owned projects over 5,000 ft ²
Washington, DC		Silver	Department of Parks and Recreation new construction and major renovation projects

CI – Commercial interior projects
CS – Core and shell projects

EB – Existing building operations
NC – New commercial construction

(Templeton, 2005)

OREGON BUSINESS ENERGY TAX CREDIT

Oregon Department of Energy
Charlie Stephens
T: (503) 378-4298
<http://oregon.gov/ENERGY/CONS/BUS/tax/sustain.shtml>

In 2001 the Oregon Legislature passed legislation for a new sustainable building tax credit (Business Energy Tax Credit) which was effective on October 8, 2001 (retroactive to January 1, 2001). In order to receive the tax credit the building must meet an established standard set by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™).

The tax credit is based on the square footage of the building and can be taken over five years (10% of the eligible costs in the first and second years and 5% of the eligible project costs each year thereafter). For projects with eligible project cost of \$20,000 or less, the 35% tax credit may be taken in one year. Unused credits can be carried forward up to eight years.

The Oregon Business Energy Tax Credit Application for Preliminary Certification Sustainable Building (Oregon Department of Energy, 2004) states that eligible applicants (project owner) must meet the following requirements:

- 1) Be a trade, business or rental property owner who files taxes for a business site in Oregon
or
Be an Oregon non-profit organization, tribe, or public entity that partners with an Oregon business or resident who has an Oregon tax liability
- 2) Own or be the contract buyer of the project
- 3) Use the equipment yourself or lease it to another person or business in Oregon
- 4) Meet the additional requirements
 - Must achieve a minimum rating of ‘Silver’ using the U.S. Green Building Council’s LEED-NC, LEED-CS or LEED-CI rating system in effect as of the project registration date. Projects receiving a ‘Gold’ or ‘Platinum’ rating will be awarded proportionally larger tax credits, as calculated by the Department of Energy.
 - In achieving its LEED rating, the project must earn at least two points under Energy and Atmosphere Credit 1 (Optimize Energy Performance).
 - In achieving LEED rating, the project must earn at least one point under Energy and Atmosphere Credit 3 (Additional Commissioning).
 - Each LEED-NC or LEED-CS project must calculate and report the building’s annual solar income in Btu (not the site income). The calculation must account for the contribution from each face (orientation with surfaces exposed to direct sunlight) and must take into account any existing or reasonably expected shading (e.g., other buildings or vegetation) of these surfaces. Calculations may ignore such things as rooftop or wall-mounted mechanical system components.
 - Eligible cost will be calculated in accordance with Table 24

**Table 24: Eligible Calculation Rates for Oregon Sustainable Building Tax Credit**

Building Area	Silver	Gold	Platinum
LEED-NC			
First 10,000 ft ²	\$10.00/ ft ²	\$13.57/ ft ²	\$17.86/ ft ²
Next 40,000 ft ²	\$5.00/ ft ²	\$5.71/ ft ²	\$9.29/ ft ²
> 50,000 ft ²	\$2.00/ ft ²	\$2.86/ ft ²	\$5.71/ ft ²
LEED-CS			
First 10,000 ft ²	\$7.00/ ft ²	\$9.50/ ft ²	\$12.50/ ft ²
Next 40,000 ft ²	\$3.50/ ft ²	\$4.00/ ft ²	\$6.50/ ft ²
> 50,000 ft ²	\$1.40/ ft ²	\$2.00/ ft ²	\$4.00/ ft ²
LEED-CI			
First 10,000 ft ²	\$3.00/ ft ²	\$4.07/ ft ²	\$5.76/ ft ²
Next 40,000 ft ²	\$1.50/ ft ²	\$1.71/ ft ²	\$2.79/ ft ²
> 50,000 ft ²	\$0.60/ ft ²	\$0.86/ ft ²	\$1.71/ ft ²

Calculation totals are multiplied by 0.35 (35% to determine Sustainable Building Tax Credit).

- Projects using on-site renewable energy production technologies such as photovoltaic or wind technologies may treat these elements as a separate project for tax credit purposes, provided that any points earned for such features in the LEED rating are not required to achieve the rating on which the Sustainable Building Project credit is to be based. In cases where subtracting such points would result in a lowering of the LEED rating (e.g., Gold to Silver), the tax credit will be awarded on the basis of the lower rating. The rating point total, net of renewable generation credits, can never be less than that required for a Silver rating.

The Application for Preliminary Certification for Sustainable Building Projects must be submitted to the Oregon Department of Energy within 30 days of receiving a LEED Project Registration Number.

To qualify for a Business Energy Tax Credit, the project must start within three years of the Preliminary Certificate approval date or within three years of the approval date of project changes.

For final certification, a copy of the U.S. Green Building Council (USGBC) Rating Certificate, the Final LEED Review, the ASHRAE Energy Cost Budget Comparison Form, USGBC Energy Modeling Table Comparative Assumptions, a narrative for Energy and Atmosphere Credit 1, annual solar income calculation and proof that the project is completed must be submitted to the Department of Energy. If the project costs more than \$50,000, a letter from a certified public accountant (not employed by the business) must be submitted indicating that project costs have been reviewed. If the project costs are less than \$50,000, copies of the dated invoice, canceled cheques or receipts that show proof of payment must be submitted.

SEATTLE OUTREACH / INCENTIVE PROGRAMS

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Seattle Public Utilities Sustainable
Building Program
Thor Peterson
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<http://www.cityofseattle.net/sustainablebuilding/>

In addition to a strong sustainable building policy, the City of Seattle has a full suite of outreach and incentives programs that contribute to sustainable building as summarized in Table 25.

Table 25: City of Seattle Sustainable Building Outreach and Incentive Programs

Department and Program Areas	Description of Programs
Seattle City Light Energy Conservation Measures Beyond Code ¹	Funding calculated based on energy savings. For Seattle LEED projects to date, approximately \$2 million.
Seattle City Light Energy Analysis Assistance ¹	Funding for energy modeling and/or develop cost-effective conservation strategies for new construction or major renovations. Funding for Seattle LEED projects: roughly \$100,000
Seattle City Light Building Commissioning Assistance ¹	Funding for building commissioning with energy impact, major construction/remodel projects > \$5 million. Seattle LEED projects to date: \$95,000.
Seattle City Light Natural Ventilation ¹	Pilot program incentives for natural ventilation studies (strategy often used due to energy savings).
Seattle City Light + partners Lighting Design Lab High Quality and Energy Efficient Lighting	Technical assistance, training, tours. Projects assisted include: Benaroya Hall, Central Library, Justice Center and City Hall.
Seattle City Light Green Power Program	Model photovoltaic projects with educational components. LEED and other projects funded: Carkeek Park Environmental Learning Center, Bradner Gardens Park Community Building, McCaw Hall, Seattle Federal Courthouse, and Ballard Library.
Seattle Public Utilities Water Conservation, Water Smart Technology Program, Rainwater Collection Pilot Program	Incentives, technical assistance. LEED projects assisted include Seattle Municipal Tower, City Hall, Park 90/5.
Seattle Public Utilities Natural Drainage Program	Technical assistance and special grants. Provided over \$2 million to Seattle Housing Authority for natural drainage at Highpoint Housing redevelopment.



Department and Program Areas	Description of Programs
Seattle Public Utilities Waste Reduction and Recycling Programs	Technical assistance, training. Encourages recycling of construction waste, building reuse, low toxic design, deconstruction. Over 56,000 tons of construction waste was recycled at City LEED projects.
Department of Planning and Development	Technical assistance with code issues, resource library, incentive development. Created Urban Sustainability Forum.
Office of Housing	Technical assistance with implementation of SeaGreen program for affordable housing.
Office of Sustainability and Environment	Policy development and liason with departments and Mayor's office.

¹Combined energy conservation measures expected to contribute an estimated 12 million kWh in annual savings.

(City of Seattle, 2005)

UNITED STATES NATIONAL AGREEMENT ON CARPET RECYCLING

SUMMARY

Voluntary carpet industry program with a 40% landfill diversion target by 2012.

CONTACT

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CARE Director
Website: www.carpetrecovery.org

BACKGROUND

Estimated carpet discards in the United States was 4.7 billion pounds in 2002. While most carpet components are recyclable or reusable, in 2002, only 4% of carpet waste was diverted. National concerns regarding disposal, combined with carpet volume has contributed to the search for diversion opportunities.

Product stewardship centers on the designing, manufacturing, selling and using parties taking responsibility for environmental impacts at every stage of a product's life. An agreement among industry, government and non-governmental organizations was created asking manufacturers to meet goals for reuse and recycling carpet waste. This approach is expected to reduce the environmental impacts of carpet throughout its life cycle — from design to end-of-life management.

PROGRAM DESCRIPTION

On January 8, 2002, a Memorandum of Understanding (MOU) for Carpet Stewardship was signed by industry, government and non-government organizations. This agreement establishes an ambitious ten-year schedule, 2002-2012, to increase the amount of reuse and recycling of post-consumer carpet and reduce carpet waste disposed at landfills.

The negotiated targets set forth in the MOU include escalating goals for reuse and recycling (Table 26). A target of 40% landfill diversion by 2012 is outlined in the MOU. The intermediate goals can be viewed as steps toward fulfilling a long-term commitment by the carpet industry for the eventual elimination of land disposal, incineration, and waste-to-energy recovery of carpet.

Table 26: Summary of the Negotiated Outcomes for Carpet

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Diversion / Disposal Options											
Total Discards ¹	4,678	4,828	4,537	5,038	5,261	5,590	5,642	5,887	6,020	6,605	6,772
Reuse	0			25			113		211		203-339
Recycling	180			353			620		903		1,354-1,693
WTE		48	45	50	53	56	56	59	60	66	68
Cement Kilns	0			100			300		200		200
Landfill				4,510			4,562		4,646		4,812
Recycling Rate	3.8%			7%			11%		15%		20-25%
Landfill Diversion Rate	3.8%			10%			19%		23%		27-34%

¹weights rounded to millions of pounds
Data on carpet discards provided by the Carpet and Rug Institute

This voluntary MOU is the result of a two-year negotiation process between members of the carpet industry, representatives of government agencies at the federal, state and local levels and non-governmental organizations. It encourages manufacturers to assume responsibility for funding the overall effort and meeting the goals for reuse and recycling. It is anticipated that this approach will reduce the environmental impacts throughout the carpet's life cycle — from its design to end-of-life management.



The MOU represents well over 90% of carpet sales in the United States. Shaw and Mohawk represent over 60% of all sales. Imported products tend not to be an issue. China may manufacture more carpet than the United States but it is not clear if the carpet will be sold in the United States or remain in Asia.

This initiative started with three states, Minnesota being one of the first and now 12 states including Wisconsin and Iowa. Several states were involved with negotiated goals, rates and dates.

The carpet industry has established a third-party organization known as Carpet America Recovery Effort (CARE) to achieve the national goals. The group, with members from the carpet industry and government, will be jointly responsible for monitoring, evaluating and assessing progress toward the negotiated goals. CARE is funded and administered by the carpet industry.

As the first of its kind in the United States, this voluntary partnership is a model for future product stewardship initiatives. The carpet industry and government representatives work together to overcome barriers to reuse and recycling of post-consumer carpet and recognize the importance of developing systems that treat discarded carpet as a resource instead of a waste product.

CARPET AMERICA RECOVERY EFFORT (CARE)

www.carpetrecovery.org

CARE focuses on utilizing market-based solutions to increasing reuse and recycling of post-consumer carpet. CARE's scope of work includes:

- Enhancing collection infrastructure for post-consumer carpet
- Serving as a resource for technical, economic and market development opportunities for recovered carpet
- Developing and performing quantitative measurement and reporting on progress toward negotiated goals
- Working collectively to seek and provide funding opportunities for activities to support negotiated goals

CARE facilitates, advises, provides resources, and is a forum for stakeholders to accomplish its mission. This organization is located in Dalton, GA where 90% of United States carpet manufacturers are located.

GOVERNMENT ROLE

State governments hold two seats on the CARE Board of Directors and the United States Environmental Protection Agency acts in an advisory capacity. Typically governments do not assist with carpet diversion other than offering

grants if available. The main focus is environmental preferable purchasing and reclamation.

FUNDING

CARE is a 501(c)3 nonprofit organization which solicits contributions (financial and otherwise) from corporations, government agencies and anyone else with a vested interest in diverting carpet from landfill.

CARE funding is based on voluntary contributions centred on industry sales (Table 27). CARE *Corporate Sponsors* are those who contribute at the recommended level (Table 28). *Green Sponsors* contribute 150% of the recommended level. *Sustainability Leadership Sponsors* contribute 200% of the recommended level. Entrepreneurs who support the CARE effort contribute in kind.

Table 27: Sponsorship Contributions
(minimum levels of contribution)

Company Sales/Organization	Financial Support
> \$3 Billion	\$30,000
\$1 Billion > \$3 Billion	\$20,000
\$250 Million > \$1 Billion	\$10,000
< \$250 Million	\$5,000
State Governments	\$2,000
NGO	\$1,000
Equipment Suppliers	\$15,000
Materials Suppliers	\$10,000
Entrepreneurs	In kind

NGO – Non-governmental Organization

**Table 28: Sponsorship Levels and Sponsoring Companies**

Sponsorship Levels	Contribution Amount	Sponsoring Companies
Sustainability Leadership	200% of the Corporate Sponsor level	<ul style="list-style-type: none"> • Interface Flooring Systems
Green	150% of the Corporate Sponsor level	<ul style="list-style-type: none"> • Honeywell Nylon • J&J Commercial • Milliken
Corporate	Minimum contribution	<ul style="list-style-type: none"> • Antron® Carpet Fiber • Cycle-Tex • DWSWA • ERCS • Kruse Carpet Recycling • LA Fiber • Mannington Carpets • Mohawk Group • NYCORE • Royalty Carpet Mills • Propex Fabrics • Shaw Industries • SI Flooring Systems • Solutia • Southern Waste Information eXchange • StarNet Commercial Flooring Cooperative

EVALUATION

Through CARE, carpet industry members and government entities are jointly responsible for monitoring, evaluating and assessing progress toward the negotiated goals. Stakeholders outside of the carpet industry will maintain active roles in CARE to assist with data collection, analysis and program evaluation to ensure transparency in reporting on activity status. A series of reports are planned to show progress toward agreement goals:

- *Annual Reports* – CARE publishes annual reports by March 31st of each year, with the first report in March 2003. This report offers updated market development opportunities for recovered carpet, information on quantities managed through the various management options outlined in the negotiated goals, an assessment of successes and obstacles encountered during the reporting period, a summary of state and federal efforts related to carpet.

Table 29 summarizes the post-consumer carpet recycling and diversion from 2002-2004.

Table 29: Post-consumer Recycling and Diversion, 2002-2004

Year	Millions of Pounds			Percent of Discards		
	2002	2003	2004	2002	2003	2004
Total Discards	4,678	4,828	4,537	-	-	-
Recycled	46.2	86.6	98.4	0.99%	1.79%	2.17%
Diverted	57.2	93.7	108.2	1.22%	1.94%	2.38%

(Carpet America Recovery Effort, 2005)

From 2003-2004, post-consumer carpet reported to be recycled increased by 13.6% and diversion from landfill increased by 15.5%. When compared with 2002, recycling has increased 130% and diversion has increased by 89%.

As with the 2003 Annual Report, the estimate level of carpet recycling is based on data provided by a small percentage of the companies that are believed to be actually recycling carpet, as such it is likely a significant underestimation of the level of carpet recycling may be taking place.

- *Interim Reports* - In 2005, CARE will prepare a status report documenting progress made toward meeting the "year three" management goals. In year five (2007), an independent study will be commissioned to evaluate the progress and identify existing barriers toward meeting the negotiated outcomes goals. A jointly supported and facilitated multi-stakeholder group composed of CARE members will review the report and develop implementation strategies and make recommendations for improving the recovery and integrated management of post-consumer carpet.
- *2010 Negotiations* - In year eight (2010), CARE and other stakeholders shall create a multi-stakeholder process for developing recommendations and goals for the next ten-year period. Invited stakeholders will include at least five (5) states, ten (10) members of the carpet industry, the U.S. Environmental Protection Agency, and one (1) NGO.
- *Final Report* - In 2012, CARE will issue a final report detailing progress made toward meeting the goals of the first ten-year plan.

CARE SUB-COMMITTEES

CARE has formed sub-committees which will focus on the technical, economic, and market development opportunities for recovered carpet. Sub-committees assist in efforts to divert carpet from waste as directed by the CARE executive committee. Membership is drawn from the carpet industry and government.

**LESSONS LEARNED**

- Be more specific in Memorandum of Understanding regarding industry financial obligations and in-kind support
- Carpet industry is naïve on how the solid waste industry functions
- More regulatory tools (e.g., end of life management) to increase diversion implemented at the state level would assist initiatives like MOU

FUTURE DIRECTION

- Developing purchasing specifications on post-consumer content for public sector contractors who supply carpet in government contracts; will have better idea of purchasing direction in 3-4 months
- Moving towards 2010 negotiations for next phase

EVALUATION CRITERIA

	Evaluation Criteria	Rating	National Agreement on Carpet Recycling Comments
1	Potential to influence Design-for-Environment	High	Involvement of producer increases likelihood of DfE
2a	Environmental impacts: waste diversion potential	Low	Lack of incentive or disincentive decreased likelihood of success.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Medium	Will take some time; new plant opening in southern Georgia to de-polymerize Nylon 66 for recycling into new carpet. Also used in carpet padding and engine components.
2c	Other environmental impacts		
3	Provides a level playing field	Low	Not to everyone. Supports large manufacturers who already have environmental goals set, financial means and a take-back option in place. Smaller manufactures are at a disadvantage.
4	Jurisdiction responsibility		Industry
5	Regulatory requirements		Memorandum of Understanding
6	Administrative burden	Low	One Executive Director (1/2 time) In 2006 hiring administrative staff starting at 30 hrs/week and ramping up to 40 hr/week
7	Cost	Low	\$350,000 annual operational budget and significant in-kind support
8	Program sustainability	Low	Industry sponsorship, approximately \$350,000 per year plus significant in kind support. NOTE: \$350,000 is not enough
9	Market disruption	Low	None
10	Industry acceptance	High	Overall industry acceptance
11	Ease of implementation	High	Reasonably simple, competitive industry, recycling carpet may be seen as a market advantage
12	Ease of monitoring	Medium	Annual reports, interim report; verification unsure

	Evaluation Criteria	Rating	National Agreement on Carpet Recycling Comments
13	Enforceability	Low	Voluntary initiative – no enforcement possible
14	Enforcement requirements	Low	None
15 a	Previously implemented – measured success in other jurisdictions		Pounds of post consumer carpet diverted by reuse, recycling, waste-to-energy and cement kilns, reported versus diversion target rates
15 b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	High	Public environmental purchasing policy requirements, landfill bans (varies between municipality, state)
17	Novel/unique approach	High	Industry
18	Other potential negative side-effects (e.g., illegal dumping)	High	None anticipated
19	Applicability to Alberta	Low	Small market unlikely to garner support for this approach.



PORTLAND, OREGON - BUSINESSES AND MULTIFAMILY COMPLEXES REQUIRE TO RECYCLE ORDINANCE

Population: 529,121

SUMMARY

Job Site Recycling Ordinance requiring rubble (concrete/asphalt), land clearing debris, corrugated cardboard, metals and wood be separated and recycled. This is a pre-construction program.

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City website:

http://www.sustainableportland.org/default.asp?sec=recycle&pg=com_work_construction

BACKGROUND

Oregon has a 45% waste diversion target for 2005 which has been achieved. The Metro Region has set waste diversion goals of 62% by 2005 and 64% by 2009. The City of Portland has a 60% by 2005 waste diversion target and roughly 75% of the City's waste is from the commercial sector. Targeted commercial materials include food waste, paper and construction and demolition waste.

All goals are 'in good faith' and there is no fine for not meeting targets.

ORDINANCE

The Businesses and Multifamily Complexes Require to Recycle requirement became effective in 1997 after business recycling was mandated in 1996. The latest amendment to the ordinance took place in June 2004.

Municipal Code (Title 17, Chapter 17.102, Sections 17.102.180):

<http://www.portlandonline.com/auditor/index.cfm?&a=21089&c=28889>

PROGRAM DESCRIPTION

The Job Site Recycling Ordinance (No. 169103) states that the following materials are required to be separated and recycled:

- Rubble (concrete/asphalt)
- Land Clearing Debris
- Corrugated Cardboard
- Metals
- Wood

The general contractor (or property owner where no general contractor is named) is responsible for ensuring job site recycling by sub-contractors.

ELIGIBILITY

All building projects in Portland with a permit value of \$50,000 or more (including construction and demolition phases).

COMPLIANCE VERIFICATION

City compliance monitoring is accomplished through Customers' and Self-haulers' completion of the Pre-Construction Recycling Plan Form and City review of the form, in addition to occasional City inspection of onsite recycling and waste systems. If a form is sent out but not returned follow-up occurs. There is no post construction verification with this program.

FINES

Failure to comply with this ordinance will result in a penalty of \$500 for the first violation (City Code 17.102.180). Very rarely are fines distributed.

IMPACTS AND EVALUATION

Program success is measured by amount diverted (e.g., 50,000 T C&D material diverted in 2004) and number of forms sent and returned each year (e.g., typically 2000 sent and returned per year).

