4

Collection and Processing

Collection and Processing

Policies

CP-1 Provide for efficient collection of solid waste, recyclables, and organics, while protecting public health and the environment and maximizing the diversion of recyclables and organics from disposal.

CP-2 Promote efficient collection and processing systems that work together to minimize contamination and residual waste, and maximize diversion from disposal.

Collection and Processing

Summary of Recommendations

Responsibility		Action	Detailed Discussion
Collection – General			
1	**County**	Evaluate whether to include Vashon/Maury Island in the county's collection service-level standards.	Page 4-6
2	**Cities, county, collection companies, Washington Utilities and Transportation Commission (WUTC)**	Explore options to increase the efficiency and reduce the price of curbside collection of bulky items, while diverting as many items as possible for reuse or recycling.	Page 4-6
3	**Cities, county**	Discontinue the collection of home-generated sharps mixed with garbage both at the curb and at all county transfer facilities; use alternative methods for proper management of sharps.	Page 4-7
4	**County, in cooperation with the cities, collection companies, material processors**	Determine how customers should prepare shredded paper for collection and in which cart it should be placed.	Page 4-10
5	**Cities, county**	Address space and collection needs of mixed-use buildings.	Page 4-20
Material Recovery Facilities			
6	**Material recovery facilities**	Continue to improve facility sorting and processing equipment and practices to remove contaminants and separate recyclables into marketable commodity grades.	Page 4-8
7	**Cities, county, collection companies**	Educate customers on proper recycling techniques to reduce contamination of recyclables going to the material recovery facilities.	Page 4-9

Responsibility		Action	Detailed Discussion
Single-Family Collection Services			
8	**Cities, county, collection companies, WUTC**	Adopt the single-family minimum collection standards.	Page 4-18
9	**Cities, county**	Increase education and promotion on the recycling of food scraps and food-soiled paper.	Page 4-20
10	**Cities, county, collection companies, WUTC**	Continue education and promotion, and consider financial incentives, to encourage recycling and reduce waste.	Page 4-20
Multi-Family Collection Services			
11	**Cities, county, collection companies, WUTC**	Update and/or enforce building code requirements to ensure adequate and conveniently located space for garbage, recycling, and organics collection containers.	Page 4-20
12	**Cities, county, collection companies, WUTC**	Adopt the multi-family minimum collection standards.	Page 4-20
13	**Cities, county, collection companies, WUTC**	Increase education and promotion, and consider financial incentives, to encourage recycling and reduce waste.	Page 4-21
14	**Cities, county, collection companies, WUTC**	Develop an infrastructure and education program for implementing collection of food scraps and food-soiled paper for multi-family residents.	Page 4-23
Non-Residential Collection Services			
15	**Cities, county**	Update and/or enforce building code requirements to ensure adequate and conveniently located space for garbage, recycling, and organics collection containers.	Page 4-23
16	**Cities, county**	Continue education and promotion to encourage recycling and reduce waste.	Page 4-24
17	**Cities**	Include non-residential recycling services in city contracts (consistent with state law).	Page 4-24
18	**Cities, county, collection companies, WUTC**	Promote recycling collection services available in the unincorporated areas and in cities served by WUTC-regulated collection companies.	Page 4-24

Responsibility		Action	Detailed Discussion
19	**Cities, in cooperation with county and collection companies**	Develop infrastructure, education, and promotion to increase recycling of food scraps and food-soiled paper.	Page 4-23
20	**Cities, in cooperation with county**	Consider developing an incentive-based rate structure for non-residential garbage customers to encourage recycling.	Page 4-24
Collection and Processing of Construction and Demolition Debris (C&D)			
21	**County**	Continue to explore options to increase the diversion of C&D from disposal by C&D processors under contract to the division, particularly for wood, metal, and cardboard.	Page 4-24
22	**County**	Encourage contractors and homeowners to use at least two containers on construction, demolition, or remodeling sites – one for garbage and one for mixed recyclables – and if there is sufficient space, to sort individual recyclables on site to maximize diversion from disposal.	Page 4-25

COLLECTION AND PROCESSING
Garbage—Recyclables—Organics—C&D

The system for curbside collection of garbage is well established in King County. Garbage collected by private- and public-sector solid waste collection companies is taken to county transfer stations, where it is consolidated and transported to the Cedar Hills Regional Landfill for disposal. The addition of recyclables to curbside collection programs has required the development of a more complex infrastructure for collecting and transporting recyclables and organics, and additional capacity for processing the materials collected.

With the Waste Not Washington Act of 1989, the state established waste prevention and recycling as the highest priorities for managing solid waste. In so doing, the legislature established a framework for making recycling services available to residents across the state. In King County, the division, cities, Washington Utilities and Transportation Commission (WUTC), solid waste collection companies, and material recovery facilities (MRFs, pronounced merfs) worked together to launch a coordinated system for curbside collection and processing of recyclables throughout the region.

Since the 2001 comprehensive solid waste management plan was adopted, the collection and processing system in the region has evolved significantly. The number of materials that can be recycled or processed for recycling and reuse has increased, technologies for collecting and processing materials have improved, and participation in curbside recycling has continued to climb.

Two key developments have added to the success of single-family residential curbside recycling in the region. First is the transition to commingled (or single-stream) collection. Since 2001, the collection companies have transitioned to commingled recycling, whereby all the recyclable materials are placed in one large cart for curbside pickup. This shift to commingled collection is possible due to the use of more advanced sorting systems at the MRFs, which allow the mixed loads to be separated by commodity in preparation for market. By making it easier and more convenient for individuals to recycle, the per capita recycling rate and overall amount recycled have increased significantly. In addition, the transition has made curbside collection more efficient for the companies that provide this service.

Commingled collection makes recycling easier and leads to increased participation.

A second development is the addition of food scraps and food-soiled paper to yard waste collected curbside. In 2001, the division began working with

the cities and collection companies to phase in curbside collection of food scraps and food-soiled paper in the yard waste cart. Compostable food scraps and food-soiled paper, which currently make up about one-third of the waste disposed by single-family residents, include all fruit and vegetable, meat, and dairy products; pastas; breads; and soiled paper used in food preparation or handling (such as paper towels). Nearly all single-family customers who subscribe to garbage collection now have access to curbside food scrap collection.

The primary processor for nearly all of the yard waste, food scraps, and food-soiled paper collected in the county is Cedar Grove Composting, Inc. Cedar Grove not only processes organic materials into compost, but offers collection of organics to area businesses and sells the finished compost locally. A growing number of cities now offer organics collection to businesses through their existing curbside collection contracts.

In addition to these major developments, markets are growing for the recycling and reuse of construction and demolition debris (C&D). C&D collection and processing facilities are capturing valuable wood, metals, plastics, and other materials from home remodeling projects and commercial construction and demolition projects throughout the region. Programs such as Leadership in Energy and Environmental Design (LEED) and Built Green™ are also focusing the building community on waste prevention, recycling, and reuse of C&D materials.

