Chapter III
Waste Reduction and Recycling

Waste reduction and recycling are recognized as basic elements of a responsible waste management system because they help to reduce waste generation and disposal rates, preserving the environment and landfill space. Accordingly, the State has identified waste reduction and recycling as priority methods of managing solid waste (RCW 70.95). King County has also identified the importance of waste reduction and recycling in preserving environmentally secure landfill capacity at Cedar Hills. It is the County's policy that aggressive and timely action be taken to preserve and insure the safe use of the landfill for as long as possible (Title 10, King County Code (KCC) 10.14).

The citizens and business community in King County have made the County a national leader in waste reduction and recycling (WR/R). Aggressive goals for WR/R were adopted by the State and County under RCW 70.95 and KCC 10.22.030, respectively, and programs designed to pursue the new policy were implemented through the 1989 King County Comprehensive Solid Waste Management Plan (1989 Plan). In 1991, 32 percent WR/R was achieved. The County has also met its first goal—35 percent WR/R in 1992. This chapter reviews the existing WR/R system and lays out a strategy to achieve the second goal—50 percent WR/R in 1995 and the foundation for 65 percent by 2000.

A. WASTE REDUCTION

1. Existing Conditions

Successful waste reduction requires changes in the ways goods and services are produced and consumed throughout society. Waste reduction challenges citizens and businesses to be efficient and creative to devise more ways to fulfill economic needs while producing little or no solid waste.

State and county legislation identify waste reduction as the highest priority for solid waste management. The development of specific waste reduction education, promotion, and service programs by the County and suburban cities recognizes the importance of waste reduction as part of King County's overall solid waste management strategy.

a. Background

By definition, waste reduction means that less waste is generated at the source or that there is a reduction of difficult-to-recycle wastes at the source. For example, reusable goods are manufactured and purchased instead of disposable ones; packaging is minimized or changed from difficult-to-recycle materials (such as plastics) to more easily recycled materials (such as paper). Other examples include products that are made to be durable and have a long useful life, use of double-sided copies in offices, and use of shrubs and ground cover that don't require pruning or mowing for landscaping. Waste reduction decisions can be made when (1) manufacturers decide what goods to produce, how they are produced, and how to package them, (2) consumers decide what to buy, and (3) consumers decide to use and reuse products efficiently.

Because waste reduction is the act of not producing waste, the best method available for measuring waste reduction is the per capita generation rate for the County. Per capita waste generation is the number of pounds of waste generated, either for disposal or recycling, per person per day within the County. Over the last decade, the County's per capita generation rate has been steadily rising. The goal of the waste reduction program is to reverse this trend over time.

Per capita waste generation is a measure of social behavior and can be influenced by a variety of factors other than waste reduction programs. Therefore, it is difficult to assign quantitative values to discrete waste reduction practices

or programs implemented by the County and suburban cities. Factors that can influence per capita waste generation include changes in population, economic cycles, and other outside influences such as information and public opinion relayed by the national media. As a result, the effectiveness of specific County or city waste reduction programs cannot be assessed at this time by measuring the volumes of waste reduced through the implementation of each program.

Because of these measurement difficulties, the County's WR/R rate includes a conservative estimate of annual waste reduction. The estimate recognizes the success of procurement policies for buying recycled products, promotion of waste reduction to school children, and media programs targeted at residential and commercial generators. Two percent of the total WR/R rate has been assigned to waste reduction, and this amount is expected to increase by approximately 0.05% annually. (See Chapter II.B for a discussion of waste reduction and recycling rates measurement and Table III.13 for WR/R rates.)

Although recycling can be accomplished locally, waste reduction measures are affected by the national and international economies and encompass changes in production methods and consumption patterns. Waste reduction measures extend waste management responsibility to a broader field of players—those who design, manufacture, and consume products and packaging.

Since 1989, local governments in Washington have been prohibited by state law from banning products or packaging and from assessing taxes or deposits on products or packaging for the purpose of affecting their use or disposal (RCW 70.95.C100 and RCW 82.02.025).

Consequently, existing programs in King County are focused on educating consumers and working with businesses to implement waste reduction practices in the work-place. The "ban on bans" will be lifted in July 1993 giving local jurisdictions a broad range of strategies with which to increase waste reduction.

King County and the suburban cites have expanded the public's understanding of waste reduction and provided the means for individuals and businesses to begin to reduce their waste by implementing the 1989 Plan's recommendations for waste reduction (Table III.1).

Table III.1 Summary of 1989 Plan Waste Reduction Recommendations

Program	Description	Implementation Status
Collection rate incentives (city/county)	Establish variable can rates to encourage participation in yard waste and recyclables collection programs.	Established in the County and 28 cities.
City optional programs (city)	Allow cities to receive backyard composting, Master Recycler/Composter, and nonresidential technical assistance services from the County or operate their own programs with funding assistance from the county.	Four cities implementing nonresidential technical assistance; one city implementing backyard composting.
Yard waste programs (county)	Provide backyard composting bins from county and Master Recycler/Composter training.	Established and ongoing.
Nonresidential technical assistance (city/county)	Conduct WR/R consultations for a wide range of nonresidential generators; develop educational materials and hold workshops to assist businesses in implementing WR/R programs in the workplace.	Ongoing technical assistance provided to businesses through onsite visits, coordinated collection, workshops, and phone assistance. Four cities implementing nonresidential technical assistance.
WR/R promotion, education, etc. (county)	Promote WR/R through printed materials, special events, and school programs	WR/R informational brochures; annual Recycle Week; community events; school education programs; WR/R telephone hotline are provided.

b. County Programs

(1) Education

King County has developed a range of education programs designed to reduce the County's per capita generation rate over time. These programs encourage citizens to generate less waste; to generate waste that is more readily recyclable and less toxic; and to recycle a greater portion of the waste generated. Most public awareness and education efforts which promote recycling also incorporate waste reduction components. These efforts include:

- *The* Home Waste Guide, *a widely distributed booklet that leads the reader on a tour through the average home and identifies waste reduction and recycling options.* It includes the "Resource Catalog," which lists contacts for more detailed information on waste reduction, and the "Waste Reducer's Checklist," which explains ways to reduce, reuse, recycle, and compost waste.
- *Special events, such as the annual Recycle Week, which recognize waste reduction accomplishments.* Recipients of the Achievement Awards for outstanding contributions to waste reduction have included an elementary school that eliminated cardboard lunch trays from its waste stream; a consumer cooperative which offers a five-cent rebate to consumers who reuse shopping bags; and a retailer who reuses packing materials provided by consumers and neighboring businesses.
- *School programs, which include materials about waste reduction for children and teachers.* The elementary school program for the academic year 1990-1991 offered an assembly presentation called "The Wiz Kids of Waste." The Wastebusters Program for middle and junior high school students includes student-teacher camp-ins where participants can learn intensively about waste reduction issues. A video focusing on the themes of reduction and reuse was produced featuring words and music written and performed by high school students.
- *Waste reduction education for businesses provided through the Business Recycling Program.* This program includes waste consultations and written materials, such as the *Business Waste Reduction and Recycling Handbook*, which has been distributed to over 2,500 businesses.
- *County Model Employee Program.* Through this program, County employees are encouraged to make double-sided copies, reuse paper and other office supplies, and use washable dinnerware. Some County agencies, such as the Solid Waste Division and the Department of Stadium Administration, use worm bins to compost organic food waste generated at the work-place.
- *Training in waste reduction practices for Master Recycler/Composter volunteers.* The manual for the 1991-1992 training has been revised to expand the waste reduction information.
- *Composting bins to help residents keep yard waste in their own backyard.* The County also provides a wide variety of printed information on composting and operates a composting hotline.

(2) Research

King County conducts experimental waste reduction or pilot projects, including:

- *A project that provides cloth baby diapers to low-income families.* In addition to promoting waste reduction, the program provides educational workshops and opportunities to improve infant care.
- *A project with Seattle Solid Waste Utility to test a variety of food waste composting methods.* This research, funded by a grant from Ecology, will also test the feasibility of backyard food waste composting and on-site nonresidential food and yard waste composting.
- *A financial assistance program (Dollars for Data) to enable businesses to implement waste reduction projects and services.* Businesses provide the County with information and data on the effectiveness of their waste reduction efforts in exchange for waste reduction assistance. Businesses participating in this program include a food bank organization that is vermi-composting unusable food, a hair salon that is providing hair care products in bulk to its clients, a major retail distributor that is replacing disposable plastic clothing bags with durable reusable covers, and a high school that has installed an electronic mail system to convey messages, reports, and other communications in lieu of using paper.

(3) Other Services

The other types of waste reduction measures used by the County and suburban cities are support services, such as rate incentives and a procurement policy that promotes the use of both reusable and recycled products.

Variable can rates, which provide an incentive for garbage subscribers to reduce the amount of materials they throw away, have been established throughout unincorporated King County. Subscribers are encouraged to practice waste reduction and recycling by subscribing to a mini-can rate, which offers cost savings over the regular one-can rate. There are substantial cost differentials between garbage service levels, and an additional fee is charged for each extra can the subscriber requests and occasional extra bags of garbage placed at the curb. The County and suburban cities regularly disseminate rate incentive and recycling information to subscribers through brochures, radio ads, and bus boards.

The King County Recycled Products Procurement Policy promotes waste reduction by requiring county departments to use both sides of paper sheets whenever practicable. All bids and proposals issued by the County require contractors and sub-consultants to adhere to this policy when submitting documents.

c. City Programs

Waste reduction information is included in brochures and other publications distributed by the cities. Many cities participated in the statewide Shop Smart campaign coordinated by Ecology in 1991 to encourage consumers to reduce waste by shopping selectively for minimally packaged products, durable and reusable items, and bulk quantities. The cities have also initiated other efforts to promote waste reduction, such as distributing reusable travel mugs and developing waste reduction kits for schools. (Refer also to Volume II, Appendix E for more information on city programs.) Most cities have enacted some form of garbage rate incentives and several have formally adopted procurement policies.

2. Needs and Opportunities

a. Comprehensive Waste Reduction Strategy

Realization of the next two WR/R goals, 50 percent by 1995 and 65 percent by 2000, can be greatly assisted by major achievements in waste reduction. Despite remarkable WR/R success, the per capita waste generation rate continues to grow (see waste generation discussion, Chapter II, Section B). Also, as recycling strategies are successfully implemented and recycling increases, achieving additional marginal increases in the recycling rate may become more difficult and expensive. These two reasons underscore the need for much more aggressive waste reduction aimed at reducing the County's per capita waste generation rate, in addition to existing and future recycling efforts. A comprehensive waste reduction strategy would encompass legislative efforts to actively pursue elimination of excessive and non-recyclable packaging as well as more focused and better integrated educational efforts and financial incentives. The role of the private sector should also be considered in product design, manufacturing, and marketing.

b. Education

The County and cities have already implemented many waste reduction education programs. However, these could be even more effective with better integrated and more widespread promotion that conveys a clear definition of waste reduction and offers specific examples of actions which reduce waste. A county-wide educational effort, delivered through a variety of media, could reach a wider consumer audience. Specific strategies also need to be developed for businesses, residents, governments, and institutions.

c. Financial Incentives

Financial incentives can be very effective tools in changing purchasing and disposal habits. Manufacturers and retailers need to be encouraged to reduce waste at the points of production and marketing. This can best be accomplished through such state-imposed actions as product disposal charges on particular products, or tax exemptions or credits for companies and institutions that follow specific waste reduction procedures.

At the local level, a variable can rate for garbage collection or other financial incentives to reduce waste need to receive continued emphasis and support. Existing rate incentives could be further developed to increase their effectiveness.

d. Product Packaging and Source Reduction

Under State law, King County and the cities have the ultimate responsibility for managing solid waste and meeting state and local recycling goals. The County and the cities need a full complement of strategies to deal with solid waste disposal issues. The expiration of the "ban on bans" in July 1993 offers the opportunity to examine the various source reduction strategies. Among the strategies that need to be examined are packaging and product prohibitions, advance disposal fees, deposit systems, and mandatory recycling and disposal sites.

e. Measurement

In order to monitor progress made toward achieving the waste reduction program's goal of a decreasing per capita waste generation rate over time, an accurate method of measurement needs to be developed. The methodology developed must account for changes in the per capita waste generation rate attributable to population shifts and economic cycles so as to produce an accurate projection of social behavior.

The evaluation of the effectiveness of specific waste reduction programs implemented by the County is also necessary for making decisions about how to expand and improve on the County's overall waste reduction effort. As discussed in Section III.A.1.a., it is difficult to measure the impact of discrete waste reduction practices or programs on per capita waste generation rates. Therefore, alternative methods for measuring the effectiveness of programs must be developed that include focusing on the targeted waste stream and potential number of generators impacted by a particular program.

3. Alternatives

There are two waste reduction alternatives considered: maintaining the status quo and expanding existing programs. These alternatives are summarized in Table III.2 and discussed below.

a. Alternative A, Maintain Status Quo

Existing policies and programs promoting waste reduction would be continued (rate incentives, procurement policies, and packaging guidelines). Regional education programs (school programs, publications, special events, technical assistance to businesses, volunteer training) would continue to treat waste reduction as the first priority for solid waste management. The County's model employee program would continue to incorporate waste reduction practices into the work-place.

Ongoing data collection on waste reduction projects through the financial assistance program to businesses would be an important resource for determining effective strategies for the commercial sector.

b. Alternative B, Expand Existing Waste Reduction Programs

The County and cities would continue to integrate waste reduction into all WR/R programs. In addition, each jurisdiction would establish additional waste reduction programs targeted at residences, businesses, governments, and institutions. The County and the cities would all implement and maintain a variable rate structure for solid waste collection with cost differentials that offer substantial incentives to reduce waste.

Table III.2 Summary of Waste Reduction Alternatives

Alternative A	Continue existing policies and programs
Alternative B	Expand existing waste reduction programs

The programs described in Alternative B would require relatively small budgets for implementation. No increases in rates due to these programs is anticipated.

Waste reduction efforts would consist of seven major strategies, which are discussed in the sections that follow.

(1) Integration of Existing Programs

The County and cities would continue to integrate waste reduction elements into programs for all targeted groups. Business, school, and public education programs described under "Existing Conditions" (III.A.1) would continue to operate at the same level of effort. This strategy is referred to as "Waste Reduction First." New strategies that would be implemented under these programs are as follows.