**LESSONS LEARNED**

- Ensure that state/province is behind a construction and demolition waste diversion program. In Portland's case the state government does not include construction and demolition as a 'counted' material towards recovery for waste sheds.
- Ensure that tipping fees are high enough to make recycling an attractive option.

FUTURE DIRECTION

Even though 50,000 T of construction and demolition waste was diverted in 2004; an estimated 95,000 T remains. The City would like a more targeted approach that decreases administrative time. They will discuss the possibility of mandating that all construction and demolition debris must be mixed loads (e.g., not separated on site) and haulers must transport this material to a construction and demolition material recovery facility for processing. Additionally, they will consider increasing the dry landfill tipping fee and may raise the commercial haulers Solid Waste Management Fund fee.

EVALUATION CRITERIA

	Evaluation Criteria	Rating	City of Portland Business Recycling Ordinance Comments
1	Potential to influence Design-for-Environment	Low	Focus on waste.
2a	Environmental impacts: waste diversion potential	Medium	Limited by materials, only pre-construction program with no follow-up
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	Focus on waste.
2c	Other environmental impacts		
3	Provides a level playing field	High	One exemption, construction and demolition permit values less than \$50,000
4	Jurisdiction responsibility		Municipal
5	Regulatory requirements		Fill out form
6a	Administrative burden - Municipal	Low	Minimal labour right now; 20% of one person's time for mailing pre-construction form and data input and 10% of one person's time for inspections/enforcement
6b	Administrative burden - Business	Low	No complaints from businesses
7	Cost	Low	Administration time, brochure

	Evaluation Criteria	Rating	City of Portland Business Recycling Ordinance Comments
8	Program sustainability	Medium	Solid Waste Management Fund pays for program; commercial haulers pay \$3.80/ton to fund commercial programs. Approximately \$1 million annual budget for commercial programs from Fund. Used towards business recycling requirement; Blue Work recognition program; business outreach for paper, food and C&D materials; and C&D Business Recycling Ordinance.
9	Market impact	Low	No market disruption right now, markets already in place
10	Industry acceptance	High	Yes, has been around for awhile; not much wide spread outreach
11	Ease of implementation	High	Approximately 1.5 years for stakeholder meetings and market development
12	Ease of monitoring	High	Little in the way of inspections
13	Enforceability	Low	Infrequent warning given; not sure if infraction has ever been issued
14	Enforcement requirements		
15a	Previously implemented – measured success in other jurisdictions	High	Receive quarterly reports from commercial haulers so know how much construction and demolition waste is disposed at transfer stations
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	Low	No, it is actually cheaper to dispose at dry waste landfill than to recycle
17	Novel/unique approach	Low	Recyclable materials ; upfront program; technique versus outcome
18	Other potential negative side-effects (e.g., illegal dumping)	High	None at this time
19	Applicability to Alberta	Low	Could be used in concert with other tools.



TORONTO, ONTARIO – REGENT PARK DEVELOPMENT

Regent Park Population: 7,500 now, 12,000 in future

SUMMARY

The Toronto Community Housing Corporation has chosen to pursue a fully integrated sustainability agenda with the redevelopment of Regent Park. Specific sustainability targets with respect to water and wastewater, stormwater management, solid waste management, construction and demolition, transportation, landscape and building design will be adhered to over the next 12 years of construction.

The sustainable redevelopment of Regent Park represents the first endeavour of this scale in Canada and will act as a model for future residential developments

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BACKGROUND

Regent Park is a 28 hectare (69 acre) public housing development located in downtown Toronto. The site is bordered by Parliament, Gerrard, River and Shuttle streets and situated within walking distance of the Don River Valley park system, the St. Lawrence Market and downtown Toronto. Built between 1948 and 1959, the development contains 2,087 rent-g geared-to-income units (RGI) units accommodating a population of approximately 7,500. The new plan will retain all of the residential, retail, community service, institutional and park uses. Upon completion, in 10 to 12 years, roughly 5,000 residential units will be created, representing an estimated population of 12,000.

In December 2002, Toronto Community Housing presented the Regent Park Revitalization Study to Regent Park residents. The study incorporated a strong community engagement process to ensure that tenants were able to shape its content. Over 2,000 residents, community agencies and financial, design and planning experts contributed their ideas. Toronto Community Housing staff, with input from tenants and other stakeholders, created an Action Plan that confirmed the study's recommendations and laid out a plan for moving forward.

The plan is based on the principle of creating a healthy community and reintegrating it with the surrounding city. It recommends introducing streets, creating large new park spaces, aligning buildings along the streets and providing opportunities for employment, education, culture and community facilities.

PROGRAM DESCRIPTION

The redevelopment of Regent Park presents considerable opportunities for the application of existing and emerging sustainable construction, renovation and demolition waste management practices. Existing buildings and infrastructure slated for removal contain large volumes of materials, which can be reused or recycled. The Toronto Community Housing Corporation has committed significant funding towards maintenance and upgrading of buildings and fixtures.

With respect to the waste diversion and reduction, the Regent Park Project will:

- Assist the City of Toronto who has made a commitment in principle to research and establish a reuse centre that would handle salvaged building materials. Regent Park has the volume and kinds of materials that, if recovered for reuse, would serve to jump-start such a municipal facility.
- Provide the opportunity to forge a new relationship with Provincial officials by demonstrating leadership in how it manages demolition and construction wastes. It can do this by not only demonstrating that it is complying with regulations but exceeding them by some measure. It can use mechanisms as defined under 3Rs regulations.
- Allow optimum value engineering which is now widely applied to residential construction design in useful reductions in materials.
- Present emerging sustainable building design to show how to achieve waste reductions in the design phase of a project, thus achieving the purest form of waste diversion.

SUSTAINABLE COMMUNITY DESIGN

The Sustainable Community Design Report by Dillon Consulting Limited (2004) documents the process used and the recommendations for sustainable design for Regent Park.

Recommendations encompass a fully integrated sustainable design that achieves significant targets for environmental protection and enhancement including: 35% reduction in per capita water use; 75% energy use reduction; 80% reduction in green house gas emissions; significant improvements in stormwater runoff retention, quality and quantity; 35-60% solid waste diversion; improved natural environment/landscape; and reduced environmental impacts from building materials, construction and demolition.



Demolition and construction recommendations centre on the adoption of a specialized 3R demolition process, on-site brick/concrete crushing, asphalt, metals and wood recycling, comprehensive waste audit and pre-approved waste haulers. For demolition wastes, recycling and best management practices such as the use of specifications in demolition projects that require that large amounts of materials be reused or recycled or maximum recovery of materials for reuse centers are two options.

Reductions in volumes of demolition and construction waste going to landfill are anticipated to be 90% diverted and there will be reduced environmental impacts associated with building material used in the project due to recycled-content, local sourcing and use of certified wood and rapidly renewable building materials.

Additionally, significant improvements in solid waste diversion are expected (e.g., 40-60% reduction for townhouses and 35-50% for apartments versus less than 15% currently diverted). The recommended measures for apartment units reflect the City's current priority to divert waste from landfill but are beyond what is required for approval. Marginal capital costs are approximately \$300 per unit which will accrue to the City through reduced landfill costs.

EVALUATION CRITERIA

	Evaluation Criteria	Rating	Regent Park Program Comments
1	Potential to influence Design-for-Environment	High	Incorporation of design concepts in a wholistic project approach.
2a	Environmental impacts: waste diversion potential	High	Assuming goals will be translated into contract specifications.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	High	Potential for innovative design.
2c	Other environmental impacts	High	Looks beyond waste to other housing impacts.
3	Provides a level playing field	High	
4	Jurisdiction responsibility		Builder
5	Regulatory requirements		None – voluntary procurement.
6a	Administrative burden - Municipal	Low	
6b	Administrative burden - Business	?	Depends on reporting requirements.
7	Cost	?	
8	Program sustainability	Low	Project-specific.

	Evaluation Criteria	Rating	Regent Park Program Comments
9	Market impact	Low	If adopted by other projects, could stimulate innovation.
10	Industry acceptance	High	
11	Ease of implementation	Low	Requires buy-in from developers.
12	Ease of monitoring	?	
13	Enforceability		No regulation.
14	Enforcement requirements		None – assume builders will be monitored.
15 a	Previously implemented – measured success in other jurisdictions		
15 b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	High	Leadership/ demonstration project potential
17	Novel/unique approach	High	
18	Other potential negative side-effects (e.g., illegal dumping)	Low	
19	Applicability to Alberta	High	Could provide model for leadership demonstration project in Alberta.



UNITED KINGDOM – DEMOLITION PROTOCOL

Population: 59,834,900

England: 50,093,800

Wales: 2,952,500

Scotland: 5,078,400

Northern Ireland: 1,710,300

SUMMARY

The Institution of Civil Engineers Demolition Protocol provides a set of methodologies to achieve resource efficiency in construction, demolition and refurbishment projects.

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ICE Website: <http://icextra.ice.org.uk/tlml/demolition>

AggRegain Demolition Website:
http://www.aggregain.org.uk/demolition/the_ice_demolition_protocol/index.html

BACKGROUND

The development of the Demolition Protocol arose out of the Resource Sustainability Initiative a group formed jointly by the Institution of Civil Engineers (ICE) Waste Management Board and the Chartered Institution of Wastes Management (CIWM) to support innovative construction waste management projects. The project itself was prepared by EnviroCentre Ltd, commissioned by London Remade and funded by the ICE R&D Fund, Cory Environmental Ltd and Cleanaway Ltd.

The protocol is now being handled by the Waste and Resources Action Programme (WRAP) for marketing, education and future development.

PROGRAM DESCRIPTION

The voluntary ICE Demolition Protocol, launched November 18, 2003, provides a pragmatic set of methodologies to achieve resource efficiency in construction, demolition and refurbishment projects.

A main principle of the protocol is that the production of demolition material can be linked to its specification and procurement as a high value material in new builds. The protocol describes how demolition and new build design processes are managed to ensure that resource efficiency is achieved. This is achieved by minimizing waste and maximizing the displacement of primary materials in the new build, through specifying recovered (recycled/reclaimed) materials where viable (in terms of cost, supply and performance).

Key features of the protocol include:

- works effectively through the planning system (planning conditions/agreements)
- provides a framework for action through the supply chain (e.g., through tenders and contracts)
- provides a basis for assessing the capacity of local reprocessors to supply recovered materials and creates demand where appropriate
- provides a basis for assessing the potential for procuring components/materials with recycled content

TARGET AUDIENCE

The protocol is aimed at the following groups:

- Planners responsible for planning policy development at the national level
- Planning authorities responsible for development control
- Project teams responsible for managing demolition work
- Project teams responsible for the procurement and specification of new construction materials
- Community groups involved in local recycling initiatives

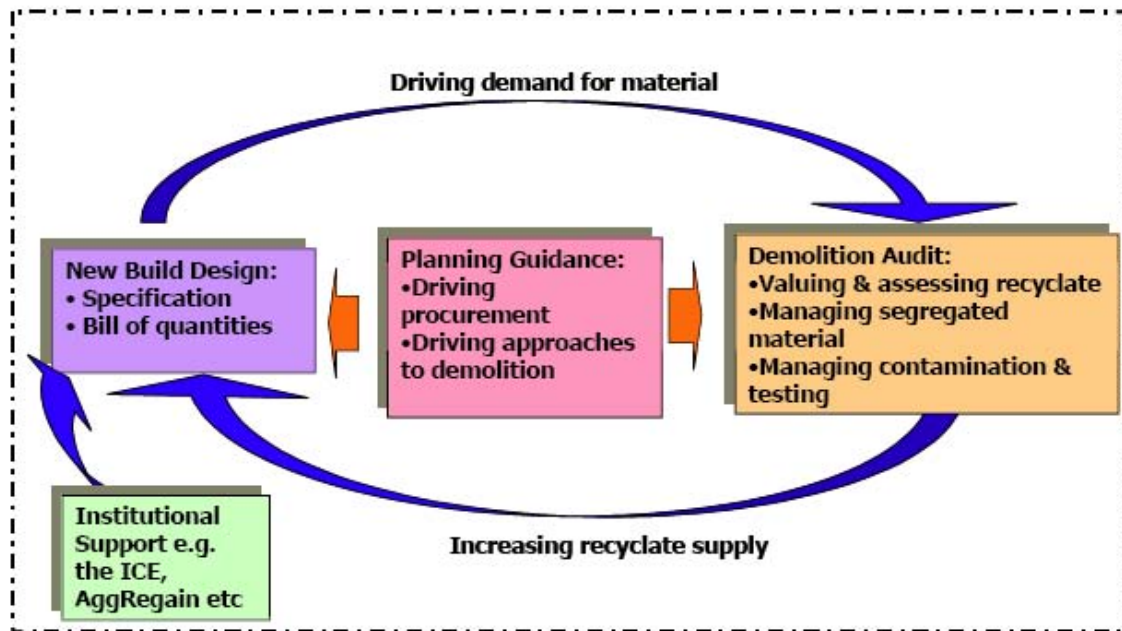
RESOURCE EFFICIENCY MODEL

This protocol provides guidance on how demolition recycle (demolition materials processed into recycled-content building material) can be driven up the value chain. With the development of planning and management models to support resource efficiency, both demand and supply will increase. The result

being a pricing structure for demolition recyclate that reaches higher values than currently available.

The resources efficiency process and associated mechanisms influencing supply and demand are shown in Figure 5.

Figure 5: Environmental Management System – Resource Efficiency Model



(EnviroCentre Ltd., 2003)

RECOVERY INDEXES

Key outputs from the protocol, which provide the best practice and opportunities for planning influence include:

1) Demolition Recovery Index

The protocol shows how a building audit can be used to generate a Demolition Recovery Index (DRI). The DRI allows project teams to identify the potential for cost effectively recovering material from demolition. In addition, the DRI provides planning authorities with a tool for ensuring that demolition methodologies reflect national and local authority policies on waste management and sustainable development.

2) New Build Recovery Index

The development of new standards, for example through the Construction Products Directive, means that the potential for specifying demolition recyclate in new buildings is continually increasing. The protocol's New Build Recovery Index

(NBRI) provides a tool for establishing the potential percentage and quantity of recovered materials that can be specified in a new building or other structure. Where a project involves demolition and new build, the NBRI can be linked to the DRI to provide project teams with a model for assessing the efficiency of resource use for the whole project.

Ideally, if 20% of demolition material is recycled then material used in the new build should be 20% recycled-content. The recycled-content new build material does not have to be the same material that was recycled during the demolition process.

There is a requirement to purchase recycled-content as long as it is cost neutral or lower cost (does not add to project cost).

BEST PRACTICES

The protocol provides best practice guidelines for the project team through new developments in standards (e.g., Construction Products Directive) and the various elements required for cost effective material management. Three main steps exist:

1) Pre-demolition audit – identifies resources that can be recovered for future use

Website:

http://www.aggregain.org.uk/demolition/demolition_new_build_best_practice/demolition_best_practice/stage_1.html

2) Demolition site layout plan – site design that allows for effective material resource segregation

Website:

http://www.aggregain.org.uk/demolition/demolition_new_build_best_practice/demolition_best_practice/stage_2.html

3) Evidence of material recovery – project team must be able to demonstrate compliance with targets set for the recovery of demolition materials, along with the procurement of recovered materials for the new build

Website:

http://www.aggregain.org.uk/demolition/demolition_new_build_best_practice/demolition_best_practice/stage_3.html



SPECIFICATIONS

The use of specifications is important as they dictate exactly how a contractor will deliver project requirements. They are also used to describe how a best practice, such as the ICE Demolition Protocol, will be implemented.

Specification clauses can be downloaded from the National Green Specification (NGS) website at www.greenspec.co.uk. Through the NGS, the clauses remain compatible with current National Building Specifications (NBS). NGS examples include:

1) Demolition Specification

NGS GreenSpec C20 Demolition/Deconstruction Resource Recovery

Website:

<http://www.greenspec.co.uk/html/spec/listC20.html>

2) Construction (and Demolition) Waste Minimization/Management Preliminaries

NGS GreenSpec A38 Construction Waste Minimization/Management

Website:

<http://www.greenspec.co.uk/html/spec/listA38.html>

3) Refurbishment and Alteration Specifications

NGS GreenSpec C91 Alteration – Resource recovery and Waste Minimization (for removal of materials for disposal and recovery of materials for reuse and recycling)

Website:

<http://www.greenspec.co.uk/html/spec/listC91.html>

AUDIENCE BROCHURES

The ICE Demolition Protocol is the backbone to Waste and Resources Action Programme's (WRAP) Demolition Programme. WRAP has extracted and published four targeted brochures from the full Demolition Protocol produced by EnviroCentre for the Institution of Civil Engineers and London Remade.

1) The Demolition Protocol: Aggregates Resource Efficiency in Demolition and Construction Volume 1. for Policy-makers and Planners

Supports local authorities and policy-makers, including planning, sustainability and building control officers, in their pursuit of resource efficiency in infrastructure projects.

Website:

www.aggregain.org.uk/templates/temp_agg_publication_details.rm?id=2298&publication=1937

2) The Demolition Protocol: Aggregates Resource Efficiency in Demolition and Construction Volume 2. for Developers and Designers

Provides information on the Protocol's methodologies and its benefits to one of the key target audiences: the development team, comprising the developer, engineering consultant & architects (designers).

Website:

www.aggregain.org.uk/templates/temp_agg_publication_details.rm?id=2298&publication=1938

3) The Demolition Protocol: Aggregates Resource Efficiency in Demolition and Construction Volume 3. for Contractors

Provides information on the Protocol's methodologies and its benefits to one of the key target audiences: Construction & Demolition Contractors.

Website:

www.aggregain.org.uk/templates/temp_agg_publication_details.rm?id=2298&publication=1939

4) The Demolition Protocol: Aggregates Resource Efficiency in Demolition and Construction Volume 4. for Suppliers

Provides information on the Protocol's methodologies and its benefits to one of the key target audiences: recycled aggregate suppliers.

Website:

http://www.aggregain.org.uk/templates/temp_agg_publication_details.rm?id=2298&publication=1940



ADOPTION OF THE DEMOLITION PROTOCOL

1) Wembley Development, Borough of Brent

The London Borough of Brent Council integrated the Demolition Protocol into its supplementary planning guidance and used the development control process to require the developer (through planning requirements) to give meaningful consideration to resource efficiency during the demolition and new build phases of the Wembley Development.

This case study demonstrates that the planning system is a powerful driver in creating change within the construction industry, in terms of sustainable waste and resource recovery. The planning conditions, which established the requirement to adopt the Demolition Protocol, acted as the catalyst for a number of successful outcomes involving the use of demolition material, the specification of recycled aggregates in the new build and the potential to specify recycled aggregates in structural concrete.

Additionally, it demonstrates that unless planning conditions had been set it is unlikely that the opportunities for recycled aggregates would have been developed.

More detailed information on this case study is located at <http://www.wrap.org.uk/downloads/msoA5CF2.0b1732eb.PDF>

2) Greater London Authority

The Greater London Authority is looking at adopting the Demolition Protocol as one of the preferred planning standards in 2006.

IMPACTS AND EVALUATIONS

WRAP does not evaluate the Demolition Protocol. The protocol is one part of a larger construction program that is evaluated. Project case studies are developed. If WRAP was to evaluate the protocol it would likely be based on the number of local authorities that adopt it.

LESSONS LEARNED

- Planning authorities have the power and process to drive this initiative
- If protocol not applied over a large scale, it does not create a level playing field
- Stakeholder buy-in is essential
- Spend the time and money to have a structured stakeholder consultation
- Spend the time and money to create dedicated audience brochures

FUTURE DIRECTION

Increased adoption of the Demolition Protocol by local authorities.

EVALUATION CRITERIA

	Evaluation Criteria	Rating	Demolition Protocol Program Comments
1	Potential to influence Design-for-Environment	High	If widely accepted and adopted by industry.
2a	Environmental impacts: waste diversion potential	Low	Lack of incentives or regulatory requirement. Higher when adopted within planning process.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	High	Use recycled demolition materials in new build projects
2c	Other environmental impacts		
3	Provides a level playing field	Low	Only if adopted within planning process.
4	Jurisdiction responsibility		Individual local authorities; local town/city planning rules
5	Regulatory requirements		None, voluntary protocol
6a	Administrative burden - WRAP	Low	No employee dedicated to the Demolition Protocol. Everything contracted out (e.g., website development, audience brochures, seminars)
6b	Administrative burden - Business	Low	
7	Cost		Protocol development, £100,000 + in kind time from ICE, developers and demolition association
8	Program sustainability	High	Central federal government funding (e.g., landfill tax and Aggregates Sustainability Fund)
9	Market impact	Low	Hard to say
10	Industry acceptance	High	To a degree, not hostile, acceptance that landfill does not have space and it is expensive to landfill
11	Ease of implementation	Low	2 ½ years
12	Ease of monitoring	High	No inspections
13	Enforceability	Low	By local authorities if planning department adopt protocol
14	Enforcement requirements		None
15a	Previously implemented – measured success in other jurisdictions		WRAP does not evaluate the Demolition Protocol, case studies are developed



	Evaluation Criteria	Rating	Demolition Protocol Program Comments
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	High	Complements BREEAM (BRE's Environmental Assessment Method), similar to LEED
17	Novel/unique approach	Medium	Voluntary, focuses on local planning authorities driving process Real driver is the fact that local authorities (municipalities) have to produce sustainability plans. All have sustainability officers; the extent to which they adopt the protocol depends on the sustainability officer, but there is interest in making it mandatory as part of the planning process (same idea as mandatory LEED in Chicago, Austin and Albuquerque)
18	Other potential negative side-effects (e.g., illegal dumping)		If not adopted on a large-scale (e.g., large municipality or region) it will not create a level playing field
19	Applicability to Alberta	Low	Industry programs already exist through LEED, Built Green and Go Green

Category 2: Mechanisms That Influence Design (Upstream/EPR)

UNITED KINGDOM - AGGREGATES LEVY

Population: 59,834,900

England: 50,093,800

Wales: 2,952,500 Scotland: 5,078,400

Northern Ireland: 1,710,300

SUMMARY

The Aggregates Levy of £1.60 per tonne, implemented by the United Kingdom (England, Scotland, Wales) Government in 2002, targets the use of primary aggregates in construction and is applied to commercial exploration of aggregate (e.g., sand, gravel, rock).

