



CITY OF
Lethbridge

J. Robert Havlick Award Submission for Environmental Deconstruction Initiative by City of Lethbridge



Submitted by:

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INTRODUCTION

Environmental deconstruction at the municipal level is an innovation that is in its infancy, but is slowly catching on as a large scale initiative toward environmental conservation and sustainability at local, regional and national levels. While ‘innovation’ may not be a word normally used to describe the concept of recycling, the City of Lethbridge, as a municipality has embraced this concept and adopted the practice of environmental deconstruction unparalleled anywhere else in the province of Alberta, and establishing themselves as one of the top municipal leaders in this initiative, Canada wide. Due to the continued methodical infill of local and regional landfills, the concern for the environmental sustainability of these valuable municipal resources is ever growing, and environmental deconstruction can vastly extend the life of these facilities.

INNOVATION DESCRIPTION & PROCESS

Aligning with City of Lethbridge environmental interests, for the past four years Facility Services has taken a responsible attitude to mitigate the impact on the environment when a City facility or building has reached the end of its useful lifecycle and must be removed. In the context of physical construction, ‘deconstruction’ is the selective dismantlement of building components, specifically for re-use, recycling, and waste management. It differs from demolition where a site is cleared of its building by the most expedient means. Buildings, like everything, have a life-cycle. Deconstruction focuses on giving the materials within a building a new life once the building as a whole can no longer continue. The process known as ‘waste streaming’ involves identifying and assessing various building elements prior to deconstruction so they can be diverted accordingly. Hazardous materials are properly abated to render a safe and clean site and prearranged ‘homes’ are found for remaining usable materials prior to even starting work. The successful contractor is generally awarded salvage of all materials which help generate funds to offset deconstruction and disposal costs. Ultimately deconstruction is a method of harvesting what is commonly considered “waste” and reclaiming it into useful building material.

INNOVATION BENEFITS

Deconstruction has strong ties to environmental sustainability. In addition to giving materials a new life cycle, deconstructing buildings helps to lower the need for virgin resources. This in turn leads to energy and emissions reductions from the refining and manufacture of new materials, including a reduction in the transportation of raw and new materials for the manufacturing process as well as post product delivery.

Deconstruction can also potentially support communities by providing local jobs and renovated structures, as deconstruction work typically employs three to six workers for every one employed in a comparable demolition project.

However the prime benefit of this innovation is that solid waste from conventional demolition is diverted from local landfills. This proves a major benefit because construction and demolition (C & D) waste accounts for approximately 20% of the solid waste stream at the Lethbridge landfill, and our current landfill capacity lifecycle is anticipated to be 12 to 15 years. As a landfills basic commodity is selling cubic meters of ‘air’ this is especially relevant as C & D waste compacts less than normal mixed stream waste, thus consuming up to 25% more area.

Deconstruction’s economic viability varies from project to project. The amount of time and cost of labor can be a drawback. Harvesting materials from a structure can take weeks, whereas demolition may be completed in roughly a day. However, some of the costs, if not all, can be recovered. Reusing materials

in future projects, selling reclaimed materials, donating materials for income tax write-offs, and avoiding transportation and landfill “tipping fees” are all ways in which the cost of deconstruction can be made comparable to demolition. As the City of Lethbridge continues with this innovation we have found that the local contractor’s ingenuity in finding new uses for reclaimed materials is ever increasing.

PROCESS

Quantifying the waste diversion is based on a percentage of the C & D material weight of all building materials including, interior furnishings, equipment, building materials, and site elements such as parking lots, swimming pools and sidewalks. The City of Lethbridge engages a waste streaming specialist to assess achievable goals, and to further aid in the successful diversion of C & D materials from local landfills. This consultant monitors and records the disposal of all materials and subsequently prepares a detailed report of the projects success.

INNOVATION SYNOPSIS

The following addresses specific queries outlined in the submission documents.

How is it a quantum leap of creativity? This innovation has become an immense step forward for the City of Lethbridge as past council has approved and unprecedented +/- \$180,000,000 of building construction projects for the next 5 to 7 years and several of these projects involve the removal of existing facilities. The resulting extended life that our local / regional landfill will realize from this initiative will be immense and prove a positive effect on the environment for many years to come.

Who has benefited from the innovation? Beyond the obvious benefits directly to the earth and environment, the citizens of Lethbridge and region have benefited as our landfill services far into rural Southern Alberta.

How was the innovation initiated and implemented? Facility Services has decided to adopt this process as a ‘norm’ for the removal and disposal of existing facilities as we believe it is a responsibility we have as stewards of public facilities and it is an innovation that has real and achievable goals in today’s economy.