- The County would expand its waste reduction efforts in its business recycling program by developing a model office display which would demonstrate methods, equipment, and procurement procedures that reduce waste. The display would be exhibited at trade fairs, offices, and malls.
- The County Model Employee Program would continue to encourage double-sided copying, reuse of office supplies, and use of durable dishware through motivational signs and waste reduction checklists. A networking committee would be formed to look for potential waste reduction projects within the County.
- The outreach potential of Master Recycler Composters would be increased with additional training in holiday waste reduction techniques and conducting school workshops.

The County would also be responsible for implementing additional programs that are related to existing efforts. These include:

- Green Works - a program which recognizes businesses that have implemented at least three waste reduction strategies. It is anticipated that the positive image associated with Green Works recognition will motivate businesses to incorporate waste reduction into company practices.
- Holiday Waste Reduction - a program that would target consumers as well as businesses by providing information on how to reduce waste generation during the holiday season; presenting demonstrations on how to wrap gifts and make greeting cards using waste reducing techniques; educating consumers on less wasteful purchasing habits; and working with retailers to encourage the use of reusable shopping bags and gift boxes.
- Green Teams - a program that would augment the waste reduction component of the elementary school program by assisting in the formation of teams at each school. Green team members would include students and teachers who would adopt and pursue a waste reduction goal such as reducing the amount of paper or food waste generated at their school. They would be assisted in their efforts through King County curriculum materials.

(2) Media Campaign

The County would implement a county-wide mass media waste reduction educational campaign which would be coordinated across jurisdictions in its message, presentation, and audience. The purpose of the campaign would be to define waste reduction for the public and describe actions they can take to reduce the amount of waste they generate. Media approaches could include the following.

- Newspaper, television, radio and bus-board ads.
- Videos on waste reduction, home composting, and household toxics reduction purchased by the County for possible airing on public access and commercial television stations.
- A multi-jurisdictional project to buy air time to promote waste reduction topics during breaks in children's programming.

(3) Targeted Waste Reduction Plan

The cities and the County would develop specific waste reduction programs to meet the particular needs of their residents, businesses, and institutions. The County would implement, at a minimum, at least one program for each residential, business, and institutional generator class from the following list of existing strategies for unincorporated King County.

Each city would either implement at least one program from each of the waste reduction strategies below for each generator class, or create their own programs appropriate for each generator class. If cities create their own programs, program summaries would be reviewed and commented upon by the County before implementation, and implementation

status would be reported by the cities in their annual report to the County.

Residences

- *Point of purchase exhibits and information.* Develop and display exhibits and information in retail stores to educate consumers on selective shopping techniques that reduce waste.
- *Swap meets.* Sponsor citywide or community-based swap meets to encourage residents to trade or sell used goods.
- *Model programs.* Develop and publicize a model residence where waste reduction techniques have been incorporated into daily activities. A checklist might include the use of reusable sandwich boxes for school lunches, cloth diapers, solar-powered products, and landscaping and gardening practices that reduce waste. Emulation by other residents would be encouraged through a recognition program.
- *Durable shopping bag distribution.* Devise a program targeted at shoppers who do not yet use durable or reusable bags. Provide durable shopping bags containing brochures and other materials on selective shopping and other waste reduction strategies.

Businesses

- *Procurement workshops for businesses.* Conduct workshops that assist businesses in developing procurement programs that favor durable and reusable products.
- *Model programs.* Develop model programs for different types of businesses and encourage emulation by other businesses through recognition programs.
- *Waste reduction technical assistance.* Provide technical assistance to retailers and other businesses in developing waste reduction programs.
- *Product or shelf-labeling programs.* Work with retailers to develop a product or shelf-labeling program to help consumers identify types of products that reduce waste.
- *Directory of businesses/organizations employing waste reduction methods.* Develop a directory of businesses that employ waste reduction practices as a resource for other businesses planning waste reduction programs.

Government/Institutions

- *Procurement standards.* Ensure that procurement specifications for equipment, vehicles, supplies, furniture, parts, and materials provide for the systematic purchase of durable and reusable products.
- *Model programs.* Develop models for waste reduction in offices, cafeterias, parks, or other facilities. Use recognition programs to encourage widespread adoption of waste reduction practices.

(4) Collection Rate Incentives

The County and the cities would continue to implement rate incentives that encourage waste reduction and recycling and further develop variable rates to ensure substantial cost differentials between solid waste collection service levels. These incentives could include:

- Mini-can garbage service.
- A special recycling service rate for customers who do not subscribe to garbage collection service.
- Distribution of recycling costs among all rate payers.
- Substantial cost differentials between solid waste collection service levels.

(5) Waste Reduction Policy and Program Research and Development

King County would undertake a comprehensive analysis of waste reduction policies and programs implemented in other parts of the country to identify new options for augmenting the expanded programs discussed above. Areas of research could include the following:

- Review current assumptions regarding waste generation to determine whether King County's waste generation forecasting model needs revision.
- Analyze trends in manufacturing and product packaging and design to determine the types of packaging to be targeted in waste reduction programs.
- Identify excessive and non-recyclable packaging, wasteful products, unavoidable waste, and waste that could potentially be eliminated or reduced.

- Identify existing waste reduction efforts by the private sector and by government agencies at the local, state, and federal levels.
- Evaluate regulatory options for enhancing waste reduction.

The results of this analysis could lead to additional program proposals for the current planning period. Among the new policies and programs that could be considered are:

- Establish a waste reduction consortium with trade associations and manufacturers.
- Increase intergovernmental waste reduction coordination to influence state and local decisions.
- Work with citizen groups, as well as local, state, and national government coalitions to lobby for regional and national changes in the manufacture, distribution, and marketing of goods and packaging.

(6) Packaging Restriction Program Research and Development

With the expiration of the ban on bans, the County and cities would immediately gain the authority to implement product restrictions or impose taxes. Although local jurisdictions would have the right to act independently, the County and the cities would attempt to coordinate the implementation of any product restrictions or taxes with one another. Any actions would be implemented through ordinances and be subject to public review.

The County and the cities would propose to evaluate the following actions for the 1995 Plan to determine if they are necessary to meet state and local goals:

- Prohibitions on the sale of products made of materials that result in excessive waste or waste that is difficult to recycle
- Enactment of advance disposal fees on the sale of products that also result in excessive waste or waste that is difficult to recycle
- Deposit systems requiring retailers to add a deposit fee for specified products to be refunded upon their return
- Establishment of mandatory recycling/disposal sites by retailers for certain products that they sell. (This option would require amendment of existing statutes.)

Measurement

King County would develop and implement a waste reduction measurement program consisting of:

- Annually reporting the per capita waste generation rate countywide. The reported generation rate would account for population shifts and economic cycles in order to accurately assess social behavior.
- Evaluating the effectiveness of specific waste reduction programs implemented by the County and suburban cities at the end of each planning period. The evaluation would consist of an analysis of the size of the waste stream targeted and number of generators impacted by the particular program.

4. Recommendations

Alternative B, expand existing waste reduction programs, is recommended because it addresses the need for greater waste reduction achievements (specific recommendations that comprise Alternative B are summarized in Table III.3). It provides both short- and long-term strategies for managing waste among businesses, residents, and local governments through waste reduction. The short-term strategy is to increase the awareness of waste reduction opportunities for all generator classes. For the long term, Alternative B provides research and analyses that will lead to the development of more targeted programs and more accurate measurement of program effectiveness. Waste reduction activities are interrelated with recycling programs and goals. Therefore, this recommendation is also coordinated with the recycling recommendations in Section B.

5. Implementation

The waste reduction implementation chart (Table III.4) provides information on program responsibility and projected timelines. Both new and continuing programs are shown.

Table III.3 1992 Waste Reduction Recommendations

		Strategy	Implementation Responsibility
Recommendation III.1	Business waste reduction	Expand business waste reduction program by developing model office display, and recognize businesses that incorporate waste reduction into company practices.	County
Recommendation III.2	Employee recycling program	Form a networking committee to expand and create new waste reduction programs for employee recycling program.	County
Recommendation III.3	Holiday waste reduction	Expand waste reduction programs targeting consumers and businesses during the holiday season.	County
Recommendation III.4	Green teams	Increase number of Green Teams school program sites to include all schools.	County
Recommendation III.5	Multimedia strategy	Purchase videos on waste reduction for airing on public access television and participate with other jurisdictions and television media to buy air time to promote waste reduction	County
Recommendation III.6	Targeted waste reduction	Develop and implement one waste reduction program per generator type (residential, business, and institution).	County, cities
Recommendation III.7	Packaging analysis	Analyze trends in manufacturing and product packaging and design and identify excessive and nonrecyclable packaging.	County
Recommendation III.8	Identification of reducible waste	Identify categories of waste which can or cannot be reduced to target eliminating reducible waste.	County
Recommendation III.9	Waste reduction data	Identify existing waste reduction efforts by the private and public sectors.	County
Recommendation III.10	Consortium building	Establish a waste reduction consortium with trade associations and manufacturers.	County
Recommendation III.11	Intergovernmental coordination	Increase intergovernmental coordination to increase influence on waste reduction decisions.	County, cities
Recommendation III.12	National activities	Develop proposals for establishing industry consortiums, intergovernmental coordination and national coalitions to promote waste reduction in products and packaging.	County
Recommendation III.13	Rate incentives	Continue to encourage waste reduction and recycling through such rate-related incentives as mini-can garbage service, special recycling service rate for non-garbage customers, distributing cost of recycling among all rate payers, and establishing substantial cost differentials between solid waste collection service levels.	County, cities

Table III.4 Waste Reduction Implementation Table

	Program Name	Implementation Responsibility	1992	1993	1994	1995	1996	1997	1998
III.1	Business waste reduction	CO							
III.2	Employee recycling program	CO							
III.3	Holiday waste reduction	CO							
III.4	Green teams	CO							
III.5	Multimedia strategy	CO							
III.6	Targeted waste reduction	C,CO							
III.7	Packaging analysis	CO							
III.8	Identification of reducible waste	CO							
III.9	Waste reduction data	CO							
III.10	Consortium building	CO							
III.11	Intergovernmental coordination	C,CO							
III.12	National activities	CO							
III.13	Rate incentives	C,CO							

Cities = C
County = CO

Planning period
Implementation period
Continuation

B. RECYCLING

The 1989 Plan established minimum levels of recyclables collection service for the residential sector. Household recyclables collection is required in urban areas and drop-sites are required in rural areas. Yard waste collection was specified for both urban and rural areas. Substantial progress has been made implementing residential collection programs. About 95 percent of the County's single-family residences have household collection of recyclables available, and in many areas household yard waste service is provided as well.

Support programs, such as procurement policies and collection rate incentives, encourage participation in WR/R programs and services. Education programs have provided information to schools, businesses, and residents on specific ways to reduce and recycle waste.

1. Existing Conditions

This section reports on the status of the 1989 Plan recommendations for recycling and provides background information on recyclables collection and material markets. More specific information on county and city activities and accomplishments over the last three years is also presented in Volume II, Appendix E.

a. Background

(1) Status of 1989 Plan Recommendations

The status of recycling recommendations made in the 1989 Plan is summarized in Table III.5. Except for special waste recycling, which is readdressed in this plan update, all of the 1989 recommendations have been fully or partially implemented. For instance, while rate incentives are in place in 28 cities, procurement policies have been adopted so far by only the County and six cities. However, other cities have informal policies pending formal adoption.

Additionally, 20 of 24 cities in the urban area have implemented a household recyclables collection program. Auburn has implemented an alternative program which is being assessed for adequacy by Ecology and Algona is still developing plans for its household recycling program. Efforts are ongoing to fully implement all recommendations.

Table III.5 Summary of 1989 Plan Recycling Recommendations

Program	Description	Implementation Status
Urban/rural designation	Determine urban and rural boundaries to provide basis for minimum levels of recycling services.	Established in 1989 Plan.
Recyclables designation	List possible materials to include in collection programs.	Established in 1989 Plan.
Minimum service levels (cities)	Require household collection of recyclables in urban cities and encourage it in rural cities. Require drop-site collection, at a minimum, in rural cities. Require yard waste collection services in both urban and rural cities.	Twenty of 22 urban cities and 3 of 7 rural cities have or plan household collection of recyclables. Yard waste programs are offered or planned in 28 cities.
Minimum service levels (county)	Require household collection of recyclables for urban areas and encourage it for rural areas, which must otherwise be served by drop-sites or buy-back centers. Require yard waste collection in urban areas. County must provide solid waste facilities in rural areas for collection of recyclables and yard waste.	Household collection of recyclables and yard waste is available throughout urban unincorporated King County and some rural cities. Most county solid waste facilities offer recycling services. Drop boxes and buyback centers serve rural areas.
Rate incentives	Establish variable can rates to encourage participation in yard waste and recyclables collection programs.	Established in the County and 28 cities.
Procurement policies	Adopt procurement policies that favor the use of recycled or recyclable materials.	Adopted by the County and six cities; remaining cities have informal policies.
Minimum requirements for new construction	Revise zoning and building codes to include the provision of recycling collection space in new construction.	Recycling space requirements will be included in the Revised King County Zoning Code; recycling space requirements are under consideration by many cities.
Monitoring progress toward WR/R goals	Require cities and county to prepare annual reports on status of programs and progress toward WR/R goals.	Progress by all cities and the County is reported in *Solid Waste Division Annual Report.*
Analysis of multifamily collection options	List options and implementation strategies for cities to use in developing collection programs for multifamily residences.	Draft manual distributed in 1991.
City optional programs	Allow cities to receive backyard composting, Master Recycler/Composter, and nonresidential technical assistance services from the County or operate their own programs with funding assistance from the county.	Four cities implementing nonresidential technical assistance; one city implementing backyard composting. Remainder participate in countywide programs.
Yard waste programs	Provide backyard composting bins from county, Master Recycler/Composter training, Christmas tree collection, and nursery composting demonstrations.	Established and ongoing.
Food waste processing	Evaluate food waste processing alternatives.	Received Ecology grant to study collection, processing, and composting.
MMSW processing	Evaluate implementation issues and develop a procurement approach related to the construction of a mixed municipal solid waste processing facility.	MMSW processing evaluated by Solid Waste Division in report issued in 1991.
Nonresidential technical assistance	Conduct WR/R consultations for a wide range of nonresidential generators; develop educational materials and hold workshops to assist businesses in implementing WR/R programs in the workplace.	Ongoing technical assistance provided to businesses through onsite visits, coordinated collection, workshops, and phone assistance.
Market development	Encourage procurement of recycled products by all King County agencies; emphasize the development of local markets through the King County Commission for Marketing Recyclable Materials.	County procurement policy adopted; cities adopting procurement policies on an individual basis (six cities have formal policies). Marketing Commission established and is undertaking several market development activities.
WR/R promotion, education, etc.	Promote WR/R through printed materials, special events, and school programs.	WR/R informational brochures; annual Recycle Week; community events; school education programs; WR/R telephone hotline.
Special waste recycling	Evaluate collection, processing, and recycling of bulky waste, CDL waste, and woodwaste.	Readdressed in 1992 Plan.