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HM Revenue and Customs website

http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageExcise_InfoGuides&columns=1&id=AGGREGATESLEVY

Department for Environment, Food and Rural Affairs (DEFRA) Aggregates Levy Sustainability Fund website

<http://www.defra.gov.uk/environment/waste/aggregates/>

BACKGROUND

The extraction of aggregates from the environment (e.g., sand, gravel and crushed rock) represents 82% by tonnage of all non-fossil fuel minerals extracted from the land and sea in the UK. The extraction, transport and eventual disposal of these aggregates has significant implications for the environment.

Independent research commissioned by the Department for Transport, Local Government and the Regions (DTLR) identified significant environmental impacts associated with quarrying that are not already reflected in the cost of the materials. These include noise, dust, visual intrusion and loss of biodiversity and amenity.



In recognition of these impacts, the aims of the levy are to ensure that the environmental impacts of aggregates production not already addressed by regulation are more fully reflected in process, to promote greater efficiency in the use of the aggregates and to encourage the use of alternative materials such as recycled aggregates. The Aggregates Levy is designed to 'internalize' these environmental costs into the price of the aggregate.

The Aggregates Levy follows from the United Kingdom government's commitment to sustainable development and the use of environmental economic instruments where appropriate. Two such instruments are already in place in the landfill tax and the climate change levy.

This levy is unrelated to waste diversion initiatives; even though there is a voluntary 75% reduction by 2010 of waste disposed at landfills (based on 1995 levels).

LEGISLATION

The primary legislation that brings the Aggregates Levy into effect is the Finance Act 2001, Chapter 9, Part 2, Clauses 16-49 and Schedules 4-10
<http://www.opsi.gov.uk/acts/acts2001/20010009.htm>

PROGRAM DESCRIPTION

The United Kingdom's Aggregate Levy became effective on April 1, 2002. This levy targets the use of primary aggregates in construction and is applied to commercial exploration of aggregate (e.g., sand, gravel, rock). Businesses responsible for commercially exploiting aggregate in the United Kingdom must register and pay a levy of £1.60 per tonne.

The Aggregates Levy reduces demand for primary aggregates by increasing their cost and makes the use of recycled and secondary materials more viable; and so although it reduces environmental impacts overall it does not decouple aggregates extraction and environmental impacts.

HM Customs and Revenue has produced a detailed, Aggregates Levy Guide (2004) that answers numerous questions ranging from exemptions and registration to imports, accounting, payment and penalties.

LEVY RATE

The levy rate was set following research commissioned by the former Department of the Environment, Transport and the Regions which estimated the environmental costs of aggregate extraction, on a conservative basis, to be £1.80 per tonne. The levy was set at a more cautious rate of £1.60 per tonne. This levy rate can be prorated (e.g., £0.80 per half tonne, £0.40 per quarter tonne).

The levy rate has remained at £1.60 per tonne since its inception and is reviewed on an annual basis to ensure that it remains consistent with environmental aims of the tax and other Ministerial objectives.

Levy collection takes place either monthly, quarterly or annually, depending on the project, to HM Revenue and Customs.

ELIGIBILITY

Anyone that is exploiting or intends to exploit aggregate commercially in the United Kingdom must register. Unlike the Value Added Tax (VAT) there is no threshold.

The levy applies to the commercial exploration of rock, gravel and sand aggregate. Aggregate is 'commercially exploited' when it is:

- Removed from the originating site
- Removed from another site that is registered under the name of the operator of the originating site
- Removed from any site where there is an intention to apply an exempt process, but that process was not applied
- Subject to an agreement to supply
- Used for construction purposes
- Mixed with any material other than water

Exports of aggregate are relieved from the levy while imports are subject to the levy on the first sale or use in the United Kingdom.

EXEMPTIONS

Numerous materials and processes are exempt from the levy including but not limited to:

- Quarried and mined products (e.g., coal, lignite, clay, shale, slate and its spoil)
- Soil, vegetable or other organic matter
- Industrial minerals (e.g., metal ores, gypsum, fluorspar)
- Gemstones or precious stones
- Dimension stone for building
- Any mineral used in prescribed industrial or agricultural processes (e.g., glass manufacture, fertilizer production, lime and cement production)
- Recycled aggregates (e.g., recycled construction and demolition material, colliery spoil, blast furnace and steel slag)
- Materials removed from the road (e.g., asphalt planings)



- Waste from industrial combustion processes, smelting or refining of metals
- Highway construction cut and fill operations (but not borrow pits)
- Dredging of navigational channels
- Aggregate arising from laying of any foundations, pipes or cables in connection with the modification or erection of a building
- Drill cuttings from oil exploration
- Material from utilities trenching

Quarry waste materials are classified as natural materials and subject to the levy.

Other quarried materials are excluded because:

- A much greater volume of aggregates is extracted than any other mineral (some 240 million tonnes in 1998)
- Some minerals are internationally traded commodities and therefore their taxation would have far wider implications than for aggregates, which are mainly traded domestically
- Many of the products that fall outside the scope of the levy do not have recycled alternatives, unlike aggregates
- The structure and economic of most of these industries differs from that of the aggregates industry

NORTHERN IRELAND RELIEF

From the inception of the levy, it was clear that Northern Ireland required special arrangements due to its unique position within the United Kingdom of sharing a land boundary with another member state. The Republic of Ireland does not have an equivalent aggregates tax and the relative ease with which aggregate and aggregate products can be transported across the land boundary provides ample scope for market disruption and undeclared/untaxed imports. To address this, and with European Commission state aid approval, the Government introduced a relief scheme for Northern Ireland when the levy was introduced.

The relief scheme was originally restricted to aggregate used to manufacture processed products because it was perceived that this was the sector under greatest threat of cross-border competition. Essentially, equivalent products manufactured in the Republic could be made from levy-free aggregate and, since the levy does not apply to imported processed aggregate products (e.g., concrete blocks), they would have a significant price advantage over those produced domestically.

Initially the Government thought that the relief should be a temporary measure, designed to allow Northern Ireland producers time to 'acclimatize' to the new market conditions brought about by the levy. Therefore, in its first year there was a 100% relief for aggregates used there to make processed products. In

subsequent years the amount of relief was to reduce by 20% per year, until 2007-08 when the full rate of levy would apply.

However, in late February 2003, the Quarry Products Association (Northern Ireland) submitted proposals to Government seeking an extension of the duration and scope of the relief scheme. In order to verify some of the industry's assertions, the Government commissioned the Symonds' Group to carry out research into the state of the quarrying industry in the Province. Their report - *Assessment of the State of the Construction Aggregates Sector in Northern Ireland*- revealed that the levy was not achieving the objectives it was set up to achieve.

Following work with industry representatives and the Department of Environment Northern Ireland (DoENI), the Government announced in Pre-Budget Report 2003 that it would extend the scope and duration of the relief, subject to state aid approval effective April 1, 2004. This state aid approval was received in May 2004 and relief was introduced retroactively from April 1, 2004.

Any aggregates business in Northern Ireland that wishes to benefit from the extended relief must agree to sign a negotiated agreement with the DoENI. Broadly, these agreements set targets for improvement in environmental performance of quarrying operations. The areas of performance covered include air quality, blasting, dust, energy efficiency, groundwater and waste management. Each agreement is individually tailored to the circumstances of the quarry in question, taking into account, current standards and scope for improvement.

The relief continues to cover aggregate in processed products but has been extended to cover virgin aggregate. It is fixed at 80% of the full rate until March 31, 2011 (e.g., aggregates levy payable will be 20% of £1.60 per tonne, 32 pence per tonne at the current levy rate). The DoENI regularly monitors and reviews quarry environmental improvements.

As quarry owners in Great Britain or the Republic of Ireland are not in a position to enter into agreements with DoENI for environmental improvements, aggregate quarried in Great Britain or the Republic of Ireland is not be eligible for the new relief. Aggregate 'imported' into Great Britain from Northern Ireland is not eligible for relief, thereby avoiding market distortion in Great Britain.

The majority of quarry operators in the United Kingdom welcome and support the introduction of the relief scheme in Northern Ireland, acknowledging that market circumstances are unique.



ENFORCEMENT

A business profile is developed based on Value Added Tax (VAT), Aggregates Levy and other taxes to determine company compliance. A risk matrix is then used to determine who is to be audited. On average, a business is audited every three years, however, if a business profile shows non-compliance they are audited every six months.

If the business is found not compliant, numerous financial penalties can be applied to the Aggregates Levy, including:

- If one fails to register, at the correct time they may be liable to a £250 penalty or 5% of the levy involved, whichever is greater
- If one fails to deregister, comply with regulations, produce records and information, or render returns or full payment on time they may be subject to a £250 penalty
- If one is a non-resident tax payer and fails to obtain Customs' approval to appoint a tax representative they may be subject to a £10,000 penalty
- If discovered that one had under-declared or over-claimed credit on the return they may be liable to pay a penalty equal to 5% of the amount of levy under-declared or over-declared
- If one is an unregistered customer and a genuine error resulting in an under declaration by the registered supplier results, one may be liable to a penalty of 105% of the value of the levy
- If one evades the levy, one takes or omit to take any action, and the conduct involves dishonesty, one will render themselves liable to a penalty equal to the amount of levy evaded or sought to be evaded plus the actual amount of levy evaded

A procedure is in place for those who pursue a review or appeal.

If financial penalties are invoked (e.g., late payment) the monies collected go to a central fund which is not dedicated to the Aggregates Levy.

AGGREGATES LEVY SUSTAINABILITY FUND

The Aggregates Levy Sustainability Fund uses revenue from the Aggregates Levy to reduce the environmental impacts per tonne of aggregates extraction and helps to stimulate the market for recycled and secondary materials. The Department for Environment, Food and Rural Affairs oversees the Sustainability Fund.

Table 30 lists current objectives and projects that the Sustainability Fund in England contributes towards:

Table 30: Sustainability Fund in England Objectives and Projects

Objective	Delivery Partner/Distributing Body
Minimising the demand for primary aggregates	Waste and Resources Action Programme (WRAP) – Aggregates Programme
Promoting environmentally friendly aggregates extraction on land	Mineral Industry Research Organization Office of the Deputy Prime Minister English Heritage
Promoting environmentally friendly aggregates extraction in the marine environment	Centre for Environment, Fisheries and Aquatic Science Office of the Deputy Prime Minister English Heritage English Nature
Promoting environmentally friendly transport of aggregates	Department of Transportation
Addressing the environmental impacts of past aggregates extraction	Partnership of English Nature and Countryside Agency English Heritage
Compensating local communities for the impacts of aggregate extraction	Leicestershire/ Rutland, Derbyshire including part Peak, Somerset, North Yorkshire, Staffordshire, Cumbria, North Somerset, South Gloucestershire, Lancashire, Devon, Essex, Lincolnshire, Durham, Doncaster, Shropshire, Cornwall, Nottinghamshire, Gloucestershire

Separate arrangements have been made for Sustainability Funds in Scotland, Wales and Northern Ireland, details can be found at the following links:

- Scotland: www.scotland.gov.uk/Topics/Environment/17108/7370
- Wales: www.wales.gov.uk/subiplanning/content/minerals/aggregates/index-e.htm
- Northern Ireland: www.doeni.gov.uk/epd/about_us/default.asp

IMPACTS AND EVALUATION

An estimated £315 million was raised in the first year which is part of a package of measures intended to be revenue neutral. Most of the money raised is recycled back into businesses by a 0.1% cut in employer's National Insurance Contributions and a new Sustainability Fund. In 2004-05 the Aggregates Levy raised £335 million and it is projected to raise £340 million in 2005-06 (Fitzgerald, 2005). Today there is around 750 levy registrations and approximately 1,400 quarries in the United Kingdom.



2005 BUDGET ANNOUNCEMENT

In the 2005 Budget the Government announced that early indications suggest that the levy is effective in achieving its objectives (Fitzgerald, 2005), including:

- Against a backdrop of buoyant construction activity, sales of primary aggregate in Great Britain were down 8% between 2001 and 2003, to the lowest level since 1982
- In England, the estimated production of recycled aggregates increased by 3.13 million tonnes between 2001 and 2003
- When surveyed, expanding recycled aggregate businesses gave the levy as the most frequent reason given for growth since 2001
- Levy exemptions for china clay and slate waste sold as aggregate are successful incentives to use waste materials - between 2001 and 2004, china clay waste sold as aggregate in the UK increased by 14% to 2.5 million tonnes and national sales of slate for 'fill and other' uses increased by 65% in 2003, compared with the pre-levy year 2001.

AGGREGATES LEVY SUSTAINABILITY FUND

The Sustainability Fund promotes a broad range of environmentally beneficial practices including measures aimed at minimizing the demand for primary aggregates, maximizing the use of recycled aggregates and to deliver local environmental benefits to areas most subject to the environmental impacts of the extraction and transportation of aggregates. The value of the fund is estimated to be £35 million per year.

2003 MID TERM EVALUATION

When the Aggregates Levy Sustainability Fund was launched, it was announced that an evaluation would take place in the summer of 2003 to decide if it should operate beyond the initial two years. Results of the Mid Term Evaluation of the Aggregates Levy Sustainability Fund (Environment Protection Economics Division, 2003) include:

Performance of the Aggregates Levy Sustainability Fund (ALSF)

- A robust economic case can be made for the continuation of the ALSF as a targeted government intervention to address the environmental costs of aggregates extraction. The Aggregates Levy alone will not achieve this outcome.
- The allocation of funds to the distributing bodies has been broadly followed. About 95% of the total amount proposed (£58 million over two years) has been allocated in a Memorandum of Understanding signed with DEFRA. Over half (56%) of the allocated funding has been used to directly reduce the local effects of aggregate extraction and approximately 30% to

- minimize demands for primary aggregates. 15% has been allocated to promote environmentally friendly extraction and transport.
- Evidence available from the first 18 months of the Fund's operation suggests that the distributing bodies have successfully identified portfolios of projects to deliver Fund objectives. However the absence of monitoring data relating project outputs to the Fund's objectives, and the relatively early stage of programme operation, make it difficult to conclude the effectiveness of the ALSF in delivering its stated objectives.
 - Quantitative data collected during the evaluation indicates that local communities are involved in planning almost a third of projects and implementing slightly more, and that most projects (80%) have taken place at quarry sites, or within two miles of one. Approximately 70% of the total expenditure up to May 2003 has been disbursed in local projects. This suggests that benefits are at least reaching the intended areas.
 - However, feedback from industry, non-government organizations and the Mineral Planning Authorities suggest that some, or even many, of the projects to address local efforts are not directly addressing the local environmental impacts of quarrying. Distributing bodies identified the problems of engaging local groups within a very short timeframe available; but the absence of involvement of local Mineral Planning officers in identifying and selecting projects may provide another reason.
 - A number of concerns were raised by stakeholders about the relevance of research undertaken with ALSF monies. There was a view that some of the funding was duplicating existing research and that it might not always be justified. At present no organization is providing a coordinating function or strategic steer, nor monitoring the overall spending on research across the ALSF. The need for such a role is given by the fact that individually most of the distributing bodies are supporting research projects of some kind.

Performance of the Department for Environment, Food and Rural Affairs (DEFRA)

- Although its implementation structure is consistent with a delivery strategy which promotes regional initiatives and delivery via a range of agents, there is still the need for DEFRA to ensure that it is managed in a coherent, coordinated and strategic way, in order to deliver value for money and to ensure that an evaluation of the impact of total program expenditure is possible in terms of outcome.
- Unfortunately this need was either not identified, or not resourced, during the design stage of ALSF. As a result the resources to provide effective and strategic program management, including the development of monitoring and evaluation systems, were not available to the team in Waste Strategy which has been responsible for ALSF.



- The impact of this was evident in the responses from all distributing bodies and other stakeholders consulted for the Mid Term Evaluation. Problems identified were delays by DEFRA in completing key administrative tasks, a lack of guidance on State Aid issues, a lack of coordination and promotion of the Fund and the failure to develop a coherent monitoring and evaluation framework at the outset of the Program. As a result there was general agreement that the Fund has lacked strategic focus and coordination, the involvement of local communities directly affected by quarrying activities has been constrained and there has been no overarching mechanism in place to measure program impacts in terms of desired outcomes.
- Problems relating to State Aid clearance which had not been anticipated by DEFRA led to a significant proportion of the Fund, which was to deliver on the second objective (promoting environmentally friendly extraction and transport), not being allocated.

The Mid Term Evaluation assisted in determining that the Sustainability Fund would continue for another three years.

LESSONS LEARNED

- Ensure a strong evaluation program is defined before program starts. Levy can evaluate sales of primary aggregate and increased use in recycled-content material. However, it cannot demonstrate the effect the Aggregates Levy has on reducing noise, dust, visual intrusion and loss of biodiversity and amenity which makes the Levy difficult to justify.
- Ensure that rationale for exemptions is solid

FUTURE DIRECTION

The following topics discuss the future direction of the Aggregates Levy (Fitzgerald, 2005).

2006 AGGREGATES LEVY SUSTAINABILITY FUND REVIEW

Department for Environment, Food & Rural Affairs (DEFRA) will be carrying out a policy review of the Aggregates Levy Sustainability Fund during 2006. The study will examine the extent to which the Fund has met its objectives so far, whether it should continue and if so, what activities it should fund beyond 2007.

REVIEW OF AGGREGATES LEVY SCOPE

Prompted largely by increased industry anti-levy lobbying, DEFRA has and will be examining options for revising the levy scope. Industry has complained about the levy over the years but in recent months lobbying has centered on stockpiling issues of low grade aggregate and exempt materials.

STOCKPILING

Quarry outputs are comprised of different materials and can be categorized into two main 'grades' of aggregate, primary and secondary. Primary being the best quality that is used for high specification aggregate purposes while secondary is a lower quality and generally used for low specification applications (e.g., unprocessed fill or ballast).

Quarry operators have no problems selling primary aggregates post-levy as material prices have always been relatively high and thus the additional cost of the levy is easily 'absorbed' into the price. However, secondary materials have always sold for much lower prices, often as little as 50 pence per tonne, so the addition of £1.60 per tonne has priced many of these materials out of the market. To a certain extent the levy is designed to do this and thus encourage use of levy-free alternatives, but industry insists that it is leading to increased stockpiling and disposal. Excessive disposal has associated negative environmental impacts, which do nothing for the environmental credentials of the levy.

Industry claims that this effect is being compounded in certain regions of the country by the exemption granted to some materials.

EXEMPT MATERIALS

Industry concerns regarding exempt materials have arisen, primarily china clay waste and slate waste.

Production of china clay and slate is a wasteful process which leads to disposal of vast quantities of production by-products. The Aggregates Levy grants exemption to these by-product materials to encourage their use as alternatives to virgin aggregate. In regions where these by-products are produced, competition occurs with secondary aggregates, which industry claims compounds disposal issues.

DEFRA will work closely with industry to gather evidence that demonstrates the extent of the problem and develop options for a dual levy rate which is primarily designed to address the alleged distortion of the secondary aggregate market.

BRITISH AGGREGATES ASSOCIATION LEGAL ACTION

DEFRA awaits the British Aggregates Association (BAA) Aggregates Levy appeal, a brief summary of the legal action follows.

The BAA took action in the High Court in 2002 to try to force the Government to abolish the levy; their case centred on the assertion that the levy's design contains illegal state aid. They lost the case on all counts but were granted leave to appeal.



To stand any chance of winning an appeal, the BAA must first overturn a European Commission decision which declares the levy to be free of illegal state aid, which was a key piece of evidence in DEFRA's defence at the High Court. The Commission's declaration was made in the state aid approval letter for the first Northern Ireland levy relief scheme.

The BAA has brought their case against the Commission before the European Court of First Instance (CFI) which is comprised of two linked cases (T-210/02 and 359/04), both of which link to state aid approvals for the 'old' and 'new' Northern Ireland relief schemes.

The CFI have fixed a date for oral proceedings in respect of case T-210/02, December 13, 2005, but not T- 359/04. It is unclear whether both cases will be heard at the same time.

If the CFI rule in favour of the BAA it could force the Commission to suspend state aid approval for the Northern Ireland relief scheme, pending a full investigation of the levy's state aid status. This would cast some doubt over whether the levy could continue in its present form and enable the BAA to proceed with their case at the Court of Appeal in the United Kingdom.