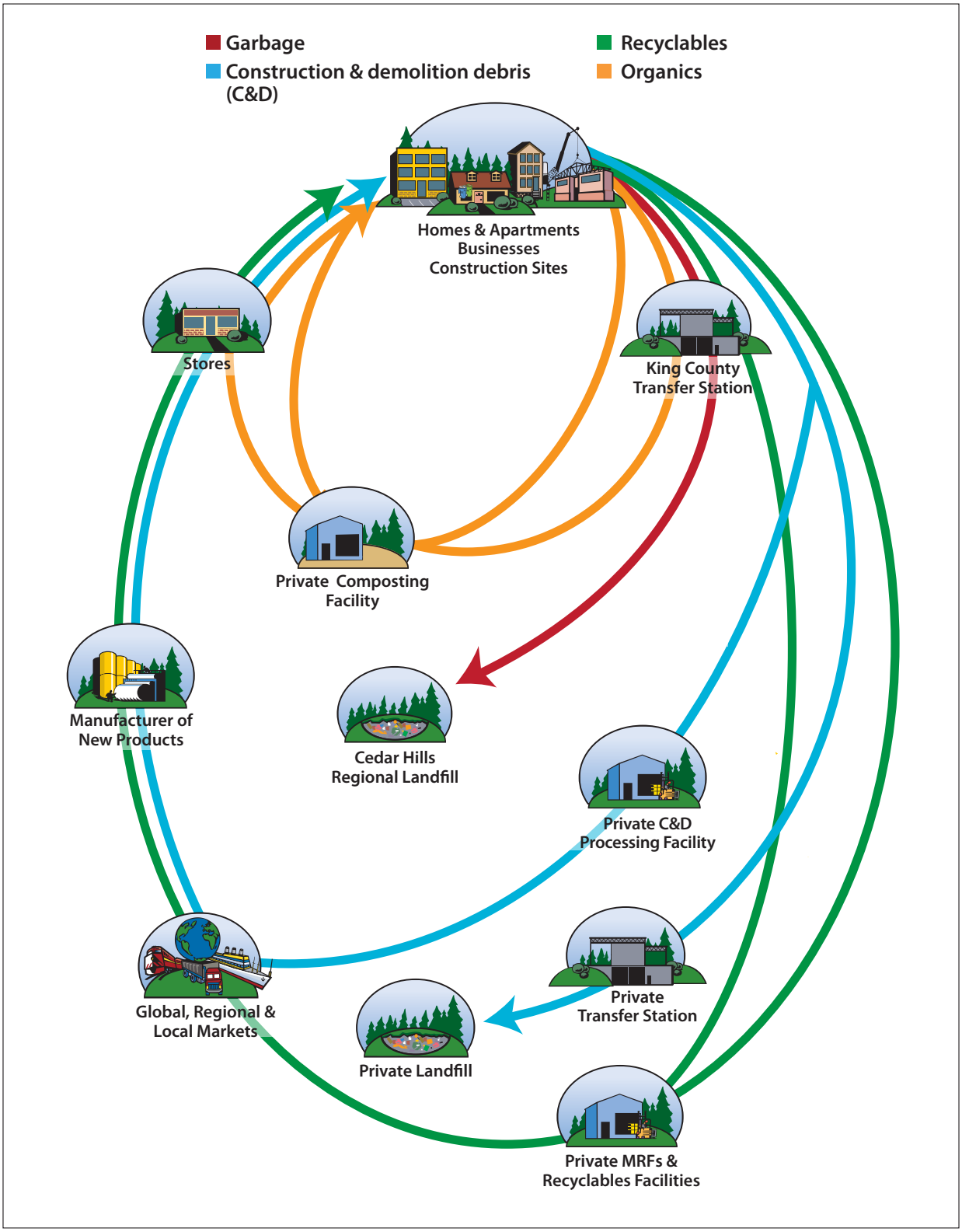
Figure 4-1 provides a general overview of the collection, transportation, and processing systems for garbage, recyclables, organics, and C&D. Garbage is transported to the Cedar Hills Regional Landfill for disposal, while recyclables, organics, and most C&D materials are taken directly to processing or compost facilities where materials are prepared for sale to manufacturers and other users. As shown, these recycled or composted products eventually return to the market for consumer purchase.

As can be seen in Figure 4-1, this multi-faceted system uses the combined resources of the public and private sectors. Regulations and systems for collection and transport that come into play are complex, involving state, county, city, and private-sector responsibilities. The following section describes the rules that govern these important processes in solid waste management.

Garbage collected curbside in commercial collection trucks is taken to county transfer stations for consolidation and transport to the Cedar Hills Regional Landfill.

The remainder of the chapter looks at the current collection challenges and recommendations for improvement for three sectors of generators – single-family households, multi-family complexes, and non-residential customers, which include businesses, institutions, and government entities. For each sector, the issues may vary and present different challenges due to collection methods and the regulations by which they are governed. C&D is discussed separately at the end of this chapter because of the unique nature of C&D collection and processing.

Figure 4-1. Solid waste management system in King County



Governor's Climate Change Challenge Spurs Action

The governor's climate change challenge led to the development of *Leading the Way: Implementing Practical Solutions to the Climate Change Challenge* (November 2008). This report was prepared by the state's Climate Action Team in conjunction with its many members and stakeholders and the Beyond Waste and other Implementation Work Groups. The plan's proposed actions, as they relate to solid waste management, would mandate that citizens and businesses separate their garbage, recyclables, and organics for curbside collection. It would also require all residential and non-residential customers to participate in curbside collection services for all three waste streams. The goal of the plan is to achieve a statewide recycling rate of 80 percent by 2020.

Key excerpts from the plan are as follows:

- *… require source separation of solid wastes by residential and commercial generators into at least three categories: recyclable materials and products, organic materials, and residual solid wastes.*
- *Residential generators must separate their wastes and participate in provided collection services.*
- *Commercial generators must separate their wastes and can select their recycling service provider.*
- *Local governments will be required to update their local comprehensive solid waste management plans …*
- *Local governments are to write plans to assure construction and demolition wastes are reused and recycled at registered recycling businesses.*
- *Financial incentives are provided to the private sector to encourage investment in the infrastructure needed to support this action.*

Based on this plan and its recommendations, House Bill 1718 was introduced in the 2009 legislative session. It was intended to, among other things, optimize solid waste collection systems by reducing energy consumption and greenhouse gas emissions and increase recycling. While the house bill did not move forward in 2009, similar legislation may be proposed in the future. If a similar bill were to pass in a later session, the county would incorporate into its systems any changes resulting from the approved legislation.

THE MECHANICS OF COLLECTION AND PROCESSING

Collection of Solid Waste and Recyclables

In accordance with state law RCW 81.77.020 and 36.58.040, counties are prohibited from providing curbside garbage collection services. Legal authority for collection is shared primarily between the state – acting through the WUTC – and the cities. The WUTC sets and adjusts rates and requires compliance with the state and local adopted solid waste management plans and related ordinances. RCW 81.77 also includes a process for allowing cities to opt out of the WUTC regulatory structure and either contract directly for solid waste collection or provide city-operated collection systems.

The county's 2001 comprehensive solid waste management plan specifies that recycling should be included as part of the basic garbage rate for residents in most of King County. King County enacted a service-level ordinance (KCC 10.18) that includes this requirement for unincorporated areas, and the WUTC required collection companies to develop tariffs that spread the cost and availability of recycling to all residential garbage customers. These tariffs and service-level requirements also apply to cities that have not opted out of the WUTC regulatory structure.

Most of the garbage, recyclables, and organics collection in the county's service area, both contracted for by cities and through the WUTC, is provided by four private-sector companies operating in the region – Allied Waste Services, Inc., Waste Management, Inc., Waste Connections, Inc., and CleanScapes, Inc. Most of the 37 cities in the service area contract directly with one or more of these private companies for collection services. Two cities – Enumclaw and Skykomish – provide municipal collection services within their own jurisdictions.

Enumclaw collects garbage, recyclables, and organics; while Skykomish collects only garbage. Eight cities (Beaux Arts, Black Diamond, Covington, Hunts Point, Kenmore, Medina, Woodinville, and Yarrow Point) and all of the unincorporated areas receive collection services from these same private companies, except CleanScapes, operating under certificates issued by the WUTC.

Revenue Sharing Provides Incentive for Collection Companies to Enhance Recycling

In 2002, the state legislature passed a statute (RCW 81.77.185) establishing a process by which solid waste collection companies regulated by the WUTC could retain up to 30 percent of the revenue paid to them for the recycled materials they collect from households. (The statute does not apply to collection in cities with contracts for recyclables collection.) The purpose of the statute is to provide collection companies with a financial incentive to enhance their recycling programs. Formerly, all revenues from the sale of residential recyclables were passed back to the households as a credit on their garbage bills.

To qualify for the revenue sharing, collection companies must submit a plan to the WUTC that has been certified by King County as consistent with the current comprehensive solid waste management plan. The Solid Waste Division Director has authority to make this certification.

To qualify for certification, the collection company's plan must:

- Be submitted annually for approval
- Demonstrate how proposed program enhancements will be effective in increasing the quantity and quality of materials collected
- Demonstrate consistency with the minimum collection standards
- Incorporate input from the Solid Waste Division
- Be submitted to the Solid Waste Division with sufficient time to review prior to WUTC deadlines

As of June 2009, all WUTC-regulated areas of King County have certified agreements in place.

