

BOW VALLEY ORGANIC WASTE DIVERSION DEMONSTRATION PROJECT

INTERIM REPORT



Bow Valley Waste Management Commission
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In cooperation with the Regional Organics Steering Committee

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EXECUTIVE SUMMARY

Following the 2cg organics diversion feasibility study and the recommendations therein which were adopted in principle by the Member councils in the fall of 2004 the Organics Waste Diversion Demonstration Project was organized in 2005. The first step was to utilize biosolids composting facility at the Banff waste water treatment plant to initiate a pilot programme to provide direct experience in separating, collecting and transporting organic municipal solid waste (OMSW) to a local composting facility and to test some the key assumptions the consultant made in his report. After the planning phase was completed, in late 2005 the Bow Valley Waste Management Commission contracted a coordinator to begin a programme of diverting organic material to the Banff composting facility. This programme is intended to examine the implementation of a "second bin and cart" collection programme in association with the current truck based collection system. In addition, the programme is intended to examine the use of garburators and sewage infrastructure to collect and deliver organics to the compost facility at the WWTP.

The pilot programme is gathering momentum towards a pilot that can represent operational conditions. Initial delays were encountered due to a protracted process of procuring and installing equipment required to blend organic municipal solid waste with biosolids. There was also some reluctance on the part of commercial operators to use garburators however an effective test site has been established at one restaurant that is providing insight into water consumption and the ability of garburators to serve as convenient commercial food waste diversion technology. A number of commercial operators also have shown interest in or have tested various aspects of implementing a source separated organics programme in their operations although very few have been successful in initiating ongoing diversion. The core of a residential programme has been established and is demonstrating that it may be feasible to establish a residential OMSW diversion programme with amounts of contamination that can be tolerable given the sorting capability of a small scale municipal composting programme.

Pilot data show that rates of diversion from landfill disposal in the order of 10 to 20 percent are easily achieved through an organics diversion programme. Experience is showing that regulatory and financial incentives will be valuable assets in encouraging commercial operators to participate in separating organic wastes from landfill disposal. While efforts to date have provided practical information the pilot programme needs more operators to be actively separating organic waste to provide operational scale information to inform the questions raised and projections made by the feasibility studies.

A variety of recommendations are made to facilitate ramping up the organics diversion programme in Banff in addition to recommending that the pilot programme continue until September 2008. This period will allow the programme to achieve a level of participation that represents an operational scale and provides a long enough sample period to represent seasonal variations in the organic waste stream. It is recommended that the organics coordinator position be continued to facilitate the pilot programme and provide an active presence for encouraging organics diversion.

1. BACKGROUND

Residential and commercial municipal solid waste generated in the Bow Valley is transported to landfill in Calgary. This exposes communities to increasing transportation and tipping fees and contributes to environmental problems associated with landfills such as the generation of methane gas. Much of the municipal solid waste stream is composed of organic materials that are compostable. For example, in Banff the organic fraction of the commercial waste stream ranges as high as 70 percent by weight. This suggests that some of the costs and environmental issues associated with landfill disposal can be avoided if organic material can be diverted to alternate disposal practices such as composting.

As a first step towards implementation alternative management options for organic municipal solid waste (OMSW) streams in the Bow Valley the Bow Valley Waste Management Commission (BVWMC) commissioned a technical feasibility study of establishing a regional organics recycling programme (2cg 2004). This report recommended that composting solid waste stream organics in combination with municipal biosolids was the preferred solution to diverting organic waste from landfill disposal. This report was followed by an assessment of the feasibility of diverting food waste to the Banff Waste Water Treatment Plant (WWTP) using food waste disposers (garburators) and existing sewage lines (Earth Tech 2006).

Each of these reports offers valuable but indirect “desk top” information relating to the logistics and costs of diverting the organics portion of the waste stream to composting. Recognizing the lack of direct experience in the local setting the 2cg report also recommended that the biosolids composting facility at the WWTP be used to initiate a pilot programme to provide direct experience in separating, collecting and transporting food wastes to a local composting facility.

In late 2005 the BVWMC contracted a coordinator to begin a programme of diverting organics to the Banff composting facility. This programme is intended to examine the implementation of a "second bin and cart" collection programme in association with the current truck based solid waste bin collection system. In addition, the programme is intended to examine the use of garburators and sewage infrastructure to collect and deliver organics to the compost facility at the WWTP. This preliminary report provides an overview of activity in the programme, presents data gathered, and reports on the opportunities to gather information and move organic waste diversion forward. Recommendations for defining the pilot programme are also provided.



The new vertical mixer accepts a load of woodchips for blending as an amendment during the compost process.

2. SUMMARY OF ACTIVITIES TO DATE

2.1 EQUIPMENT TO FACILITATE DIVERSION

Feedstock Mixer

Prior to the pilot programme compost feed stocks (biosolids, amendments, activating re-mix) at the Banff compost facility were mixed using a labour intensive process. This involved spreading and mixing material

on the facility floor with a front-end loader. It was recognized early on that if OMSW was added to the composting process at the Banff WWTP a more efficient way of blending feed stocks was needed. To address that problem funding for the programme has been used to rent a mixer which has been installed in the composting facility. Procuring the mixer turned out to be a protracted process of soliciting quotes and waiting for the mixer to be constructed and delivered to Banff in March 2007. The mixer is a twin auger, electric drive stationary unit with interference knives and on-board scales. It became operational in April 2007 and is proving to be an efficient tool for measuring and mixing the different feedstocks. More testing and experience is required to determine if the mixer is sufficient for reducing the size of large items or breaking open material in fiber or polymer bags for exposure to decomposing organisms in the composting tunnels.