EVALUATION CRITERIA

	Evaluation Criteria	Rating	UK Aggregate Levy Comments
1	Potential to influence Design-for-Environment	High	Application to producer of material.
2a	Environmental impacts: waste diversion potential	High	Stimulates recycling.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	High	In England, the estimated production of recycled aggregates increased by 3.13 million tonnes between 2001 and 2003
2c	Other environmental impacts	Medium	Reductions in noise, dust, visual intrusion and loss of biodiversity
3	Provides a level playing field	Medium	Exemptions (e.g., quarried and mined products- coal, lignite, clay, shale, slate and its spoil; soil, vegetable or other organic matter; industrial minerals- metal ores, gypsum, fluorspar; gemstones or precious stones, dimension stone for building) Northern Ireland relief
4	Jurisdiction responsibility		Federal

	Evaluation Criteria	Rating	UK Aggregate Levy Comments
5	Regulatory requirements		Legislation in Finance Act
6	Administrative burden	Medium	3-5 staff for high level policy Numerous staff within HM Revenue and Customs Businesses do not like the additional administrative time
7	Cost		£1.34 million (approximate cost of annual collection)
8	Program sustainability	Medium	Centrally funded through the Civil Service Department; not funded by Aggregates Levy
9	Market disruption	High	Forestalling occurred, lots of businesses stockpiled aggregate prior to Aggregates Levy implementation resulting in a significant slump for three months once Levy initiated. Allegedly pricing commodity out of market (e.g., 50 pence/tonne for product + £1.60 levy)
10	Industry acceptance	Low	Industry deeply opposes Aggregates Levy
11	Ease of implementation	Medium	Two years (one year for political will and one year to design tax program)
12	Ease of monitoring	High	Total production, inspection as required
13	Enforceability	High	Levy paid to HM Revenue and Customs monthly, quarterly or annually (depends on business)
14	Enforcement requirements		Audits and penalties through HM Revenue and Customs
15a	Previously implemented – measured success in other jurisdictions	High	Level of aggregate production and recycled-content use in projects
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	Low	Unrelated to waste diversion tools
17	Novel/unique approach	High	Federal levy
18	Other potential negative side-effects (e.g., illegal dumping)		Increased tipping of waste materials and by-products from blasting, crushing and washing
19	Applicability to Alberta	Medium	Levy concept well-received by stakeholders. Mechanism uncertain.



Category 3: Financial Mechanisms

TORONTO, ONTARIO – GREATER TORONTO AIRPORT AUTHORITY

Population: 4,558,800

SUMMARY

Over 200,000 tonnes of concrete was salvaged, crushed and reused on site from the demolition of the old Terminal One at Toronto Pearson Airport.

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BACKGROUND

The Greater Toronto Airport Authority (GTAA) manages, operates and controls Toronto's Pearson International Airport. In 1999, Pearson was the first airport in North America to receive ISO 14001 certification. The GTAA has been audited annually since 1999; the last audit was conducted in the spring of 2003 when the GTAA successfully maintained its certification.

PROGRAM DESCRIPTION

Recently the GTAA launched its Airport Development Program which is a 10 year, \$4.4B redevelopment including major projects for terminals, airside, infield and air support. The Greater Toronto Authority reports that by 2010 the terminal will handle more than 50 million passengers a year, making Toronto Pearson the busiest airport in Canada.

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

Following the bid process, Priestly Demolition Inc. was awarded the contract and was given from May – November 2004 to completely remove the building and surrounding flight deck paving. With a mobile concrete recycling plant, making it

possible to recycle concrete on site, their goal was to recycle at least 95% of all material extracted from each project.

IMPACTS AND EVALUATION

All trucks leaving the site and those transporting aggregate to the mobile concrete recycling plant on site were weighed to determine tones of materials diverted. Backup way bills were also available from the recycler.

All concrete (205,000 tonnes) was reused and nearly all other demolition wastes were reused and recycled, including asphalt and brick rubble (Table 31). All metals were separated for individual recycling including copper from electrical wiring. Over 95% of the demolition wastes was diverted from landfill. An estimated \$1,845,000 was saved by recycling concrete on site.

Table 31: Pearson Terminal One Demolition Material Diversion

Material	Disposal Method
Concrete: poured in place and block	On site crushing by Priestly Demolition Inc. and reused by GTAA on site
Rebar	Recycled, larger rebar has higher value
'Baling': ductwork, light gauge steel, exterior siding, roof panels	Baled on site, sold to metal recycling broker for off-site recycling
Structural steel: beams embedded on concrete	No reuse value as structural beams once extracted from concrete by pulverization – cut up on site, sold through broker for off-site recycling
'Shredding': non-ferrous metals (e.g., copper, aluminum, non-stainless steel)	Sold through broker for off-site recycling
Electrical wire: copper encased in vinyl sheathing	Sold to recycler who strips and recycles vinyl sheathing and copper wire
Asphalt	Transported by Priestly Demolition Inc. to local crusher for nominal fee, \$30 per load
Brick rubble	Crushed on site by Priestly and reused as temporary road bedding on site
'Garbage' insulation, wood, drywall, rubber, vinyl flooring carpeting	Transported by Priestly Demolition Inc. to Rancor Recycling (Belleville, ON) for further multi-material shredding and recovery, glass, metals, paper, plastic, wood with balance landfilled

(Recycling Council of Ontario, 2005)

**LESSONS LEARNED**

- Hard to educate on-site labour (e.g., material separation for recycling is required at this site)
- Hard to educate truck drivers (e.g., why do they need to drive 1 ½ hours away to a specific recycler when landfill is 15 minutes away)
- Easier to separate daily as going through demolition rather than tear down building and separate at the end
- Communicate with recycler at the front end to determine how they would like the material delivered (e.g., concrete, 2 ft x 2 ft with no rebar)

FUTURE DIRECTION

Continue to work in demolition projects with material diversion or recycling component.

EVALUATION CRITERIA

	Evaluation Criteria	Rating	Greater Toronto Airport Authority Program Comments
1	Potential to influence Design-for-Environment	Medium	Although focus remains on waste, high targets could drive future design changes.
2a	Environmental impacts: waste diversion potential	High	Very high diversion targets.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Medium	High waste diversion targets could trigger material substitution on future projects.
2c	Other environmental impacts		
3	Provides a level playing field	N/A	One project
4	Jurisdiction responsibility		None, following client specifications.
5	Regulatory requirements		None, following client specifications
6a	Administrative burden – GTAA	Medium	GTAA staff reviewed diversion tonnage to ensure specifications are achieved
6b	Labour burden - Priestly	High	20 machine operators, 20 other torch men and labourers, 5 foreman
7	Cost	Low	\$21 million for terminal and 8 story parking lot demolition (\$5 million of total for asbestos abatement). Overall cost savings.
8	Program sustainability		One time job

	Evaluation Criteria	Rating	Greater Toronto Airport Authority Program Comments
9	Market impact	Low	Some local market impact. Aggregate as recycled/reused on site, other material to appropriate recycler.
10	Industry acceptance	High	PCL/Priestly agreed to specifications
11	Ease of implementation	Medium	Had to purchase additional equipment for project size
12	Ease of monitoring	Medium	Weigh bills
13	Enforceability	High	Following client specifications
14	Enforcement requirements	Medium	Used weigh bills.
15a	Previously implemented – measured success in other jurisdictions	High	Material tonnage diverted
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments		
17	Novel/unique approach	High	Specification to recycle demolition materials
18	Other potential negative side-effects (e.g., illegal dumping)	Low	None
19	Applicability to Alberta	High	Good example of effective procurement policy.



UNITED KINGDOM – RECYCLED CONTENT MATERIALS, AGGREGATES

Population: 59,834,900

England: 50,093,800

Wales: 2,952,500

Scotland: 5,078,400

Northern Ireland: 1,710,300

SUMMARY

Program that promotes the use of recycled aggregate.

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BACKGROUND

In 2003, the Government's Sustainable Procurement Group recommended setting requirements for recycled content in the procurement of Government construction projects of £500,000 or more. In May 2004, the Government's Sustainable Buildings Task Group recommended that a requirement for 10% of the materials value to be diverted from recycled content should be included in Building Regulations and a higher standard adopted as a minimum requirement in a Code of Sustainable Building.

The Environment Agency's (EA) procurement strategy 'Constructing a Better Environment' is based on the 'Achieving Excellence' principles of the Office of Government Commerce. Through this strategy, and the framework agreements established to deliver this strategy, the EA aims to deliver a 15% cost saving over five years.

Within this procurement approach, the EA sets requirements for materials recycling. The EA initially set the requirement at 50% recycled material, which has been increased to 60% because of the success of contractors in meeting the requirement. Experience has led the EA to believe that the use of recycled materials can deliver cost savings in certain instances.

PROGRAM DESCRIPTION

Targets

National targets have been set for the use of recycled and secondary aggregates (RSA), rising from 40 million tonnes in 2001 to 55 million tonnes by 2006 (or 60 million tonnes by 2011 in draft guidance). The increase in the use of these materials required to achieve the 2006 target needs to be 2-3 million tonnes a year.

Benefits

Potential triple bottom line benefits for using recycled content materials include:

Economic

In a number of instances procuring sustainable aggregates has been shown to be cost neutral or can even deliver good financial returns. Potential economic benefits associated with the procurement of sustainable aggregates include:

- avoidance of waste disposal charges and Landfill Tax
- avoidance of Aggregates Levy payments, from which Recycled and Secondary Aggregates are exempt
- reduced costs of transporting aggregates when recovered materials are available locally
- lower costs and shortened timescales associated with some construction techniques that use Recycled and Secondary Aggregates (e.g., 'crack and seat' in road maintenance)
- improved tender and contract negotiations
- value of social and community gains

Social

A range of social benefits may also be achieved by procuring locally sourced recycled and secondary aggregates, such as:

- increases in local employment
- reductions in road haulage activities that will reduce nuisance (e.g. road congestion, noise, etc.) and increase road safety
- creation of educational and recreational opportunities
- business development opportunities
- nuisance reduction



Environmental

The environmental benefits associated with the procurement of sustainable aggregates in construction are diverse. Key potential benefits include:

- conservation of natural resources by decreasing (and in some instances eliminating altogether) the demand for virgin materials
- protection of local ecosystems, maintaining biodiversity levels
- reduction in energy consumption, transport emissions and the disposal of waste to landfill

AggRegain

To complement 'Achieving Excellence', AggRegain, the sustainable aggregates information service from the Waste and Resources Action Programme (WRAP) encourages and assists businesses to utilize recycled aggregate products.

Funding

WRAP Aggregates Programme, funded by the Department for Environment, Food and Rural Affairs (DEFRA) from the Aggregates Levy Sustainability Fund, was launched in 2002. Its aims are to promote sustainable aggregate use by reducing the demand for primary aggregates through encouraging greater use of recycled and secondary aggregates. WRAP is also funded by the Scottish Executive for an Aggregates Programme in Scotland.

Goals

The Aggregates Programme is addressing the barriers to greater use of these materials:

- Lack of effective reprocessing infrastructure to supply high quality products to local markets.
- Need for robust and readily available information to assist those involved in the specification, procurement, use and supply of recycled and secondary aggregates.
- Low end-user confidence and awareness of the cost effectiveness and performance specifications of recycled and secondary aggregates.
- Barriers in the supply chain, both real and perceived, that arise through legislation and regulations.
- Need for more uses for recycled, and particularly secondary, materials.

WRAP Aggregates Programme targets for 2006, recently published in the second WRAP Business Plan 2 - 2004-06 are:

- To deliver a three million tonnes increase in reprocessing capacity for recycled and secondary aggregates;
- To bring about a 10% increase in the usage of recycled and secondary aggregates in higher-value (non-fill) applications;
- To develop, agree with stakeholders and communicate a protocol for the environmental specification and point of recovery of recycled and secondary aggregates;
- To promote and facilitate the specification of recycled and secondary aggregates to the point at which 10% of local authorities are specifying these materials in street maintenance contracts by 2005, rising to 20% by 2006.
- To deliver a minimum of 50 training opportunities during the course of the programme supported by new tools and information within the aggregates supply chain.

AggRegain, was launched in February 2003 and, in response to users feedback, has undergone a major programme of expansion and development in 2005 to increase the range of information available. It is designed to assist anyone interested in producing, specifying, purchasing or supplying recycled or secondary aggregates.

The AggRegain website contains information on: specifications, suppliers, case studies, planning, recycling infrastructure, quality, waste management regulations, demolition, procurement and sustainability.

Website: <http://www.aggregain.org.uk/index.html>

Quick Wins

WRAP defines Quick Wins as a construction specification, product or material that offers the opportunity to increase recycled content beyond current average practice, and:

- is cost-competitive to procure and install within a construction scheme
- satisfies the conditions of being technically acceptable
- meets the required level of performance
- has a reliable supply and availability
- ideally, demonstrates strong environmental credentials, or at least does not introduce significant environmental penalties relative to conventional alternatives



Quick Wins options also include in-situ and ex-situ techniques for re-using waste materials (e.g., from highways maintenance - “turning roads back into roads”) that are commercially available, technologically proven, and offer financial and performance advantages over conventional construction methods.

WRAP has spent significant time producing guidance documents that provide details on specifications and products or materials that have been identified as Quick Wins:

- Opportunities to use Recycled Materials in Preliminary Building Works and Civil Engineering: Quick Wins Guide
- Opportunities to use Recycled Materials in Preliminary Building Works and Civil Engineering: Quick Wins Reference Manual
- The Big Picture. Specifying Recycled in Local Authority Contracts for Highways Maintenance: Good Practice
- Opportunities to use Recycled Materials in House Building: Reference Guide
- Opportunities to use Recycled Materials in Building: Reference Guide

These documents can be found at
www.aggregain.org.uk/procurement/quick_wins/index.html

CASE STUDIES

Numerous case studies are available demonstrating how specific recycled and secondary aggregates requirements can be incorporated into the procurement process.

1) Surrey, England

Surrey County Council’s new partnering contract, set up in 2003, defines the following performance indicator:

“The constructor will be expected to demonstrate an improvement in the use of recycled materials / products / processes year-on-year through the contract period.”(Waste and Resources Action Programme, 2006)

As this is not overly ambitious at the outset, all parties entered into a process of setting baselines in year one from which targets will be formulated. Regular meetings were set up to develop the use of recycled materials, and the contract requires records to be maintained regarding the extent of recycling. Arrangements have been made for stockpiling materials at depots prior to re-use.

Surrey County Council's partnering contract was awarded on both quality and price (50/50). The contract requires all parties to work towards the delivery of key objectives – including the reduction or elimination of waste and selection of the

most cost-effective solutions. The process will be driven by setting targets, which will include recycled content. The partnering approach, and open book accounting, will enable construction wastes to be stockpiled and re-deployed between the partners, in the most effective way to achieve mutual benefit. As part of its partnership contract for highways maintenance, Surrey County Council requires its contractors to record a range of information including:

- materials removed to tip (and ticketed) on a scheme basis
- materials recycled on a scheme basis
- imported recycled materials
- construction laying records
- material type and layer thickness
- material validation and/or supply certification

Recording this data allows the Council to verify that the contractor has been fulfilling the requirements laid down in the outcome-based contract specification.

2) London Borough of Merton

London Borough of Merton developing a framework agreement for the surfacing of carriageways with preferred suppliers. Sustainability and the use of recycled materials are addressed at all stages of the procurement process – identifying need, requirement specification, tender evaluation and contract management.

Requirement Specification

The department has set minimum levels for recycled content in different applications. These are 100% for sub-base, 20% for base and binder layers, and 5% for the surface course. Thresholds will be extended to other applications such as footways and street furniture in the near future. These levels reflect currently available and cost-competitive practice, and will be written into contract specifications – to be met by all tenders.

Tender Evaluation

Beyond the minimum specification, the department is keen to be offered higher levels of recycled content. In order to show that this still delivers Best Value, the department assesses competing tenders in terms of a quality / price balance (with 60% weighting to price). Quality factors include not just the recycled content itself, but also other benefits resulting from the chosen recycling process – such as reduced time to complete the work, fewer lorry journeys and less pressure on landfill. This reflects the scope under the Local Government Act to spend money that reduces costs to the Community, such as disruption, pollution and congestion.



Contract Management

The selected contractors will be evaluated at the end of each job against the Council's performance indicators. This will provide a continual incentive for innovation in the use of recovered materials.

Merton found that Standing Orders could have restricted their ability to introduce their new framework agreement for highways maintenance. In the first instance, this was avoided by using the scope for exemptions already built into the Council's Standing Orders – without waiting for the Orders to be revised. Merton's experience highlights the need to review Standing Orders to reflect current thinking on procurement good practice.

One of the lessons from Merton is the vital importance of a mandate from the top of the authority to implement requirements for recycled content. The clear linkage of contract specifications, award criteria and performance indicators to Council policy priorities, demonstrates this approach. Such a procurement strategy will serve local authorities well in Comprehensive Performance Assessments from 2005, where the Audit Commission proposes to assess how well procurement and other delivery mechanisms are aligned with Council corporate objectives.

Other Programs

WRAP also offers procurement assistance with the following programs:

ConGlassCrete – using recycled glass in concrete
<http://www.wrap.org.uk/conglasscrete/>

GlassAggregate – recycled glass in construction
<http://www.wrap.org.uk/dundee%5Fglass/>

RecycleWood – wood recycling and recycled wood products
<http://www.recyclewood.org.uk/>

IMPACTS AND EVALUATIONS

Baseline study already completed.

External market research company is currently determining extend of recycled content quantity change from 2004-2005. Anticipate research to be completed in March 2006.

LESSONS LEARNED

- Require top-down leaders in the private (e.g., owner) and public (e.g., policy driver) sectors
- Be creative, what can be added without increasing costs
- Have a solid evidence base (do your homework and research before starting a program)
- Supply the who, what, where, when, why and how to your audience in a clear and effective manner

FUTURE DIRECTION

- Increase number of projects that use recycled content materials
- Currently a Building Code recommendation is under review for the mandated use of recycled content materials in public and private building projects in England and Wales
- In future would consider adding the value of projects that set recycled content requirements as an evaluation criteria

EVALUATION CRITERIA

	Evaluation Criteria	Rating	WRAP Recycled Content Program Comments
1	Potential to influence Design-for-Environment	High	Procurement drives design.
2a	Environmental impacts: waste diversion potential	Low	Will expand if extended beyond government projects.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	High	Recycled content materials
2c	Other environmental impacts		
3	Provides a level playing field	High	
4	Jurisdiction responsibility		None, unless businesses, local authorities mandate use of recycled content materials
5	Regulatory requirements		None
6a	Administrative burden - WRAP	Low	4 full-time staff
6b	Administrative burden – Business/municipal	Low	
7	Cost		Not at liberty to say



	Evaluation Criteria	Rating	WRAP Recycled Content Program Comments
8	Program sustainability	Low	Government sponsorship
9	Market impact	Medium	Some players in the supply chain may feel disadvantaged (e.g., different products require different amounts of recycled content – commercial disadvantage)
10	Industry acceptance	High	Yes, positive response to take action
11	Ease of implementation	High	2 years
12	Ease of monitoring	High	None
13	Enforceability	High	None
14	Enforcement requirements		None
15a	Previously implemented – measured success in other jurisdictions		Market research on quantity change of recycled content materials from 2004-2005, anticipated completion in March 2006 Case studies
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	High	Sustainability building methods (e.g., BREEAM - BRE's Environmental Assessment Method, similar to LEED)
17	Novel/unique approach	Medium	Voluntary procurement initiative
18	Other potential negative side-effects (e.g., illegal dumping)	High	None
19	Applicability to Alberta	High	Procurement concept positive for government leadership.

Category 4: Mechanisms Linked to Permitting

SAN JOSÉ, CALIFORNIA – CONSTRUCTION AND DEMOLITION DIVERSION DEPOSIT (CDDD) PROGRAM

Population: 904,522

SUMMARY

City of San José's Construction and Demolition Diversion Deposit Program is an incentive program to encourage the recovery of C&D debris. Deposits are based on type of construction/alteration/demolition, project size and value, and range from \$0.10 per ft² to \$1.16 per ft². Additionally, a flat rate for roof tear-off projects is set at \$100. Partial refunds may be authorized when less than 50% by weight of the waste generated by project is diverted from landfill.

CDDD Website:

<http://www.sirecycles.org/business/cddd.htm>

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BACKGROUND

The California mandated Integrated Waste Management Act of 1989 (AB939) requires each local jurisdiction to divert 50% of its waste from landfills by the year 2000. In the late 1990's San José was diverted 43% of waste generated in the City. Based on a waste composition study and two landfill gate surveys performed in 1998 and 1999, the amount of C&D debris landfilled from San José projects each year was estimated to be more than 160,000 tons. At this time San José does not have a municipal diversion target; eventually they anticipate moving towards zero waste.

The Environmental Services Department developed the CDDD program to bring about more recycling and re-use of C&D materials. This program provides an incentive to generators of the C&D waste to recycle or re-use materials rather than landfilling disposal. The intent of the deposit is to at least equalize any differential economic costs to contractors and developers between diverting and landfilling materials. It is estimated that the City can achieve a 50% overall



diversion rate if just over half of C&D materials currently going to landfill diverted. As well, the CDDD program will stimulate growth of the C&D processing and re-use infrastructure in the San José area, causing even more diversion to occur, and adding to the overall economy.