What risks were associated with planning and developing the innovation? With a thorough understanding of construction practices, the process of deconstruction basically involves the same building practices only in reverse. Therefore the City of Lethbridge was able to fully assess associated risks and proceed in a knowledgeable manner armed with sufficient data to address any concerns. That said, associated costs were unknown in this area when we started this initiative. We realized project completion time frames would have to be extended to accommodate this more lengthy demolition process but this was relatively easy to accommodate with simple project coordination. Close consultation with local contractors and provincial industry specialists also provided an acceptable level of understanding as to expected project outcomes.

What was the environment in which the innovation was created and sustained? Locally, both public and political interests lie in conservation of the earth and environment as we have several other City departments invoking environmentally conscious projects and activities at various levels. This major innovation and process fit those interests extremely well in such that its validity can easily be realized and directly attributable in contributing to local environment and resources.

What were execution costs and savings? As previously mentioned, deconstruction’s economic viability varies from project to project; however we have realized that anticipating extended project timelines and allowing the contractor to have salvage rights for all materials generally results in costs commensurate with that of typical demolition projects.

What lessons were learned that could be shared with other local governments? Generally municipalities are tasked with being responsible purveyors of the public purse and when this responsibility can coincide with being environmentally responsible, it can prove to be a win-win situation for any government, both financially and politically. As we continue to realize remarkable successes in this area, the City of Lethbridge is establishing them self as an industry leader and is showing that this is a viable alternative for other municipalities as well as local and regional contractors thus extending this initiative into the private sector.

Which department and/or individuals championed the innovation? City of Lethbridge Facility Services initiated this innovation and insures its adoption for all future City building removal projects. The initial success of this innovation has resulted in the City receiving the provincial “2010 Municipal Leadership” award from the Recycling Council of Alberta, and the local “Green List 2010” environmental award.

SUCCESS STORIES

The following summarizes recent local deconstruction projects performed by City of Lethbridge, Facility Services. The first waste streaming project was deconstruction of the Bridge Inn Hotel. Deconstruction was found to be a new method of building removal in the region and some project ‘growing pains’ were experienced. However through time, the industry has gained a better understanding of this process and while each project is different, the percentage of successful diversion of materials has significantly increased.

Bridge Inn Hotel – 55.4% C & D Waste Diverted from Local Landfill

The Bridge Inn Hotel was a three story, 50 patron room, 1350 m² (14,550 ft²) building, deconstructed in May to June of 2007, and was Facility Services first deconstruction project. Subsequent to a building assessment, a waste diversion target of 50% was specified for this structure and through project diligence; the project achieved 55.4% of total waste diverted. This was a challenging project due to the building age and variety of construction materials used over several years of building additions and renovations. Additionally the City was able to salvage various pieces of limestone and brick to be stockpiled for possible use in future repairs of other local historic structures.

Some interesting stories of local participation include the following:

- One local resident bought 3000 bricks to finish the exterior of his garage.
- A resident bought miscellaneous wood and sandstone pieces to build a bedroom suite.
- A local antique shop bought 4 cast iron radiators and 5 wooden door frames for resale.
- The City retained 9 pallets of sandstone and 1 pallet of 600 bricks for future historic projects.
- Ducks Unlimited used concrete for an erosion control/protection project in Stirling, Alberta.

Village Inn Motel - 90% C & D Waste Diverted from Local Landfill

The Village Inn Motel was a two story, 32 patron room, 1114 m² (12,000 ft²) building, deconstructed from December 2008 to March 2009. A waste diversion target of 50% was specified for this project however the contractor’s waste management and recycling plan set a goal of over 55%. Having the ability to allow a longer project timeframe and with the added diligence of the local contractor, the majority of large volume/weight materials were diverted thus achieving over 90% waste diversion. In addition to contributing to the City’s environmental sustainability, this facility was also able to contribute to the City’s social sustainability and was utilized to house the homeless over the winter until deconstruction was scheduled to be carried out.

Some interesting stories of local participation include the following:

- The sale and removal of salvaged material destined for reuse was initiated through phone-ins; drive-bys; on-site signage and a few calls to local groups.
- One local resident removed 2"x 4"s manually for reuse in his garage.
- Another local resident used most of the windows to build a 54' x 9' x 10 feet high green house on his acreage.
- The local (Enchant) Hutterite colony was involved in the dismantling and salvage of a large amount of dimensional lumber (all roof framing) for their construction projects.
- The contractor salvaged exterior halogen site lights for reuse in their yard.
- The better quality bathtubs were sent to a local architectural salvage store for sale and some bathtubs were taken by local farmers for use as watering troughs.
- The flagstone and brick were sold to residents for local projects.
- Lafarge used the majority of the concrete and concrete block to build a base structure and breakwater structure.
- The asphalt was reused as resurfacing material for a local parking lot.
- The commercial grade washer and dryer, and rooftop air conditioner was taken for use by a local Hutterite colony.
- Furnishings were sold at a local auction and bed mattresses were offered to the patrons housed over the winter.
- The exterior stair and second level walkway railing was salvaged for reuse as deck railings for personal residences.