(2) 1989 Plan Urban and Rural Designation

Service levels for collecting recyclables are based on whether an area is urban or rural and include materials formally designated as recyclable in the King County 1989 Plan. Since the criteria in the *1985 King County Comprehensive Plan* (KCCP) for urban and rural designations are consistent with the policies and intent of RCW 70.95, the County used them for the 1989 Plan. They are shown in Figure III.1 and include:

- *Urban.* King County and the cities have made firm commitments to urban development and services; natural features are capable of supporting urban development without significant environmental degradation; public facilities and services are in place or can be provided to accommodate urban growth; and the area is generally developed at one dwelling or more per 2.5 acres and is extensively platted into lot sizes averaging less than five acres.
- *Rural.* There are major physical barriers (for example, steep slopes or water bodies) to urban services; environmental constraints make the area generally unsuitable for intensive urban development; existing resource activities (farming, forestry) and soils make the area desirable for rural designation to encourage continuing resource management; new development will average one dwelling unit per ten acres in areas where large parcels remain, and one dwelling unit per five acres in areas with many existing small parcels.
- *Transitional areas.* Areas that remain low-density land uses as a reserve for future urban development or designation as a rural area.

For urban areas, the County considered total population, population density, and land use and utility service plans. Urban areas are anticipated to develop at higher densities in the long term; areas designated as rural are expected to remain at lower densities.

Figure III.1 illustrates service areas designated as urban and rural for planning purposes; it represents the most recent updates to the KCCP map. Figure III.1 is a guide for collection services. Generally, areas with at least 200 dwelling units per square mile, as determined by the King County *1991 Annual Growth Report* should receive household collection service. Collection service areas are delineated in city and county implementation ordinances and contracts or through Washington Utilities and Transportation Commission (WUTC) regulation of haulers. Collection services are described in more detail under county and city programs, Sections B.1.b and B.1.c, and Volume II, Appendix E. They are also discussed in Chapter IV, Section A.

Figure III.1 Urban and rural service areas. (See overleaf.)

(3) 1989 Plan Designation of Recyclables

Materials are defined as recyclable in RCW 70.95 if they yield a price on the market or have a beneficial end use. Materials designated as recyclable in the 1989 Plan, and therefore among those included in collection programs, are:

- Paper—newspaper, corrugated cardboard, computer, office paper, mixed paper, other paper
- #1 and #2 Plastics—PET (polyethylene terephthalate) and HDPE (high-density polyethylene)
- Glass—container glass
- Metals—aluminum cans, tin (steel) cans, ferrous metals, nonferrous metals, insulated wire, bi-metals/combination metals
- Tires
- Yard waste
- Bulky waste—furniture, appliances, white goods

(4) Minimum Service Levels

Cities are responsible for ensuring the provision of minimum service levels within their jurisdictions and the County does so in unincorporated areas (collection services are summarized in Tables III.6 and III.7). These levels differ for urban and rural areas. However, under the 1989 Plan, both urban and rural collection programs at a minimum were required to collect:

> "(1) glass, mixed paper, newspaper, cardboard, bi-metals and aluminum cans; or (2) any combination of the materials designated as recyclable in this plan (including yard waste) that will result in the collection of at least 10 percent of

the residential waste stream by weight by July 1, 1992, as provided in SHB 1671."

The 1989 Plan minimum service levels for urban areas are:

- Household collection of source-separated recyclables from all residential dwellings, including multifamily dwellings.
- Programs for the collection of yard waste. These programs should be designed to service all residential dwellings and commercial establishments. Either drop-site (mobile or permanent) or household collection may be provided.

The 1989 Plan minimum service levels for rural areas are:

- *Collection of source-separated recyclable materials.* Programs should be designed to service all residential dwellings and commercial establishments through strategically located drop-sites, buy-back centers, or mobile collection services that provide regular service. Household recyclables collection is encouraged but not required.
- *Collection of yard waste.* Programs should be designed to service all residential dwellings and commercial establishments through strategically located drop-sites, buy-back centers, or mobile collection services that provide regular service.

(5) Collection Methods

There are four collection methods for recyclables employed in King County: household, nonresidential, drop-site, and buy-back. Appendix F is a resource guide to recycling centers in King County.

Residents who receive household collection services co-mingle recyclable materials in a single toter or separate them into multiple bins and place them near the street on a specified day for pickup. The commingled system results in higher processing costs; the multiple-bin system involves higher collection costs. For yard waste collection, residents bag, box, or bundle yard waste, or put it into toters or garbage cans. The frequency of pickup differs among service providers and includes seasonal variations. To ensure participation, some cities have passed ordinances banning yard waste from residential garbage cans.

Counties and cities do not have the authority to require haulers to offer recyclable materials collection services to nonresidential generators; therefore, collection services are provided on a voluntary basis. Nonresidential collection service providers typically require minimum volumes and processing levels for specific materials (for example, they might require that all cardboard be baled). Commercial waste haulers and private recyclers often provide multiple bins for customers with large quantities of recyclable items who are willing to source separate them. Source-separated materials usually command higher market value because of lower processing costs and higher quality product. This enables businesses to recover a portion of the market value of the recyclable either through lower garbage rates, monthly payment from the collector, or both. Financial incentives often facilitate paper recycling in individual businesses or office buildings.

Drop-site collection is provided by haulers and private recyclers who collect recyclables at commercial establishments, institutions, and multifamily dwellings. King County and some cities offer recycling and yard waste drop-sites; nonprofit organizations have drop-boxes for reusable or refurbishable goods and recyclables; and some cities hold cleanup days, when residents can drop off materials at a designated location.

Buy-back centers pay for materials from businesses or the public. They may be commodity specific or accept a variety of recyclable materials. Some buy-back centers pickup at businesses, but this is becoming less common and currently is very restrictive regarding types of materials and volume.

(6) Markets

Markets for recycled materials are affected by many of the same factors that affect other industries. For example, recycling markets depend on the availability of materials and on adequate processing capacity to convert reusable materials into feedstock; markets are affected by supply and demand and competition from other sources (such as raw materials); and prices are affected by local, national, and global economic conditions. For materials collected by King County recycling programs, all these factors come into play.

As market conditions vary, so do the recycling rates among different materials (Table III.8). For example,

Table III.6 King County Cities, Recycling Collection Service Summary

							Materials Recycled											
	Collector	Who Pays	Cost of recycling [1]	Programs	Bins collected [2]	City drop-sites [3]	Glass	Aluminum	Tin	Ferrous Metals	Nonferrous Metals	Cardboard	Mixed paper	High-grade paper [4]	Newspaper	#1 plastic bottles	#2 plastic bottles	Other materials
Algona																		
Auburn	RST			MYN		R	D	DN	DN			DN	DN		DN	DN	DN	
Beaux Arts	Eastside	All		SY	1		H	H	H			H	H		H			Wood, DN
Bellevue	Fibres	Sub	$2.50	SMY	3	R	H	H	H		H	H	H		H	H	H	Drink boxes, poly-coated paper H
Black Diamond	Meridian					Y												
Bothell	WM Sno			SY	3	R	H	H	H			H	H		H	H	H	Oil
Burien	Sea-Tac	All	$1.83	SMY	1,3		H	H	H			H	H		H	H	H	
	Raffo		$1.80				H	H	H			H	H		H	H	H	
Carnation	WM Sno					RY	D	D	D				D		D	D	D	
Clyde Hill	Eastside	All		SY	1		H	H	H			H	H		H			
Des Moines	ST	Sub		SMYN	1		HN	HN	HN			HN	HN	H,N	HN	HN	HN	
Duvall	WM Sno	All	$3.90	SMN		R	HN	HN	HN	HN	HN	HN	HN	N	HN	HN	HN	
Enumclaw	RST					R	D	D				D	D		H			
Federal Way	RST	Sub		SMY	3		H	H	H			H	H		H	H	H	
Hunts Point	Eastside	All		SY	1		H	H	H			H	H		H			
Issaquah	Lawson	Sub	$2.44	SMYN	3	R	HN	HN	HN	HN	HN	HN	HN	N	HN	HN	HN	Drink boxes, milk cartons H
Kent	Kent Dis	Sub		SMN	1		HN	HN	HN		HN	HN	HN	N	HN	HN		Wood pallets N
Kirkland	WM Sno			SMY	3		H	H	H			H	H		H	H	H	
Lake Forest Park	Eastside	All		SMYN	1		HN	HN	HN			HN	HN	N	HN	HN	HN	
Medina	Eastside	All		SY	1		H	H	H			H	H		H			
Mercer Island	Eastside			SY	1		H	H	H	H	H	H	H		H	H	H	
Normandy Park	Fibres	Sub	$3.60	SMY	3	R	H	H	H			H	H		H	H	H	
North Bend	Lawson	All	$4.00	SMYN	3	RY	HN	HN	HN	HN	HN	HN	HN	N	HN	H		
Pacific	RST					R	D	D	D						D			
Redmond	Fibres	All		SMYN	3	R	HN	HN	HN		HN	HN	HN	N	HN	HN	HN	Drink boxes, poly-coated paper H
Renton	WM Rai	All		SMY	3		H	H	H			H	H		H	H	H	
SeaTac	Sea-Tac	Sub		SMY	1		H	H	H			H	H		H	H	H	
Skykomish																		
Snoqualmie	Lawson	All	$4.00	SMN	3	RY	HN	HN	HN	HN	HN	HN	HN	N	HN	HN	HN	
Tukwila	Raffo	Sub		SMY	3		H	H	H			H	H		H	H	H	
	Sea-Tac	Sub		SMY	1		H	H	H			H	H		H	H	H	
Woodinville	WM Sno	All	$1.83	SMY	3		H	H	H			H	H		H	H	H	
Yarrow Point	Eastside	All		SY	1		H	H	H			H	H		H			

Table III.7 Urban Unincorporated Recyclables Collection Service

	Collector	Who Pays	Cost of recycling [1]	Programs	Bins collected [2]	City drop-sites [3]	Materials Recycled: Glass	Aluminum	Tin	Ferrous Metals	Nonferrous Metals	Cardboard	Mixed paper	High-grade paper [4]	Newspaper	#1 plastic bottles	#2 plastic bottles	Other materials
Service Area 1	WM NW	All	$3.74	S M Y	3	n/a	H	H	H			H	H		H	H	H	
Service Area 2	Eastside	All	$1.83	S M Y	1	n/a	H	H	H			H	H		H	H	H	
Service Area 3	WM Sno	All	$2.74	S M Y	3	n/a	H	H	H			H	H		H	H	H	
Service Area 4	Lawson	All	$4.10	S M Y	3	n/a	H	H	H			H	H		H	H	H	
Service Area 5	WM Rain	All	$2.92	S M Y	3	n/a	H	H	H			H	H		H	H	H	
	WM Sea	All	$1.95	S M Y	3	n/a	H	H	H			H	H		H	H	H	
	Sea-Tac	All	$1.83	S M Y	1	n/a	H	H	H			H	H		H	H	H	
Service Area 6	WM Sea	All	$1.95	S M Y	3	n/a	H	H	H			H	H		H	H	H	
	Sea-Tac	All	$1.83	S M Y	1	n/a	H	H	H			H	H		H	H	H	
	Raffo	All	$1.80	S M Y	3	n/a	H	H	H			H	H		H	H	H	
Service Area 7	RST	All	$1.80	S M Y	3	n/a	H	H	H			H	H		H	H	H	
	Sea-Tac	All	$1.83	S M Y	1	n/a	H	H	H			H	H		H	H	H	
Service Area 8	Meridian	All	$1.83	S M Y	1	n/a	H	H	H			H	H		H	H	H	

[1] Monthly charge per customer
[2] Household collection method: number of bins of recyclables collected
[3] City-sponsored residential drop-site services
[4] High-grade paper: collected separate from mixed waste paper.

Eastside	Eastside Disposal - Rabanco
Fibres	Fibres International
Kent Dis	Kent Disposal
Lawson	Lawson Disposal
Meridian	Meridian Valley Disposal - Rabanco
Raffo	Nick Raffo Garbage Co.
RST	RST/Federal Way Disposal (Nick Raffo)
Sea-Tac	Sea-Tac Disposal - Rabanco
WM Rai	Waste Management - Rainier
WM Sno	Waste Management - Sno-King

All	all residents pay
D	drop-site
H	household
M	multifamily
N	Nonresidential
R	recyclables
S	single-family
Sub	subscribers
Y	yard waste (household)

100 percent of lead-acid automobile batteries are recycled, but fewer than 1 percent of household batteries are recycled. This is because automobile batteries provide a competitive source of lead (due to costly environmental regulations for lead mining). The core charge on lead-acid batteries encourages users to recycle them, and processors have ample capacity. A core charge is a deposit charged when a battery is purchased; it is refunded when the battery is returned to the retailer after use. However, such market stimulants do not exist for household batteries. Except for small quantities of button cell batteries that are collected and shipped to processors in the eastern United States, there are limited outlets for recycling household batteries.