Carts

Discussions with commercial foodservice and special event operators indicated that in some operations it may be necessary to use carts to move separated organic material within buildings to a garbage disposal area. Operators also indicated that due to space restrictions in garbage storage areas having carts that are smaller than commercial bins as the primary storage container may be necessary. Funding for the pilot programme has been used to purchase a set of various sizes of carts for loaning to participants. To date the carts have been valuable in facilitating the separation organics and other recyclables at special events and have been tested by four commercial operators to allow them to test source separation and storage of food waste. All of the carts are designed to be compatible with standard truck-mounted tipping mechanisms. Those carts being used for organics have been labeled with decals provided by the Town of Banff.

Cart Tipper/Hydraulic Pump

Recognizing that carts may be useful in the collection of source separated organics (SSOs) the Town of Banff is currently obtaining quotes for the purchase of a cart tipper that can be attached to the existing collection truck. This mechanism will be necessary to allow collection crews to empty carts efficiently while avoiding repetitive lifting and handling of messy materials associated with SSOs. For example, experience in working with a local coffee bar operation has shown that cart tipping equipment will be essential to facilitate handling of coffee grounds which have potential to be messy if they are not properly drained before disposal. Funding for the pilot programme is expected to underwrite the costs of the cart tipper.

The Town of Banff has installed a new and higher capacity hydraulic pump on the residential collection truck, which is capable of handling the weight of concentrated food residuals in the bins.

Compostable Foodware and Bags

Contamination of feedstocks by plastics is a common challenge to composting programmes involving municipal solid waste. This is especially true in programmes where convenience food service operations are common as in the case in Banff or where water proof containment is required for handling food waste.



Compostable fiber bags with cellulose polymer lining have proven to be structurally sound when wet although not entirely waterproof. Draining of coffee grounds before disposal would have prevented the saturation shown here.

While investment in sorting equipment and the energy to operate it can resolve this problem the use of compostable foodware and storage bags may be a more efficient and sustainable way to avoid contamination from plastics.

Use of compostable foodware and bags is becoming widespread in North America and Europe. The pilot programme has investigated the technologies available and worked with food service operators, special events coordinators, and a number of foodware distributors to introduce and test these products for use in Banff. A number of suppliers have provided small samples of compostable products to the programme at low or no cost. Pilot funding was used to purchase the larger supplies of compostable foodware bags in support of the Town of Banff's residential food waste collection programme. The diversion coordinator has worked with grocery store managers and suppliers of compostable food waste bags to establish the purchasing relationships necessary ensure compostable bags are available on retail shelves. Compostable food waste bags are now available at Keller Foods and Home Hardware.

Garburators

The pilot programme has established a working relationship with Insinkerator. This relationship has resulted in the provision of two residential garburators and one new commercial garburator at no charge to the programme. The two residential garburators have been installed in the Town of Banff lunchrooms at the Town Hall and the Operations offices in the industrial compound with the understanding that they can be used as educational tools and demonstration units. The commercial garburator was provided to Bumper's restaurant, along with a water conservation unit, as a replacement for their existing unit which broke down in March. Insinkerator has made a standing offer to provide low cost equipment to other operators who wish to participate in the pilot programme. Four food service operations including one in Canmore have indicated they would like to take advantage of the offer but none have taken further action over the ten months that the offer has been available. Most recent correspondence with Insinkerator indicated that if no other operations commit to installing test equipment the offer of low cost equipment may be terminated.

2.2 COMMERCIAL DIVERSION CASE STUDIES

Fairmont Banff Springs Hotel

The pilot programme was initiated by collecting food waste from selected food service preparation areas within the Fairmont Banff Springs Hotel (FBSH) in May 2006. In this example food is collected in bins in selected food preparation areas and moved to the centralized garbage room where they are tipped into commercial bins that have been dedicated to organics. The programme at the Springs has been a valuable test of the logistics and storage issues that can arise in a large complex building with several food service outlets. By providing a significant amount food waste the Springs' efforts also allowed initial testing of the existing commercial collection truck for transporting organics as well providing enough feed stock to test handling at the compost facility with and without the mixer. At present the FBSH is reluctant to increase its separation of organics due to the labour and logistics involved in moving larger amounts of material from several sources scattered throughout the building. FBSH has indicated that they would like to experiment with using garburators to avoid these problems. In a meeting with Town of Banff and Commission staff hotel management indicated that more definitive insight into future municipal waste collection cost structures will play an important role in motivating their waste handling decisions.

Data for this case study is presented in Table 1 and indicates that a minimum of 12 to 18 percent (104,276 kilograms) of the waste from the main building has readily been diverted over a one year period. This diversion from landfill represents approximately \$7,300 of landfill transportation and tipping costs (@\$70/tonne) and approximately 31,356 m³ of avoided landfill methane gas production (Brown and Subler 2007).

Bumpers, The Beef House

Bumper's restaurant has been participating in the programme since September 2006 by using their garburator to dispose of fruit and vegetable waste. Management is reluctant to place meat or rice in the garburator due to concern over blockages in their small drainage line to the sewer main. Staff have been diligently cooperating by using a plastic pail to store food waste and a hand held scale to weigh each load before it is processed through the garburator. A water meter has been installed on the water line feeding the garburator which operated from September to March at which time it broke down. The breakdown was used as an opportunity to install a new model garburator in tandem with a water conservation control mechanism. This new equipment was donated by Insinkerator.