There is a fundamental difference in how the WUTC regulates residential and non-residential collection of recyclable materials. The Federal Aviation Administration Authorization Act of 1994 prohibits regulation of price, route, or service of any motor carrier transporting property. While this provision does not apply to collection of garbage and recyclable materials from residents, recyclable materials generated by the non-residential sector are considered to be property and are subject to a different regulatory structure. King County cannot enact ordinances that require commercial garbage collectors to include recyclables collection as part of the non-residential collection service. Cities, on the other hand, may include recyclables collection as part of their non-residential collection service, but cannot prohibit businesses and other non-residential entities from choosing other vendors for this service.

More and more cities are adding non-residential recycling services to their collection contracts. While residential recycling has increased steadily over the years, growth in recycling by businesses, institutions, and government entities has been less consistent. Cities that provide recycling as part of their basic collection services provide a financial incentive for businesses to recycle and make recycling more convenient.

Curbside Collection in Rural Areas

When curbside recycling was initiated in King County in the early 1990s, the collection companies (operating under WUTC certificates) that serve unincorporated areas were required to provide curbside recycling services as specified in KCC 10.18 for most of the county. These requirements, consistent with the 1989 comprehensive solid waste management plan, stated that curbside recycling would be offered to all households as part of the basic garbage service, and that yard waste service would be available to all households as a subscription service. However, some rural areas were exempted from these requirements because their low population density or lack of participation in garbage collection services suggested that curbside recycling might not be cost effective.

Currently, three unincorporated areas are not included in the county's collection service-level standards as specified in KCC 10.18:

- **Vashon/Maury Island** – Historically, a comparatively high percentage of Vashon/Maury Island residents have chosen to self-haul garbage and recyclables to the division's Vashon Transfer Station; however, the number of households subscribing to garbage service has increased over time. Waste Connections, the company providing garbage collection service on Vashon/Maury Island, also offers subscriptions to recyclables collection services. About 30 percent of residential garbage customers currently subscribe. Organics collection service is not currently offered.

- **Skykomish Area** – The area around Skykomish is remote and sparsely populated. Residents of Skykomish and some residents in surrounding unincorporated areas receive curbside garbage collection service from the Town of Skykomish. Skykomish does not collect curbside recyclables or organics. Customers may self-haul garbage and recyclables to the division's drop box facility located in Skykomish; however, separate organics collection is not provided at the facility.

- **Snoqualmie Pass** – The Snoqualmie Pass area is also very sparsely populated. Residential garbage collection is available from Waste Management of Ellensburg in Kittitas County, but is not widely used. Curbside recycling is not available; however, the division does provide drop boxes at the pass for the standard curbside recyclable materials. Organics collection is not available.

Working with the community, the division will explore the inclusion of Vashon/Maury Island in the service-level standards. Skykomish and Snoqualmie Pass will not be included at this time because of their remote locations and low population densities.

Curbside Collection of Bulky Items for Residents

An ongoing issue with collection is finding the most efficient and cost-effective way to handle bulky waste – larger, individual items that do not fit in a garbage can or recycling cart. This type of waste includes recyclable items such as appliances, potentially reusable items such as furniture, and other large items that must be disposed.

Bulky waste collection services are available from collection companies throughout the county; however, these services are not widely used. Residents may not use the service because it is expensive, ranging from $25 to $100 per item, with the possibility of additional charges for travel time and labor. Customers may also be unaware of the collection options available to them. The primary alternatives to bulky curbside collection are self-hauling the materials to transfer stations for disposal or recycling, or taking them to collection events sponsored by the county or the cities. Neither of these self-haul options is an efficient way of handling the materials because of the number of vehicle trips, the increased number of transactions at transfer stations, and the high cost of staging collection events.

Options are being explored to identify an efficient and cost-effective means of collecting large, bulky items.

The current recommendation is to work with collection companies and the WUTC to explore options to increase the efficiency and reduce the price of curbside collection of bulky items. For example, the cost would be lower if a small charge were included in the regular garbage fee, and curbside collection days were regularly scheduled and promoted, thereby increasing the efficiency of the collection routes. Collection systems for bulky items should be designed, to the extent possible, to divert reusable items to charitable organizations for resale and recyclable items to processing facilities.

Collection of Sharps

Sharps are medical products, such as hypodermic needles, scalpel blades, and lancets, which require special handling to ensure their safe collection, transfer, and disposal. Without proper containment, sharps can pose a safety hazard to workers through potential exposure to blood-borne pathogens or other disease-causing agents. Within King County, the disposal of sharps is regulated by Title 10 of the King County Board of Health Code and by King County's Waste Acceptance Rule (PUT 7-1-5 [PR] 6/05).

Separate, secure receptacles for sharps collection are provided for residents and small businesses at the Vashon transfer station and for residents only at the Shoreline Recycling and Transfer Station. The division will provide separate sharps receptacles at new transfer facilities, where practicable. Business-generated sharps are not accepted at the transfer facilities, except at Vashon with prior permission from the division's Special Waste Unit. Sharps generated by medical facilities or businesses are accepted for disposal at the Cedar Hills Regional Landfill with permission from the Special Waste Unit.

If contained in a properly marked, two-liter polyethylene terephthalate (or PET) plastic pop bottle, home-generated sharps are currently accepted with the garbage at the curb and at division transfer facilities. Until recently, PET bottles were considered the best available and affordable container for home-generated sharps. The PET bottles, however, are now being manufactured with thinner plastic, and

heavier equipment and new processes at solid waste facilities are allowing greater compaction of garbage. Together, these factors make it more likely that the PET bottles that contain the sharps could break during handling. Both the Centers for Disease Control and the U.S. Environmental Protection Agency have withdrawn support for this method of containment because of the exposure risks to workers.

Because of these risks, the division is recommending that the county and the cities stop accepting sharps mixed with garbage at the curb or at any transfer facility. This recommendation is consistent with the policies of other regional governments, federal agencies, and at least one of the solid waste collection companies in the region.

There are alternative methods for the proper management of sharps. For example, some health care providers and pharmacies will take back used sharps in pre-approved containers. There are also mail-in programs available.

Processing of Commingled Recyclables

Facilities that process mixed recyclables require solid waste permits and are regulated by Public Health – Seattle and King County (Board of Health, Solid Waste, Chapter 10.12).

The processing of recyclable materials into new commodities begins at a MRF. MRFs receive material loads from the commercial collection trucks, remove contaminants from the loads, sort materials to meet the specifications of the end users or markets, and compact or bale the material for efficient shipping. As the residential collection system has moved to commingled collection, MRFs in the region have upgraded their facilities to improve their ability to remove contaminants and sort materials into marketable commodity grades. Any residuals, or non-recyclable waste products, from recyclables processing facilities within the King County service area must be disposed of at a King County solid waste facility.

At a local MRF, sorted paper moves on to be baled for shipment to manufacturers and other end users.

The two largest collection companies in King County – Waste Management and Allied – each own a MRF located within the county to process most of the recyclable materials they collect. Waste Management's Cascade Recycling Center was designed and constructed in 2002 as part of their transition to fully commingled recyclables collection. Allied's Recycling Center in south Seattle was substantially redesigned in 2007 to improve its ability to sort commingled materials.

Other MRFs processing commingled recyclables collected in King County include Smurfit Recycling in Renton, SP Recycling in Thurston County, and JMK Fiber in Pierce County. Tacoma

Recycling processes materials collected curbside on Vashon Island. Numerous other private-sector facilities have also emerged across the county where residents and businesses can take source-separated recyclables for processing, from paper, cans, and bottles to printer cartridges and cellular telephones.

While the conversion to commingled collection makes recycling easier for consumers and has resulted in increased recycling, it presents some challenges for the recovery and processing facilities. One of the challenges is cross contamination of materials as they are sorted and separated. This is a problem particularly for the paper stream, where materials such as plastic milk jugs end up in the baled paper. Paper mills overseas typically perform additional sorting of the materials to recover misplaced recyclables; however, most domestic paper mills dispose of these materials. In the case of glass, even small amounts of contamination in the sorted material can reduce the quality and affect the potential end use of the recycled glass. These problems illustrate a fundamental conflict between the benefits of commingled recycling (it makes collection easier and leads to increased recycling) and the need for the MRFs and end users to minimize the costs of handling these materials.