By far the most significant recycled material is paper—both in terms of volume collected and percent of material generated that is recycled. Paper recycling in King County consists of fairly well-developed systems for collecting cardboard from businesses and mixed waste paper (MWP) and old newspaper (ONP) from the residential sector, as well as a developing commercial, office paper collection system. Recycling has also made significant in-roads in diverting other materials from the waste stream, such as aluminum and tin cans and ferrous scrap. A detailed discussion of market conditions for recyclable materials is given in Appendix D, which provides current and projected recycling volumes and commodity prices, an analysis of the current market and an assessment of potential new markets, and a discussion of the impact of recycling programs on market infrastructure. Key points for each major material market are as follows:

- *Paper.* In 1990, an estimated 165,500 tons of paper were collected for recycling, about 39 percent of the waste paper generated. In the coming decade, the volume of paper collected for recycling is expected to increase by an average of 9 percent annually, but the ability of recycling markets to handle

Table III.8 1990 Recycling by Material Type

Material	% Recycled	Total Tons Generated [a]	Total Tons Recycled
Paper	39	427,600	165,500
Glass	35	37,300	13,000
Metal			
Aluminum cans	43	6,450	2,800
Aluminum scrap and nonferrous	77	14,400	11,100
Tin cans	36	12,000	4,350
Ferrous scrap	69	101,400	70,400
White goods	93	30,000 [b]	28,000 [b]
Lead-acid batteries	100 [c]	5,200	5,200
Household batteries	<1	2,900,000 [d]	<29,000 [d]
Plastics	>1	83,000	930
Textiles	7	43,300	3,000
Tires	23	6,500,000 [e]	1,500,000 [e]

[a] Total tons generated are based on estimates of disposed and recycled tonnages.
[b] Based on Solid Waste Division estimates
[c] 100% recycling is assumed since no lead-acid batteries were found during the *King County Waste Characterization Study* (Appendix B). Nationally, the recycling rate for lead-acid batteries is approximately 85 percent.
[d] Individual batteries (not tons)
[e] Individual tires (not tons)

Source: Recycling Markets Assessment, Volume II, Appendix D

this growth will vary by grade. Newsprint recycling capacity in the Northwest is expected to surpass local supply by mid-1993 as new mills come on line, while MWP will continue to be exported to Pacific Rim countries. The markets for MWP are not expected to come into balance until 1994-1996. Old corrugated cardboard will remain fairly stable, while the market for higher grade office paper will decline in 1992-1994, or until new domestic capacity comes on line. Currently, much of the paper collected for recycling in King County is exported to Pacific Rim countries. Expansion of domestic markets is crucial in order to maintain long-term stability. A substantial barrier to developing domestic markets for paper is the large capital investment required. Before making these investments the paper industry must be confident that there is sufficient demand for their product.

- *Glass.* In 1990, about 13,000 tons of glass were collected for recycling in King county, about 35 percent of the glass waste generated. During the past 10 years, the increasing use of plastics has led to a decreased market share for the glass container manufacturing industry. This decreasing demand for glass containers, coupled with increasing collection of glass containers for recycling, has created a serious market imbalance for glass throughout the United States. In King County, the volume of glass collected for recycling is increasing at an average rate of 10 percent per year. With the implementation of new curbside programs, it is estimated that by the year 1995, recycled glass volumes in the Puget Sound region will reach 77,000 tons/year and will exceed 100,000 tons/year by the year 2000. At this time there are no plans by local manufacturers to increase their cullet use. Unless economically feasible export markets are developed, which is unlikely in the short term, or new end-use markets are developed, the current market imbalance will worsen.
- *Aluminum cans.* Aluminum cans were recycled at a rate of 40 percent in King County in 1990. Aluminum has traditionally been the most profitable commodity for small recycling processors, but currently the market is on a downward trend. The recycling rate for aluminum cans, unlike most materials, does not seem to be significantly increased by curbside programs. The price paid for aluminum cans seems to have a greater impact. When prices are high, people sell cans to buy-back centers. When prices are low, they either store them and wait for a better price, or recycle them at the curb.
- *Tin Cans.* Tin cans were recycled at a rate of 28 percent in King County in 1990. The Steel Can Recycling Institute estimates a national tin can recycling rate of 66 percent by the year 1995 and 75 percent by the year 2000. MRI Corporation, the only processor of tin cans in King County, has recently upgraded its machinery, and with its current equipment probably won't reach capacity until 1995. The steel market is a very established worldwide market. Recycling programs are not expected to have a significant impact on the processors, end-users, or commodity prices.
- *Plastics.* Approximately 670 tons of all types of plastic were collected for recycling in King County in 1990. This represents less than one percent of the 85,400 tons of plastics generated in the County. The plastics manufacturing industry does not use recycled resin in quantities significant enough to have a major impact on markets. From the perspective of the recycling industry, however, the low density of post-consumer plastics will cause these materials to have an increasing impact on collection and processing systems. The addition of #1 and #2 plastic bottles (PET and HDPE) to curbside routes has been manageable with existing equipment, but expansion to other types of plastics may overwhelm this capacity. Some collectors are experimenting with on-truck densifiers as a possible solution to this problem.
- *Compost materials.* In 1990, 38% of the wood and yard waste generated in King County was diverted through yard waste collection programs. The markets for yard waste products are in the middle of a critical period of rapid expansion and development in King County. The input market for unprocessed yard waste and the product markets for composted materials and mulch are being inundated by unprecedented expansions of supply. The dramatic increase of household collection programs over the last few years and continuing into 1993 will continue to provide increasing quantities of yard waste. Over the next few years, collection programs will probably produce an oversupply in the yard waste processing sector, creating compost stockpiles and difficulties in marketing. There will also be some increases in the supply of wood to recyclers, but they already have secured successful channels into the mulching and hog fuel markets. In the long term, there should be

sufficient processing and demand capacity in existing markets to ensure long-term sustainable markets for wood and yard wastes. The products will be primarily topsoil, mulch, and separated wood used as a fuel.

To date there have been no significant efforts to recycle food waste. Most of the area processors have experimented on some level with adding food waste to their yard waste during the decomposition process. Food waste is seen as a potentially strong market and addition to the compost business if processing issues such as odor, contaminants, cost, and other concerns can be resolved. A market is being secured for the food waste compost that will be derived from the County's Ecology-funded pilot project.

- *Other materials.* Currently there are limited collection, processing, and markets for polycoated paperboard in King County. Two processors handle the estimated 50 tons per year that are being recycled in the County. The current market for ferrous scrap is stable, but the price is lower than normal due to generally low prices on international steel markets. Current market conditions for nonferrous scrap are depressed due to an increase in supply caused by domestic smelters producing at or above full capacity. New recycling technologies for tires are being developed at a rapid pace and several facilities are projected to come on line over the next decade. All of the scrap tires generated in the County go to a vast array of processors and end-users throughout the Pacific Northwest or are landfilled. The tire recycling industry is still relatively young, with new technologies developing at a rapid pace. Tire-derived fuel is currently the largest end-use for scrap tires in the state. Several new markets, such as pyrolysis and rubberized asphalt, are on the verge of major growth in Washington State.

b. County Programs

WR/R programs established in the 1989 Plan are discussed under three areas:

1. Recyclables collection (cities and county)
2. Support programs (cities and county)
3. Regional programs (county and cities optional)

Over the last three years the County and suburban cities have achieved significant results in all three areas. Household collection programs are offered throughout most of the County, and support programs such as procurement policies and variable can rates have been adopted by the County and many of the cities. County recycling programs are described below, followed by a synopsis of the cities' programs; waste reduction programs are also discussed in Section III.A. Major achievements of the County and cities are summarized later in this section; a more detailed description of programs is included in Volume II, Appendix E.

(1) Recyclables Collection

Recyclables collection consists of services such as household collection and facilities that have drop-sites. Areas served by household recycling and yard waste collection services are shown in Figures III.2 and III.3. Under the 1989 Plan, King County was responsible for implementing programs that meet or exceed minimum service levels for collecting recyclables and yard waste in unincorporated areas, both urban and rural by September 1, 1991.

Requirements for unincorporated urban collection were met in 1991 by making household recyclables and yard waste collection available to all residents. Table III.7 indicates service providers, materials collected, and other program information for each of the eight unincorporated urban service areas. King County has the authority to contract recyclables collection from residents in urban unincorporated areas, but instead chose to establish a service level ordinance stating program specifications to be implemented by waste haulers. The WUTC regulates franchised waste haulers in providing these services. In May 1991, Ordinance 9928 was adopted (now King County Code [KCC] 10.18), which resulted in certificated solid waste haulers providing recyclable collection services for the 450,000 residents of urban unincorporated King County. The County has developed, and will continue to develop, promotional and educational materials to encourage further participation in these programs.

In accordance with minimum service requirements, county solid waste facilities in designated rural areas collect source-separated recyclable materials and yard waste. Services at rural King County solid waste facilities are:

- Cedar Falls drop-box—recyclables, yard waste

- Enumclaw Landfill—recyclables
- Enumclaw Transfer Station (1993)—recyclables, yard waste
- Hobart Landfill—recyclables, yard waste
- Vashon Landfill—recyclables

Rural collection programs are also planned under the Waste Not Washington Communities Program funded by Ecology for Issaquah and the surrounding area (begun in March 1991); North Bend, Snoqualmie, Carnation, and Duvall, and nearby unincorporated area (begun in early 1992); and the outlying communities of Skykomish and Snoqualmie Pass. Urban and rural areas are further served by privately operated drop-boxes and buy-back centers, which are available to both residents and businesses.

(2) Support Programs

Support programs in the 1989 Plan were the responsibility of the cities and the County, while education programs were to be primarily regional services implemented by the County. The

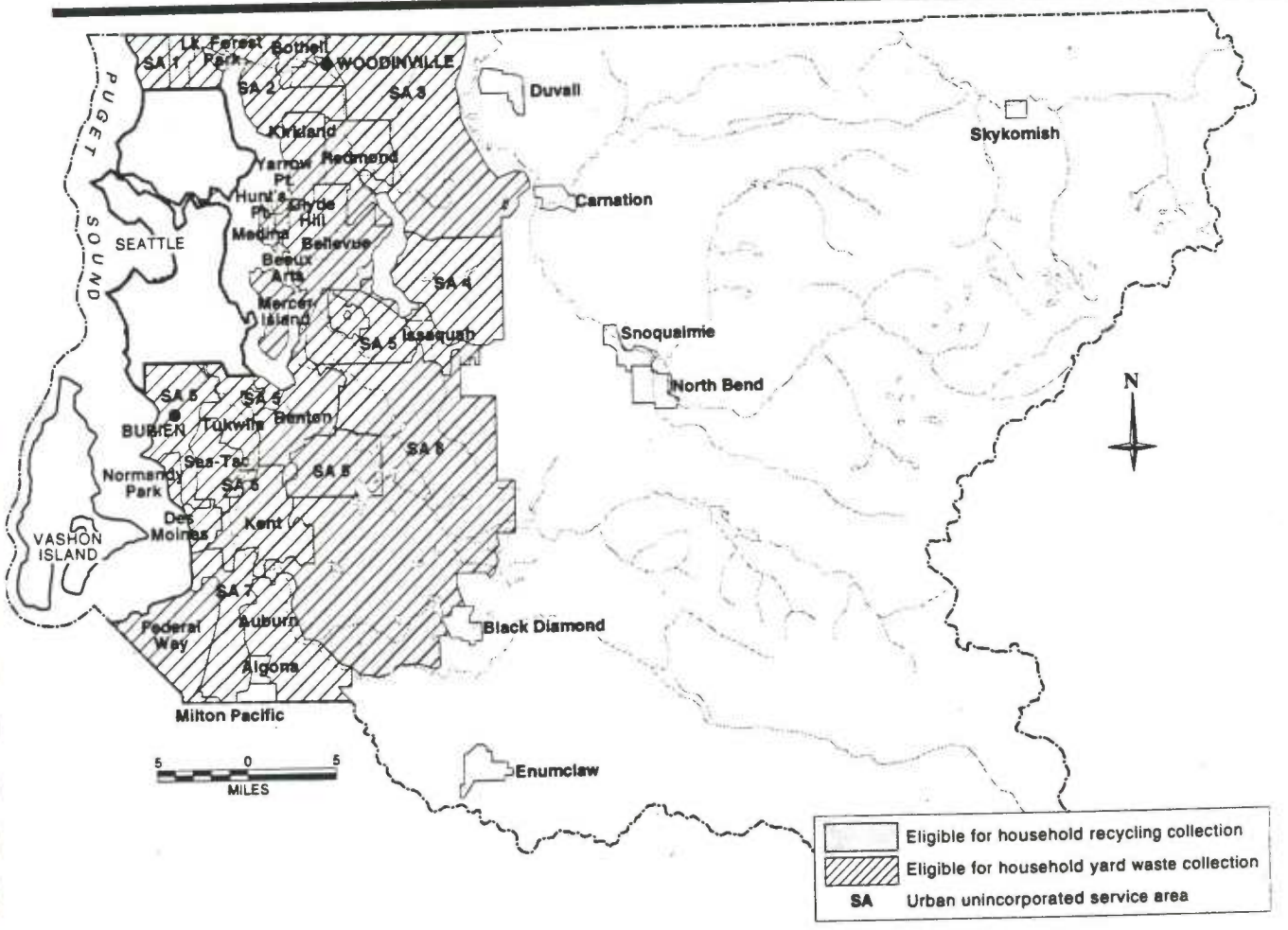


Figure III.2 Single-family household recycling and yard waste collection services, June 1992.

1989 Plan specified five support programs to be implemented by the County to encourage WR/R: rate incentives, procurement policy, recycling space requirements for new construction, monitoring, and a multifamily dwellings recycling implementation handbook.

Rate incentives are achieved through variable can rates for garbage collection, which have been established throughout unincorporated King County to encourage participation in recyclables collection programs. Other rate incentives include a "mini-can" rate, substantial cost differentials between garbage service levels, and rates for recycling service only (for non-garbage customers).

A procurement policy was adopted by the County that favors the use of recycled or recyclable products. In 1992, recycled paper use was at 82 percent in the fourth quarter of the year, surpassing the 1995 goal of 60 percent stated in King County Ordinance 9240. Recycled paper use is expected to climb gradually as additional types of recycled paper become available.