Diversion data collected at Bumper's is presented in Table 1 along with preliminary calculations of how much water is needed to process a tonne of food waste through a commercial garburator. While the water consumption data are preliminary and limited to a single operation they do provide an interesting insight into the scale of increased water consumption that may be anticipated from garburator use. Monitoring indicates that 10 to 14 cubic metres of water are used per tonne of food waste processed through Bumpers' commercial scale garburator. A total of 3,531 tonnes of food waste (including residential) is generated in Banff annually (2cg 2004). A crude calculation would seem to indicate that all food waste generated in Banff could be processed through commercial garburators using approximately 50,000 m³ of water. This is considerably less than the 403,153 m³ projected in the feasibility assessment which had to rely on rudimentary assumptions due to a lack of data relating to waster use by commercial food waste disposers (Earth Tech 2006). While the pilot data will be subjected to closer scrutiny and development of a longer record the discrepancy may be due to the feasibility study not having empirical data to rely on and therefore overestimating the amount of time commercial food waste disposers operate during the day. Garburator installation and practices can also dramatically influence the amount of water used.



Garburator with water meter and flow control.

Significant coordinator time was committed to working with the plumber to make sure installation and repairs were conducted on this installation.

Other Food Service Operations

Due to the delay in having the mixer in place and the associated capability for processing additional food waste the expanded commercial and residential programmes did not get started until late spring 2007. Since that time several commercial food service operations have begun working with the diversion coordinator to explore ways to accomplish separating food waste in their operations and the Town's capability to collect food waste from their garbage storage areas. Participating operations involve a range of operation types and sizes.

Inns of Banff Park

The Inns of Banff Park initially indicated interest in participating in monitoring increased use of the garburator. In anticipation of their participation the Town of Banff has been monitoring the weight of waste

collected at this location since November 2006. No garburator programme has been initiated at the hotel. The data in Table 1 offer baseline insight into the amount of waste generated by the operation.

Banff Park Lodge

The Banff Park Lodge (BPL) has begun exploring ways of separating food waste in their kitchen operations. BPL has tested the feasibility and explored the operational cost of using compostable film bags as bin liners to match their existing waste collection system. Initial analysis indicates that the cost of using compostable bags in their operation could range from an increase of \$10,350.00 for a complete switch to compostable bags for handling waste. A lesser cost increase of \$1987.00 was projected for a mix of compostable bags for materials destined to compost and continuing to use cheaper plastic bags for mixed waste. BPL will also experiment with using no bin liners and emptying the kitchen bins directly into their commercial bin which may result in a projected savings of \$1214.00 due to a reduction in garbage bag purchases. When BPL is comfortable with an approach to in-house separation they will contact the diversion coordinator to initiate separate collection. At present they are waiting for a supplier to provide compostable bags.

Wildflower Cafe

The Wildflower coffee shop and bakery is currently using compostable foodware in their front of house operation and is currently separating food waste in their kitchen to establish the practice. Starting in late August, a separate commercial bin was dedicated to separated food waste. Difficulties in controlling contaminants from other building tenants caused a delay in initiating collection by the town. The installation of a divider in the resource recovery room between the mixed waste and organics bins along with improved signage are expected have solve the problem. Wildflower experimented with use of an organics cart loaned to them by the pilot programme to move food waste from their kitchen area to the Bison Courtyard resource recovery room. It was found that simply using smaller buckets to transfer food residuals from the kitchen was more practical. In order to make the programme successful and avoid contamination the Wildflower and building managers are working directly with building residents and other tenants to ensure everyone is participating in separating food waste and placing it in the correct bin. This has proven to be a frustrating education process and lack of success is delaying collection of source separated organics at this location. This site is, however, a good demonstration of the difficulties encountered when shared waste facilities are involved.

Starbucks Coffee

Depending on business activity Starbucks generates between 30 and 90 kilograms of coffee grounds per day or potentially a minimum of 11 tonnes of compostable material per year. These numbers indicate that coffee grounds alone are a significant component of Banff's organic waste stream. Recognizing this contribution to Banff's waste stream Starbucks coffee bar has been eager to explore ways to separate coffee grounds. The details of source separation have been worked out using paper and cellulose compostable bags. Unfortunately, the amount of drippings involved results in messy bags stacked up in the cart provided to fit in their garbage storage area. In addition, the bags are heavy and difficult to reach in the bottom of the cart. It has been agreed that they should postpone their separation efforts until a cart tipper is available to solve these handling problems.

Canada Safeway

Canada Safeway has an award winning internal programme of collecting organic waste in their retail outlets and returning it in their delivery trucks to a centralized composting facility. The diversion coordinator worked with the Safeway regional office in Calgary and facilitated the local outlet to join Safeway's internal programme. Since mid winter Banff Safeway has begun diverting all of its organic waste to their internal composting programme.

Keller Foods

Keller Foods has been delayed in joining the pilot programme by a recent change in store managers. The new manager is busy but is anxious to regain diversion momentum and has recommitted to implementing

source separated organics in the operation. To facilitate separation the store is making space available for a dedicated commercial organics bin by reorganizing their two storage areas that are accessible from the alley. A new bin will be purchased and dedicated to organics. In November the sloping floor of the north storage area will be leveled by infilling with concrete in order to meet Town of Banff garbage storage area design criteria.