For the processing of commingled recyclables to be most efficient, it is important that consumers are careful about preventing contamination in the recycled loads by 1) preparing recyclables for the collection cart (i.e., rinsing out bottles and jars, breaking down cardboard boxes) and 2) placing materials in the proper collection container. Contamination in the recyclables can cause a wide array of problems during processing, which can lead to a reduction in the value of the materials processed for market or, in extreme cases, the disposal of entire mixed loads. This issue can best be remedied through education programs offered through local governments and the collection companies on proper recycling techniques.

As we move forward, the recommended role of the county and cities is to focus on increasing the supply and improving the quality of recyclable materials delivered to processors. The value of materials for recycling can be maximized through public education – to decrease contamination in the recycling stream and ensure that materials are properly prepared before being placed in the recycling container – and through market development – by encouraging businesses to invest in technologies used to sort and process recyclables.

There are materials that present unique challenges or require more definitive decisions about the optimal way to process them, such as container glass and shredded paper:

- **Container Glass** – With the advent of single-stream recycling, glass is being collected in the same cart as other recyclables. While commingled collection is more efficient for the collection companies, it does create some challenges for the processors. Glass containers are often broken as they are loaded into the collection trucks or when the collection trucks dump the materials onto the floor of the MRF, which causes added wear and tear on the equipment. When the glass breaks into very small fragments during processing it can limit the markets for these materials (e.g., the glass may not be suitable to be made into new glass containers). In addition, the glass sometimes gets into the paper stream where it contaminates the paper bales.

  However, the efficiencies of commingled collection far outweigh the benefits of separating the glass from the other recyclables at the curb. Thus, the MRFs have been working to minimize contamination of the paper stream by glass and are exploring new and higher-value markets for the glass.

- **Shredded Paper** – The increase in identity theft has caused increasing concern about discarding personal or confidential documents. As a result, shredding these kinds of papers has become a common activity. Loose shredded paper causes problems at MRFs where it can jam machinery and be difficult to sort from other material streams. Finely shredded (cross-cut) paper fibers cannot be recycled at all, making them a nuisance at processing facilities.

  Some recycling companies have tried to address their customers' interest in recycling shredded paper by providing special on-site shredding/recycling services for businesses or instructing customers to place shredded paper in clear plastic bags or paper bags for collection, which makes it easier for the material to be handled separately at the MRF. Some residents have been instructed to layer shredded paper in their yard waste cart. This method can create two potential problems: 1) shredded paper not properly layered with the organics can cause a litter problem at the composting facility and 2) too much paper received at the facility can create an imbalance in the correct carbon-to-nitrogen ratio necessary to make compost.

Shredded paper presents challenges for collectors and processors.

  Because of the problems of collecting and processing this material and because information given to customers about how to handle this material is inconsistent, the cities and the county will be working with the collection companies and processors to clearly determine how customers should prepare shredded paper for collection and in which cart it should be placed. And the answers may be different for residential collection versus non-residential collection, where the volumes could be much greater.

RESIDENTIAL COLLECTION

The residential garbage collection system in King County is a well-established system that serves the region in a safe, efficient, and cost-effective manner. With the shift toward increased collection services for recyclables and organics, customers can choose to subscribe to smaller, less expensive collection cans for their garbage. Container sizes now range from the micro-can at 10 gallons to the mini-can at 20 gallons and on up to the larger 90+ gallon cart. The reduced fee for the smaller cans creates an incentive to generate less waste and divert as much material as possible to the recyclables or organics carts.

Throughout King County, individual city contracts for collection of garbage, recyclables, and organics differ in a number of aspects. Cities have entered into contracts with the collection companies at different times and then renewed contracts as they have expired. Each time a contract is negotiated and renewed, the city may make adjustments to their services such as changing the range of materials being collected, the collection frequency, container types or sizes, fee structures, and more. Changes to services may also

be negotiated for in-place contracts. The varying collection standards among cities that have resulted from these changes over time have led to inconsistencies in regional education and messaging, confusion among customers, and difficulties in measuring and potentially attaining regionwide goals.

Curbside collection has become more automated over time.

To illustrate the varying collection standards that currently exist, Table 4-1 presents a summary of single-family collection services by city and unincorporated area, showing the various types of contracts held, container sizes offered, collection frequency, and fee structures. The recycling rates for each jurisdiction and unincorporated area, with and without organic materials, are also presented for comparison.

As shown in the table, the single-family recycling rate varies significantly among the cities and unincorporated areas, ranging from 33 to 70 percent (combining organics and the curbside recyclables). While it would be difficult to identify a single factor or factors that will ensure a higher recycling rate, there are some factors that appear to lead to increased participation and amounts of waste diverted from disposal, as discussed in the following sections.

Range of Materials Collected

In addition to the materials identified for curbside collection in the last comprehensive solid waste management plan – newspaper, mixed paper, and cardboard; tin and aluminum cans; plastic bottles; glass bottles and jars; and yard waste – new materials have been added over time. These materials include polycoated paper, shredded paper, aseptic packaging (such as juice boxes), plastic tubs and jugs, scrap metal, and food scraps and food-soiled paper. The county's service-level ordinance and many city contracts have already been updated to include these materials. Some cities have added other materials for collection, such as electronics, fluorescent bulbs and tubes, and plastic bags.

Curbside collection, however, is not necessarily the most efficient and cost-effective way to capture every type of recyclable or reusable product. Some products cause problems for MRFs because of their size or composition, while others are better candidates for take-back programs by manufacturers and retailers to extract potentially harmful components and recycle other components. Examples of these types of materials and their particular challenges include the following:

- **Plastic Bags** – Plastic bags and plastic wrap are prevalent in the waste stream, particularly residential. Collection of plastic bags in the recyclables cart creates a nuisance further down the line at the MRFs. As the bags move through the facility they sometimes catch in and jam the sorting machinery, and they

can blow around and cause litter problems. For these reasons, curbside collection may not be the best option for plastic bags at this time. More appropriate options for consideration may be an increased use of reusable shopping bags and the establishment of take-back programs at the retail level.

- **Electronic Products and Fluorescent Bulbs and Tubes** – Collecting these products at the curb is complicated by the fact that some of the products tend to break easily and contain potentially hazardous materials that must be safely disposed. In Washington State, legislation was passed in 2006 that requires manufacturers of computers, monitors, and televisions to provide separate locations for free recycling of these items. Handling electronics through product stewardship ensures that the various components, such as glass, plastic, and metals, are separated and recycled as appropriate and that any potentially hazardous materials are recycled or disposed of in a safe and environmentally sound manner. For similar reasons, take-back programs are being implemented for fluorescent bulbs and tubes. Relying on product stewardship efforts reduces costs to local governments and their ratepayers by eliminating the costs to recycle these products.

  Through their curbside recycling contracts, some cities have offered collection of some small appliances and home electronics not covered by Washington's current product stewardship laws. For appropriately sized products that do not contain hazardous materials, curbside collection is a viable and efficient option.

As an authorized E-Cycle Washington collector, Total Reclaim of Seattle accepts televisions and other electronics for recycling.

- **Polystyrene Foam** – One type of plastic that is not recommended for residential curbside collection is polystyrene foam, which includes clamshell containers for take-out foods and blocks of plastic that are used to package many electronics and other goods. These materials are difficult to collect curbside because they are light and bulky, can break easily into small pieces, mix with other materials causing contamination, and are difficult to process at the MRFs. In addition, the quantity collected is so small that it takes a long time to collect enough of the material to ship to market. Through the county's LinkUp program, the division is working with local recycling firm Total Reclaim Environmental Services to establish a polystyrene processing facility to serve Seattle and King County. LinkUp is providing financial, technical, and marketing assistance to support the project. The City of Seattle has taken another approach and banned the use of polystyrene containers for take-out foods.