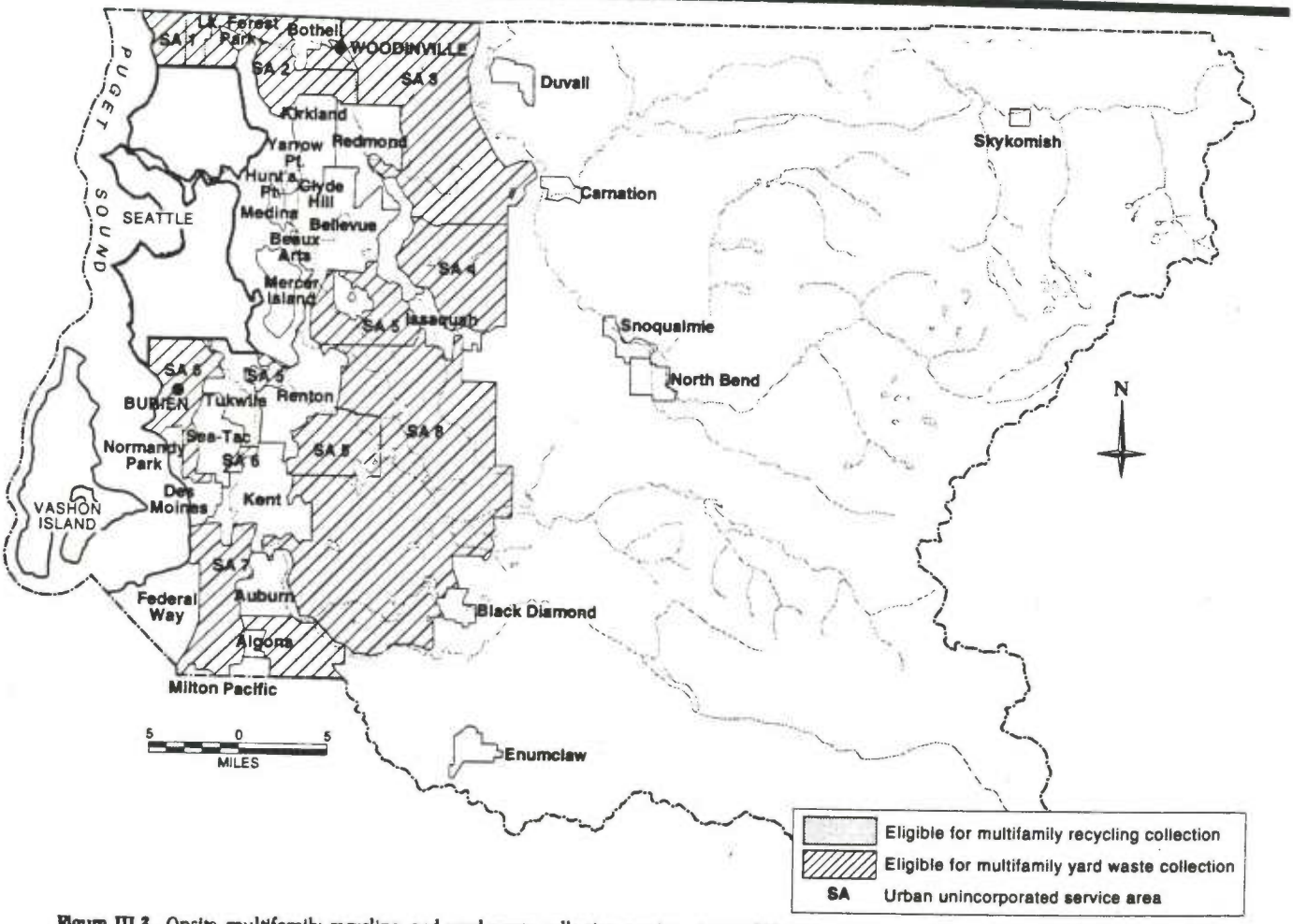


Figure III.3 Onsite multifamily recycling and yard waste collection services, June 1992.

New construction standards have been developed that will require onsite space for collecting and storing recyclables in multifamily and nonresidential structures. Draft standards were distributed for comment in the fall of 1991, and are included in the revised King County Zoning Code under consideration by the King County Council.

Monitoring of the progress made in meeting WR/R goals is reported in the Solid Waste Division's annual report to the County Council. Cities are required to submit reports for inclusion in the annual report. In addition, haulers serving the urban unincorporated areas of King County provide monthly reports of recycling and solid waste tonnages.

The 1989 Plan recommended that the County develop options and implementation strategies for cities to use in developing multifamily residence collection programs. King County prepared a draft manual and distributed it to cities in the spring of 1991.

(3) Regional Programs

Regional programs are those offered county wide to support WR/R goals including public information, education, nonresidential technical assistance, yard waste projects, experimental projects, and zone coordination.

Under the public information program, King County produces information and promotional publications (brochures, newsletters, and reports), maintains a recycling and composting information line, and sponsors special events such as Recycle Week.

Education programs for schools seek to integrate WR/R into K-12 curricula and school disposal practices—providing teacher training, classroom and school assembly materials, and support to the districts in setting up collection programs. In the community, the Master Recycler/Composter Program trains volunteers in WR/R, backyard composting, and household hazardous waste management.

The Business Recycling Program helps businesses and institutions develop and implement WR/R programs in the workplace by providing waste consultations, telephone assistance, workshops, presentations, and written and video materials.

Regional yard waste programs provide residents with yard waste handling alternatives or supplements household collection, such as programs for backyard composting and the collection of Christmas trees for recycling without charge at county disposal sites. From 1989 to 1991, mobile collection sites were provided to communities with no other yard waste alternatives. With the increased availability of household yard waste collection in urban areas, this program was discontinued in 1991.

The County has developed a resource list of over fifty businesses throughout the County that are willing to accept, collect, or recycle used appliances and which meet the new Federal Clean Air Act CFC regulations effective July 1, 1992. The County will monitor the continuing availability of this service to ensure that it remains available at a reasonable fee before considering contracting with appliance dealers and recyclers to collect appliances from residences for a fee to supplement or replace other appliance collection opportunities.

Experimental and pilot projects implemented to encourage WR/R include a project that provides reusable cotton diapers through a diaper service to low-income families; a food waste composting project at the King County Fair to obtain information that might lead to larger-scale food waste composting; a food waste collection processing and product testing grant from Ecology to King County and Seattle; and a model employee WR/R program for the King County Department of Public Works to develop techniques for reducing waste in the workplace.

The Zone Coordination Program provides information, staff assistance, and grants to cities on a variety of issues through meetings and workshops. Zone coordinators are involved in the administration of a WR/R grant program to cities that provides funding for multifamily, nonresidential, and yard waste collection, and other WR/R programs. A previous grant program distributed 17 grants from 1988 to 1991 to assist 23 cities in developing residential and nonresidential recyclables, yard waste, and public education programs.

(4) King County Commission for Marketing Recyclable Materials

The King County Commission for Marketing Recyclable Materials was formed in July 1989 by the King County Council. As part of the Department of Public Works, the Marketing Commission's objective is to help close the "recycling loop" in King County—the local remanufacture and purchase of recycled products. King County and the suburban cities have made tremendous strides in collecting recyclable materials and diverting them from landfill disposal. The Marketing Commission is complementing this effort by promoting markets for recycled materials. The Marketing Commission's efforts focus on encouraging businesses, public agencies, and the general public to buy recycled products. To this end, it is (1) providing information on where and how to obtain recycled products, (2) testing and demonstrating applications for recyclable materials and recycled products, (3) promoting the "buy recycled" ethic through a broad education program, and (4) recommending policy to address recycling market issues.

Voluntary packaging and labeling guidelines were developed by the Marketing Commission for companies to reduce contamination caused by misleading recycling labeling. The County is prohibited by state law from enacting prohibitions or deposits on products or packaging before July 1, 1993. In the absence of state or federal standards, the County has taken this step to help consumers make informed choices.

c. City Programs

The 1989 Plan directs cities to begin implementing minimum service WR/R collection and support services by September 1, 1991 and to complete implementation by September 1, 1992. The services include urban household recyclables collection, rural drop-box services, and yard waste programs. Additionally, three support service programs are being implemented: (1) rate incentives, (2) procurement policies, and (3) onsite recycling space requirements for new multifamily and nonresidential construction. Appendix E provides more detailed information on city WR/R programs.

(1) Recyclables and Yard Waste Collection

Under the 1989 Plan the cities are responsible for implementing programs that meet or exceed minimum service levels for collecting recyclables and yard waste in incorporated areas. Twenty of twenty-two urban cities and three of seven rural cities have household collection of recyclables (Table III.6 provides information on service providers, collection methods, and materials.) Five cities provide residential recycling drop-boxes. Yard waste collection programs are offered or planned in twenty-eight cities. Thirteen cities have recyclables collection services available to multifamily dwellings. In addition, a number of cities provide special collection days for certain recyclables, such as such as plastics and waste oil.

(2) Support Services

All cities, except Kirkland, provide rate incentives through variable can rates. However, the cost difference between can sizes varies among cities, with some offering greater incentives than others. (Refer to Chapter IV, Section A for additional information on solid waste and recyclables collection services and rates.)

The city of Kirkland has used a flat rate collection fee since 1973 as a disincentive to illegal dumping. In spite of their continued use of the flat rate collection fee, the participation rate for curbside collection service in Kirkland is similar to that of other suburban cities with differential rates. Kirkland would reexamine the issue of differential collection rates if the city's participation rate for curbside recycling declined.

Residents of cities where rate incentives are used are regularly educated on how they can reduce their monthly collection bill by taking advantage of differential can rates and recycling services. The cities and the haulers include information with their billings, and new residents are automatically informed of rate incentives when they sign up for collection service.

Six cities have adopted a recyclable and recycled products procurement policy; the remaining cities abide by an informal policy pending formal adoption. Six cities have developed requirements for onsite recycling for new construction; the remaining cities have indicated plans to do so.

(3) City Optional Programs

The 1989 Plan identified three programs for optional city implementation: backyard composting bin, Master Recycler/Composter, and the Business Recycling Program (BRP). Cities could apply for county funds to operate these programs or receive county services. The cities of Auburn, Bellevue, Mercer Island, and Redmond chose to implement their own BRP and received county funds to do so. Waste consultations, focus groups, workshops, and educational materials are among the services they offer. The city of Redmond also opted to implement its own backyard composting program in 1992. No cities chose to implement a Master Recycler/Composter program.

(4) Other Programs

Cities have implemented a variety of other programs including in-house recycling, newsletters and other promotional materials, waste oil collection, award programs, compost projects, and school projects. (See also Volume II, Appendix E.)

d. Mixed Waste Processing

(1) Background

Mixed municipal solid waste can be mechanically processed to remove recoverable material and reduce the amount of waste disposed. Mixed waste processing (MWP) facilities can remove recyclables and compostable material from the mixed municipal solid waste stream. These materials can be processed and can then be marketed. The quality and consistency of the end products depend on the composition of the incoming municipal waste. Unusable residual materials can be disposed of through landfilling, incineration, or the production of refuse-derived fuel.

King County Code 10.22.020 F. authorizes one privately owned and operated mixed waste processing facility in King County, which could supplement source-separation measures, and directs that the Division evaluate the long-term benefits, costs and risks of mixed waste processing in combination with extensive source separation programs.

(2) Feasibility Analysis

In 1991, King County issued the *Mixed Waste Processing Feasibility Analysis* (see Volume II, Appendix H). The report offers an evaluation of the need for a mixed waste processing facility (MWPF) and an analysis of the constraints which would be placed on the facility and the impact of those constraints on the feasibility of the project.

The report includes discussion of other jurisdictions' experiences with mixed waste processing, as well as the likely effects on the total recycling recovery rate in King County from the construction of an MWPF. The principal findings of the report are as follows:

1. Mixed waste processing could compete with the preferred source seperation programmatic strategies for waste reduction and recycling in King County.
2. King County can obtain critical information about the success of mixed waste processing facilities operating in conjunction with source reduction programs by evaluating these programs where they exist in other jurisdictions.
3. Reconsideration of current facility constraints for the operation of an MWPF is needed.

As a result of this analysis, the Division recommended delaying an issuance of request for proposals for a mixed waste processing facility until 1995 in order to:

- Monitor the success of other areas' ability to combine mixed waste processing with extensive source separation.
- Re-evaluate the potential for a mixed waste processing facility in 1995 to supplement programmatic waste reduction and recycling efforts.

Over the next few years, mixed waste processing technology may continue to advance, and more markets may emerge for the processed end-products. Additionally, sufficient time will have passed for the County to evaluate the long-term success of mixed waste processing combined with source separation in other U.S. communities. In the interim, King County can focus full attention on source separation strategies.

2. Needs and Opportunities

a. Background

The overall WR/R objective of this 1992 Plan update is to develop a strategy that will result in a 50 percent diversion rate in 1995 and lay the foundation for achieving 65 percent in 2000. To focus program efforts, unmet needs in existing collection services must be defined and appropriate government and private sector roles for providing needed services identified. Opportunities must also be identified for improving markets for materials collected for recycling, and for increasing public awareness of the importance of recycling and the need to purchase recycled and recyclable materials.

Ways to enhance existing recycling and waste reduction opportunities need to be identified and the following questions answered:

- What materials remain in the waste stream that have potential market value, especially in the immediate future (next three years)?
- Which markets need to be sustained and which markets need to be enhanced or expanded in order to support a high level of recycling?
- Which material markets have the highest priority?
- Should voluntary recycling programs be continued or should mandatory measures be instituted?
- If only existing WR/R programs are continued, will the County achieve its established WR/R goals, or do existing programs need to be expanded and new programs implemented?
- Is the current recycling infrastructure adequate or are improvements needed?
- Which generators or groups remain unserved or under served by current recycling services and infrastructure? What can be done to improve services to these groups?
- What additional or ongoing WR/R education efforts are needed and which groups are not participating in recycling programs that need to be reached?
- Are current WR/R responsibilities of the public and private sector appropriate and adequate, or should they change?

This section will discuss the needs and identify opportunities for recyclables collection, material markets, and support and education.

b. Recyclables Collection

Recycling needs can be determined by examining the composition of the unrecycled waste stream by generator and analyzing the numbers and types of generators served by existing and planned city and county programs.

(1) Unrecycled Waste Stream By Generator

The amount of waste disposed varies among different types of generators. For example, in King County residential generators contribute a larger share of the solid waste disposed than the commercial sector. The current proportions of the waste stream disposed by residential and nonresidential generators in King County are:

Generator	% of Total Disposed Waste
Urban residential	31
Rural residential	10
Self-haul residential	19
Total residential	**60**
Commercial haul nonresidential	30
Self-haul nonresidential	10
Total nonresidential	**40**

Source: *1990-1991 King County Waste Characterization Study*, Volume II, Appendix B.

This information illustrates the need to continue to expand residential recycling programs and to develop nonresidential services.