The Banff Centre

The Banff Centre is anxious to divert organic waste into the pilot composting programme. The diversion coordinator has met with Centre staff on several occasions to discuss diversion and opportunities to use compostable foodware. It was decided to wait until the new dining facility is operating smoothly to initiate separation activities. The initial plan is to use a bin and cart system to separate food waste but the Centre has also shown interest in establishing a garburator pilot programme to determine which approach is the best solution for their operation. However, to date no separation activity has been initiated.



Canada Safeway's organic residuals are stored in a crate with a compostable polymer liner and back-hauled to a composting site.

The Balkan

In October the Balkan restaurant agreed with Tommy's restaurant to share bin space in order to free up a commercial bin for dedication to food residuals from both restaurants. At their request an organics cart has been provided on loan to the kitchen. Separation is expected to begin soon.

St. James Alley

The coordinator has been working with the manager of St. James Gate to establish a common bin that could be used by several food service operations at their end of the alley. Following a meeting that involved several food service operations it was agreed that they would undertake to establish a bin and location that could be used. St. James Gate contacted the manager of the Bear Street Mall to inquire if their storage area could be used but permission was denied. St James is now stepping back and re-considering waiting for a cart tipper system to be available from the Town or possibly installing a garburator with assistance from the pilot programme.

3. RESIDENTIAL DIVERSION

In mid June the Town of Banff installed three organics bins in the Banff townsite. These bins are located at the industrial compound recycling depot on Hawk Avenue, in the downtown (Fire Hall) recycling depot and on Cave Avenue. These bins were supported by the distribution of countertop organics containers provided by the Town of Banff for a subsidized cost of \$3.00. The containers included a small supply of compostable liner bags provided by the Commission's diversion programme funding. Initially the residential organics bins included contamination in the form of mixed waste and food waste wrapped in plastic bags but the level of contamination seems to have lessened as residents become familiar with the organics bins and the materials that are accepted in them. The most common feedback on the residential programme is that the bin access doors need to be designed to make it easier for the door to remain open while emptying containers.

Preliminary numbers and observations indicate that the amount of material collected is steadily increasing. Data in presented in Table 2 at the end of this report indicate 30.76 tonnes of residential organic material was collected that between June 19 and October 9, 2007. The Town of Banff (2007) estimates the collection cost for this material to be \$59.82 dollars per tonne. Extrapolating the data to

represent a one-year period suggests that the placement of three residential bins is currently generating diversion of 11 percent of the residential organic waste stream.

A number of residential users have provided verbal feed back on the programme. Overall response to the programme is very positive and while the amount of residential organics is small relative to commercial organics the Town of Banff has established a consistent message about the need for organic waste separation in the community by initiating the residential collection programme. A common constructive comment is that more readily available educational information about composting in general and how to properly separate accepted materials is needed.

Little is known about the use of residential food waste disposers in Banff. The Organics, Composting and Bio-solids page of the Town of Banff website encourages residents to make more use of garburators as a convenient way to dispose of compostable food waste and the Town of Banff included questions about garburator use in its recent census (Appendix I). Results of that survey and unstructured conversations with residents who own garburators suggests there is a low level of garburator use for food waste disposal. The diversion Coordinator has also worked with the Banff Housing Corporation with the result that food waste disposers are now included in the specifications for residential units constructed by the Corporation.

2.4 PUBLIC EDUCATION AND RELATED ACTIVITIES

In addition to assisting with the implementation of an organics diversion programme in the commercial and residential sector a number of programme activities have served to raise the profile of separating organic material for composting.

Media Coverage

At key steps in the project local news media have been invited to report on the programme and the diversion coordinator has supported the media by arranging tours of facilities and provided photographs to accompany several press articles.

Garburator Workshop

Early in the programme it was evident that there was resistance to using garburators in Banff and a lack of knowledge about modern food waste disposer equipment. In December 2006 representatives from Insinkerator traveled to Banff at their own expense and joined in a workshop to examine organic waste handling and to discuss the viability of using garburators in a commercial setting.

Banff Centre “Summer Sizzler”

The summer sizzler event is a combined public safety and environmental sustainability fair held for staff at the Banff Centre each June. The organics diversion programme was one of approximately 20 exhibits at the 2007 event which coincided with the roll-out of the residential bin program. An automated slide presentation along with an exhibit wall and one-on-one discussion allowed the coordinator to explain the program and educate attendees about the value recycling and organics diversion.

Towards Zero Waste Events

The Coordinator has worked with the Banff Special Events Corporation to run three special events (Heat up the Rockies, Canada Day, Banff Market Places) as “Towards Zero Waste” events. In each of these events the use of compostable foodware and the separation of organic waste have been essential to

minimizing the amount of waste generated during these events. Approximately 300 kilograms of organic waste was diverted to composting from the Canada Day event.

While the Zero Waste concept is an important operational goal for special events these events also presented an opportunity for organic waste separation to have a visible profile and provide personal contact and education to the food service sector and the residential community. Waste commission staff were present at all of these events to support educational displays and discuss organics diversion as well as other recycling issues with event participants. The Banff Special Events Corporation deserves recognition for their dedicated support (policy, financing and planning) in implementing the Zero Waste concept at their events.