Auto Appearance Center Warehouse - 95% C & D Waste Diverted from Local Landfill

The Auto Appearance Center Warehouse was a single story 1115 m² (12,000 ft²) building, deconstructed in March/April of 2009. A waste diversion target of 50% was specified for this project however the contractor's waste management and recycling plan set a goal of over 65%. Again having the ability to allow a longer project timeframe and with the past experience, creativity and resourcefulness of the local contractor, the project achieved over 95% waste diversion.

Some interesting stories of local participation include the following:

- The salvaged aluminum doors were reused for sign banners by a local sign company.
- The large metal sign was reused for a new sign in town.
- The wire fencing, gate and fence posts were removed for reuse by a local contractor.
- Weathered "barn" boards and some of the 3" x 12" support columns were salvaged by an employee to build a deck.
- A significant quantity of "barn" boards were salvaged from the roof deconstruction and used to finish a small barn interior, for mounting trophy animals at a taxidermy shop in Coaldale and sold locally.
- Another local contractor used the majority of salvaged main supports and rafters to build a large camp kitchen facility.

Multi-Facility Deconstruction Project - 92% C & D Waste Diverted from Local Landfill

This project comprised the deconstruction of six buildings to make way for various City of Lethbridge projects. For deconstruction waste diversion, all buildings were considered as one mass project.

Facilities included:

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| 1. "Old Kawasaki" Commercial Building & Shop, | 2. Single Family Residence, |
| 3. Meter House Building & Water Storage Tank, | 4. Public Op's Sand Storage Quonset, |
| 5. Volker Steven Garage / Shop Building, | 6. Public Op's Salt Storage Building, |

The six facilities combined, comprise a total of approximately 2000 m² (21,550 ft²) of building area, were deconstructed from September 2009 to January 2010 and an overall waste diversion target of 65% was specified for this project. Again having the ability to allow a longer project timeframe and with the experience and added diligence of the local contractor, the project achieved over 92% waste diversion. Additionally the City was able to salvage various glu-lam beams, purlins and columns to be stockpiled and these items have been incorporated in the design for use in the future Helen Schuler Coulee Center Addition.

Some interesting stories of local participation include the following:

- The local Enchant Hutterite colony was able to dismantle and salvage a large portion of the newer Volker Steven maintenance shop for reuse.
- Majority of mechanical fixtures were salvaged for reuse by the local Enchant Hutterite colony.
- Wood beams, purlins and some planking were salvaged for City of Lethbridge reuse.
- Metal beams were salvaged for reuse by the contractor
- The wire fencing, gate and fence posts were removed for reuse by a local contractor.

IGA Building Deconstruction Project - 90%+ C & D Waste Diverted from Local Landfill

Deconstruction of this 1556 m² (16,750 ft²) building was recently completed to make way for the new City of Lethbridge Community Arts Center and the pre demolition assessment anticipated achieving a minimum of 65% waste diversion. A second structure, the Civic Center Judges Booth, which was a 37 m² (400 ft²) two story concrete block structure was also added to this project. Preliminary project waste removal tallies have been calculated and indicate that we achieved over 90% diversion of the C & D waste from local landfills for both of these structures.

INNOVATION IMPACT

In the province of Alberta it is estimated that currently only 10% of reusable construction materials are being recycled with the Construction and Demolition (C & D) sector making up approximately 22% of the total mass landfilled at Class II and Class III Alberta landfills. Alberta currently realizes a total C & D waste generation rate of 860,000 tonnes per year, which equates to the volume of approximately 6,300 average 2000 square foot homes being sent to Alberta landfills annually.

In adopting deconstruction as a responsible means of building disposal, to date Facility Services has successfully diverted 7,178 tonnes of C & D (or the equivalent volume of 53 average 2000 square foot houses) from entering local landfills, in turn resulting in only 886 tonnes (or the equivalent volume of only 6.5 houses) being landfilled.

The City of Lethbridge Facility Services is honored to have been recognized both locally and provincially for their deconstruction initiatives. All members of Facility Services are proud to be able to contribute in the sustainability of our environment and look forward to exploring alternate methods in which we might increase our environmental responsibility.