(2) Service Needs

There is a need for both residential and nonresidential generators to increase recycling levels. To develop effective programs, collection service needs were assessed; areas with adequate recycling service were identified; population data were compiled; tonnages from city and county recycling programs were determined; recyclers, haulers, and end-users were surveyed to estimate recycling volumes and sectors served; and waste composition data were analyzed. This information was used to

estimate the number of county residents currently receiving recycling services. From these data, tons disposed by recyclable material and generator type were determined. Figure III.4 shows the amount of materials that are being recycled or disposed. Paper, wood, and yard waste represent a large share of the materials currently being disposed that are readily recyclable.

Figure III.5 illustrates the disposed waste composition of the major generators in King County. This chart illustrates that single-family residences and self-haulers generate a large portion of the material being disposed. It further indicates that these are groups that will need to be reached in order to achieve established WR/R goals. For example, further education of urban single-family generators about the types of mixed waste paper that can be recycled could increase the diversion of paper in household collection programs.

Table III.9 provides detailed information on the materials which may be recyclable being disposed by single-family, multifamily, and nonresidential generators. This table provides more specific information to support Figures III.4 and III.5.

Percentages of households (urban and rural) and businesses in King County and the cities lacking recycling and yard waste collection service are:

- Single-family recycling—5 percent
- Single-family yard waste—12 percent
- Multifamily recycling—45 percent
- Multifamily yard waste—71 percent

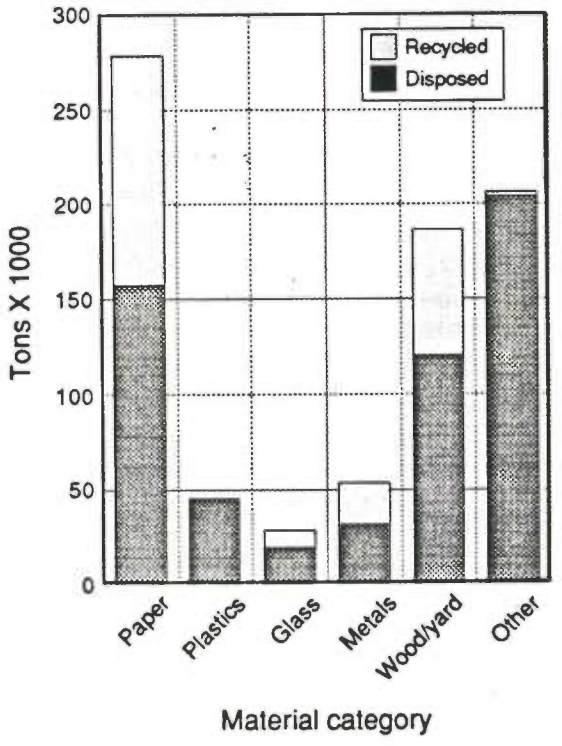


Figure III.4 1990 recycled and disposed quantities by material category. Source: *Waste Characterization Study, Volume II.*

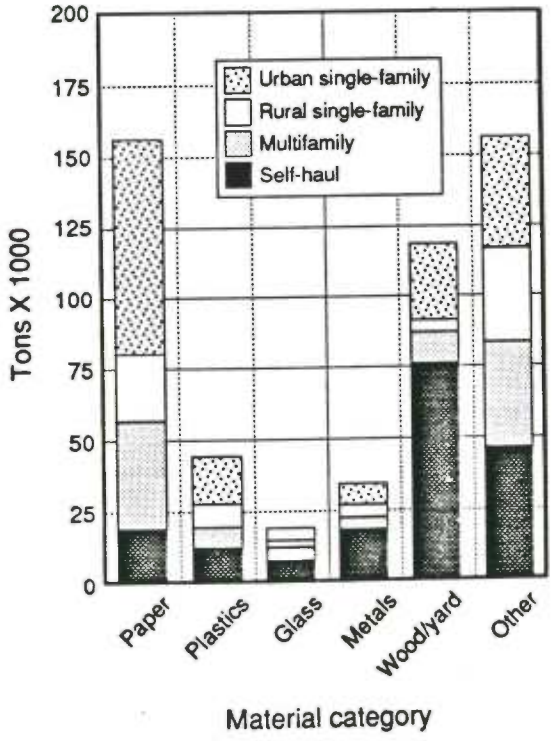


Figure III.5 1990 disposed quantities by generator and material category.

Table III.9 Tons Disposed per Year by Recyclable Commodity and Generator Type

Recyclable commodity	Generator Type		
	Single-family	Multifamily	Nonresidential
Newspaper	2,910 [b]	10,300	6,200
Cardboard	10,060 [b]	7,900	36,200
Office paper	880	260	9,400
Computer paper	200	90	3,110
Mixed paper	18,690 [b]	13,700	27,300
#1 Plastic (PET) bottles	730 [b]	190	0
#2 Plastic (HDPE) bottles	2,900	540	1,100
#3-7 Plastics	14,170	4,330	22,400
Wood waste	2,730	5,100	48,700
Yard waste	26,900	4,600	12,700
Textiles	11,800	6,200	15,900
Food waste	28,500	10,000	16,600
Glass	0 [b]	4,400	3,520
White goods	n/a	n/a	n/a
Tin cans	3,150 [b]	1,300	1,400
Other ferrous metals	2,650	850	7,700
Aluminum cans	770 [b]	520	950
Aluminum scrap	290	0	350
Other nonferrous metals	180	80	780
Batteries, household	n/a	n/a	n/a
Batteries, automotive [a]	0	0	0
Polycoated paper	4,500 [c]	3,000 [c]	7,500 [c]
Tires [a]	0	0	0

[a] Estimates based on deposit of used tire or battery with retail establishment at the time of purchase of new tire or battery.

[b] Denotes tonnage corrections to the September, 1990 waste stream sampling. The estimated volume of the marked commodities was claculated for programs that have come on line between September 1, 1990 and March 31, 1992, and subtracted from the total disposed tonnage sampling numbers.

[c] Based on unpublished research for the polycoated paper industry.

n/a = Figures not available.

Source: *King County Waste Characterization Study*

- Nonresidential recycling—80 percent

While the above percentages indicate overall service gaps, a breakdown by urban and rural areas provides more specific information on services offered and services needed.

In urban areas, household collection of recyclables is available to 95 percent of single-family residences, and yard waste collection is available to 79 percent. For urban multifamily residences in incorporated areas, household collection of recyclables is offered to 51 percent and yard waste collection to 6 percent. All multifamily residences in urban unincorporated areas have access to household collection of recyclables and yard waste (see also Figure III.3). Household collection programs typically include recyclables, such as paper, glass, metals, #1 and #2 plastic bottles (PET and HDPE), and yard waste under 3 inches in diameter. Some recyclables, however, such as white goods, #3-7 plastics (vinyl, LDPE, polypropylene, polystyrene), scrap metal, and yard waste over 3 inches in diameter are not widely collected. As Figure III.3 indicates, there are few opportunities for urban residences to

recycle these latter recyclable materials. This information also indicates there is a need to expand multifamily recyclables and yard waste collection services in the cities of King County, and to a lesser extent, improve single-family household yard waste collection in urban areas.

In rural areas, household collection of recyclables is not required but several rural cities offer it. Others are served by existing or planned drop-sites, thus completing coverage of incorporated rural areas for recyclables collection. Yard waste drop-sites are located in five rural cities, serving 54 percent of rural incorporated area residents. Recycling and yard waste collection services in the rural unincorporated areas are more limited. Drop-sites for recyclables and yard waste are available at rural county disposal sites at Cedar Falls and Hobart; drop-sites for recyclables are available at the Enumclaw transfer station and Vashon landfill. There is still a need to improve recycling and yard waste services in rural areas.

In the nonresidential sector, approximately 10 percent of King County businesses receive recyclables collection service through city-sponsored programs and an additional 10 percent are served through privately operated programs. The majority of the remaining unserved businesses are within a five-mile radius of a drop-site, transfer station, or buy-back center. However, only an estimated 10 to 20 percent of these businesses regularly use these facilities. In short, businesses are not participating in recycling programs at the same level as residences in King County. Significant increases in nonresidential recycling must be achieved to meet WR/R goals.

King County's Business Recycling Program has effectively provided businesses with information about how to improve WR/R activities, and several cities have successful collection programs. However, providing information addresses only one barrier. Regulatory barriers to implementation, such as cross-subsidization between commercial garbage and recycling rates, also need to be addressed; impediments to increased nonresidential WR/R should be identified; and the roles and responsibilities of the cities, the County, and the private sector in overcoming these barriers need to be delineated. The following issues must be addressed:

- *Collection services.* To determine gaps in nonresidential collection services, the following should be identified: types of businesses and areas of the County receiving recycling services and the materials currently collected.
- *Local government authority.* State law does not provide local governments the same regulatory authority for commercial recyclables collection as it does for residential recyclables collection. The cities' and County's authority to provide for commercial recycling must be clearly delineated. Because commercial recyclers respond to market demand, service may not be available to all businesses in a given area, and materials collected and prices charged can vary. Changes in state law may be needed to allow local government the authority to require that a minimum level of recycling services be made available to businesses county wide.
- *Financial incentives.* Rate-setting practices can result in recycling rates that are not competitive with or are more than the cost of disposal. Financial incentives to encourage businesses to recycle should also be addressed.

Programs are also needed to address the significant quantities of waste disposed by self-haulers—largely residents and businesses that do not subscribe to garbage service or periodically dispose of waste at county facilities. Of the 1990 tonnage disposed by residential self-haulers (estimated to be 15 to 20 percent of the single-family population), 18 percent was recyclable materials and 43 percent was yard waste and wood. Of the nonresidential disposed tonnage, 15 percent was recyclable materials, and 27 percent was yard waste and wood.

c. Markets

(1) Background

In order for recycling programs to succeed, increased recycling collection efforts must be accompanied by greater consumer demand for recycled products. King County and the suburban cities can continue to set an example by purchasing recycled products and promoting the purchase of recycled products by the private sector. Market demand can also be addressed by identifying economically viable uses for recycled feedstocks, increasing local capacity to process and remanufacture recyclable and recycled products, and investigating legislative enhancements for recycling markets.

Special attention needs to be given to glass, mixed waste paper, plastics, compost, and other commodities that pose

special market development challenges. Establishment of minimum content standards for glass can be encouraged at the state level, while the County can aggressively pursue testing and use of products that can be made from recycled cullet. Markets for yard waste products can be strengthened by providing quality testing and certification, consumer education and awareness, processing regulation, and open channels for procurement by county agencies.

To ensure the quality of materials collected for recycling, development of commercial paper recycling programs needs to focus on source-separated programs by grade of paper. Collection systems designed for plastics and yard waste also need to emphasize source separation. In addition, continuing education to decrease contamination is important in the collection of all materials. (See Volume II, Appendix D for more information about recyclable materials markets.)

To promote more widespread use of products made from recycled materials and to support recycled materials markets, consumers need to be informed about their availability. For example, Lake Forest Park will use plastic lumber for benches and other equipment in its first city park. While durability will require years to assess, information addressing considerations such as public acceptance and aesthetics can be shared with other jurisdictions much sooner. Various recycled products should be tested for effectiveness, durability, and other qualities by testing programs distributed among the cities and the County.

(2) Key Market Needs

- *Plastics.* The key strategies for King County to pursue in improving markets for recycled plastics fall into three categories: (1) facilitating the design and implementation of source-separated, contamination-free collection systems; (2) buying products that use recycled plastics and encouraging similar purchasing behavior on the part of the cities and the public; (3) educating the public about buying products made from recycled post-consumer plastics.
- *Glass.* Demand must be increased to address the oversupply of glass. The Washington State Department of Trade and Economic Development has established a 1995 goal that 50 percent of the glass recovered statewide be used in glass containers, 15 percent be used in fiberglass insulations, 5 percent exported, and 25 percent used for other purposes. Other uses being explored include refilling wine bottles, glass aggregate as a drainage material, the use of glass aggregate in place of sand in asphalt, and the use of glass foam for insulation.
- *Compost.* The short-term market outlook may bring an oversupply and difficult market conditions. Three factors could contribute to greater supply: yard waste disposal limitations, an expanded PSAPCA burn ban, and other potential regulatory changes. Long-term markets are expected to be more stable with sufficient processing and demand to lead to sustainable markets. Many processors hope government agencies will become major consumers.
- *Mixed waste paper.* Mixed waste paper consists of mixed paper as well as paper left over after higher grades of paper have been removed. Two major weaknesses of the material collected are high contamination levels and lack of consistency in product quality. These weaknesses have prevented local mills from accepting significant quantities for recycling into new paper products. In 1990, 76,000 tons of mixed waste paper were collected in Washington State, with only 6,000 tons consumed by the region's mills. The majority of the mixed waste paper was exported to Pacific Rim countries for recycling.

The current glut of mixed waste paper is expected to get worse before it gets better. As new local and national curbside programs come on line, increasing quantities of mixed waste paper will flood the market and compete for the same export markets.

James River and Daishowa are two large mills which have come on line in the Northwest which accept used phone books for repulping. With these two mills in operation, the Northwest is now a net importer of phone books and markets for these paper products may increase.

(3) Marketing Commission

To pursue its five-year objective to develop markets by stimulating procurement of recycled products, the Marketing Commission needs to:

- Educate the public, government and private industry about the importance of buying post-consumer content recycled

products. Three important topics are recyclable material contamination, product quality and benefits of using products made from recycled materials.

- Encourage increased government recycled product procurement, recommend market development policy and legislation, and encourage collection of commodities in short supply.
- Test the performance of recycled products in new and existing applications. Draft specifications for recycled product procurement, and encourage further research and development.
- Facilitate common market development goals of public agencies, citizens, and the private sector.
- Address policy and legislative issues such as cooperative purchasing, advance disposal fees, and the removal of price supports for virgin material.
- Provide the private and public sectors with information on the quality and benefits of recycled products.

d. Support

No new needs for support programs are identified, however cities and King County need to continue existing support programs. These include collection rate incentives, procurement policies that favor the use of recycled or recyclable products, new construction standards that require onsite space for collecting and storing recyclables, routine recyclables collection data reporting, and annual reports of progress toward Plan implementation.

e. Regional Programs

(1) Intergovernmental Relations/Coordination

The Zone Coordination Unit has functioned as a resource to city recycling staff, administered grants programs, and coordinated meetings among county and city staff to exchange information and ideas. There is a need for the County to provide more information through such activities as periodic mailings that update the role and responsibilities of county WR/R staff; jointly sponsored workshops or roundtables; continued grant program funding, and issue-specific interjurisdictional committees. In establishing disposal bans, for purposes of promoting recycling or for other operational reasons, the County will coordinate implementation with the cities through the Zone Coordination Unit.