Web Sites

Educational material has been prepared to support the Town of Banff web site and the web site being developed for the Bow Valley Waste Management Commission. To date this material has been limited to basic information about where to take residential organics and the types of materials that are currently being accepted by the programme. Once the Commission web site is operational it is intended to be used a key source of information about organics diversion including educational material about the need for diversion and composting, the composting process, what materials can or cannot be accepted in Bow Valley communities, tips on effectively separating organics, resources for setting up diversion programme in a business operation, and how-to information on best practices for using diversion related equipment such as food waste disposers and bins.

Testing Processing Capability At The Banff WWTP

Over the last several months a number of materials have been tested in the composting facility. Initial collection has focused on plant matter such as rice, fruit and vegetables. A variety of compostable containers and food ware products have also placed in the composting tunnels as tests of small quantities as well as operational volumes such as the material collected during the Canada Day celebration. While the food waste seems to break down sufficiently there have been mixed results from the foodware tests. When small amounts of material were flagged and placed in select locations items such as plates, cups, bowls and especially cutlery did not always break down completely in the tunnels. However, the operational tests using the mixer proved positive with very little material being recognizable as tunnels were emptied suggesting that current amounts of material either break down or thoroughly or blend in with and are lost among other feedstocks.

Most biodegradable materials are typically certified to break down in managed composting operations over 60 to 120 days depending on the material. Residence times in the Banff tunnels are restricted to about 30 days and are not actively managed (e.g. turned) during the time in the tunnels. While the current tunnel residence time may not be sufficient to break down all organic material it is expected that further breakdown will occur during the curing process and any significant residual material will be removed if cured compost is screened prior to marketing.

3. OPPORTUNITIES AND LESSONS LEARNED

Organic waste diverted to date is limited which in turn limits the opportunity to gain realistic knowledge of the costs involved. However, working with organizations and commercial operators and processing limited amounts of material at the compost facility has provided first hand lessons in the practical aspects of separating and collecting organic waste in the local setting. Based on this experience the following barriers and opportunities have been identified and recommendations for taking appropriate actions are made.

a) Incentives are Needed

The programme has worked with operators who have indicated a willingness to participate in the organics diversion programme on a voluntary basis. However, most of these operators have been slow to take action. Without financial or regulatory structures to provide incentives to separate organic waste most operators are likely to be reluctant or slow to initiate separation programmes and participation rates will be less than that which can be achieved if there are more tangible incentives to separate organic material for composting. Experience is also showing that costs such as training, labour and equipment for handling waste may be significant. Incentives could provide the motivation to overcome these barriers and would also provide an equitable environment in which all generators face the same waste disposal conditions.

A number of participants have indicated that in spite of their willingness to separate organics changing waste management practices is low on their list of priorities and more time is needed to take action. It is likely that this attitude will prevail as long as implementation occurs in the absence of a firm target date for implementing a source separated organics programme in the municipality.

Recommendations

Bow Valley communities should take necessary steps to implement financial and/or regulatory tools that encourage separation of organic waste. These measures should take into consideration incentives that will encourage the use of food waste disposers as well as bin and cart collection programmes.

The Town of Banff should consider publicizing target date(s) when it will be understood that commercial and institutional generators will be expected to be implementing source separation of organics and when any financial or regulatory structures that provide incentive for change and accepting associated costs will come into effect.

Regulatory and financial mechanisms should consider addressing both the encouragement of source separation of organics and directly discouraging organics in the mixed municipal solid waste stream. That is, regulations should consider whether generators of organic waste could choose to not separate organic waste, perhaps at higher collect cost or whether the Town should restrict level of organic waste in the mixed municipal solid waste stream.

b) Compatible Collection Equipment Will Facilitate Diversion

Operations with little storage space currently do not have the opportunity to have waste collected from a second smaller bin. This prevents generators of organic waste from following through with their intentions to separate unless an opportunity to have organic material collected is provided.

Recommendation

In order to maximize participation in the future, steps could be taken to offer a variety of collection methods (tipping cart, commercial bin, garburator) to match the logistical issues faced by both residential and commercial or institutional generators.



Difficult access to alleys and extra storage space in alleys confronts collection crews and businesses.

c) Concern for Reliability of Garburators and Associated Plumbing Infrastructure

Garburators seem to be underused in the commercial and residential sectors. There are three key reasons for this under use. First is the perception that past town administrators have discouraged the use of garburators. There is also a perception that older plumbing or small diameter drains limit the potential to use garburators and that use of garburators creates increased potential for drain blockages. In addition, garburators are perceived as being subject to break downs that could interrupt commercial kitchen operations. Given the modern waste water treatment plants in the valley garburators offer a clear opportunity to divert OMSW and many of these concerns can be addressed with “best practices”.

Recommendations

Educational materials relating to garburators and best practices need to be made readily available.

Additional commercial or institutional garburator test sites should be developed to establish a locally credible performance record for institutional or commercial garburators.

Municipalities should raise the profile of garburators as an accepted waste disposal technology.

d) Storage Space Is Not Under Generator Control

A number of food residual generators have indicated that they are not in control of their waste storage space or containers. In order to participate in diversion of organics they require the cooperation of a building manager or other business that is in control of the space they use. These managers may have several non-food service operations manage and tend to be less motivated to participate in a volunteer organics diversion program and are less motivated to dedicate bins or storage space to organics.