Size of Collection Container

The size of the recycling collection cart can affect recycling success. Larger carts generally lead to higher recycling rates. As more materials are identified for commingled recycling, and food scraps are added to the yard waste cart, recyclables carts are getting larger and the size of garbage can to which customers

Table 4-1. Summary of single-family collection services in King County

Jurisdiction or Unincorporated Area	Type of Collection[a]			Cart Size (gallons) and Collection Frequency[b]					Fee Structure		Disposal and Recycling Rates		
	Collection Company	Contract/ WUTC Tariff No.	Mandatory Garbage Collection	Standard Recycling Cart	Standard Yard Waste Cart	2008 Frequency of Recycling Collection	2008 Frequency of Organics Collection (spring-summer-fall)	2008 Frequency of Organics Collection (winter)	Recycling Included in Garbage Fee	Organics Included in Garbage Fee	2008 Garbage Disposal (lbs/cust/ wk)	2008 Recycling Rate (including organics)	2008 Recycling Rate (excluding organics)
Cities													
Algona	WM	Contract	X	64	96	EOW	EOW	EOW	X		29	42%	26%
Auburn	WM/KM	Contract[c]	X	64	96	EOW	W	EOW	X		22	53%	33%
Beaux Arts	AW	11		96	96	EOW	EOW	EOW	X		26	71%	50%
Bellevue	AW	Contract		96	96	W	W	W	X	X	23	66%	44%
Black Diamond	KM	27		34/96	96	EOW	EOW	EOW	X		31	35%	23%
Bothell	WM	Contract	X	64	96	W	W	W	X	X	25	64%	40%
Burien	WM	Contract		96	96	EOW	W	EOW	X		27	54%	37%
Carnation	WM	Contract	X	64	96	EOW	W	EOW	X		27	58%	26%
Clyde Hill	AW	Contract		96	96	EOW	W	EOW	X		28	64%	36%
Covington	KM	27		34/96	32/96	EOW	EOW	EOW	X		31	39%	23%
Des Moines	AW	Contract		34/96	96	EOW	EOW	EOW	X		28	45%	30%
Duvall	WM	Contract	X	64	96	W	W	EOW	X		25	59%	35%
Enumclaw	City	City	X	96	96	EOW	EOW	EOW	X		27	54%	23%
Federal Way	WM	Contract		64	96	EOW	W	EOW	X		26	54%	32%
Hunts Point	AW	11		96	96	EOW	EOW	EOW	X		34	54%	38%
Issaquah	WM/AW	Contract[c]		96	96	W	W	W	X	X	22	59%	42%
Kenmore	AW	11		96	96	EOW	EOW	EOW	X		27	53%	35%

Jurisdiction or Unincorporated Area	Type of Collection[a]			Cart Size (gallons) and Collection Frequency[b]					Fee Structure		Disposal and Recycling Rates		
	Collection Company	Contract/ WUTC Tariff No.	Mandatory Garbage Collection	Standard Recycling Cart	Standard Yard Waste Cart	2008 Frequency of Recycling Collection	2008 Frequency of Organics Collection (spring-summer-fall)	2008 Frequency of Organics Collection (winter)	Recycling Included in Garbage Fee	Organics Included in Garbage Fee	2008 Garbage Disposal (lbs/ cust/ wk)	2008 Recycling Rate (including organics)	2008 Recycling Rate (excluding organics)
Cities													
Kent	KM	Contract	X	34/96	96	EOW	EOW	EOW	X		29	51%	33%
Kirkland	WM	Contract	X	64	96	W	W	W	X	X	20	68%	45%
Lake Forest Park	AW	Contract		96	96	EOW	EOW	EOW	X	X	24	61%	41%
Maple Valley	WM	Contract		96	96	EOW	EOW	EOW	X		28	50%	32%
Medina	AW	11		96	96	EOW	EOW	EOW	X		30	60%	38%
Mercer Island	AW	Contract		96	96	EOW	EOW	EOW	X	X	27	62%	38%
Newcastle	WM	Contract		96	96	EOW	W	EOW	X		28	56%	37%
Normandy Park	AW	Contract/26[d]		34/96	32/96	EOW	EOW	EOW	X		29	47%	29%
North Bend	AW	Contract	X	64	96	W	EOW	EOW	X		30	49%	33%
Pacific	WM	Contract	X	64	96	EOW	EOW	EOW			26	41%	17%
Redmond	WM	Contract		64	96	W	W	EOW	X	X	22	63%	43%
Renton	WM	Contract[c]	X	96	96	EOW	W	W	X	X	22	57%	34%
Sammamish	WM/AW	Contract		96	96	EOW	W	EOW	X		28	59%	41%
SeaTac	AW	Contract		96	96	EOW	EOW	M	X		27	41%	30%
Shoreline	CS	Contract		96	96	EOW	EOW	EOW	X		24	56%	39%
Skykomish	City	City	X	NS	NS	NS	NS	NS					
Snoqualmie	AW	Contract	X	64	96	W	EOW	EOW	X		29	46%	35%
Tukwila	AW	Contract		96	96	EOW	EOW	EOW	X		39	46%	31%
Woodinville	WM	14		96	96	EOW	W	EOW	X		27	52%	37%
Yarrow Point	AW	11		96	96	EOW	EOW	EOW	X		29	61%	37%
Subtotal Cities											**25**	**57%**	**37%**

Jurisdiction or Unincorporated Area	Type of Collection[a]			Cart Size (gallons) and Collection Frequency[b]					Fee Structure		Disposal and Recycling Rates		
	Collection Company	Contract/ WUTC Tariff No.	Mandatory Garbage Collection	Standard Recycling Cart	Standard Yard Waste Cart	2008 Frequency of Recycling Collection	2008 Frequency of Organics Collection (spring-summer-fall)	2008 Frequency of Organics Collection (winter)	Recycling Included in Garbage Fee	Organics Included in Garbage Fee	2008 Garbage Disposal (lbs/cust/ wk)	2008 Recycling Rate (including organics)	2008 Recycling Rate (excluding organics)
Unincorporated Areas													
Juanita	AW	11		96	96	EOW	EOW	EOW	X		29	52%	34%
Eastgate/ Sammamish Plateau	AW	11		96	96	W	W	EOW	X		26	48%	30%
Eastern county	KM	27		34/96	32/96	EOW	EOW	EOW	X		30	34%	23%
South-central county	AW	26		96	96	EOW	W	EOW	X		25	50%	32%
Northeastern county	WM	14		96	96	EOW	W	EOW	X		30	51%	34%
Southern county	WM	21		96	96	EOW	W	EOW	X		26	51%	35%
Vashon Island	WC	7		4-bin	NS	EOW	NS	NS			27	6%	6%
Snoqualmie Pass	WM	10		NS	NS	NS	NS	NS					
Subtotal Unincorporated Areas											**28**	**46%**	**30%**
Total County											**26**	**55%**	**35%**

[a] *Collection Companies:*
AW - Allied Waste
CS - CleanScapes
KM - Kent Meridian (owned jointly by Allied and Fiorito Enterprises, Inc.)
WC - Waste Connections
WM - Waste Management

[b] *Collection Frequency:*
EOW - every other week
EW - every week
M - monthly
W - weekly

[c] *City also has recently annexed areas served by WUTC-regulated hauler(s); these areas may have different cart sizes, collection frequencies, and fee structures.*

[d] *Garbage collection is regulated by WUTC; recycling rates and service are established by city contract.*

Note: NS = no service provided

subscribe should become smaller. In the Eastern unincorporated area of the county, most residential customers have been using smaller recycling carts and have shown lower recycling rates (see Table 4-1). In this same area, when larger carts have been provided the recycling rate has increased.

Frequency of Collection

Making adjustments to the frequency of curbside collection for garbage, recyclables, and organics is a tool that can be used to influence recycling and disposal behaviors and reduce collection costs and truck traffic. Garbage collection across King County typically occurs on a weekly basis. This collection schedule has been driven, in part, by the presence of food scraps and other organics in the garbage that rapidly decompose and have the potential to lead to environmental or public health concerns. With recycling and recent advancements to separate organics for collection, there is an opportunity to alter weekly garbage collection to benefit ratepayers and the environment.