ORDINANCES AND RESOLUTION

Resolution of the City of San José Establishing a Diversion Deposit for Construction, Demolition and Alteration Projects, Effective July 2001 – Resolution No. 69953

http://www.sirecycles.org/business/pdf/cddd_finalrate.pdf

Ordinance of City of San José Amending Chapter 9.10 of Title 9 of the San José Municipal Code to Establish the Construction and Demolition Diversion Deposit Program – Ordinance No. 26219

http://www.sirecycles.org/business/pdf/cddd_finalord.pdf

Ordinance of the City of San José Amending Sections 9.10.2420 and 9.10.2430 of Chapter 9.10 of Title 9 of the San José Municipal Code to Extend the Construction and Demolition Debris Deposit Program Exception for Roofing Projects and to Add Exemptions for Certain Types of Projects – Ordinance No. 26556

http://www.sirecycles.org/business/pdf/cddd_amend.pdf

PROGRAM DESCRIPTION

The City of San José's Construction and Demolition Diversion Deposit Program is an incentive program to encourage the recovery of C&D debris that has been in place for 4 ½ years. The City collects a deposit and fully refunds it if the C&D 50% of the C&D debris is diverted from the landfill. Partial refunds may be authorized when less than 50% by weight of the waste generated by project is diverted from landfill.

ELIGIBILITY

All projects requiring a building permit (under Chapter 24.02 of San José Municipal Code) require a CDDD Deposit, including residential and non-residential:

- New construction projects
- Alteration projects
- Demolition projects
- Roofing projects with tear-off

EXEMPTIONS

Numerous projects are exempt from the CDDD including:

- Roofing projects that do not include the tear-off of the existing roof
- Work for which only a plumbing permit, only electrical or only a mechanical permit is required
- Seismic tie-down projects
- Installation or replacement of shelves
- Installation of pre-fabricated patio enclosures and covers where no foundation or other structural building modifications are required
- Installation of swimming pools and spas, provided that the exemption shall apply only to (i) that area to be excavated for the installation of the pool or spa and (ii) the area for the pad for the pool/spa equipment that does not exceed sixteen square feet, and shall not apply to any related construction or alterations necessary for any other equipment or accessories, nor to any other portion of the project
- Installation of pre-fabricated accessories such as signs or antennas where no structural building modifications are required

DEPOSIT

When applying for a permit, the City assesses a deposit based on the square footage and type of project. The deposit is listed on the permit receipt. San José receives roughly 7,000 deposits each year or on average 26 permits a day which equates to approximately \$4 million annually.

Deposits are calculated based on the following rate schedule (Table 32).

Table 32: San José CDDD Program Rate Schedule

Building Segment	Deposit per Ft²	Minimum Valuation	Maximum Ft² Subject to Deposit
Residential new construction	\$0.20	\$115,000	125,000 detached 100,000 attached
Non-residential new construction	\$0.10	\$135,000	25,000 commercial 75,000 industrial
Residential alterations	\$1.16	\$2,000	None
Non-residential alterations	\$0.35	\$5,000	None
Residential demolition	\$0.35	\$5,000	None
Non-residential demolition	\$0.10	None	None
Flat Rate			
Roof project with tear-off	\$100.00	None	None



MATERIAL RECYCLING AND REUSE

Before starting the construction, remodeling or demolition, determining how to manage the C&D debris is important. Three options to consider include:

- A) Take materials to a Certified CDDD Facility for recycling/recovery
- B) Re-use or donate materials
- C) Combination – some materials can be taken to a CDDD Certified Facility for recycling/recovery and other materials can be re-used or donated

Document the selected method(s) and save the information for the refund. The easiest way is to take the materials to a CDDD-Certified Facility which has been audited by the City to verify that at least 50% of the material accepted is diverted from landfills.

Facility Certification Process

The facility certification process started in July 2001. Administrative Certification (inert processors recover at least 90%) and Full Certification (mixed C&D facilities recover at least 50%) are available. Updated Rules and Regulations effective July 2004 states that recovery facility certification includes:

- Procedures to obtain certification
- Facility operations and records requirements
- Customer receipts
- Reporting requirements

Due to the competitive nature of San José businesses it took little encouragement for businesses to become certified. Roughly 95% of the recycling/recovery facilities in the area are certified, this includes:

- 9 Mixed C&D/Landfills/Transfer Stations
- 7 Rock/Asphalt/Quarry
- 2 Metal
- 1 Carpet
- 1 Wood
- 1 Reuse

REFUND

In order to collect the refund three options exist:

- A) For projects where the materials are taken to a CDDD Certified Facility for recycling/recovery, submit the following:
- Permit receipt showing CDDD solid waste deposit amount paid
 - Original CDDD Refund Request Form (Figure 1) with Sections 1 and 2 completed and signed in blue ink
 - Copy of CDDD Certified Facility receipt for loads taken for recycling/recovery, with Permit Number printed on the receipt (not handwritten). Receipts must show volume, weight and type of material.
- B) For projects where the materials are re-used or donated, submit all of the following:
- Permit receipt showing CDDD solid waste deposit amount paid
 - Original CDDD Refund Request Form with Sections 1 and 2 completed and signed in blue ink
 - One page written description detailing how C&D debris and /or building materials were reused/donated or where no excess materials were generated for project
 - Attach photographs of project and salvaged materials
- C) For projects where the materials are taken to a CDDD Certified Facility for recycling/recovery and, When materials are re-used or donated, submit all of the following:
- Permit receipt showing CDDD solid waste deposit amount paid
 - Original CDDD Refund Request Form with Section 1 and 2 completed and signed in blue ink
 - Copy of CDDD Certified Facility receipt for loads taken for recycling/recovery, with Permit Number printed on the receipt. Receipts must show volume or weight and type of material
 - One page written description detailing how C&D debris and or building materials were reused/donated or where no excess materials were generated for project
 - Attach photographs of project and salvaged materials

Less than 50% of permit applicants apply for a refund, with \$1.5 million returned in 2004. The majority of the difference is attributed to a lack of communication; permit applicants tack on the deposit to project costs and owners do not realize that they can receive a refund. Even though no refund is applied for, the majority



of the C&D material is diverted as 95% of recycling/recovery facilities are certified by San José. This in turn leads to the question, if most C&D materials are processed at certified facilities, why imposed a deposit? San José's response is that a deposit is incentive to recycle and 'play by the rules'.

Today, roughly \$10 million remains in the program liability account unclaimed. In 2006 an ordinance will be taken to council stating if a refund has not been submitted 180 days after project completion the deposit will become the property of the CDDD program. Once the ordinance is passed, letters will be sent to all permit holders that have not claimed their deposit reminding that a refund application is required. After a designated date the money remaining belongs to the program and will be used as grant funding for industry market development and education, not program administration.

Figure 6: San José CDDD Program Deposit Refund Request Form
http://www.sjrecycles.org/business/pdf/cddd_refund_form.pdf

CDDD Refund Request Form

Please review the Refund Requirements and ensure all required information is included with this Refund Request Form. All Refund Requests must **include original signatures in blue ink**.

Approved refunds will be mailed within 90 days following receipt of Refund Request.

Applicants must initiate a Refund Request within 180 days following final project sign-off by the City Building Department, or following termination of the project. Delayed Requests will not be eligible for a refund.

Do not cut or modify this form. Please submit the entire page.

<p>Complete Sections 1 and 2 below. Refunds may not be issued if Sections 1 and 2 are incomplete.</p> <p>Section 1</p> <p>Permit Number _____ - _____</p> <p>Deposit Paid \$ _____</p> <p>Project Address _____</p> <p>City _____ Zip _____</p> <p>Section 2</p> <p><i>I certify that the information provided with this Refund Request represents the disposition of at least 90% of the materials generated from this project. Furthermore, I certify that this information represents materials generated only from the project listed above. (please use blue ink to sign)</i></p> <p>Signature _____</p> <p>Date _____</p> <p>Print Name _____</p> <p>Title _____</p> <p>Phone Number () _____</p> <p><i>Refund check will be mailed to the name and address listed on the Permit Receipt in the box marked "Received From". If the refund check is to be sent to a person or address other than that listed in the "Received From" box, please complete Sections 3 and 4 of this form.</i></p>	<p>If the refund check is to be sent to a person or address other than the "Received From" party listed on the Permit Receipt, complete Sections 3 and 4 below in addition to Sections 1 and 2.</p> <p>Change of Address for Refund Notice <i>(To be completed by "Received From" party listed on Permit Receipt)</i></p> <p>Section 3</p> <p>By signing my name, I hereby direct any CDDD Refund for</p> <p>Permit Number _____ - _____</p> <p>to be sent to the name and address listed in Section 4 below.</p> <p>Signature _____</p> <p>Date _____</p> <p>Print Name _____</p> <p>Title _____</p> <p>Section 4</p> <p>New Name/Address</p> <p>Name _____</p> <p>Address _____</p> <p>City _____</p> <p>State _____ Zip _____</p>
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Please review the Refund Requirements and ensure all necessary information is included with this Refund Request Form.

<p>Mail completed Refund Requests to:</p> <p>CDDD Refund Request Environmental Services City of San José 200 East Santa Clara Street San Jose, CA 95113</p>	<p>For City official use only</p>
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IMPACTS AND EVALUATION

From July 2004 to June 2005 C&D diversion rates are as follows:

- Asphalt - 98%
- Cardboard - 100%
- Carpet and Padding - 77%
- Concrete - 99%
- Dirt/Fill - 100%
- Landscape Trims - 99%
- Metals - 100%
- Mixed C&D - 56%
- Other - 79%
- Roofing - 29%
- Wood - 95%

In 2004 a Customer Survey Summary Report was completed for the Deposit Program. Key results from the survey include:

- Awareness of the CDDD program is widespread
- The strong general awareness may be an outgrowth of the successful dissemination of promotional materials
- In addition to information received through the brochure, one-third of respondents have contacted the City regarding the CDDD program, and most are satisfied with the service they received
- Survey respondents overwhelmingly support the concept behind the CDDD program
- Concern about the environment dominated reasons volunteered for supporting the CDDD program
- Those opposed to the program commented most on what they perceived to be its bureaucracy
- Two out of five respondents who have taken a permit out in the past three years have collected a refund of their deposit under the terms of the CDDD program
- The reasons mentioned most for not taking part in the program had little to do with qualitative aspects of the program
- Among those who had collected a refund, seven out of ten were satisfied with the overall operation of the program
- In addition, by nearly a two to one ratio, those who had taken part in the program consider the amounts of the deposit to be reasonable
- Seven out of ten respondents who have collected a refund under the terms of the program consider the process for doing so to be easy

- Roofers appear to have somewhat higher levels of unhappiness with the program than do other types of businesses
- When asked how the City could encourage recycling and reuse of building materials, respondents generally called for publicizing more information about the CDDD program or streamlining the process for participation
- Sizable majorities of respondents said that people would be more likely to recycle if the City provided more information about the types of materials that could be recycled and the places where the materials could be recycled, or sent follow-up letters to those who did not collect refunds

LESSONS LEARNED

- Set deadline for deposit refunds
- Strong education component is required (e.g., clear written instructions)
- Individual running deposit program should have experience with the construction industry
- Deposit is not significant enough for builders to recycle, only a few projects
- Sweat the details with the Permit Center/Building Department
- Plan for staffing upfront
- You can not control everything
- Have accurate data

FUTURE DIRECTION

- Pass ordinance that gives deposit program all money not refunded after 180 days
- Increase recovery of roofing materials
- Add case studies to website

EVALUATION CRITERIA

	Evaluation Criteria	Rating	City of San José CDDD Program Comments
1	Potential to influence Design-for-Environment	Low	Focus on waste
2a	Environmental impacts: waste diversion potential	High	Incentive stimulates diversion
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	None, believes that LEED and other green building programs/specifications result in using recycled-content materials
2c	Other environmental impacts		



	Evaluation Criteria	Rating	City of San José CDDD Program Comments
3	Provides a level playing field	High	Minor exemptions (e.g., work for which only a plumbing, electrical or mechanical permit is required and seismic tie-down projects)
4	Jurisdiction responsibility		Municipal
5	Regulatory requirements		Ordinances and AB939 state requiring municipalities to meet 50% diversion
6a	Administrative burden - Municipal	Medium	2 full-time staff (1 to process refunds and 1 for program coordination)
6b	Administrative burden - Business	Medium	Initially some complaints, now no complaints, complaints decreased once business realized that program was here to stay No fee given to permit department; little work with deposits
7	Cost		Capital costs: \$300,000 (including consultant studies, database development and stakeholder meetings) Annual operational costs: 2 staff positions and education/marketing (e.g., brochures)
8	Program sustainability	High	Program paid for through AB939 (waste \$0.50/yard from generator) and commercial fees (waste \$3.49/yard from hauler - franchise system) The \$0.50/yard totals approximately \$1.7 million annually and goes to the Environmental Services Department to fund commercial programs such as CDDD, outreach, technical assistance, desk side recycling containers and desk top 'cups' for waste, electronics recycling The \$3.49/yard totals roughly \$10 million annually and goes into a General Fund for streets and infrastructure
9	Market impact	Low	None
10	Industry acceptance	Medium	Over time initially resistant but once implementation - medium-high
11	Ease of implementation	High	-2 years lead time (includes waste characterization study; 2 landfill gate surveys and public consultation) -lead time mostly tied to political process -no need to 'reinvent the wheel' enough studies that can cut down lead time
12	Ease of monitoring	High	No inspections
13	Enforceability	High	Must pay deposit when apply for permit must prove diversion for refund
14	Enforcement requirements		Financial incentive to get back deposit
15a	Previously implemented – measured success in other jurisdictions	High	Success measured through certified facilities tonnage and % diversion, and # of deposits/refunds

	Evaluation Criteria	Rating	City of San José CDDD Program Comments
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	Medium	Waste management plan, no bans or landfill differential tipping fees
17	Novel/unique approach	High	Detailed deposit
18	Other potential negative side-effects (e.g., illegal dumping)	High	Does not encourage dumping as have to prove recycling
19	Applicability to Alberta	High	Proven success and positive feedback to deposit concept from stakeholders suggest good potential.



SAN DIEGO, CALIFORNIA - CONSTRUCTION AND DEMOLITION DEBRIS DIVERSION PROGRAM

Population: 1,200,000

SUMMARY

City of San Diego's Construction and Demolition Diversion Deposit Program is an incentive program to encourage the recovery of C&D debris. Deposits are based on type of construction/alteration/demolition, project size and value, and range from \$0.10 per ft² to \$0.35 per ft². Additionally, a flat rate for roof tear-off projects and residential alterations have deposits set at \$100 and \$500 respectively. Partial refunds may be authorized when less than 50% (ramping up to 75%) by weight of the waste generated by project is diverted from landfill.

City website:

<http://www.sandiego.gov/environmental-services/recycling/green.shtml>

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BACKGROUND

A State law, Assembly Bill 939, requires local governments to reduce waste disposed in landfills by 50% by the year 2000. In that year, the City of San Diego diverted 48% and the latest data shows it at 45% diversion in 2003. The California Integrated Waste Management Board granted the City of San Diego two extensions to meet the mandated diversion requirements. The first extension expired in December 2004 and the second expires December 31, 2005. If the City fails to achieve 50% diversion, it can be fined \$10,000 a day until compliance is achieved. At this time the City of San Diego has not set a municipal waste diversion target.

Despite significant diversion efforts, the City of San Diego has not met the 50% State mandated diversion rate. The City's diversion rate in 2002 is estimated at 44%, a drop of 4% from the 2000 rate of 48%. This drop correlates to an increase in construction and demolition activities in the region. Construction and demolition waste comprises approximately 35% of total waste disposed in the City. While efforts have been made to provide for recycling of source separated C&D material in the San Diego region, approximately 400,000 tons of mixed

C&D waste continues to enter the Miramar Landfill each year. For every 33,000 tons of C&D material recycled, the City will achieve 1% toward 50% waste diversion.

ORDINANCE

On October 10, 2005 the San Diego City Council unanimously adopted the C&D Ordinance. The Ordinance will start 45 days after a mixed C&D recycling facility is operating in the City of San Diego. The diversion requirement starts at 50%, 45 days after a certified facility with a 50% diversion rate opens (anticipated fall of 2006) and ramp up to 75%, 30 days after a 75% certified facility is opened (approximately 6 months to one year after 50% certified facility opens).

Ordinance Amending Chapter 6, Article 6 of the San Diego Municipal Code by Adding Division 6, Sections 66.0601, 66.0602, 66.0603, 66.0604, 66.0605, 66.0606, 66.0607, 66.0608, 66.0609, and 66.0610, All Relating to the Diversion of Construction and Demolition Debris From Landfill Disposal
http://www.sandiego.gov/environmental-services/recycling/pdf/0-2005-143_rev.pdf

PROGRAM DESCRIPTION

Construction and Demolition Program

1) C&D Debris Diversion Deposit Ordinance

Applies to applicants for building permits and demolition permits, including the City if projects require such a permit. This deposit provides an incentive for generators of C&D to recycle or reuse debris rather than landfill disposal.

Eligibility

The City will collect a refundable diversion deposit for specified construction, demolition or remodeling projects when applicants submit building or demolition permit applications.

Exemptions

Exemptions to the deposit requirement include the following:

- Pools
- Decks
- Carports
- Fences
- Retaining walls
- Projects that only require plumbing
- Electrical or mechanical permit
- Projects generating only hazardous waste
- Projects with a calculated deposit of less than \$100



Deposit

The deposit amount is based on the type and size of the project (Table 33). Applicant must submit a Waste Management Form Part I with the permit which estimates the type and amount of waste material that the project will generate. Deposits will be calculated by Development Services Department staff, based on the approved deposit schedule and paid with the permit application fee. The City hopes that the deposits charged is enough to promote behavioural changes, if not they have the ability to change deposit rates at the department director level without going through City Council.

Table 33: City of San Diego Construction and Demolition Debris Diversion Deposit Schedule

Building Category	Deposit/Ft ²	Maximum Ft ² Subject to Deposit	to Ordinance
Residential New Construction	\$0.20	125,000 detached 100,000 attached	500
Non-residential New Construction	\$0.10	25,000 commercial 75,000 industrial	1000
Non-residential Alterations	\$0.35	None	286
Residential Demolition	\$0.35	None	286
Non-residential Demolition	\$0.10	None	1000
Flat Rate			
Roof Project with Tear-off	\$100	None	None
Residential Alterations	\$500	None	500

(City of San Diego, 2005a)

Material Recycling and Reuse

The applicant is required to document recycling activities at facilities certified by the City. A certified facility is one that meets City standards for debris recovery, verifies the applicant's diversion rate and ensures that they have obtained all required permits and licenses necessary to operate the facility in California. The City is currently developing rules and regulations for the certification process. It is anticipated that a private C&D material recovery facility (city/private partnership) will be built next to the City's composting site and will be operational by the fall of 2006. Another private C&D material recovery facility located on San Diego's outskirts will be ready for business in the summer of 2006. Participation in the program by processing and reuse facilities is on a voluntary basis. When possible, reuse of debris is encouraged, with the requirement that applicants provide photo and narrative documentation of their efforts.

Refund

In order to be entitled to a diversion deposit refund, in whole or in part, the applicant is required to submit to the Environmental Services Department within 180 days of the final inspection date for the project the Waste Management Form Part II along with the documentation that establishes the diversion rate the applicant achieved for the project. If the diversion requirement is achieved, a refund will be approved and a cheque sent within 30 days of receipt. Refunds will be prorated on a straight scale if partial compliance is achieved. In the event that an applicant does not request a refund of the C&D deposit within 180 days of the final inspection date, or is entitled to a partial refund only, the deposit and/or unrefunded balance becomes the property of the City. Interest on deposits is also the property of the City.

It is estimated that non-refunded deposits will be \$200,000 - \$300,000 during the first year of implementation. This money will go directly back to the program for administration and education costs.

Enforcement

The City of San Diego is business friendly, enforcement through inspections, infractions, fines or jail time is not planned at this time.

- 2) City-funded projects which do not require a building permit or demolition permit, but which are expected to generate C&D debris.

City funded projects that do not require building permits are required to recycle C&D debris pursuant to contract provisions.

- 3) Projects undertaken by City Departments which are expected to generate significant C&D debris.

Environmental Services Department is to continue to work with Engineering & Capital Projects to develop contract language for all City contracts that will generate recyclable waste debris. City funded projects that require building or demolition permits are subject to the Ordinance.

- 4) Educational and outreach effort which will ensure that all affected parties are knowledgeable about C&D recycling.

Prior to Ordinance implementation, the Environmental Services Department (ESD) and Development Services Department (DSD) will undertake extensive public education and outreach efforts. Educational materials such as bulletins and handouts are to be developed and provided on ESD's and DSD's websites, and made available at DSD information centers, libraries and Community Service



Centers. Additionally, information will be provided in industry newsletters and staff will offer workshops and technical assistance to industry organizations.

Policy

Construction and Demolition (C&D) Material Recycling
Council Policy No. 900-16
Effective November 22, 2004
<http://clerkdoc.sannet.gov/Website/council-policy>

The purpose of this policy is to express the City's commitment to recycling C&D waste, as an integral part of the City's comprehensive solid waste management strategy, and to provide guidance in promoting, facilitating and instituting such practices in the community, including City departments, the building industry, and waste haulers.

Upon review of the effectiveness of this policy in meeting Assembly Bill 939 requirements and City diversion goals, or as a result of compliance orders or other mandates from regulatory agencies including, but not limited to, the California Integrated Waste Management Board, the City Council may direct staff to take additional measures to increase the diversion of C&D waste. Such actions may include, but are limited to, implementing ordinances requiring the recycling of C&D materials, or banning the landfill disposal of C&D materials. Should additional measures be necessary, efforts will be made to minimize fiscal impacts on private industry and the City, and more specifically, the City's General Fund.