Recommendation

Any regulatory or financial incentives should be designed to ensure more direct motivation is provided to building managers.

e) Use the Processing Facility to Fully Test a Variety of Materials

Collection and composting of organics to date has focused on food waste that breaks down easily. However, preliminary testing indicates that less volatile materials such as cardboard, foodware and some biodegradable plastic films may not completely break down in the existing facility. Given that the processing facility is operated to address bio-solids composting, this partial breakdown of different materials is to be expected.

Recommendation

Further testing of operational volumes of less volatile materials will provide better confirmation of whether these materials can be processed.

Stored compost should be monitored for the degree of breakdown being achieved for the full range of organic materials following processing in the tunnels.

f) Test the Available Capacity of the Composting Facility

Depending on the volume of OMSW material received there is potential for the composting facility to reach its capacity. Operators have indicated that in peak summer months there is little flexibility to allow material longer processing times in the tunnels. However, the feasibility study (2cg 2004) reports that the Banff Compost facility is operating at half capacity.

Recommendation

Continue to increase the amount of OMSW collected to begin to approach operational amounts that test composting capacity at peak summer periods and the level of OMSW breakdown in the time allowed in the tunnels at those times.

g) Willingness to Participate

Logistical issues notwithstanding many residents and commercial operations have welcomed the opportunity to divert organics waste from landfill in Banff. This acceptance of the practice combines with the natural desire to be part of a trend to give momentum to participation in the diversion initiative.

Recommendation

The pilot programme should continue to be presented as “doing the right thing” with media exposure and educational materials continuing to communicate organics separation as joining a popular trend within the community.

h) Maximizing Diversion from Large Operations

Large volumes of material are likely produced from a few large food service operations. Therefore the most immediate gains in diversion are to be achieved from initiating organics separation programmes in these large operations.

Recommendation

Continue to encourage larger food service operations to participate in the pilot programme.

Any incentive or regulatory programmes to be implemented should consider, as a minimum, targeting large generators of food waste.

Increased monitoring of the weight collected from generators should be implemented to identify the largest producers of organic waste.

i) Expand the Residential Programme

Initial participation response and tolerable levels of contamination suggest the residential programme is successful. This success appears to be presenting organics diversion as a positive experience and establishing a profile of organics separation as a social norm in the community. Success is associated with the knowledge that convenience is a major motivator for participation.

The residential organics bins have not been tested in winter conditions when problems may arise such as fluids from concentrated food residuals resulting freezing problems in the bins.

Recommendation

The Town of Banff should consider providing one or two additional bins in additional neighbourhoods to maximize convenience and also to test if the currently perceived success can be duplicated or if it is simply a result of bins being located in diversion friendly neighbourhoods and being patronized by already committed participants.

Use the coming months to test the residential collection bins under winter operating conditions.

Expansion beyond one or two additional bins is not recommended until the residential bin program has experienced the full range of winter conditions.

j) Coordinator Opportunity

The opportunity to have a dedicated coordinator for tasks associated with the pilot programme has proven valuable over the period of the pilot by providing the following advantages:

Providing active liaison among the various participants including, businesses, residents, equipment suppliers, municipal and wastewater treatment plant staff.

Having someone available respond to the variety of detailed tasks that arise in facilitating the programme including preparing documents, ordering supplies, responding to news media, collection and synthesis of data, following up with participants and encouraging them to move forward with diversion activities, and assisting participants to avoid or work through problems.

Providing local expertise in the field of organics management, diversion and making that expertise available through attendance at special events and in-service sessions.

Providing a human face to the programme that interested parties can recognize as giving the programme a sense of identity.

Recommendation

The coordinator position should be continued.

4. KEY RECOMMENDATIONS FOR NEXT STEPS IN THE PROGRAMME

The following recommendations are considered key to ensuring the programme continues successfully into the coming months:

Continue the coordinator position to ensure that action can be taken as required and that liaison with the business community has continuity.

Establish an organics “education and resource centre” on the Bow Waste Management Commission web site.

Assist with ensuring any equipment needed to facilitate diversion is available as needed. Procuring a cart tipper that can be attached Banff’s commercial truck is considered essential to explore collection options.

Continue to bring a variety of operations into the pilot programme to allow it to grow to a point where it can provide logistical and cost information based on a realistic operational scale. While emphasis

on larger generators should be continued to maximize the amount of material captured smaller operations should be included to gain understanding of the relevant issues associated with those sometimes specialized settings.

5. DEFINE THE BOUNDARIES OF THE PILOT PROGRAMME

The programme to date has consisted of building diversion capacity through procuring the required equipment such as the vertical mixer, the placement of residential bins by the Town and soliciting participants. This has resulted in increasing organics diversion but the amount currently being collected falls well below that required to confirm operational scale costs projected in the feasibility study and to discover and find solutions to logistical issues. It is recommended that, as organics diversion increases in Banff, the following description be placed on the pilot programme in order to extract information to inform strategic decisions versus ongoing development of OMSW diversion.

1/ The pilot be considered to continue until September 30, 2008.