One of the most important factors in determining the appropriate collection frequency for the various material streams, particularly for organics (yard waste and food scraps), is compliance with the public health and environmental standards in Title 10 King County Board of Health Solid Waste Regulations Health Code. To study the effects of changing the collection method and possibly the frequency of collection, in summer 2007 the division conducted a pilot study in cooperation with the City of Renton, Waste Management (the collection company), and Public Health – Seattle and King County (the Health Department). The purpose of the study was to explore the public health and environmental impacts, customer responses, and effects on potential waste diversion that would result from changes in collection. In particular the Health Department was concerned about the feasibility of collecting meat and bones every other week in the yard waste cart and changing garbage collection to less than weekly. To explore these concerns, approximately 1,500 Renton households participated in the 6-month pilot study to look at two different collection schedules:

- Every-other-week collection of all three solid waste streams – garbage, recyclables, and organics
- Every-other-week collection of garbage and recyclables and weekly collection of organics

The pilot study showed positive results for both collection schedules tested. There were no negative health or environmental impacts observed, and customers were highly satisfied with the varied collection schedules and the container sizes provided to adjust for the shift in schedule. Study results indicated not only a 20 percent decrease in the amount of garbage disposed, but an overall reduction in the generation of garbage, recycling, and organics. An added benefit was the reduction in truck traffic and transportation costs with the less frequent collection cycles.

As a precursor to changing the Title 10 Health Code based on the successful results of the pilot study, the Health Department approved a variance that would allow all organics and garbage to be collected less than weekly (see page 4-17). As a result, the City of Renton rolled out a citywide program in January 2009 to offer every-other-week collection of garbage and commingled recyclables, with every week collection of organics. Renton is the first city in King County to provide every-other-week garbage collection as the standard collection service.

Regulatory Changes Allow Adjustments in Collection Frequency Schedules

After successful completion of the Renton pilot study, a variance to the Title 10 King County Board of Health Solid Waste Regulations Code was approved to allow every-other-week collection of organics (with the yard waste) for single- and multi-family residents, as well as every-other-week collection of garbage. The variance applies as long as the following standards (excerpted directly from the variance) are met. During the next scheduled review of the Title 10 Health Code, these variances are scheduled to be adopted:

Residential (Single-Family) Garbage Collection

Residential garbage may be collected every other week provided that:

- Garbage is contained in a provided cart
- A food scrap collection program is available and actively promoted to residents
- The garbage collection and food scrap collection services are offered on alternating weeks to ensure that customers have access to an at least weekly disposal or composting option for problematic compostables
- Residents are instructed to bag all garbage before placing it in carts to reduce vectors, free liquids, and litter

Residential (Single- and Multi-family) Organics Collection (with yard waste)

- When mixed with yard debris, residential food scraps may include all vegetative, meat, dairy products, pastas, breads and soiled paper materials used for food preparation or handling, provided that all collected materials are picked up by haulers which deliver the mixed yard waste to a permitted transfer and/or permitted composting facility for serviced customers.
- Combined food scraps and yard debris shall be collected no less frequently than every-other-week, year-round provided that there are no leachate generation, odor, or vector problems.
- Combined food scraps and yard debris shall be collected in carts. Residents shall be instructed to place food scraps only in the cart provided to them. Any extra customer-provided cans or large paper bags shall contain only yard debris.
- Compostable bags may be used to consolidate food scraps placed in carts if and only if the bags have been approved by the facility receiving the material for composting. Plastic bags shall not be used for yard debris.
- Haulers shall make available a cart-cleaning or replacement service for customers with carts which have unacceptable residue or odor levels to avoid improper disposal of rinsewater to storm drains, yards, etc and reduce the need for customers to self-clean their containers.
- Educational and promotional materials from the county, city, and haulers shall inform residents about the benefits of recycling food scraps and soiled paper; appropriate options for managing kitchen waste, including the use of approved compostable bags; and appropriate options and restrictions for cleaning carts.

(*continued*)

Based on a separate commercial pilot, an additional variance is under review by the Health Department to allow collection of non-residential and multi-family organics that are not mixed with yard waste.

Commercial/Multi-Family Food Scraps Collection (without yard waste)

- Food scraps shall be collected in leak proof contractor-provided containers with tightly-fitting lids.
- Containers shall be kept clean through the use of contractor-cleaning, compostable bagging, compostable cart lining or boxing, or limiting the types of materials collected from a particular customer.
- Containers shall be cleaned by the customer or the hauler immediately upon the request of City, County or Public Health personnel.
- Customers shall be informed of container cleaning restrictions (i.e. Proper disposal of rinsewater and any residues from containers outside of storm drains, landscaping, etc.).
- Customers shall be informed of what is not acceptable in containers and the need to keep container lids closed when not in use and inaccessible overnight on commercial containers.
- Collection of commercial/multifamily food scraps shall occur at a minimum weekly. Any exception to the minimum weekly schedule will have to be justified by information on a particular customer's food scrap composition where it can be shown that less frequent collection can occur without leachate generation, odor, and vector problems.

Fee Structure

In nearly all areas of King County, households paying for garbage collection services are also required to pay for recycling collection. The fee for recycling services includes the cost of the recycling containers and, in most cases, the ability to set out unlimited amounts of recyclables for the same flat fee. In contrast, the fee for garbage service varies depending on the number or size of containers a household sets out. Consequently, King County residents have a clear financial incentive to reduce the amount they dispose and increase the amount they recycle.

Eight cities, comprising about 30 percent of the single-family households in the county, have adopted rate structures that require residents to pay for organics collection (yard waste and food scraps), providing a further incentive for residents to reduce disposal and maximize use of the recycling options for which they are paying. In 2008, the average pounds of garbage disposed per household in these eight cities was 17 percent lower than the average for the rest of King County.

Single-Family Residential Collection

As shown in Table 4-1, single-family collection services for garbage, recyclables, and organics are well established. As discussed earlier, however, there are many variations among the cities in the specific methods of collection and rate structures. The division has evaluated the factors that appear to lead to higher recycling rates and an increase in the diversion of materials from the garbage. Based on

this evaluation, it is recommended that minimum collection standards be adopted by the cities and unincorporated areas to provide the optimal service level for reducing waste and increasing the diversion of recyclables and organics from disposal. Establishing minimum collection standards countywide will help us 1) meet a target of 45 percent single-family recycling by 2015 (not including organics), 2) lead to more efficient operations by standardizing services, and 3) clarify what or how materials are collected through more consistent messaging regionwide.

The new minimum collection standards can be implemented as the county updates its service-level ordinance and jurisdictions amend their collection contracts (some changes may not require changes to contracts). A description of the recommended collection standards is provided below.

Single-Family Minimum Collection Standards

	Garbage	Recyclables	Organics
Required Materials for Collection	Mixed solid waste	Newspaper, cardboard, mixed paper, and polycoated paper Plastic bottles, jugs, and tubs Tin and aluminum cans Glass bottles and jars Aseptic packaging Small scrap metal Shredded paper[a]	Yard debris Food scraps Food-soiled paper Shredded paper[a]
Container Type	Wheeled carts or containers	Wheeled carts	Wheeled carts
Container Size	Subscriptions available for various sizes	60+ gallons if collected weekly 90+ gallons if collected every other week Smaller size if requested by customer	60+ gallons if collected weekly 90+ gallons if collected every other week Smaller size if requested by customer
Frequency of Collection	Every other week	Weekly or every other week	Weekly or every other week
Fee structure	Fee increases with container size	Recyclables collection included in garbage fee Additional containers available at no extra charge	Organics collection included in garbage fee Additional carts may be included in base fee or available at an extra charge Customers requesting smaller carts may be offered a reduced rate

[a] *The cities and the county will be working with the collection companies and processors to determine how customers should prepare shredded paper for collection and in which cart it should be placed.*

Continuing education and promotion will also be important for increasing recycling and reducing wastes generated by single-family residents. The cities and the county will increase education and promotion to encourage the recycling of food scraps and food-soiled paper. In concert with the commercial collection companies, the cities and the county will also continue to focus promotions on the proper recycling of the standard curbside materials to increase participation and reduce contamination in the recycling containers. Financial incentives will also be explored through the fee structure for garbage and recyclables and grants to cities (discussed in Chapter 3).