(2) City Optional Programs

Three programs were designated as city optional in the 1989 Plan: (1) nonresidential technical assistance, (2) backyard composting bins, and (3) master recycler/composter. Under the program, cities could apply to the County for funds to establish and operate these programs or continue to receive services from the County. There is a need to evaluate which programs operate more effectively as regional services and which are best updated locally. The Backyard Composting Bins Program and the Master Recycler/Composter Program are most cost-effective as regional services, and cities have generally not opted to implement these programs. To continue to offer cities some flexibility in providing services, new programs need to be considered for city optional status.

(3) Education/Schools

More emphasis on coordination with school districts and cities is needed to streamline scheduling and enhance program effectiveness. Currently, presentations depend on individual teachers who request it for their classes. Schools also need assistance with establishing recyclables collection programs.

(4) Public Education

The County's public education and promotion of WR/R issues is extensive. While comprehensive in its coverage of topics and use of various media, there remain opportunities to increase public awareness of the need to reduce, recycle, and purchase recycled products. These include providing information on what to use in place of difficult-to-recycle materials, increased information on procurement for the nonresidential sector, and a more visible waste reduction campaign.

New and innovative promotional approaches need to be explored, such as newspaper inserts, paid advertising, and cooperative efforts with other organizations, businesses, and the suburban cities. Finally, targeted information needs to be delivered to minority, low-income, senior groups, and other groups not reached by previous educational efforts.

(5) Clean Wood Waste

Clean wood is defined as wood that has been processed into lumber and has not been contaminated during use. Most clean wood waste is generated by large commercial and residential construction projects and is taken to privately owned CDL facilities. After September 1993, most CDL generated in the County will be taken to a privately owned processing system developed to meet operational specifications established by the County (Section V.D.1.e.). Recycling will be encouraged by requiring that the contractors maintain a specified minimum processing capacity at one or more of the facilities that receive loads of mixed CDL materials from generators and haulers and by reserving the County's right to prohibit or limit disposal of materials deemed recyclable. The County is also developing WR/R programs that target building contractors and other trades that will utilize the CDL processing system.

While the new CDL processing system is expected to capture most of the clean wood generated in the County, small volumes of clean wood generated by remodeling contractors, do-it-yourself remodelers, and pallet users will likely continue to be delivered to transfer facilities in privately licensed vehicles (PLVs) for disposal. Opportunities for recycling and programs for waste reduction and recycling education are needed for this portion of the wood waste stream not captured by the County's CDL processing system.

The Waste Characterization Study, prepared for the County in 1991, documents the quantity of wood waste present in both the residential and nonresidential waste streams. However, the study did not provide information about the specific components of the wood waste stream. Therefore, it is difficult to project how much wood entering the CDL processing system or County transfer system will be clean wood. This lack of specific information makes it difficult to plan or implement wood waste recycling program. In order to improve the County's ability to manage wood waste, the 1993 Waste Characterization Study will gather information to better differentiate clean wood waste components, identify generator sources, and determine volumes.

f. Summary of Needs and Opportunities

In summary, alternative methods for enhancing recycling efforts should be evaluated that consider the following needs and opportunities:

- Additional residential collection programs to include household collection of yard waste in all urban areas; services and facilities for secondary recyclables such as white goods, #3-7 plastics (vinyl, LDPE, polypropylene, polystyrene), oversized yard waste, and scrap metal; and more comprehensive rural residential recycling systems.
- Self-hauler recyclables and yard waste collection opportunities.
- Yard waste collection alternatives for multifamily and commercial generators.
- More comprehensive, nonresidential recycling systems, which include collection service standards and financial incentives to increase recycling among nonresidential generators.
- Legislative authority allowing the County and the cities to require minimum levels of recyclables collection service for nonresidential generators.
- Market development for collected materials, particularly paper and compost.
- Stronger intergovernmental coordination of common WR/R efforts.
- Identification of additional strategies as potential city optional programs.
- Testing and promotion of additional products made from recycled materials.
- Increased coordination with school districts and cities to assist schools in implementing collection programs.
- Distribution of WR/R information to all segments of the population using multiethnic and other educational strategies.
- Increased diversion of recyclables, such as mixed waste paper, in existing collection services through additional educational efforts.

3. Alternatives

There are three alternative ways to meet the WR/R needs described in the previous section:

- Continue the existing voluntary WR/R efforts.
- Continue existing efforts and initiate new measures to increase recycling of targeted materials or generators.
- Continue some existing efforts and prohibit the disposal of selected recyclable materials.

Criteria used to develop and evaluate recommendations include cost of service, waste diversion potential, and potential for implementation within three years. The alternatives considered are summarized below and in Table III.10. The additional diversion potential for the three alternatives are displayed in Figure III.6.

- *Alternative A—Continue Existing Programs.* This alternative would continue voluntary programs established in the 1989 Plan without instituting new programs or disposal bans or limitations. It would likely result in an estimated additional diversion of 5 percent by 1995, for a total WR/R rate of 40 percent. This increase would be achieved through targeted promotional efforts and continuing public education for existing programs and the addition of services that are currently in the planning stages (i.e., multifamily and yard waste collection programs). Diversion rates greater than 40 percent would not be expected because no significant improvements in recycling services or facilities would be considered.
- *Alternative B—Expand existing programs and institute a yard waste ban.* This alternative would expand voluntary services for all generators, provide collection opportunities for additional materials, and ban or limit disposal of yard waste. It would establish nonresidential collection service guidelines to encourage the expansion of services to commercial generators. This would likely achieve an estimated diversion rate of just over 50 percent by 1995, assuming that a yard waste disposal ban or limitation is in place in 1993.
- *Alternative C—Initiate mandatory recycling through disposal bans.* This alternative would initiate mandatory recycling measures, including disposal prohibitions for certain recyclables and yard waste. It would be more expedient and less costly than focusing on voluntary collection programs for recyclables and yard waste, and if fully implemented would result in an additional 26 percent of recyclables collected, bringing total diversion to 60 percent or more by 1995, but only if active enforcement is initiated. Furthermore, the capacity of processing facilities and the adequacy of markets to absorb each commodity would need to be ascertained before a material is banned from disposal.

The advantages and disadvantages of all three alternatives are compared in Table III.11. The diversion potential of the program alternatives is based on analyses of the *King County Waste Characterization Study* (Volume II, Appendix B), the 1991 Ecology recycling survey results (Washington State Recycling Survey, Ecology), and Solid Waste Division waste generation forecasts. The alternatives reflect policy considerations and priorities expressed by the suburban cities and other participants at plan update workshops.

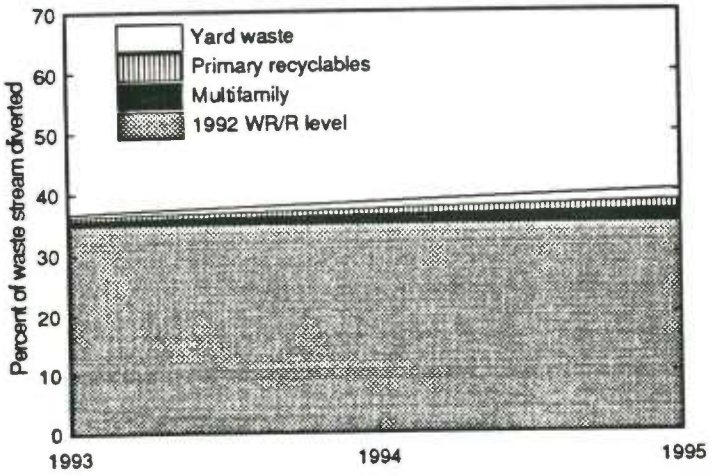
Each of the three alternatives respond in some way to the needs and opportunities of the WR/R system. Alternative A assumes that there are limited resources and that additional resources would not be allocated to new WR/R programs. This alternative also assumes that continued implementation of status quo programs adequately meets the WR/R needs of King County residences and businesses.

Alternative B assumes that there is a significant amount of material with recycling potential that is being disposed. This alternative also recognizes that additional efforts by the County, cities, and the private sector are needed to meet WR/R needs in the County and to meet established goals.

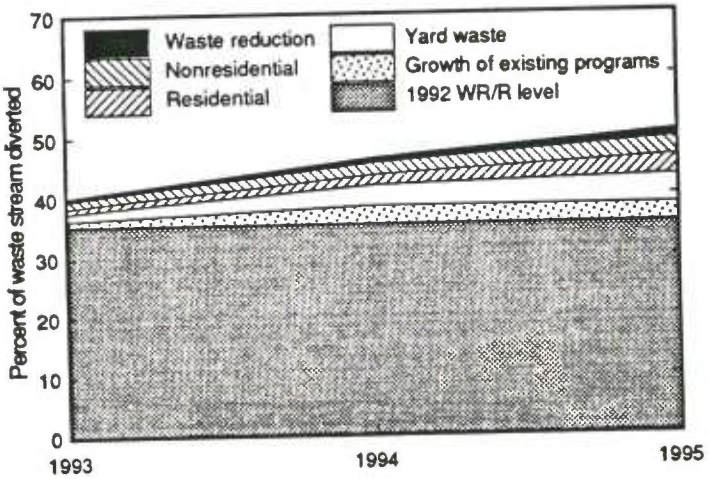
Alternative C also recognizes that additional diversion of certain materials is needed in order to meet WR/R goals. However, this alternative would achieve additional diversion through mandatory measures, such as prohibiting the disposal of recyclable materials, rather than continue with the existing approach of providing voluntary programs and services.

Table III.10 Summary of Recycling Alternatives

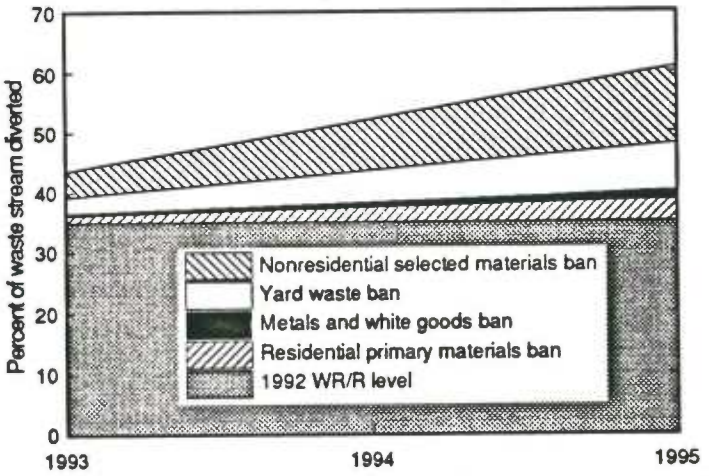
Alternative A	Continue existing programs.
Alternative B	Expand existing programs and institute a yard waste ban.
Alternative C	Initiate mandatory recycling through disposal bans.



Alternative A



Alternative B



Alternative C

Figure III.6 Additional diversion potential resulting from Alternatives A, B, and C.

Table III.11 Summary and Comparative Advantages and Disadvantages of WR/R Alternatives

Alternative A—Continue Existing Programs

Advantages
- Presents no new costs to cities, County, and the private sector.
- Presents fewest implementation difficulties.

Disadvantages
- Attains only 40% WR/R; falls far short of 1995 50 percent diversion goal.
- Does not address all identified needs in materials collection.
- Does not increase recycling opportunities for businesses and self-haulers.

Alternative B—Expand Existing Programs with Yard Waste Ban

Advantages
- Could attain 50 percent 1995 WR/R goal.
- Utilizes existing hauler infrastructure for service options.
- Requires no additional statutory authority.
- Incurs moderate regulatory and enforcement costs.
- Is less likely to meet with public opposition than Alternative C.

Disadvantages
- Has potentially higher cost to customers for recyclable collection services.
- Incurs additional operating costs for haulers; additional costs for cities and county.
- May incur additional capital costs for construction of facilities.
- Has potential for delays because of facility siting difficulties.
- Requires further planning to clarify public and private responsibilities for providing collection facilities.
- Provides no guarantee that collection needs of the nonresidential sector will be met.

Alternative C—Initiate Mandatory Recycling through Disposal Bans

Advantages
- Could attain 60% WR/R rate, and has highest potential diversion rate.
- Offers potentially lower costs to the County, cities, and haulers for services and facilities.
- Gives greater autonomy to cities in determining additional collection services and their WR/R program.

Disadvantages
- Incurs additional costs to the County and haulers to enforce bans.
- Poses potential increase in illegal dumping if collection alternatives are not economical and convenient.
- Poses potential short-term disequilibrium for recycled product markets.
- Has enforcement and monitoring difficulties.

Specific programmatic proposals for each alternative are described in the sections that follow.

a. Alternative A, Existing Programs

This alternative would continue to implement the voluntary programs recommended by the 1989 Plan described in Section III.A.1, which could result in additional 5 percent waste stream diversion. This could be achieved by more fully implementing the 1989 Plan programs, such as yard waste and multifamily recyclables collection in urban areas; however, this alternative does not meet all of the needs identified in Section III.A.2.

The additional diversion that could be expected from continued implementation of the 1989 Plan recommendations is shown in Table III.12. The 1992 WR/R rate of 35 percent would be maintained, and some additional diversion would result from added multifamily and yard waste service. Existing

programs fall into four general categories: waste reduction, recyclables collection, support programs, and regional programs. These programs and implementation responsibility are discussed in detail in Section III.A.1 and summarized below.

(1) Recyclables Collection

King County and the cities would continue to implement programs to meet or exceed minimum service levels for collecting recyclables and yard waste in the urban and rural areas. The minimum levels of services are described in Section III.A.1, with a list of the recyclable materials.

To fulfill the minimum service levels from the 1989 Plan, multifamily recyclables service and yard waste collection would need to be available countywide. Increasing service availability and participation to multifamily residences in cities would be emphasized. Currently 41 percent of multifamily units in incorporated areas do not have recycling service. Of those that do, it is estimated that fewer than 50 percent use the services.

Household yard waste collection services would be extended to the 21 percent of urban single-family households in incorporated areas (one through four units) that do not currently receive this service. Needs for yard waste collection and processing facilities would be evaluated countywide.