2/ The commercial bin/cart programme be developed to the point where there are enough generators contributing to define typical municipal collection amounts. The number and spatial distribution of generators should also represent a typical collection route and be representative of a variety of business sizes and types. The following is recommended based on current voluntary interest:

- a) Continued use of the existing residential bins plus an additional two in new neighbourhoods if possible.
- b) On going monitoring of the garbage at Bumper's with solicitation of additional garbage use and the possible installation one additional commercial garbage with water use monitoring.
- c) Establishing 15 to 20 commercial participants. Based on current interest, previous discussions and meeting the above criteria the following participants will continue to be targeted:

Balkan	Melissa's Restaurant and Bar
Banff Day Care	Mineral Springs Hospital
Banff Park Lodge	Mount Royal Hotel
Bison Courtyard	Saltlik
Cascade Mall	St. James Gate
Earls	Starbuck's Coffee
Fairmont Banff Springs Hotel	The Banff Centre
Giorgio's Trattoria	The Keg (Caribou)
Keller's Foods	Tommy's

d) If the 15 or twenty participants are not on stream with the diversion program by February 2008 the program should be reevaluated to determine whether it should stand on available data or extend activity to obtain a more limited set of data and information.

e) The pilot programme should extract information or data to address the following key questions in a final report:

What are actual water consumption rates for commercial garbage?

What is the appropriate collection strategy for Banff?

What are the costs experienced with truck based collection of OMSW?

What is the cost of processing operational amounts of OMSW delivered by trucks to the composting facility?

Does the Banff compost facility adequately process the amounts and types of OMSW generated?

Does the Banff compost facility have the capacity to process operational amounts OMSW?

6. ACKNOWLEDGEMENTS

The following organizations have provided significant contributions to move the programme forward by providing services beyond normal staff duties, donating equipment, or participating in diversion activities. Their contributions are gratefully acknowledged.

Bag To Earth
Banff Special Events Corporation
Bumpers Restaurant
Happy Planet Productions
Insinkerator Division of Emerson Electric
The Fairmont Banff Springs Hotel
Town of Banff Operations Staff

7. REFERENCES

- 2cg 2004. Regional Organics Recycling Implementation Program - Phase1: Technical Feasibility Study. Final Report to the Bow Valley Waste Management Commission. May 2004.
- Brown S. and S. Stubler 2007. Composting and Greenhouse Gas Emissions: A Producers Perspective. BioCycle, 48(3).
- Earth Tech, 2006. Food Waste Disposer Feasibility Assessment. Prepared by Earth Tech Canada for the Bow Valley Waste Management Commission.
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Table 1: Banff Commercial Organics Diversion Data - May 2006 To August 2007

(Weights in Kilograms)

Totals column only includes months for which both mixed and separated organics were collected.

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total	
Fairmont Banff Springs Hotel Main Building (Truck collection from selected food preparation areas)																			
Mixed Waste Collected	N/A	N/A	64930	68320	53060	56040	41584	47720	47090	40710	43920	45370	48940	70360	ND	33390	41370	702804	
Food Waste Collected	6420	6970	8100	9700	6720	8580	6840	9130	8760	8560	9926	9460	9520	8980	ND	8845	12930	126051	
Total Waste Collected	N/A	N/A	73030	78020	59780	64620	48424	56850	55850	49270	53846	54830	58460	79340	ND	42235	54300	774555	
% Waste Diverted to Compost	N/A	N/A	11	12	11	13	14	16	16	17	18	17	16	11		21	24	16	
Bumpers: The Beef House (Garburator Trial - Vegetable/Salad Preparation Only)																			
Mixed Waste Collected						3506	1440	1820	2220	2100	3240	3460	2860	2770	ND	2330	3085	28831.0	
Food Waste Collected					305	291	223	260	453	476	249				115	456	381	3208.5	
Total Waste Collected						3797	1663	2080	2673	2576	3489	3460	2860	2770	ND	2786	3466	31619.6	
% Waste Diverted to Compost						8	13	12	17	18	12					16	11	15	
Inns of Banff Park (Truck Collection - No Organics)																			
Mixed Waste Collected								640	3285	5470	4720	7550	7200	5190	3200	ND	2935	3255	43445.0
Food Waste Collected																			
Total Waste Collected								640	3285	5470	4720	7550	7200	5190	3200	ND	2935	3255	43445.0
% Waste Diverted to Compost																			

* May and June 2006 FBSH organics not included in totals.

**Bumpers garburator went out of service March 20, 2007. Diversion rate corrected for period of service in March. New Installation with Aqua Saver started July 25, 2007

ND = No Data

	Bumper's Water Meter Data (Metered November 23, 2006 to March 19, 2007)	Bumper's Water Meter Data (Water saver installed, July 25, 2007 to Oct. 19, 2007)
Total Food Waste Diverted During the Period of Metering	1519.3 kg.	1153.0 kg.
Total Water Used to Process Material	15.5 m3	16.35 m3
Garburator Water Consumption Rate	10.2 m3/t	14.2 m3/t

TABLE 2: Data Summary for Residential Organics Collection (June 19 to October 9, 2007).

Collection Period (days)	113
Total Weight of Organic Material Collected (tonnes)	30.76
Number of Collection Trips	23
Time Required Per Collection Trip (hours)	2
Cost Per Trip	\$80
Total Collection Cost for the Period	\$1,840
Cost per Tonne Collected	\$59.82
Average Weight Collected Per Day (kilograms)	272.2
Projected Weight Captured Per Year (tonnes)	99.4
Annual Residential Organic Municipal Solid Waste	861
Projected Annual Capture Rate	11%