The following principles are strongly encouraged for adoption by private industry:

1. Businesses, organizations, and contractors are encouraged to facilitate as much waste diversion from landfills as possible through recycling, waste reduction and reuse.
2. Demolition, construction and renovation project proponents should evaluate potential for maximizing waste diversion through recycling, waste reduction and reuse. Diversion plans should be adequately communicated with all contractors and subcontractors.
3. Diversion goals should be 100% diversion of inert materials (e.g., concrete, rock, asphalt, dirt) and at least 50% diversion of all remaining materials by weight if mixed C&D recycling facilities are available or as feasible through source separation of recyclable materials if a mixed C&D facility is not available.
4. Businesses, organizations, and contractors should purchase products made from recycled materials to the maximum extent feasible.

Tipping Fees

50% - 80% of tipping fees can be saved by bringing separated recyclables over mixed loads (Table 34).

Mixed wastes are loads composed of refuse and recyclable materials.

Table 34: Tipping Fees Cost Comparison at Miramar Landfill

Material Type	Fees
Mixed Waste	\$43/ton (average) - includes \$24/ton tipping fee, \$12/ton franchise fee, \$7/ton Assembly Bill 939 fee
Recyclable Concrete	\$10/ton (average)
Recyclable Green Waste	\$22/ton (average)

(City of San Diego, 2005b)

IMPACTS AND EVALUATION

Once the program is implemented measurements of success will be verifying if C&D loads to City landfill decrease, tonnage received at C&D MRF's and the reporting through permit and refund applications.

LESSONS LEARNED

- Have a structured stakeholder process
- Be aware that stakeholder intentions may be genuine to begin with, over time intentions may change. If intentions are not genuine move forward with program as stated to stakeholders. Keep resolve.
- Work closely with Building Permit Department from beginning; learn about the permitting process

FUTURE DIRECTION

- Will have a C&D recycling telephone hotline number operational in early 2006. Anticipate that no one will answer the phone. If message left, then someone will respond.
- Need to have program officially implemented to determine future direction.

**EVALUATION CRITERIA**

	Evaluation Criteria		City of San Diego Construction and Demolition Debris Diversion Comments
1	Potential to influence Design-for-Environment	Low	Focus remains on waste.
2a	Environmental impacts: waste diversion potential	High	Financial incentive could drive high diversion.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	Waste focus.
2c	Other environmental impacts		
3	Provides a level playing field	High	Exemptions (e.g., pools, decks, carports, fences, retaining walls, projects generating only hazardous waste, projects with a calculated deposit of less than \$100).
4	Jurisdiction responsibility		Municipal
5	Regulatory requirements		Ordinances and AB939 state requiring municipalities to meet 50% diversion
6a	Administrative burden - Municipal	High	-Currently 4 people working 10-20% time; in future anticipate 2-3 people working full time (1 accountant, 1 review refund applications, 1 coordination) - Building Permits Division will paid \$15-25/transaction, anticipate 7000-8000 transactions annually
6b	Administrative burden - Business	High	Businesses not happy about additional administration work; will do if mandated
7	Cost		\$105,000 to \$200,000 paid annually to Building Permits Division, program staff, printing and distribution of materials (\$30,000 in 2006, less in following years), database development
8	Program sustainability	High	-Current salaries paid for by \$7.00/ton Assembly Bill 939, fee paid at landfill gate and billed to business later -AB939 fees bring in roughly \$1,000,000 annually which funds recycling programs (e.g., curbside recycling and yard waste collection, code enforcement, community clean-ups, field operations, and education and policy) -Internal Department decision on how fees spent -In future hope that program will be sustainable from non-refunded deposits
9	Market impact	Medium	No impacts, hope for market growth, markets already in place, city/private partnership to build a C&D MRF
10	Industry acceptance	Low	Little acceptance: chamber of commerce, contractors, C&D recyclers, haulers all oppose as do not like having to follow another regulation and pay deposit

	Evaluation Criteria	Rating	City of San Diego Construction and Demolition Debris Diversion Comments
11	Ease of implementation	Medium	Takes about 1 year after stakeholder consultation
12	Ease of monitoring	Medium	No inspections at this point
13	Enforceability	High	No infractions/fines/jail time City of San Diego is business friendly
14	Enforcement requirements	High	Time penalty (if waste management plan/form not filled out correctly, applicant will have to reapply) deposit/refund program
15a	Previously implemented – measured success in other jurisdictions		
15b	Previously implemented – initiated, but no measurement of impacts		In early stages of implementation, evaluation yet to come
16	Reinforces or complements other instruments	High	Waste management plan/form, no bans, hope that C&D MRF fee will be same as landfill tipping fee
17	Novel/unique approach	High	Detailed deposit
18	Other potential negative side-effects (e.g., illegal dumping)	Low	C&D waste must be collected by non exclusive franchise hauler; anticipate that non franchised haulers will start business
19	Applicability to Alberta	High	Positive feedback on deposit option from stakeholders.



OAKLAND, CALIFORNIA - CONSTRUCTION AND DEMOLITION DEBRIS WASTE REDUCTION AND RECYCLING REQUIREMENTS

Population: 399,484

SUMMARY

Building permit applicants are required to develop a recycling plan for all project waste to assist in achieving the city's goals of reducing construction and demolition debris sent to landfills by 50% or greater. This program is extremely hands-on by nature.

City website:

<http://www.oaklandpw.com/oakrecycles/construction/index.htm>

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BACKGROUND

Thousands of tons of construction and demolition debris from Oakland are needlessly disposed of each year (76,000 tons, or 152 million pounds were landfilled in 1999). More than half of these materials can be reused or recycled, conserving limited natural resources and landfill space.

California State law requires Oakland to reduce its quantity of materials disposed at landfills by 50% from 1990 levels. Additionally, Alameda County Reduction and Recycling Initiative (Measure D) requires 75% waste reduction by 2010 (Alameda County is on the path towards zero waste) and the City of Oakland has implemented a 75% waste diversion target.

The Reduction and Recycling Initiative (Alameda County Waste Reduction and Recycling Act (1990) – Measure D) was approved by voters in 1990. It established aggressive countywide waste diversion goals above the goals mandated by the state. Measure D not only sets a 75% and higher goal for reduced landfilling, but also places the main emphasis on preserving natural resources and describes the need to establish long-term sustainable consumption and disposal patterns.

ORDINANCE

The Construction and Demolition Recycling Ordinance was established with other programs, to meet the 75% recycling goal and keep materials from being buried in the landfill. Ordinance 12253 § 2 (part) became effective July 2000.

Construction and Demolition Debris Waste Reduction and Recycling
Requirements
Municipal Code Title 15, Chapter 15.34, Sections 15.34.010-15.34.090

<http://bpc.iserver.net/codes/oakland/>

PROGRAM DESCRIPTION

Affected building permit applicants are required to develop a recycling plan for all waste, scrap and debris generated for the scope of work covered by a building permit. This will assist in meeting the city's goals of reducing construction and demolition debris sent to landfills by a minimum of 50%.

A Waste Reduction and Recycling Plan was the selected construction and demolition waste diversion tool as City Council had pressure to minimize financial constraints on local businesses or those potentially relocating to Oakland.

ELIGIBILITY

The following types of permits are affected:

- All new construction
- Demolition
- Alteration/Addition with construction valuation of \$50,000 or greater

EXEMPTIONS

- Demolition of single family dwellings and duplexes
- Alteration/additions for single family residents

WASTE REDUCTION AND RECYCLING PLAN (WRRP)

Complete and submit a Waste Reduction and Recycling Plan (Figure 7) with building permit application.

The WRRP shows how projects will meet the 50% or greater diversion of all construction and demolition debris.



The following quantities must be listed in tons:

- Estimated amount of construction and demolition debris generated based on material take offs
- Estimated quantities of materials reused, recycled and/or disposed
- Reuse, recycling and disposal facilities and service providers to be used

If WRRP indicates less than 50% of construction and demolition diversion, additional information (in writing) explaining why the 50% requirement cannot be achieved must be submitted (e.g., hazardous materials).

Completed WRRP's are to be submitted to the building permit counter at the City of Oakland.

The WRRP is reviewed to ensure that it is complete and that quantities of materials generated and overall plan for reducing waste by 50% or greater is realistic. The review will be completed in three to five business days. Plans are returned if they are incomplete, writing illegible, calculations unrealistic or inaccurate, or wrong form is submitted. A hold will be placed on issuance until revisions are received and approved. City staff is not responsible for delays due to requests or revisions.

Figure 7: City of Oakland Waste Reduction Recycling Plan
<http://www.oaklandpw.com/oakrecycles/construction/pdf/wrrp.pdf>

Construction & Demolition Debris Waste Reduction and Recycling Plan (WRRP)



CITY OF OAKLAND

This form must be completed for the following types of projects:

- All New Construction
- Demolition, (excluding single family & duplex)
- Addition/Alteration with construction valuation exceeding \$50,000 (excluding single family & duplex)

NOTE: Building permits will not be issued without an approved WRRP. Allow 5 business days for WRRP processing. A separate WRRP is required for each building permit. Submit WRRP with permit application to the Building Permit Counter, 250 Frank H. Ogawa Plaza, 2nd Floor. If you have questions, please call **(510) 238-SAVE (7283)**. **DO NOT FAX**

Application #: _____
 Project Address:(Include floor, suite, etc.): _____
 Contact Name: _____ Title: _____
 Company: _____
 Contact Mailing Address: _____
 Phone: _____ Fax: _____ Email: _____

- 1) Project Type (check one): New Construction Addition/Alteration Demolition
- 2) Building Type (check one): Non-residential Single Family/Duplex Apartment
(condo, live/work)
- 3) Tenant Improvement (check one): Yes No
- 4) Size of Project _____ sq. ft Project Valuation \$ _____
- 5) Estimated Start Date ___/___/___ Estimated Completion Date ___/___/___
- 6) a Briefly describe project (e.g. renovate warehouse, remodel office, etc.),
 b Indicate handling method(s) for scrap/waste materials to ensure salvage/reuse or recycling
 c List communication method to inform employees and subcontractors the recycling requirements.
 (Do not attach additional materials.)

For City Use Only:			
Permit No. _____	App Filed ___/___/___	WRRP Submitted ___/___/___	
Project Name _____	Permit Counter Staff Initials _____	<input type="checkbox"/> OT	
ESD Staff Initials _____	Received ___/___/___	Approved ___/___/___	Type of Assistance _____
PTS <input type="checkbox"/> 104 <input type="checkbox"/> 305	DB ___/___/___	Applicant Contacted ___/___/___	Time Spent _____
<input type="checkbox"/> 50% Diversion	<input type="checkbox"/> Good Cause	<input type="checkbox"/> Non-Attainment	Hold Placed ___/___/___
<input type="checkbox"/> Approved	<input type="checkbox"/> Conditional Approval	<input type="checkbox"/> Not Approved	Hold Removed ___/___/___



REQUIREMENT:

Reduce quantity of materials disposed at landfills by 50% or more by weight.

Instructions: Develop a plan outlining how much scrap and debris will be generated during construction or demolition and include handling methods for all materials. Complete the chart below and make sure your column totals are correct. Estimate the total volume of construction scrap and discard related to this permit. Determine how you will reuse or recycle at least 50% of that material. Consult the Builders Guide to Reuse and Recycling for vendors and recycling centers. All items on this list have the potential to be recycled.

Column A – Tons of scrap/debris for each material type. Refer to your materials take-offs. Use Materials Conversion Worksheet, to convert from cy, sqft, bdft, etc.

Columns B, C, D –quantities to be salvaged or reused; recycled; or disposed.

Column E –list vendors or facilities you plan to use for salvage or reuse, recycle, or disposal.

Column Totals – Add up all quantities listed in Column A, B, C and D.

<<Recycled Mixed Debris – See Instructions on Mixed Debris Worksheet. Do not forget the \$10.00 rebate. >>

Application #:		Project Address:			
Material Type	A Total Quantity Discarded	B Salvage or Reuse*	C Recycling	D Disposal (non-recyclable)	E Proposed Destination(s)
<i>Example: Cardboard</i>	<i>1.5 tons</i>	<i>0.25</i>	<i>1.25</i>		<i>on site packaging & Davis St. Recycling Center</i>
Asphalt & Concrete					
Brick/ Masonry/Tile					
Cabinets/Fixtures/Windows/Doors/ Equipment (circle all that apply)					
Carpet					
Carpet Padding/Foam					
Cardboard					
Ceiling Tile (acoustic)					
Drywall (used/painted)					
Drywall (New, unpainted sheets or scrap)					
Landscape Debris (brush, chips, trees, stumps, etc.)					
Scrap Metal (all types)					
Wood, Pallets, & Lumber clean & unpainted, no pressure treated wood					
Non-Recyclable Debris		X	X		
Other, indicate					
Recyclable Mixed Debris §		X	X		
Column Totals	A	B	C	D	

* See instructions for definition of Salvage/Reuse §- see instructions for Mixed Debris and Rebate Program

7. Fill in the blanks below to determine if your plan meets the City's requirement of reducing project waste by 50% or more.

Column Totals $B \underline{\quad} + C \underline{\quad} = \underline{\quad} \div A \underline{\quad} = \underline{\quad} \times 100 = \underline{\quad} \%$

8. Is the percentage listed in #7 greater than or equal to 50%? YES NO

If NO, explain why _____

Print Name: _____ Signature: _____ Date ____/____/____

MATERIAL RECYCLING AND REUSE

Keep all weight tags, gate receipts and/or necessary to document actual quantities of materials generated, reused, recycled ad/or disposed throughout the project, as well as a listing of facilities or service providers used.

SUMMARY REPORT

Deliver completed Summary Report (similar to the WRRP), to the city building services counter prior to sign off at Final Inspection, and issuance of a temporary certificate of occupancy or certificate of occupancy. Quantities must be verifiable, based on weight tags or other documentation. If less than 50% of construction and demolition debris was diverted documentation demonstrating that a 'good faith' effort was made to achieve the 50% waste reduction goal must also be submitted.

The Summary Report is reviewed after final inspection and prior to issuance of a temporary certificate of occupancy or certificate of occupancy to determine if the applicant met the goals.

ENFORCEMENT

Certificate of Occupancy is held until compliance reports are approved and the city has the right to monitor and inspect progress.

TRANSPORTATION OF CONSTRUCTION AND DEMOLITION DEBRIS

The ordinance also states that it is "unlawful for any person other than city's licensed franchised collector or those persons employed by the franchise collector to collect or haul and construction and demolition debris within the city except: under contract to the city and those collected through private arrangements between the generator and the collector. Loads which consist of mixed paper and which contain more than 10% by weight of residual shall not be considered source separated recyclables. Loads which consist of recyclables other than mixed paper and which contain more than 5% by weight of residual shall not be considered source separated recyclables."

IMPACTS AND EVALUATION

At this time approximately 70% of construction and demolition materials is being diverted.



LESSONS LEARNED

- Requiring a deposit gets builders undivided attention
- Real incentives make a difference to builders
- Not all projects require a Certificate of Occupancy
- No all inspectors collect reports

FUTURE DIRECTION

- Pushing to a minimum 70% recycling rate, except 100% on asphalt and construction materials
- Emphasis on deconstruction versus demolition
- Cash incentives for recycling rates > 85%
- Sliding scale for deconstruction versus demolition recycling tonnage
- May also add single family dwellings alterations and demolitions to program

EVALUATION CRITERIA

	Evaluation Criteria	Rating	City Oakland Construction and Demolition Debris Waste Reduction and Recycling Requirements Comments
1	Potential to influence Design-for-Environment	Low	Focus on waste.
2a	Environmental impacts: waste diversion potential	Medium	No direct incentives. Soft approach.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	Focus on waste.
2c	Other environmental impacts		
3	Provides a level playing field	High	Exemptions (e.g., demolition of single family dwellings and duplexes, alteration/additions for single family residents)
4	Jurisdiction responsibility		Municipal
5	Regulatory requirements		Ordinance, Alameda County Waste Reduction and Recycling Act (Measure D) requiring 75% diversion and AB939 requiring 50% diversion

	Evaluation Criteria	Rating	City Oakland Construction and Demolition Debris Waste Reduction and Recycling Requirements Comments
6a	Administrative burden - Municipal	Low	One full-time employee Alameda County staff conducts inspections
6b	Administrative burden - Business	High	Complaints regarding administration time spent filling out WRRP and Summary Report
7	Cost	?	Unknown, difficult to track
8	Program sustainability	Low	Paid for through grants (e.g. Alameda County) and Measure D 1990
9	Market impact	Medium	Some markets were expanded and the City co-sponsored a private (Waste Management Inc.) C&D MRF in San Leandro that opened in 2002
10	Industry acceptance	High	Yes
11	Ease of implementation	High	One year to prepare before program is implemented
12	Ease of monitoring	Medium	Inspections take place quarterly for all sanctioned facilities
13	Enforceability	High	Certificate of Occupancy held until compliance reports are approved
14	Enforcement requirements		Time delays
15a	Previously implemented – measured success in other jurisdictions	High	Program success measured in tonnage diverted and turn around time for application processing
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	High	No landfill bans, differential tipping fees supports the program and the program supports source separation for maximum recycling rates
17	Novel/unique approach	Medium	Hands-on process with inspections
18	Other potential negative side-effects (e.g., illegal dumping)	High	None
19	Applicability to Alberta	Medium	May be an applicable component in conjunction with other tools.



CHICAGO, ILLINOIS - CONSTRUCTION OR DEMOLITION SITE WASTE RECYCLING ORDINANCE

Population: 2,896,016

SUMMARY

Fine based approach starting January 1, 2006 with 25% recycling of all C&D debris, measured by weight, increasing to 50% recycling of all C&D debris, measured by weight, effective January 1, 2007.

Fines for construction projects or demolitions greater than 10,000 ft² of renovated, newly constructed, or demolished space, \$1,000 for each percentage point of difference between the amount by this section to be recycled and the amount actually recycled. For projects less than 10,000 ft², \$500 for each percentage point of difference between the amount required by this section to be recycled and the amount actually recycled.

CONTACT

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City website:

http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Streets+and+Sanitation%2fConstruction+Recycling+Information%2fI+Want+To&deptMainCategoryOID=-536890017&channelId=0&programId=0&entityName=Streets+and+Sanitation&topChannelName=Dept&contentOID=536918761&Failed_Reason=Session+not+found&contentTypeName=COC_EDITORIAL&com.broadvision.session.new=Yes&Failed_Page=%2fwebportal%2fportalContentItemAction.do&context=dept

BACKGROUND

At this time there is no state waste diversion target.

The City of Chicago has a significant problem with illegal dumping, especially from small 'mom and pop' businesses.

The intent of the ordinance is to encourage recycling to achieve the City of Chicago's 2006 25% diversion goal, maintain C&D sites as good neighbors, hold general and demolition contractors responsible and to achieve the vision of making Chicago America's Greenest City.

ORDINANCE

City of Chicago Construction or Demolition Site Waste Recycling Ordinance
http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?topChannelName=HomePage&contentOID=536932617&Failed_Reason=Session+not+found&contentTypeName=COC_EDITORIAL&com.broadvision.session.new=Yes&Failed_Page=%2fwebportal%2fportalContentItemAction.do

Approved: December 2004
Effective: January 2006

PROGRAM DESCRIPTION

In December 2004, the Chicago City Council passed the Construction or Demolition Site Waste Recycling Ordinance. Beginning with permits issued in January 2006, the ordinance requires:

- 25% recycling of all C&D debris, measured by weight, starting January 1, 2006
- 50% recycling of all C&D debris, measured by weight, starting January 1, 2007

Excludes waste contaminated by lead, asbestos, or other hazardous materials that are not legal to recycle.

C&D debris defined in Municipal Code Section 11-4-120.

In December 2005, ordinance amendments went to City Council and were approved. Amendment changes became effective January 1, 2006 with the program initiation.

ELIGIBILITY

These requirements apply to the following:

- Construction of a new residential building with four or more units
- Construction of a new non-residential building greater than 4,000 ft²
- Rehabilitation of a building that requires a certificate of occupancy from the Department of Buildings
- Demolition of a residential building with four or more units that includes demolition of at least one outside wall
- Demolition of a non-residential building greater than 4,000 ft²
- Demolition project for which the total cost is \$10,000 or more.



EXEMPTIONS

Exemptions include projects that require only a plumbing, electrical or mechanical permit; residential projects with less than four units, and non-residential projects with 4,000 ft² or less.

PROCESS

When a general or demolition contractor applies for a building/demolition permit they receive a construction and demolition site recycling package which includes a Recycling Compliance Form and a Hauler Affidavit that must be completed within 30 days of project completion. The permit application has a completion date that signals to the Department of the Environment (DOE) when follow-up is required.

The general or demolition contractor submits a notarized affidavit containing:

- Total amount of waste produced on site (less not recyclable waste, e.g., asbestos)
- Total amount of waste recycled
- Calculation of any applicable penalty
- Receipt from Department of Revenue that penalty has been paid
- Notarized affidavit from waste hauler/recycler

The Department of Buildings is not able to issue a new permit until the compliance verification has occurred on the previous project.

