



CITY OF
Lethbridge

ICMA Community Sustainability Award Submission by City of Lethbridge Environmental Deconstruction Initiative



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OFFICE OF FACILITY SERVICES

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. 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 is establishing themselves as one of the top municipal leaders in this initiative, Canada wide. 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.

PROBLEM ASSESSMENT

Due to the continued methodical infill of local and regional landfills, the concern for the environmental sustainability of these valuable municipal resources is ever increasing, and environmental deconstruction can vastly extend the life of these facilities. 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. 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.

PROGRAM IMPLEMENTATION AND COSTS

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. 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, and therefore consumes 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.

TANGIBLE RESULTS

Success Stories

The following summarizes recent local deconstruction projects performed by City of Lethbridge, Facility Services. The first waste streaming project was deconstruction of a three story 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.

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 and having the ability to allow a longer project timeframe 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.

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

This 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.

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 a Commercial Building & Shop, Single Family Residence, Meter House Building & Concrete Water Storage Tank, Road Sand Storage Quonset & Salt Storage Building, and an Industrial Seven Bay Garage / Shop 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 large wood beams, purlins and columns to be stockpiled and these items have been incorporated in the design for use in the future local Helen Schuler Coulee Centre Addition.

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

Deconstruction of this 1556 m² (16,750 ft²) single story former food store building was completed in September / December 2010 to make way for the new City of Lethbridge Community Arts Center. 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. The pre demolition assessment anticipated achieving a minimum of 65% waste diversion for both structures combined, but having the ability to allow a longer project

timeframe and with the experience and added diligence of the local contractor; the project achieved over 90% waste diversion.

Residential Neighbourhood Deconstruction Project - 93%+ C & D Waste Diverted from Local Landfill

This project comprised the removal and recycling of 16 single family residential wood frame bungalows, totalling approximately 1449 m² (15,600 ft²) and included all neighbourhood hard surface infrastructure such as building foundations, sidewalks, driveways, curb & gutter and asphalt roads. The removal of the residences was completed over a two year period during which various homes were also used for low rent housing, and police tactical and K-9 training. At the end of their use, the residences were auctioned to various building moving companies and private citizens and all were relocated elsewhere in southern Alberta for refurbishment and reuse. Hard surface elements were then slated to be used as clean fill base material to fill coulees for a major road project planned to extend through the neighborhood. Final calculations indicated that over 93% of C & D waste from the residences was diverted from entering local landfills, with a further 100% of the remaining hard surface infrastructure (building foundations, sidewalks, driveways, curb & gutter and asphalt roads) to be processed into clean fill for the new road project.

LESSONS LEARNED

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 the City of Lethbridge has successfully diverted 9,478 tonnes of C & D waste or the equivalent volume of 70 average 2000 square foot houses from entering local landfills, in turn resulting in only 1038 tonnes or the equivalent volume of only 7.7 houses being landfilled.