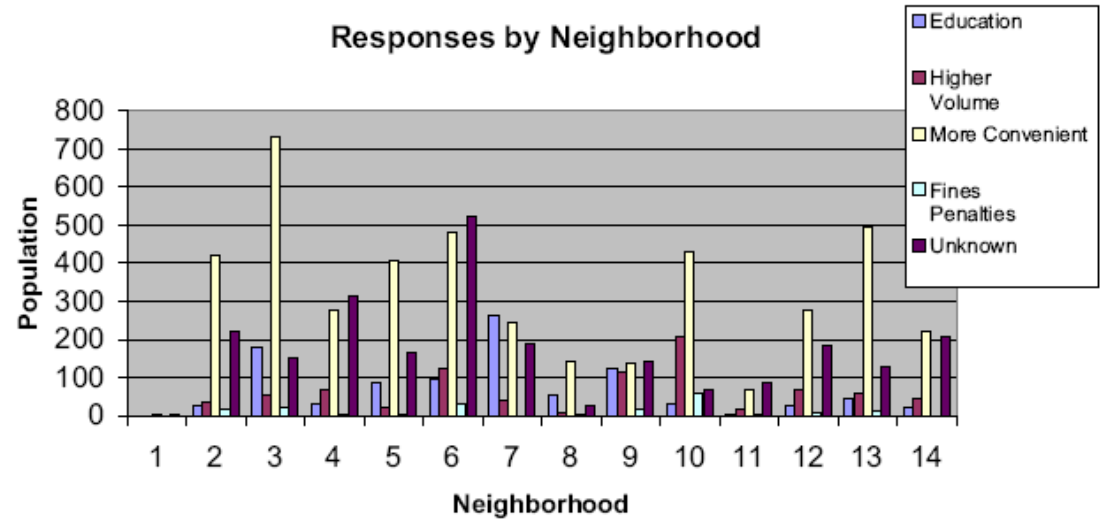
APPENDIX I

RECYCLING AND GARBURATOR RESULTS FROM BANFF CENSUS

3.0 Recycling

3.1 Summary of Responses

What would encourage you to recycle more?	Number	% of Total
Education	988	11.27
Higher Volume Facilities	860	9.81
More Convenient	4342	49.51
Fines or Penalties	176	2.01
Unknown	2404	27.41
Total	8770	100



3.2 Responses by Neighborhood

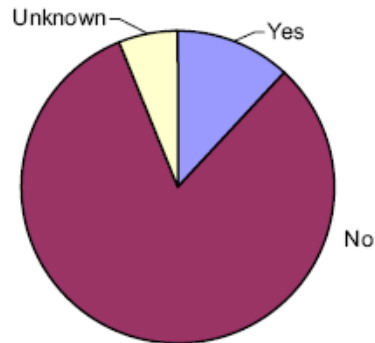
Area #	Education	%	Higher Volume	%	More Convenient	%	Fines Penalties	%	Unknown	%	Total	% of Total
1	0	0	0	0.00	1	33.33	0	0.00	2	66.67	3	0.03
2	25	3.48	35	4.87	420	58.50	15	2.09	223	31.06	718	8.19
3	181	15.89	54	4.74	731	64.18	23	2.02	150	13.17	1139	12.99
4	30	4.29	70	10.01	278	39.77	5	0.72	316	45.21	699	7.97
5	88	12.98	20	2.95	405	59.73	1	0.15	164	24.19	678	7.73
6	95	7.56	124	9.86	483	38.42	31	2.47	524	41.69	1257	14.33
7	263	35.54	41	5.54	246	33.24	0	0.00	190	25.68	740	8.44
8	55	23.61	6	2.58	143	61.37	5	2.15	24	10.30	233	2.66
9	125	23.28	114	21.23	139	25.88	17	3.17	142	26.44	537	6.12
10	30	3.77	208	26.13	430	54.02	59	7.41	69	8.67	796	9.08
11	3	1.69	18	10.11	70	39.33	2	1.12	85	47.75	178	2.03
12	24	4.26	70	12.43	277	49.20	8	1.42	184	32.68	563	6.42
13	46	6.26	57	7.76	496	67.48	10	1.36	126	17.14	735	8.38
14	23	4.66	43	8.70	223	45.14	0	0.00	205	41.50	494	5.63
Total	988		860		4342		176		2404		8770	
% Total		11.27		9.81		49.51		2.01		27.41		100

* Percentage of responses per Neighborhood.

3.3 Summary of Responses

Do you use a Garberator to dispose of kitchen scraps?	Number	% of Total
Yes	1050	11.97
No	7196	82.05
Unknown	524	5.97
Total	8770	100

Do you use a Garberator to dispose of kitchen scraps?



3.4 Responses by Neighborhood

Area #	Yes	%	No	%	Unknown	%	Total	% of Total
1	0	0	3	100	0	0	3	0.03
2	36	4.98	629	87.00	58	8.02	723	8.24
3	104	9.11	1011	88.61	26	2.28	1141	13.01
4	53	7.56	512	73.04	136	19.40	701	7.99
5	114	16.81	508	74.93	56	8.26	678	7.73
6	184	14.64	1052	83.69	21	1.67	1257	14.33
7	48	6.46	657	88.43	38	5.11	743	8.47
8	6	2.58	226	97.00	1	0.43	233	2.66
9	101	18.81	429	79.89	7	1.30	537	6.12
10	0	0.00	753	97.79	17	2.21	770	8.78
11	41	22.91	107	59.78	31	17.32	179	2.04
12	232	40.77	286	50.26	51	8.96	569	6.49
13	89	11.99	639	86.12	14	1.89	742	8.46
14	42	8.50	384	77.73	68	13.77	494	5.63
Total	1050		7196		524		8770	
% Total	11.97		82.05		5.97		100	

Response by Neighborhood