COMPLIANCE VERIFICATION

The Department of the Environment or Department of Constructions and Permits verifies that the forms are complete. If the forms are not complete or the DOE has further questions, a short or long audit follows which includes site inspections and dump/recycling ticket confirmation. Contractors are required to keep all dump and recycling tickets for three years after project completion.

In order to obtain a certificate of occupancy from the Department of Buildings, documentation (e.g., notarized affidavits) must be submitted from the contractor and waste hauler verifying compliance.

FINES

Projects that fail to meet the recycling percentages are subject to the following fines by the DOE:

1. For construction projects or demolitions greater than 10,000 ft² of renovated, newly constructed, or demolished space, \$1,000 for each percentage point of

difference between the amount by this section to be recycled and the amount actually recycled.

2. For construction projects or demolitions involving less than 10,000 ft² of renovated, newly constructed, or demolished space, \$500 for each percentage point of difference between the amount required by this section to be recycled and the amount actually recycled.

Originally the fines were \$5,000 for each percentage point difference for projects greater than 10,000 ft² and \$2,000 for each percentage point of difference for projects less than 10,000 ft². Groups lobbied the City of Chicago that the fines were to steep resulting in a fine adjustment with the December 2005 amendment.

The City of Chicago has yet to determine how fine money will be spent.

ENFORCEMENT

- Liability for full penalties as if nothing was recycled (e.g., up to \$25,000)
- Can't get future permits until forms are submitted
- Can't get Certificate of Occupancy until form are submitted
- Subject to general or demolition contractor license revocation for failing to submit forms

EDUCATION/COMMUNICATION

- Contractor seminars and training
- Best Management Practices brochure
- Website
- Recycling Compliance Forms
- List of recycling facilities (yet to come)

IMPACTS AND EVALUATION

As this program is being implemented on January 1, 2006, no evaluation on the program success has taken place. The City of Chicago anticipates that changes will occur overtime, including amendments to the Construction or Demolition Site Waste Recycling Ordinance. At this stage the City is ensuring that everything runs smoothly for the ordinance implementation and is minimizing potential concerns upfront.

**LESSONS LEARNED**

- Planning stage is time consuming
- Positive and negative effects of interdepartmental work
- Have a lawyer involved to ensure that constitutional issues are addressed from the beginning (e.g., if fined, businesses have a right to a hearing; can't hold a certificate of occupancy).

FUTURE DIRECTION

The City plans to create a database tool that will automatically calculate weight of construction and demolition material diverted to measure program success

EVALUATION CRITERIA

	Evaluation Criteria	Rating	City of Chicago Construction or Demolition Site Waste Recycling Ordinance Comments
1	Potential to influence Design-for-Environment	Low	Focus on waste.
2a	Environmental impacts: waste diversion potential	High	If fines high enough then effective
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	None identified.
2c	Other environmental impacts		
3	Provides a level playing field	High	Some exemptions exist (e.g., projects that require only a plumbing, electrical or mechanical permit, residential projects with less than four units, and non-residential projects with 4,000ft ² or less)
4	Jurisdiction responsibility		City of Chicago waste diversion goal; 25% by 2006
5	Regulatory requirements		City of Chicago Ordinance; no state waste diversion goal
6a	Administrative burden - Municipal	Medium	2 full-time and 1 half-time working on implementation; anticipate need to hire more when program starts for inspections/audits
6b	Administrative burden - Business	High	Fill out forms, varies with size of project, must obtain notarized affidavits
7	Cost	?	Mostly labour costs that are funded through Illinois Environmental Protection Agency grants right now; not sure where funding will come from once program starts; marketing/communication costs (e.g., brochures, contractor seminars, advertising)
8	Program sustainability	?	Working on how to sustain program

	Evaluation Criteria	Rating	City of Chicago Construction or Demolition Site Waste Recycling Ordinance Comments
9	Market impact	Low	Recently tendered a marketing study to research recycling facilities in Chicago and surrounding area and in northwest Indiana
10	Industry acceptance	Medium	Mixed review
11	Ease of implementation	High	Relatively easy; one year lead time; resistance to initial fines
12	Ease of monitoring	Low	Labour intensive with inspections and audits
13	Enforceability	?	Requires staff to do so. Will work on as program develops
14	Enforcement requirements		Yes, 25% C&D recycling by 2006; 50% C&D recycling by 2007 onsite inspections
15a	Previously implemented – measured success in other jurisdictions		
15b	Previously implemented – initiated, but no measurement of impacts		Looking at how to evaluate program
16	Reinforces or complements other instruments		No other instruments used
17	Novel/unique approach	Medium	Punitive
18	Other potential negative side-effects (e.g., illegal dumping)	Low	Anticipate none
19	Applicability to Alberta	Low	Punitive approach not likely to be acceptable.



Category 5: Regulatory or Mandatory Mechanisms

ONTARIO, CANADA - 3Rs REGULATIONS FOR CONSTRUCTION AND DEMOLITION PROJECTS

Population: 12,541,410

SUMMARY

3Rs Regulations from 1994 are still on the books in Ontario, although not enforced. Regulation 102/94 required construction projects of at least 2,000 m² in Ontario to carry out waste audits and develop waste reduction plans. Additionally, Regulation 103/94 stated that brick and Portland cement concrete, cardboard, drywall (unpainted), steel and wood (not including painted or treated wood or laminated wood) from construction projects greater than 2,000 m² must be source separated. Meanwhile for demolition projects brick and Portland cement, steel and wood (not including painted or treated wood or laminated wood) must be source separated.

BACKGROUND

The waste management crisis in Ontario in the early 1990's led to the formation of different industry working groups to assess how to reduce waste streams from different industries, or large volume materials. The C&D group suggested regulations to create a level playing field.

In February, 1991, the Ontario Government established the Waste Reduction Action Plan (WRAP), in response to projections that Ontario would face a waste disposal crisis by the mid-1990's. Prior to 1997, the US government had prohibited solid waste imports from Ontario unless the waste was incinerated. The process of finding new landfills was becoming increasingly difficult and expensive.

One of the goals of WRAP was to ensure that Ontario would reach a provincial waste reduction goal of diverting 50% of waste from disposal by 2000, using 1987 as a baseline against which the reduction was measured. The goal has still not been reached in 2005 (current Ontario diversion is about 28%).

To achieve this goal, WRAP had several components. The most important was development of the 3Rs regulations to stimulate reduction, reuse and recycling of waste generated by the municipal and IC&I sectors. The original intent was that the 3R regulations would function in the context of clear 3R funding programs, administered by the Waste Reduction Office (WRO) of MOE. WRAP was based on the development of a comprehensive public education program to provide information, training and technical assistance on waste reduction and recycling of waste. The Ontario government changed from NDP to Conservative in 1995. The

US border opened up to Ontario waste; cheap landfill became available and the crisis was averted for a number of years.

The Conservatives were in power in Ontario from 1995 to 2003. The new Liberal government of Dalton McGuinty was elected in October, 2003. Meeting a 60% diversion objective by 2008 was an election promise the government is slow to break. Attention has been focused on waste management recently and the Ontario government is evaluating their options to increase waste diversion.

With the recent Michigan objections to landfilling over 3 million tonnes of Ontario waste each year, the Ontario government may have a crisis on their hands by mid-2006.

PROGRAM DESCRIPTION

Even though they have not been enforced, the 3Rs regulations are still on the books in Ontario.

Regulation 102/94 required certain sizes of businesses in Ontario to carry out waste audits and develop waste reduction plans. It applied to:

- Retail Shopping Establishments (Part II)
- Retail Shopping Complexes (Part III)
- Large Construction Projects (Part IV)
- Large Demolition Projects (Part V)
- Office Buildings (Part VI)
- Restaurants (Part VII)
- Hotels and Motels (Part VIII)
- Hospitals (Part IV)
- Educational Institutions (Part X)
- Large Manufacturing Establishments (Part XI)

Part IV of the regulation stipulated that:

“Builders” of construction projects with an area of at least 2,000 m² were required to:

- Conduct a waste audit covering the waste that will be generated in the construction project. The audit shall also address the extent to which materials or products used consist of recycled or reused materials or products (Section 20. (1))
- Prepare a written report of the audit (20.2)
- Prepare a written waste reduction work plan, based on the waste audit, to reduce, reuse and recycle waste generated in the construction project (O. Reg 102/94, s 21)



- Implement the waste reduction work plan
- The waste reduction workplan shall include measures for communicating the plan to the workers at the construction site and, as a minimum, those measures shall require
- That the plan be posted at the construction site in a place where most of the workers will see it and
- If a summary is posted, that any worker who requests to look at the plan be allowed to do so.
- The waste audit and waste reduction work plan had to be completed before construction began at the site.

Requirements are virtually the same for demolition projects (waste audit, waste reduction work plan and communication).

Regulation 103/94 required source separation of the following materials in construction projects greater than 2,000 m²:

- Brick and Portland cement concrete
- Cardboard
- Drywall (unpainted)
- Steel
- Wood (not including painted or treated wood or laminated wood).

For demolition projects, the materials which had to be source separated were:

- Brick and Portland cement
- Steel
- Wood (not including painted or treated wood or laminated wood)

Specific wording re source separation was:

- Provide for the removal from the building site of any commingled categories of waste set out in Part III of the Schedule and for the immediate separation of such waste from all other kinds of waste and also from each other category of waste in Part III at:
 - Permanent premises of the person undertaking the construction project;
 - Permanent premises of the person on whose behalf the construction project is undertaken or
 - A waste disposal site operating under the authority of a certificate of approval or provisional certificate of approval.

This provision allowed the designated materials for source separation to be commingled at the site, but they had to be subsequently separated and

“reasonable efforts to ensure that full use is made of the program and that the separated waste is reused or recycled”

IMPACTS AND EVALUATION

When the Ontario 3Rs regulations were brought into force in 1994, they were accompanied by a series of guides published by the Ontario Ministry of Environment Waste Reduction Office to help waste generators, packagers, municipalities and recycling site operators understand and comply with the requirements contained in the regulations. The Waste Reduction Office was available to provide support for communication and education to waste generators who had questions. The WRO was disbanded in fall, 1994, and communication and education of the IC&I sector stopped. It also became clear that enforcement of the 3Rs regulations was not a government priority.

When the regulations were brought into force in March, 1994, the then Minister of the Environment stated that “the new requirements will divert as much as 2 million tonnes of waste a year”, and that “we will meet our year 2000 target of 50% waste reduction in ways that benefit both our environment and our economic recovery”. It is not clear how the estimate of 2 million tonnes was developed, and it is clear that this diversion never occurred.

In 1995 the MOE undertook an extensive review of all of its regulations to assess if there was a continuing need for each regulation. MOE staff reviewers concluded that the initial objectives of the 3Rs regulations were still valid, and that voluntary mechanisms (such as Memoranda of Understanding between the MOE and private sector companies) were not sufficient to meet the ambitious waste diversion objectives.

An assessment carried out by the Environmental Commissioner of Ontario (ECO) in 2000 concluded that:

- Ontario was lagging behind other provinces in waste diversion, even though it was the only province with 3Rs regulations in place, making diversion mandatory for the IC&I sector, and also with strong markets which could support higher diversion
- When the 3Rs regulations were initially promulgated, the MOE provided \$200,000 to the Recycling Council of Ontario to provide educational material and operate a telephone hotline. These programs ended in 1995.
- Large buildings and agencies, including those occupied by the Government of Ontario, and construction projects with government of Ontario funding, were out of compliance with the 3Rs regulations
- Many waste generators (including construction and demolition companies) were unaware that the 3Rs regulations existed
- Many businesses and institutions used the 3Rs regulations as the rationale to put recycling systems in place, with the understanding that a



level playing field would be established through enforcement of the regulations

- Reduction of the MOE educational activities, lack of enforcement and substantial decreases in landfill tipping fees meant that the recycling activities remained stationary
- Newer and smaller companies are unaware of the regulations altogether
- Stakeholders suggested that greater enforcement would be welcome to help rejuvenate the regulations

The MOE lacked personnel and financial resources to administer the 3Rs regulations. Therefore, there was a complete lack of enforcement of the 3Rs regulations, virtually from the day they were promulgated. There has only been one charge for non-compliance with the regulations, resulting in a fine of \$250 in 1994. Only two occurrence reports were recorded between 1999 and 2001 for Central Region. MOE staff is discouraged from logging these types of occurrences, despite an MOE policy that stipulates that any complaints received be documented.¹

LESSONS LEARNED

- Effective and clear enforcement is needed to make regulations work.
- An enormous effort is needed to effectively communicate the needs of source separation regulations to small and medium sized companies in particular.
- It is difficult to enforce regulations on construction sites unless you have a fairly large workforce; enforcement needs resources and costs money
- Not attached to a permitting process

WHAT THEY WOULD DO DIFFERENTLY

- Some method of linking communication to building permits would be effective.

	Evaluation Criteria	Rating	Ontario 3Rs Regulations Comments
1	Potential to influence Design-for-Environment	Low	In Ontario - Not in terms of materials chosen, no incentive to choose recycled; some incentive to design for minimal waste generation. No incentive.
2a	Environmental impacts: waste diversion potential	High	Has huge diversion potential if markets are available for recovered material and regulations are enforced.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	

¹ Environmental Commissioner of Ontario 2000/2001 Annual Report, Page 95

	Evaluation Criteria	Rating	Ontario 3Rs Regulations Comments
2c	Other environmental impacts		
3	Provides level playing field	Medium	A level playing field would have been provided in Ontario if they were enforced. Cut off of 2,000 sq m eliminates a lot of small projects.
4	Jurisdiction responsible		Provincial regulations.
5	Regulatory requirements		Provincial Regulations were written in Ontario
6	Administrative burden	High	For company in Ontario, these regulations were a nuisance and a lot of work if they have been followed
7	Cost	Medium	Costs to construction companies mostly in Ontario, to have source separation, develop a plan, and recycle rather than dispose (recycling more expensive).
8	Program sustainability	Low	It would have been sustainable in Ontario if markets were secure or regulation enforced.
9	Market impact	Medium	Potential to disrupt construction materials markets.
10	Industry acceptance	Low	Industry want level playing field; will always resist regulations
11	Ease of implementation	Medium	Biggest implementation challenge is to enforce, and establish markets
12	Ease of monitoring	Low	A lot of work
13	Enforceability	Low	A lot of work to enforce at each site;
14	Enforcement requirements	Low	Need to visit each site, or have some method of using associations to self police.
15	Previously implemented Measured success in other jurisdictions Initiated, but no measurement of impacts		No measurement of impact in Ontario. Should be significant if they had been implemented
16	Reinforces or complements other instruments	High	Procurement specs for government construction projects would help
17	Novel/ unique approach	Low	Ontario regulations were novel at the time.
18	Other potential negative side-effects (i.e. illegal dumping)	High	No evidence of illegal dumping in Ontario
19	Applicability to Alberta	Medium	Provides an interesting potential provincial regulatory framework.



CONCLUSIONS

The Ontario 3Rs Regulations were unsuccessful because of lack of enforcement, but they provide a good model for Alberta to work from.

Challenges are to figure out:

- How to enforce
- Where the cut-off should be to not have to comply with source separation and waste reduction planning requirements
- See how associations can get involved in enforcement or self-policing
- Develop a good training program on how to do audits and write plans
- How to rationalize the costs of source separation and writing regulations if disposal is cheaper
- Create markets for the finished products through procurement specs (true EPR)

CALIFORNIA - ASSEMBLY BILL 939 AND PUBLIC RESOURCES CODE

Population: 33,871,648

SUMMARY

In 1989, California State mandated 25% diversion by 1995 and 50% diversion by 2000, and gave the California Integrated Waste Management Board (CIWMB) the option to impose administrative civil penalties of up to \$10,000 per day for continued failure to comply. Through the Public Resources Code, cities and counties are given the power to collect fees sufficient to pay the costs of preparing, adopting, and implementing a countywide integrated waste management plan. Additionally, the CIWMB is allowed to collect fees for an Integrated Waste Management Fund that assists with subsidizing CIWMB programs.

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BACKGROUND

In 1990, the nation's landmark solid waste law, the Integrated Waste Management Act, (Assembly Bill 939) took effect in California to build up the state's recycling-based infrastructure and reduce reliance on landfill disposal. Authored by then-Assembly Member Byron Sher (D-Palo Alto), the law placed new and unprecedented responsibility on California cities and counties to manage solid waste.

Assembly Bill 939 was imposed at a time when stringent environmental regulations came into place. At this time many California landfills did not have a scale and long-term life, and they tended to be expensive and difficult to locate.



PROGRAM DESCRIPTION

Even though Assembly Bill 939 pertains to waste diversion of all waste streams, it is the driving force for numerous city and county C&D waste diversion programs. San Diego and San Jose's deposit refund systems, and Oakland's waste management plan are discussed in detail in their respective case study sections. Numerous other C&D diversion programs are found throughout California.

ASSEMBLY BILL 939

Assembly Bill 939, part of the Integrated Waste Management Board Act of 1989 included the following provisions as stated in the History of California Solid Waste Law 1985-1989 (California Integrated Waste Management Board, 2005a):

1) California Integrated Waste Management Board

Replaced the part-time Solid Waste Management Board with a six-member California Integrated Waste Management Board (CIWMB). Required the new Board to include: one member appointed by the Governor with private sector experience in the solid waste industry; one member appointed by the Governor who has served as an elected or appointed official of a non-profit environmental protection organization, whose principle purpose is to promote recycling and the protection of air and water quality; two members appointed by the Governor who shall represent the public; one member appointed by the Senate Committee on Rules who shall represent the public; and one member appointed by the Speaker of the Assembly who shall represent the public.

2) Integrated Waste Management Planning

Replaced the County Solid Waste Management Plan (CoSWMP) with an Integrated Waste Management Plan (IWMP). Required each county to establish a task force to coordinate the development of city Source Reduction and Recycling Elements (SRREs) and a countywide siting element. Required each city, by 7/1/91, to prepare, adopt and submit a SRRE to the county which includes the following components: waste characterization; source reduction; recycling; composting; solid waste facility capacity; education and public information; funding; special waste (asbestos, sewage sludge, etc.); and household hazardous waste. Also required each county, by 1/1/91, to prepare a SRRE for its unincorporated area, with the same components described above, and a countywide siting element, specifying areas for transformation or disposal sites to provide capacity for solid waste generated in the jurisdiction which cannot be reduced or recycled for a 15 year period. Required each county to prepare, adopt, and submit to the Board an Integrated Waste Management Plan (IWMP), which includes all of the elements described above, according to the following schedule: by 1/1/92 for counties with less than 5 years landfill capacity; by 1/1/93

for counties with 5 to 8 years landfill capacity; by 1/1/94 for counties with more than 8 years landfill capacity.

3) Waste Diversion Mandates

Required each city or county plan to include an implementation schedule which shows: diversion of 25% of all solid waste from landfill or transformation facilities by January 1, 1995 through source reduction, recycling, and composting activities; and, diversion of 50% of all solid waste by January 1, 2000 through source reduction, recycling, and composting activities. Excluded agricultural wastes, inert wastes and other wastes not normally disposed of at landfills. Authorized any plan submitted after 1/1/95 to include up to 10% transformation in achieving its 50% diversion goal, provided front-end removal of recyclable materials and other specified conditions are met. Authorized the Board to exempt a city or county from these goals or to reduce the requirements if the city or county demonstrates that attainment of the goals is not feasible due to the small geographic size of the jurisdiction and the small quantity of waste generated. Authorized the Board to establish an alternative goal to the 50% requirement, after 1/1/95, if the Board finds that the local agency is effectively implementing all source reduction, recycling, and composting measures to the maximum extent feasible. Also authorized the Board to reduce the goals for any city or county which, prior to 1/1/89, disposed of 75% or more of its solid waste by transformation, provided that attainment of the 25% or 50% waste diversion goals would impair existing contracts, or would interfere with repayment of debt incurred to finance a transformation project.

4) Board Review of IWMPs and Plan Implementation

Required the Board to approve or disapprove a city element or a county plan within 120 days of receipt. Required the Board to issue a notice of deficiency with specific recommendations for corrections, if an element or plan is disapproved, providing 120 days in which the city or county must correct the document and resubmit it to the Board. Required the Board to conduct a public hearing on any element or plan which still fails to meet the requirements after the revision, and authorized the Board to impose administrative civil penalties of up to \$10,000 per day for failure to submit an adequate plan. Also required the Board to review the implementation of each SRRE at least once every two years. Authorized the Board, if it finds, after a public hearing, that the city or county has failed to implement its element, to issue an order of compliance with a specific schedule. Also authorized the Board to impose administrative civil penalties of up to \$10,000 per day for continued failure to comply. Required each city to review its element and each county its plan at least once every five years to correct deficiencies, comply with the waste diversion requirements, and revise documents as necessary.



5) *Permitting and Enforcement*

Established a comprehensive statewide system of permitting, inspections, enforcement, and maintenance for solid waste facilities. Required the Board to adopt minimum standards for solid waste handling and disposal to protect air, water, and land from pollution. Required the Board, by 1/1/94, to establish minimum standards requiring operators of solid waste facilities to provide assurance of financial ability to respond to possible damage claims. Required the Board, by 8/1/91, to prepare and adopt certification regulations specifying requirements that a local agency shall meet before being designated as a Local Enforcement Agency (LEA). Required the Board, in conjunction with an inspection conducted by an LEA, to conduct at least one inspection per year of each solid waste facility in the state.