Target: 45 Percent for Single-Family Curbside Recycling

The waste prevention and recycling goals are countywide goals that are not calculated on a city-by-city basis. However, the rate for single-family curbside recycling, which is reported to the division and the cities by the collection companies, can be measured for each city and unincorporated area. If every city and unincorporated area in King County were to achieve at least a 45 percent single-family curbside recycling rate (excluding organics) by 2015, we will have diverted an estimated additional 230,000 tons of material from disposal at the Cedar Hills Regional Landfill.

Recycling rates for each city and unincorporated area can vary widely – from a high of 50 percent to a low of 17 percent in 2008, with most falling somewhere in the range of 30 to 40 percent (excluding organics). Reaching a target of at least 45 percent curbside recycling can be achieved through a combination of producing less garbage and recycling more. For a city or unincorporated area with a lower recycling rate, one of the best ways to improve the rate would be to adopt the recommended minimum collection standards outlined in detail on page 4-19.

It should be noted that a lower recycling rate is not always a negative outcome. The simultaneous reduction of both garbage and recyclables can be a positive outcome – it may mean that overall waste generation is decreasing through waste prevention.

Multi-Family Residential Collection

As discussed in Chapter 3, *Waste Prevention and Recycling*, multi-family recycling has not been as successful as single-family recycling. There are a number of contributing factors, including space constraints for collection containers and a higher turnover of residents and property managers. These factors make it difficult to implement standardized collection services and provide consistent recycling messaging to this diverse sector.

In addition, in many areas of the county there is an ever-growing trend in the construction of mixed-use buildings, which contain retail shops in the lower level(s) and residential units above.

Mixed-use buildings present somewhat similar challenges for recycling, including:

- A lack of space for adequate garbage, recycling, and organics collection (often competing with parking needs and other uses)
- A need for collaborative planning among property developers, garbage and recycling collection companies, and cities early in the development process to ensure that adequate space is designated for garbage, recycling, and organics containers in the building design
- Different customer types, both residents and employees, with different recycling needs

Recycling could be increased substantially at multi-family complexes and mixed-use buildings by adopting the new minimum collection standards for multi-family collection. The multi-family standards vary somewhat from the single-family standards to account for differences in service structure. To improve recycling at mixed-use buildings, the cities and the county must consider both the multi-family collection standards and the recommendations for non-residential collection.

Multi-Family Minimum Collection Standards

	Garbage	Recyclables	Organics
Required Materials for Collection	Mixed solid waste	Newspaper, cardboard, mixed paper, and polycoated paper Plastic bottles, jugs, and tubs Tin and aluminum cans Glass bottles and jars Aseptic packaging Small scrap metal Shredded paper[a]	Yard debris Shredded paper[a] Optional: Food scraps Food-soiled paper
Container Type	Wheeled carts or dumpsters	Wheeled carts or dumpsters	Wheeled carts or dumpsters
Container Size	Subscriptions available for various sizes	Container with at least 150% of garbage container capacity Smaller size if requested by customer	60+ gallons if collected weekly 90+ gallons if collected every other week Smaller size if requested by customer
Frequency of Collection	Weekly, or more often if needed	Weekly or every other week	Weekly or every other week
Fee structure	Fee based on container size and/or collection frequency	Recyclables collection included in garbage fee Additional containers available at no extra charge	Subscription service available for an added fee

[a] *The cities and the county will be working with the collection companies and processors to determine how customers should prepare shredded paper for collection and in which cart it should be placed.*

Increased education and promotion are needed to improve recycling at multi-family complexes. In 2007-2008, the division conducted a pilot education campaign to increase recycling in five large, multi-family complexes in the county. The study results indicated the need to overcome some fundamental challenges in order to increase recycling, including:

- Differing levels of recycling services, often due to space constraints, and inconsistent communication to residents
- A lack of consistent building standards for locating collection containers and/or unclear information provided to residents about the container locations
- Inconsistencies in the quality of signage on the collection containers, which can lead to a higher rate of contamination in the containers (i.e., improper materials in the various containers)

- In some cases, even with an increase in the amount of recyclables in the container, the need to dispose of the entire contents because of contamination
- A high turnover rate of residents and oftentimes property managers, which requires ongoing efforts to provide proper education about recycling

During the pilot education campaign, the division initiated a multi-faceted education program, including one-on-one contact with property managers by the division's recycling coordinators; improvements to the recycling/garbage collection areas; improved signage; and distribution of multi-lingual education materials. The pilot program was costly on a per-unit basis, and the results were inconclusive, with slight increases in recycling at some complexes and no measurable changes at others. The overall recycling rate did not increase. At complexes where recycling did increase, it was not clear what led to the change.

Increasing multi-family recycling will require concerted efforts on the part of many to standardize the collection infrastructure and provide ongoing education and promotion for property managers and residents alike. The City of Bellevue has embarked on an education campaign to increase multi-family recycling in the city and will share their results when they become available.

In general, improving multi-family recycling will likely require, at a minimum, the following actions:

- **Clarify and strengthen building code requirements** – The county and the cities should update and/or enforce building code requirements to ensure there is adequate and conveniently located space for garbage, recycling, and organics containers.

- **Provide manager and maintenance staff education** – Involvement and support from the property managers and staff is important to the long-term success of multi-family recycling. With the high turnover of residents, property managers become the ones with the institutional knowledge to provide recycling education to residents. Inspection for contamination in the recycling containers, posting of adequate signage, and providing feedback to residents is necessary to the success of a recycling program.

- **Provide ongoing recycling education for residents** – Because of the high turnover of residents in multi-family complexes, recycling education will be needed on a continuing basis. Recycling information should be provided in the lease agreement and distributed to all residents at least annually. On a periodic basis, residents could get information about the recycling program through newsletters and posters.

- **Involve collection companies to assist with service improvements and education** – The collection companies should be involved to provide insight and information about the complexes' recycling systems and to help with their programs. The companies should monitor the recycling performance of the complexes and tag or refuse pickup of loads that are contaminated. They can also help with recycling education by improving signage on containers.

- **Provide financial incentives** – Financial incentives for both the property managers and residents should be considered. Reduced garbage rates that are passed on to residents to reinforce successful recycling efforts may be an effective incentive to increase recycling rates and decrease contamination in the containers.

Currently, only a few cities offer collection of food scraps and food-soiled paper to multi-family residents. The county and the cities will be working with the collection companies to develop a collection system for capturing these materials for composting. To explore appropriate container sizes and collection methods that will work best for multi-family complexes, the division may conduct pilot programs and/or work with the cities that have food scrap collection programs in place. Education and promotion will be a critical component of a new food scrap collection program. The cost for the new collection service could be included in the garbage rate.

NON-RESIDENTIAL COLLECTION

The non-residential sector comprises a range of businesses, institutions, and government entities from manufacturing to high-tech and retail to food services. This sector has achieved recycling successes in the last few years, with a recycling rate of 59 percent in 2007.

Unlike the residential waste stream, the types of materials discarded by the non-residential sector differ widely from business to business. Thus, the recycling potential for any particular business or industry can vary greatly. For example, restaurants and grocers are the largest contributors of food scraps, while manufacturers may generate large quantities of plastic wrap and other packaging materials.

Because of the diversity of businesses in the region, a more individualized approach is needed to increase recycling in this sector. One area with significant room for improvement is the diversion of food scraps and food-soiled paper. The largest increase will be realized as more restaurants and grocers contract with private-sector companies to collect their food scraps for composting, and more cities begin to offer commercial organics collection.

Strategies for increasing recycling in the non-residential sector present some of the same challenges as the multi-family sector, including:

- The lack of consistent and/or adequate building standards for locating collection containers.

- The need for financial incentives for business owners, property managers, and tenants to take advantage of recycling services. For example, cities that include recycling services in their garbage rate provide a financial incentive for businesses to recycle.

- A need for consistent and ongoing technical assistance and education. Involvement and support of the business owners and property managers is important to the long-term success of recycling at individual businesses or complexes. Educating building maintenance staff about properly collecting recyclables from building tenants is important to ensure the proper handling of recyclables. Education for employees about proper recycling methods is also crucial.

To assess the relative size of the non-residential waste stream in different jurisdictions, we have looked at the number of jobs located within them. About 93 percent of jobs in King County are located within incorporated cities. More than one-half of these jobs are in cities where the garbage collection contracts include recyclables collection in the garbage fee. Most contracts define the capacity required for recycling collection as 150 to 200 percent of the amount of garbage capacity. And most contracts provide for collection of the same materials collected in residential curbside programs.