6) *Financing*

Authorized local jurisdictions to impose fees based on the types or amounts of solid waste generated to be used to pay actual costs incurred in preparing, adopting and implementing integrated waste management plans, as well as in setting and collecting the local fees. Also provided that state planning, implementation and operating costs be funded by a fee collected by every operator of a solid waste landfill and paid quarterly to the Board of Equalization, based on all solid waste disposed of at each disposal site, after 1/1/90. Set the fee initially at 50 cents per ton through 6/30/90; at an amount sufficient to generate the 1990-91 funding, but not to exceed 75 cents per ton from 7/1/90 through 6/30/91; and, from 7/1/91, at an amount sufficient to generate funding for each fiscal year, but not to exceed one dollar per ton. (*Chapter 1095*) Fees discussed in this section pertain to the state Integrated Waste Management Fund.

ALTERNATIVES

Due to extraordinary circumstances cities/counties may not be able to meet the 50% diversion goal. Alternative options exist for those that require assistance, including an alternative diversion rate (to a rate reasonable to achieve) and time extensions.

For instance, San Diego and Newport Beach received time extensions to December 31, 2005 while Mendota and Brisbane received alternative diversion rates set at 44% and 40% respectively.

In order to receive an alternative the city/county must submit written documentation to the CIWMB stating the reasoning for not meeting the diversion goal.

Effective January 1, 2006, no further time extensions will be granted.

ENFORCEMENT

Very rarely has a penalty been issued to municipalities that have not achieved the 50% diversion target. Those that have received a fine have shown no effort towards waste diversion at all. To date, the \$10,000 per day fine has not been imposed. Typically the penalty is in the range of \$1,000 to \$3,000 per day as the state has the discretion to adjust the fine as required.

PUBLIC RESOURCES CODE

Public Resources Code website:

<http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=prc&codebody=&hits=20>

INTEGRATED WASTE MANAGEMENT FUND

Today, the Public Resources Code, Sections 48000 – 48008 (Legislative Council State of California, 2005) states that “each operator of a disposal facility shall pay a fee quarterly to the State Board of Equalization which is based on the amount, by weight or volumetric equivalent, as determined by the board, of all solid waste disposed of at each disposal site”. A disposal site is defined as a landfill or transfer station.

Commencing in 1995-96 the fee was \$1.34/ton, today it is at the maximum of \$1.40/ton. This fee is one of three that finances California Integrated Waste Management Board work, including C&D diversion research. Other fees include a tire and used oil fee. Only a statutory change including verification of why additional money is required can increase the \$1.40/ton fee.

Fees are deposited in an Integrated Waste Management Fund. Unless otherwise specified, all money received shall be used for:

- Administration and implementation of this division
- State water board's and regional water board's administration and implementation of Division 7 (commencing with Section 13000) of the Water Code at solid waste disposal sites
- State water board and regional water board regulatory activities for solid waste landfills

If the fee established pursuant to Section 48000 does not generate revenues sufficient to fund the programs specified in this section, or if the amount appropriated by the Legislature for these purposes is reduced, those reductions shall be equally and proportionally distributed between funding for the solid waste programs of the state water board and the regional water boards and the board.

If an operator of a solid waste landfill receives less than a monthly average of five tons per operating day, they are exempt from the fee.



PROVISION FOR CITY AND COUNTY PROGRAM FUNDING

The Public Resources Code, Sections 41901 – 41904, also gives municipalities and counties the power to “impose fees in amounts sufficient to pay the costs of preparing, adopting, and implementing a countywide integrated waste management plan prepared pursuant to this division. The fees shall be based on the types or amounts of the solid waste, and shall be used to pay the actual costs incurred by the city or county in preparing, adopting, and implementing the plan, as well as in setting and collecting the local fees. In determining the amounts of the fees, a city or county shall include only those costs directly related to the preparation, adoption, and implementation of the plan and the setting and collection of the local fees. A city, county, or city and county shall impose the fees pursuant to Section 66016 of the Government Code.”

In addition, “local agency may directly collect the fees authorized by this chapter or may, by agreement, arrange for the fees to be collected by a solid waste hauler providing solid waste collection for the city or county.”

IMPACTS AND EVALUATIONS

The purpose of Assembly Bill 939 is to conserve resources and extend landfill capacity, not penalize jurisdictions for increases in population or economic growth. Thus, when population and the economy grow, jurisdictions do not automatically fail to meet the diversion goals. The impacts of demographic and economic changes on the waste stream are considered when calculating diversion rates. By incorporating these demographic factors, the CIWMB’s adjustment method allows comparisons between years regardless of the changes in population and economics.

Table 35 summarizes California’s estimated diversion rates from 1989 to 2004.

Table 35: Estimated Statewide Diversion Rates
<http://www.ciwmb.ca.gov/lgcentral/Rates/Diversion/RateTable.htm>

Year	Millions of Tons			Estimated Diversion Rate
	Estimated Diversion	Reported Disposal	Estimated Generation	
1989 ¹	5.0	44.0	49.0	10%
1990	8.5	42.4	50.9	17%
1991	9.7	39.5	49.2	20%
1992	10.2	38.4	48.6	21%
1993	11.4	36.7	48.1	24%
1994	12.4	36.3	48.7	25%
1995	13.7	36.0	49.7	28%
1996	15.9	35.0	50.9	31%
1997	17.0	35.5	52.5	32%
1998	18.5	37.4	55.9	33%
1999	22.2	37.5	59.7	37%
2000	28.0	38.1	66.1	42%
2001 ²	29.9	38.1	68.0	44%
2002 ²	34.2	37.6	71.8	48%
2003 ²	35.8	39.9	75.7	47%
2004 ²	37.0	40.9	77.9	48%

¹1989 estimates are based on the best available data at that time. The rise in estimated diversion and the rate of diversion from 1989 to 1990 is attributed to the acquisition of more complete and consistent data under AB 939, as well as adjustments to that data reflecting program expansion since 1989.

²2001-2004 disposal figures do not include waste sent to three Integrates Waste Management Board-permitted inert mine reclamation facilities in Southern California. This represents approximately two percentage points of diversion.

(California Integrated Waste Management Board, 2005b)

CIWMB site inspections take place along with biannual reporting from cities/counties to the Board. If a city/county is on compliance, they must submit reports every two to three months.

The CIWMB has a Countywide, Regionwide and Statewide Jurisdiction Diversion Progress Report database that describes how each city/county making headway with waste diversion. This database can be found at <http://www.ciwmb.ca.gov/LGTools/mars/jurdrsta.asp>

LESSONS LEARNED

California's public is very receptive to environmental initiatives.

**FUTURE DIRECTION**

The CIWMB will be looking at waste currently being landfilled and determine which resources can be diverted to the highest and best good. Additionally, it is anticipated that discussions may start in 2006 regarding an increase to the waste diversion target from 50% to 75%.

EVALUATION CRITERIA

	Evaluation Criteria	Rating	Assembly Bill 939 Comments
1	Potential to influence Design-for-Environment	Low	Program targeted at disposal.
2a	Environmental impacts: waste diversion potential	High	Incentive and overall goal to divert waste.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Low	Focused on quantity, not type of waste.
2c	Other environmental impacts		
3	Provides level playing field	Medium	Not a cookie cutter approach, looks at the needs, concerns and circumstance for each jurisdictions. No complete exemptions exist but alternatives (e.g., time extensions and alternative diversion rates) applied in some cases.
4	Jurisdiction responsible		State
5	Regulatory requirements		Assembly Bill 939 and numerous amendments, Public Resources Code
6	Administrative burden	High	200-plus staff, grants/loans, administrative costs
7	Cost		Too long ago to remember. Needed staff and grants/loans.
8	Program sustainability	High	On-going program costs paid for by \$1.40/ton landfill fee.
9	Market impact	Low	Works within existing system. Active program for recycled content materials, includes promoting diversion, developing markets, purchasing recycled content materials.
10	City/county acceptance	High	California public is very supportive of environmental initiatives.
11	Ease of implementation	?	Unsure – lack of institutional memory.
12	Ease of monitoring	Medium	Biannual reports submitted by jurisdiction.

	Evaluation Criteria	Rating	Assembly Bill 939 Comments
13	Enforceability	?	Unsure – not generally enforced. Fines of up to \$10,000/day if do not meet 50% diversion requirement.
14	Enforcement requirements		Have only fined a few jurisdictions.
15	Previously implemented Measured success in other jurisdictions Initiated, but no measurement of impacts	High	Large number of municipalities with track record.
16	Reinforces or complements other instruments	High	Is the reason why other instruments are used (e.g., bans)
17	Novel/ unique approach	High	State mandate.
18	Other potential negative side-effects (i.e. illegal dumping)	Low	Illegal dumping always existed, no substantial increase with AB 939 adoption
19	Applicability to Alberta	Medium	Provincial goal good fit. Fines for municipalities not likely to be well-received.



MASSACHUSETTS – WASTE DISPOSAL BAN REGULATION, CONSTRUCTION AND DEMOLITION MATERIALS

Population: 6,416,505

SUMMARY

Effective July 1, 2006 the State of Massachusetts is banning asphalt pavement, brick, concrete and metal from disposal, incineration or transfer for disposal at a solid waste facility. Additionally, wood will be banned from disposal or transfer for disposal at landfills.

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BACKGROUND

Significant volumes of C&D debris are generated in New England. In 2002, construction and demolition debris accounted for 36% of all residential and commercial solid waste generated in Massachusetts, and nearly 50% of the state's total commercial solid waste stream.

In Massachusetts, the Department of Environmental Protection (DEP), in its Beyond 2000 Solid Waste Master Plan, committed Massachusetts to an 88percent reduction in C&D waste by 2010. The plan also stated that the DEP would ban the disposal of unprocessed C&D in 2003, assuming an adequate market-based infrastructure was in place.

In 2003, an estimated 4,720,000 tons of construction and demolition waste was generated in Massachusetts, with approximately 3,990,000 tons being diverted (85% diversion).

ORDINANCES AND RESOLUTION

310 CMR 19.017: Waste Disposal Ban Regulation
<http://www.mass.gov/dep/recycle/laws/bansreg.htm>

PROGRAM DESCRIPTION

To assist in achieving the Solid Waste Master Plan goal, the DEP is banning asphalt pavement, brick, concrete and metal from disposal, incineration or transfer for disposal at a solid waste facility effective July 1, 2006. Additionally, wood will be banned from disposal or transfer for disposal at landfills effective July 1, 2006.

Waste Ban Compliance Plans from landfills need to be submitted to the appropriate DEP regional office by April 1, 2006.

Landfills will not be allowed to accept any of these banned materials for disposal and facilities can meet the ban by not accepting the materials or by diverting the materials to C&D processing facilities. Transfer stations must comply with the waste bans and will need to demonstrate that if they accept C&D waste then those loads will be diverted to a C&D processor or directly to recycling markets.

The DEP does not anticipate significant export of C&D waste for disposal in landfills out of state.

Additionally, Massachusetts has a sample construction and demolition waste management plan that contractors can use voluntarily to itemize a breakdown of materials that will be recycled, reused, and salvaged. This allows for easier on-site categorization of materials that will be handled by different vendors.

Waste Management Plan

<http://www.mass.gov/dep/recycle/reduce/wastplan.pdf>

ELIGIBILITY

- Landfills
- Transfer stations
- Municipal waste combusters
- C&D processor facilities

EXEMPTIONS

- Loads under five cubic yards do not require comprehensive load inspections or record keeping
- 20% minimum standard of asphalt, brick, concrete, metal and wood combined per load
- Municipal waste combusters may accept wood for combustion
- Transfer stations can send loads to facilities that will divert restricted material from disposal



CAPACITY TO PROCESS

Massachusetts has sufficient capacity online and coming online to process all the C&D waste generated and to divert banned materials from disposal.

- 10 C&D waste processing facilities in Massachusetts
 - 1 C&D processing facility in New Hampshire which takes 65% of its material from Massachusetts sources
- Total management capacity of over 7,000 tpd
- Total yearly capacity of approximately 2,100,000 tpy
- 4 new facilities coming on line that will add 1,110,000 tons per year of capacity (two anticipated by the end of 2006 and two by the end of 2007)
 - 1 permitted and under construction
 - 3 in the permit process

ENFORCEMENT

State Solid Waste Regulations enforce bans. Fines can vary from a notice of non-compliance (warning) to \$25,000.

Massachusetts has applied fines to other bans and anticipates that it will need to fine non-compliance of the C&D material bans.

IMPACTS AND EVALUATION

Once the ban is in effect, measurements of success will be determined through annual reports from landfills, transfer stations, municipal waste combustors, and C&D processor facilities.

Once the program is implemented measurements of success will center on C&D loads decreasing at landfills, tonnage received at C&D material recovery facilities and reporting through permit and refund applications.

LESSONS LEARNED

- Source separation is feasible and economically viable at job sites
- Research local construction practices before designing a ban
- Work with local stakeholders
- Research regionally and internationally for more ideas

FUTURE DIRECTION

- Potential ban of asphalt shingles and gypsum wallboard in the future

EVALUATION CRITERIA

	Evaluation Criteria	Rating	Massachusetts Waste Disposal Ban Regulation – C&D Materials
1	Potential to influence Design-for-Environment	Medium	Bans may influence future design considerations.
2a	Environmental impacts: waste diversion potential	High	Ban should drive diversion.
2b	Environmental impacts: material substitution (e.g., durable, recyclable)	Medium	Bans may influence future design considerations.
2c	Other environmental impacts		
3	Provides a level playing field	High	Exemptions (e.g, loads under five cubic yards do not require comprehensive load inspections or record keeping)
4	Jurisdiction responsibility		State
5	Regulatory requirements		Waste Disposal Ban Regulation
6a	Administrative burden - State	Low	Several individuals contributed time
6b	Administrative burden - Business	Low	
7	Cost	Low	Labour by DEP
8	Program sustainability	High	Regulation provides stability.
9	Market impact	Medium	Will drive local recycling markets
10	Industry acceptance	Medium	Lots of questions at beginning, not a lot of resistance
11	Ease of implementation	Medium	-Took four years due to extenuating circumstances (e.g., recession, change in management) - If process runs smoothly, should take two years
12	Ease of monitoring	High	Annual reports from landfills, transfer stations, municipal waste combustors and C&D processor facilities
13	Enforceability	High	Solid Waste Regulations allows for enforcement and fines
14	Enforcement requirements		
15a	Previously implemented – measured success in other jurisdictions	High	First state to mandate C&D material bans



	Evaluation Criteria	Rating	Massachusetts Waste Disposal Ban Regulation – C&D Materials
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments	Low	Stand-alone regulation
17	Novel/unique approach	Medium	State-wide ban
18	Other potential negative side-effects (e.g., illegal dumping)	High	A significant amount of C&D waste is recycled now with very little illegal dumping
19	Applicability to Alberta	High	Alternatives suggest aggregate bans could be accepted.

CAPITAL REGIONAL DISTRICT, BRITISH COLUMBIA
WASTE DISPOSAL BANS - CONSTRUCTION AND DEMOLITION MATERIALS

Population: 354,206

SUMMARY

Landfill bans have been part of the Capital Regional District waste diversion strategy since 1991 and are only implemented when viable and sustainable recycling alternatives exist. Recyclable materials banned from disposal include drywall (1991); corrugated cardboard, metal appliances, tires and telephone directories (1993); scrap metal, aggregate, asphalt, concrete, rubble and clean soil (1995), and paper fibres (1998).

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BACKGROUND

The original Capital Regional District (CRD) Solid Waste Management Plan, which was approved in 1989, called for 10% waste diversion by 1993 and 15% by 1998. The Solid Waste Management was revised in 1991 and again in 1995 to establish a 50% solid waste diversion goal and confirm the need to develop phase 2 of the Hartland landfill. Since 1995 the Plan has not changed, however five amendments are attached.

Today the CRD is working towards the 50% solid waste diversion goal.

In 2005 an estimated 21,000 tons of construction and demolition (e.g., asphalt shingles, carpet and underlay, insulation and wood related to the C&D industry including cedar shakes and shingles) was disposed of at the Hartland Landfill.

BYLAW

Hartland Landfill Tipping Fee and Regulation Bylaw No. 5, 2003
<http://www.crd.bc.ca/bylaws/solidwastehartl /3117tippingfee/3117TippingFee.pdf>



PROGRAM DESCRIPTION

To assist in achieving the Solid Waste Management Plan goal, the CRD is banning materials from the Hartland Landfill when viable and sustainable recycling alternatives exist.

Solid Waste Management Plan

<http://www.crd.bc.ca/es/hartland/SolidWasteManagementPlan.htm>

Table 36 summarizes the C&D material Hartland Landfill bans.

Table 36: CRD Construction and Demolition Related Hartland Landfill Bans

Material	Ban Start Date
Drywall	August 1991
Corrugated Cardboard	April 1993
Aggregate	April 1995
Asphalt	April 1995
Clean Soil	April 1995
Concrete	April 1995
Rubble	April 1995
Scrap Metal	April 1995

(Capital Regional District, 2003)

ELIGIBILITY

- All Hartland Landfill loads, including 40 yard bins at various regional and private collection points.

EXEMPTIONS

- None, zero tolerance

CAPACITY TO PROCESS

As soon as a market is in place for the desired material, a landfill ban follows.

ENFORCEMENT

Total annual bylaw enforcement costs are approximately \$115,000 for all bans combined, or about \$2.30 per tonne of diversion. This total includes one full-time bylaw officer at Hartland landfill who ensures that all landfill related bylaws are met (e.g., bans, loads are covered).

Most businesses are compliant with the landfill bans. Those that are not are issued a \$100 MTI (municipal ticket information) per instance. Rarely are the tickets ever fought in court.

IMPACTS AND EVALUATION

Data derived from waste composition studies conducted at Hartland landfill in 1990, 1996 and 2001 provide estimates of the quantities of each material type being disposed annually over time and confirm the significant benefit of landfill bans on waste diversion rates (Table 37). The total estimated amount of diversion from disposal at Hartland landfill attributable to landfill bans is approximately 48,395 tonnes per year.

Table 37: Bans at Hartland and Tonnage Diverted

Material Type	Date Banned	Approx. Tonnage Landfilled 1990	Approx. Tonnage Landfilled 1996	Approx. Tonnage Landfilled 2001	Estimated Reduction (1990-2001)	Estimated Annual Tonnage Diverted
Drywall	Aug. 1991	4,197	734	379	91%	3,450
Corrugated Cardboard ¹	Apr. 1993	15,958	4,416	3,602	77%	13,100
Metal Appliances	Apr. 1993	612	0	0	100%	650
Tires	Nov. 1993	450	0	0	100%	450
Realty/Telephone Directories	Nov. 1993	Unknown ²	258	108	N/A	N/A
Scrap Metals ³	Apr. 1995	13,689	4,959	5,336	61%	9,700
Fill Materials ⁴	Apr. 1995	4,179	1,889	1,002	76%	2,800
Paper Fibres ⁵	May 1998	37,140	24,973	17,510	53%	22,600
TOTAL		76,225	37,228	27,938	63%	48,395

¹ includes waxed and other contaminated corrugated cardboard

² included with paper fibres in 1990 study

³ includes both ferrous and non-ferrous metals

⁴ includes concrete, rubble, clean soil, asphalt and aggregate

⁵ excludes corrugated cardboard and realty/telephone directories, which are listed separately

(Capital Regional District, 2003)

**LESSONS LEARNED**

- Important to have good communication with waste hauling industry
- Ensure that a consultation process takes place before ban is implemented
- Bans spur recycling businesses

FUTURE DIRECTION

Kitchen waste ban in 2-3 years

EVALUATION CRITERIA

	Evaluation Criteria	Rating	Capital Regional District Landfill Bans – C&D Materials
1	Potential to influence Design-for-Environment		
2a	Environmental impacts: waste diversion potential		Yes
2b	Environmental impacts: material substitution (e.g., durable, recyclable)		
2c	Other environmental impacts		
3	Provides a level playing field		Yes
4	Jurisdiction responsibility		Regional District
5	Regulatory requirements		Hartland Landfill Tipping Fee and Regulation Bylaw No. 5, 2003
6a	Administrative burden – Regional District		1 full-time bylaw officer at Hartland landfill, additional administrative assistance to train new staff, deliver tickets, follow-up on tickets
6b	Administrative burden - Business		Little, if comply with ban
7	Cost		Budget for public consultation, communication and outreach for up coming yard waste ban was \$20,000
8	Program sustainability		Yes
9	Market impact		High
10	Industry acceptance		Questions at beginning, little resistance
11	Ease of implementation		One year to implement ban in full effect (6 months to do public consultation, 6 month after ban start date give businesses Recycling Opportunity Notices instead of fines)
12	Ease of monitoring		Bylaw officer and staff spotters at Hartland landfill

	Evaluation Criteria	Rating	Capital Regional District Landfill Bans – C&D Materials
13	Enforceability		Bylaw allows for fines (\$100/instance)
14	Enforcement requirements		
15a	Previously implemented – measured success in other jurisdictions		Other Regional District's in British Columbia use landfill bans
15b	Previously implemented – initiated, but no measurement of impacts		
16	Reinforces or complements other instruments		Bans complements residential recycling program (e.g., paper fibres ban complements paper fibres collection in residential recycling)
17	Novel/unique approach		Regional District wide ban; long list of bans
18	Other potential negative side-effects (e.g., illegal dumping)		None
19	Applicability to Alberta		



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