Non-residential customers have the option to take advantage of recyclables collection offered by their service provider or to contract with other collection companies that may pay for the more valuable recyclable materials, such as high-grade office paper. For cities with collection contracts, adding recycling service to their contracts and including the cost of service in the garbage rate does lead to higher non-residential recycling rates and ensure that recycling services are available to all businesses. However, while including recycling service in the rate requires all business to pay for the service, it does not require that those businesses use the service that the city contractor provides. In fact, there is a wide array of recycling service providers in King County from which businesses in unincorporated King County and cities with WUTC-regulated collection services can choose for their recycling needs. Promotion of these services by the county and these cities will help increase awareness among businesses of the available options. For example, the county's "What do I do with…?" feature on the Web site is one place businesses can look for a service provider.

Another strategy that might increase recycling for some business customers is to consider a rate structure based on weight or composition of waste, rather than the size of the container. A study was conducted to measure container weights for non-residential wastes on five weekday collection routes in the City of Kirkland over a 12-month period (KCSWD et al. 2008a). This study determined that businesses with large amounts of food scraps generate garbage that is significantly heavier than the garbage generated by businesses without large amounts of food scraps.

In Washington, non-residential garbage rates are based on the size of the garbage container. So generators of heavy materials, such as food scraps, pay less than they might if the rates were based on weight, as they are in some jurisdictions across the country. Because a weight-based rate would likely cost more for generators of large amounts of food scraps, it would provide an incentive for increased participation in organics recycling programs.

C&D COLLECTION AND PROCESSING

C&D includes debris from the construction, remodeling, repair, or demolition of buildings, other structures, and roads. It includes clean wood, painted and treated wood, gypsum wallboard, roofing, siding, structural metal, wire, insulation, packaging materials, and concrete, asphalt, and other aggregates. As with recycling,

C&D collection and processing is handled primarily by private-sector firms. Debris from new construction sites is fairly easily separated and recycled. At demolition sites, however, while some of the debris can be salvaged, the remaining mixed materials are difficult to separate and recycle.

Separation of recyclable C&D materials from C&D and other wastes at the job site is generally more cost effective than disposal. Proper separation at the job site also ensures that materials go to higher end uses, such as the manufacture of new recycled-content building materials. C&D materials are typically hauled from a job site by 1) the contractor or the individual working at the job site, 2) an independent C&D hauler permitted to handle C&D for recycling only, or 3) a collection company permitted to haul materials for both recycling and disposal. C&D processing of recyclable materials occurs using either source-separated or commingled methods. Source-separated processing, which occurs particularly on large projects with adequate space, involves sorting specific types of C&D material on the job site (e.g., metals, concrete, and clean wood) and transporting them to a recycling facility(ies). Commingled processing involves placing all recyclable C&D in one container and then transferring the mixed C&D loads to a facility that uses mechanical and manual methods to sort the recyclable materials.

With improvements in the ability of processing facilities to separate materials, the current trend is toward the commingling of recyclable C&D. If C&D and garbage are commingled, however, the recyclables cannot be extracted for processing. These mixed loads must therefore be disposed of in their entirety. At large job sites, demolition debris or construction materials are sometimes loaded into 100-cubic-yard containers and transported by a solid waste-permitted hauler directly to an intermodal facility where they are loaded onto railcars and sent directly to a landfill for disposal. Again, in these cases, there is no opportunity for the recycling of any materials in these loads.

Independent C&D haulers with commercial permits can transport recyclable C&D materials from job sites to either source-separated or commingled C&D processors. These independent haulers cannot, however, transport C&D materials for disposal. Only collection companies permitted by the WUTC to haul solid waste can transport C&D materials for disposal, as well as recycling.

At the C&D processing facilities, loads are deemed either appropriate or inappropriate for recycling. For loads deemed appropriate for recycling, the materials are sorted for shipment to market. If deemed inappropriate for recycling (typically due to contamination by garbage or materials that cannot be recycled), the materials are transferred directly to a disposal facility. In some cases, easily separated recyclables may be extracted for recycling before the load is disposed.

Separation of materials with economic value, such as metals, at a construction site can help reduce project costs.

The division contracts with Waste Management and Allied Waste to take C&D for both disposal and recycling. Between them, the two companies operate six facilities in the region that collect C&D. While initially most of the C&D was collected for disposal, both companies have been increasing their ability to sort and recycle more and more of these materials (Table 4-2).

Improving separation of recyclable and non-recyclable materials at the job site would have a positive effect on the recycling rates at these facilities. Effective April 2009, a statewide rule took effect that requires job sites to have separate containers for recyclable materials and non-recyclable materials (garbage), wherever C&D recycling is being performed. The intent is to reduce contamination in the container slated for recyclable C&D.

Table 4-2. C&D facilities under contract to the division

C&D Facility	Location	Status of Efforts to Increase Recycling
Allied Waste		
Third & Lander Recycling Center & Transfer Station	2733 - 3rd Ave. S Seattle	Installed a C&D sort line in 2008 to separate out recyclables. Working to gradually increase diversion of C&D materials.
Black River Recycling & Transfer Station	501 Monster Rd. Renton	Does not divert C&D for reuse, recycling, or beneficial use. May begin diverting materials on-site in the next couple of years.
Waste Management		
Cascade Recycling Center	14020 NE 190th Woodinville	Processes all C&D through screens, grinders, and a sort line to separate out recyclables. Expected to continue this process.
Eastmont Transfer/Recycling Station	7201 W Marginal Way SW Seattle	Processes selected C&D loads through a sort line to separate out recyclables. No other changes expected.
Recycling Northwest	701 2nd St. NW Auburn	Occasionally diverts incoming single-source loads to recycling or beneficial use. No other changes expected.
Argo Yard (intermodal containers only)	5000 Denver Ave. S Seattle	Accepts sealed intermodal containers of C&D for direct transport to a landfill. No recycling occurs.

Current contracts between the county and Waste Management and Allied Waste offer monetary incentives to encourage the recycling and diversion of C&D materials. In 2008 about 8.5 percent of what was delivered to their facilities was diverted from disposal. A challenge for these companies is that by contract

they are required to accept all loads of C&D brought to their facilities, including loads that contain mixed materials or garbage that cannot economically be separated for recycling.

There are a number of facilities not under contract with the county that also accept C&D for recycling. Because they do not accept all loads of C&D, their recycling rates may approach 100 percent. These facilities range from those that accept only limited materials, such as concrete and asphalt, to those with operations similar to the contracted facilities that accept commingled C&D materials for separation and recycling.

Management of Residuals from C&D Processing

The processing of C&D produces materials that are reused, remanufactured, or put to what is termed "beneficial use." Beneficial use, per WAC 173-350, refers to the use of solid waste as an ingredient in a manufacturing process, or as an effective substitute for natural or commercial products, in a manner that does not pose a threat to human health or the environment. The avoidance of processing or disposal costs alone does not constitute beneficial use.

In King County, the amount of residuals generated during C&D processing can vary from 15 to 50 percent depending on the amount of non-recyclable materials present in the processed load and the efficiency of the operation. Under state law (WAC 173-345) recyclable materials are defined "pursuant to a local solid waste management plan." Residuals, which consist mainly of fine-grained particles and other small-diameter materials, have little market value and are not appropriate for recycling in markets for materials such as metals and wood. However, these processing residuals typically have properties that allow them to be used as daily cover or engineered structural fill in a permitted landfill. Two landfills in Washington reportedly use processing residuals as daily cover, and one landfill uses the residuals for structural fill.

If the C&D residuals for landfill application are considered wastes and not beneficial reuse (i.e., recycling), transport and processing of the materials would be limited to those with permits to handle solid waste, which could significantly reduce the number of available options for recycling of C&D in King County. As recommended in Chapter 4, *Waste Prevention and Recycling*, the division will be clarifying the definitions of recycling and beneficial use, and working with other jurisdictions to establish common definitions.

Currently, residual waste from C&D processing facilities within the King County service area must be disposed at a county-designated C&D receiving facility.