Current levels of yard waste and recycling opportunities would continue to be provided at current levels at county disposal facilities. New facilities scheduled to come on line before 1995, including the Enumclaw Transfer Station, would be designed with the capacity to collect all primary recyclables.

Table III.12 Additional Diversion Potential Resulting from Alternative A

	1993	1994	1995
Yard Waste	.75	1.50	2.25
Primary Recyclables	.30	.65	1.00
Multifamily	.60	1.20	1.75
Total WR/R Increase from 1992	**1.65**	**3.35**	**5.00**
1992 WR/R Rate	35.00	35.00	35.00
Total WR/R Rate	**36.65**	**38.25**	**40.00**

(2) Support and Education Programs

Existing programs would be continued, with emphasis on publicizing service expansions to multifamily dwellings. Education programs include school programs, community event displays, and a recycling/composting hotline. Cities would continue to either utilize the County's Business Recycling Program or apply for county funds to implement their own.

(3) Regional Programs

Existing regional programs would be continued. The Backyard Composting Program and Master Recycler/Composter Program would become regional—instead of city optional—support and education programs.

(4) Program Costs

Implementation of alternative A generally would maintain public and private costs at current levels. Existing funding mechanisms would be used. Collection services would continue to be paid through city contracts or directly through fees charged to customers. Cities would continue to fund other WR/R programs and services with utility taxes, general fund revenue, and grants. Regional programs and services offered by the County would continue to be funded through tipping fees charged at disposal facilities.

The addition of new household yard waste collection services could result in an added monthly cost to participating households. The cost to the customer of new multifamily recyclables collection service could vary widely depending on the size of the complex and the frequency of service. However, most customers should also see a commensurate reduction in their garbage bill, as they reduce the amount of waste being disposed if rates are structured to do so.

(5) King County Commission for Marketing Recyclable Materials

Under alternative A, the King County Commission for Marketing Recyclable Materials would continue to establish, enhance, and ensure methods of utilizing recyclable materials; promote the use of products manufactured from recycled materials; and recommend policies to enhance market

development. The following programs and actions would be undertaken by the Commission to fulfill this charge:

- *Market information.* Maintain a market information system that allows the County to monitor basic trends in the regional recycled materials infrastructure.
- *Recycled products promotion and education.* Continue to expand recycling markets by promoting the use of recycled products by residents, businesses, and public agencies. Educate and motivate the public, government, and private industry about the importance of buying post-consumer content recycled products. This should include information about contamination issues, as well as the qualities and benefits of using recycled materials.
- *Recyclable commodities priorities.* Focus efforts on priority commodities including—but not limited to—glass, compost, mixed waste paper, and plastics.
- *Recycled yard waste compost.* Promote the consumption of recycled yard waste compost in King County through product testing and market development and support activities
- *Clean Washington Center coordination.* Continue working cooperatively with the Clean Washington Center and other agencies to promote local recycling markets, providing assistance and support to the Center for its market development activities in the region.
- *Coalition building.* Facilitate the common market development goals of public agencies, citizens, and the private sector. This can be accomplished by using the expertise of the Commissioners, assisting public agencies to buy recycled products, and recommending policies regarding market development issues.
- *Product testing and demonstration.* Test recycled materials in new and existing applications to evaluate their performance and potential for continued and expanded use. This would include drafting specifications for recycled product procurement, and monitoring and supporting research and development efforts of private industry and other public agencies.
- *Technical assistance.* Provide technical assistance to private businesses and public agencies by providing information on qualities and benefits of recycled products, and assistance in drafting specifications that meet applicable guidelines.
- *Procurement of recycled products.* Promote the purchase of recycled products by the public and private sector by supporting the King County Purchasing Agency to promote local agency procurement of recycled and recyclable materials. Provide technical assistance to targeted businesses to incorporate recycled and recyclable products into the merchandise they market and the supplies they use. Increase exposure and access to recycled and recyclable products for residents.
- *Procurement goals.* Establish procurement goals for targeted commodities by King County.
- *Policy analysis.* Analyze legislative initiatives and recommend policy, including those regarding cooperative purchasing, advance disposal fees, and removal of price supports for virgin material.
- *Legislation.* Support market development legislation at the state and federal level.

b. Alternative B, Expanded Services

Under this alternative most existing services and programs would continue; additional services, facilities, and programs would be provided; more types of materials would be collected; and the 1989 Plan recommendation for a yard waste disposal ban would be phased in beginning in 1993. The first phase of the disposal limitation would affect single-family residences. The second phase would affect all other yard waste generators and is expected to take effect by 1995.

Implementation of 1989 Plan requirements resulted in a 35 percent WR/R rate in 1992. Alternative B is based on the need to go beyond the minimum requirements of RCW 70.95 to achieve 50 percent diversion or higher. This approach identifies additional services or actions needed to do so, assuming King County continues a voluntary WR/R system.

The additional services proposed in alternative B are designed to meet the service needs identified in Section III.A.2:

- Add services (and materials) to established urban household collection programs to include all primary recyclables. These include paper, cardboard, glass, tin, and aluminum beverage containers, yard waste, and #1 and #2 plastic bottles (PET and HDPE).

- Implement a campaign to educate residents in the urban area about the availability of urban household collection programs for all primary recyclables.
- Provide optional collection opportunities for secondary materials in both urban and rural areas. These include wood, #3-7 plastics (vinyl, LDPE, polypropylene, polystyrene), textiles, appliances, furniture, scrap metals, and food waste.
- Provide additional yard waste recycling opportunities to serve residences, self-haulers, and businesses.
- Establish minimum service guidelines for nonresidential recyclables collection.
- Initiate the phased implementation of the yard waste disposal ban.
- Determine roles and services of Solid Waste Division facilities in recyclables collection.

Programs are described in detail in the sections that follow.

The diversion potential of Alternative B is shown in Table III.13. It illustrates the additional increment of diversion expected from continued implementation of the 1989 Plan recommendations and the new diversion increment that would result from new services. The 35 percent WR/R rate being achieved in 1992 would be maintained and there would be some additional diversion as a result of additional multifamily and yard waste services. Expansion of curbside yard waste collection service to all urban residents, initiation of a yard waste ban, and additional composting opportunities would result in an additional 6 percent diversion by 1995. These estimates assume that almost 80 percent of the currently disposed yard waste would be diverted from disposal. It also assumes that, by 1995, at least 50 percent of those eligible for program services would be participants.

New optional programs to provide additional collection opportunities for selected secondary recyclables could result in an additional 1 percent diversion of the total waste stream in 1995. Significant diversions can be achieved through the promotion of multifamily recycling services, additional amounts of mixed waste paper, and additional opportunities for textiles collection. It is estimated these programs would achieve an average participation rate of 60 percent.

The successful promotion of voluntary nonresidential recycling collection service guidelines could result in an additional 3 percent diversion by 1995, if half the businesses targeted in the guidelines recycle 50 percent of their waste stream. Greater diversion could be expected if the legislative authority of counties and cities is changed to allow local governments to require nonresidential recyclables collection.

This alternative also assumes a moderate increase in waste reduction as a result of accelerated educational efforts by cities and the County, and through additional backyard composting of yard waste.

(1) Residential Collection
Minimum Service Levels

Alternative B increases the 1989 minimum service levels for both residential and nonresidential collection. Both urban and rural collection systems must include all primary recyclables (the urban and rural boundaries are shown in Figure III.1; primary recyclables are listed in Table III.15). In changing minimum service levels, cities with contracts for residential garbage and/or recycling services would negotiate these service levels with their contractor. King County would change its service level requirements (KCC 10.18) as needed. Cities with garbage or recycling services regulated by the WUTC could amend their service level requirements to ensure minimum services or work with their franchise haulers through franchise agreements or other means.

Recyclable materials, as defined by this Plan are in accordance with RCW 70.95.030 (Table III.14). They are classified as "primary" and "secondary." Primary recyclables are those materials most commonly collected in household and drop-box programs and those with established or emerging markets, including paper, cardboard, glass, tin, aluminum beverage containers, and #1 and #2 plastic bottles (PET and HDPE). Secondary recyclables are those less commonly collected than primary recyclables because of limited markets or lack of collection systems. These include batteries, #3-7 plastics (vinyl, LDPE, polypropylene, polystyrene), textiles, appliances, furniture, scrap metals, and food waste.

State statute RCW 70.95.090 and KCC 10.22 require that a list of recyclable materials be included in the County's solid

waste management plan. Criteria were developed for determining what recyclable materials could be included on the primary and secondary lists. These criteria are that the materials:

- are already being collected or are collectable,
- are recyclable,
- have markets or potential markets (as described in Appendix D, Recycling Markets Assessments), and
- have potential diversion rates that will contribute to meeting state and local recycling goals.

A scale of high to low was used to rank materials according to the criteria. A high ranking in all the criteria is preferable for placement of materials on the list; however, materials can be included without receiving high ranking for all criteria. Recyclable materials could be placed or kept on the recyclables list for one of the following reasons:

Table III.13 Alternative B, Estimated Percent Increase Resulting from Expanded Voluntary Programs with Yard Waste Disposal Ban

	1992		1995	
	Total Tons	% of Total Waste Stream	Total Tons	% of Total Waste Stream
Total Waste Stream	**1,339,600**	**100.00**	**1,571,582**	**100.00**
Total Disposal Stream	**870,447**	**64.98**	**784,573**	**49.92**
Residential Programs				
Single-Family Primary Recyclables	64,212	4.79	119,131	7.58
Multifamily Primary Recyclables	5,068	0.38	29,418	1.87
Secondary Recyclables	12,123	0.90	19,836	1.26
Buy-Back Centers	6,143	0.46	11,600	0.74
Wood Waste	1,000	0.07	16,399	1.04
Construction/Demolition	0	0.00	2,599	0.17
Drop-sites (Primary Recyclables)	1,428	0.11	3,737	0.24
Clean-Up Events	943	0.07	3,000	0.19
	90,917	**6.79**	**205,719**	**13.09**
Nonresidential Programs				
Nonresidential Recycling	303,499	22.66	394,280	25.09
Wood Waste	1,000	0.07	25,047	1.59
Construction/Demolition	0	0.00	8,260	0.53
	304,499	**22.73**	**427,588**	**27.21**
Yard Waste Programs				
Single-family Collection	20,578	1.54	39,090	2.49
Multifamily Collection	0	0.00	4,293	0.27
Nonresidential Collection	136	0.01	1,569	0.10
Roll-off Services	0	0.00	1,170	0.07
Drop-boxes	30,102	2.25	62,005	3.95
	50,816	**3.79**	**108,127**	**6.88**
Waste Reduction Programs				
Residential Programs	12,317	0.92	25,066	1.59
Nonresidential Programs	10,604	0.79	20,509	1.30
	22,921	**1.71**	**45,575**	**2.90**
Total Diversion	**469,153**	**35.02**	**787,009**	**50.08**

- to create or guarantee an adequate and consistent supply of materials for development and maintenance of a recycled products industry,
- to avoid frequent changes in the recyclables list that could undermine the public's commitment to WR/R,
- to insure adequate diversion of recyclable materials from the waste stream to meet state and local goals.

Table III.14 defines the scale for each of the criteria used for developing the recyclables lists. Table III.15 applies the criteria and displays the ranking for the materials on the Plan lists.

Urban, household, collection programs would be expanded to include the following minimum levels of residential services:

- *Urban household primary recyclables collection.* All single- and multifamily residences would have household collection, or a collection program determined to be equivalent to household collection by Ecology, of paper (newspaper, cardboard, mixed wastepaper); #1 and #2 plastic bottles (PET and HDPE); yard waste (smaller than 3 inches in diameter); glass containers; and metal (tin and aluminum cans). Participation by residences would be voluntary. As the yard waste disposal ban is phased in, household options for managing their yard waste would be limited to participating in household collection programs, self-hauling their yard waste to processors or collection facilities or on-site composting.
- *Urban, single-family, yard waste collection.* Household collection of yard waste (less than 3 inches in diameter) would be required in urban areas. Regular yard waste collection service would likely be subject to volume restrictions to be set by individual cities and by the County.
- *Urban, multifamily, on-site yard waste collection.* Local governments would ensure that this service is available by requiring haulers to provide on-call multifamily yard waste collection service throughout their territory; or through some other means of collection that is deemed appropriate by the individual jurisdiction. This service would be made available in all urban areas but participation by multifamily property owners would be voluntary.

Expanding this service will not cause overall collection rates to rise. Haulers can employ the same equipment used for single-family household yard waste collection. Additional operational costs would be covered by service fees paid by program participants. Promotional costs can be managed within existing budgets.

Although it is expected that only a small percentage of multifamily complexes will participate, the program will close an identified service gap.

- *Urban, household, appliance collection service.* To comply with the federal Clean Air Act which prohibits the venting of chlorofluorocarbons (CFCs) into the air, effective July 1, 1992, appliance and appliances containing CFCs will require special handling before they can be recycled. Other appliances (stoves, ranges, heat pumps, water heaters, dehumidifiers, dishwashers, washers and dryers, trash compactors, furnaces) would also be banned from disposal at the county's transfer stations and landfills on September 1, 1993.

Local governments would ensure that appliance collection service is available to residents by disseminating information about existing collection services or accepting appliances at locally sponsored special events. King County would maintain and continue to regularly update a list of the 50 or more appliance dealers, recyclers, and non-profit organizations that accept large appliances, including those that contain CFCs, or provide household pick-up for a reasonable fee. In addition, over the long term, all new County transfer stations would be designed to accept CFC appliances. The availability and costs of appliance collection would be re-evaluated during the 1995 planning process.

Because appliance collection would not be a part of regular solid waste and recyclables collection services, there would usually be an additional cost to those households that must dispose of a used appliance. In 1992, the average fee for residential pick-up of a CFC appliance in urban areas is approximately $40. The average fee for non-CFC appliances is approximately $30. Costs to local governments for promotion can be managed within existing budgets. Governments can expect to spend an average of $13,000 to sponsor a special collection event; adding appliances to the list of materials to be collected at planned events will add costs to events but can be managed within existing budgets.

- *Urban, household, bulky yard waste collection service.* This includes yard waste too large for regular household collection (limbs, stumps, and other yard waste larger than 3

Table III.14 Criteria for Primary and Secondary Recyclables Rankings

Ranking	Collectable	Processing Capacity	Market Potential	Diversion Potential
H	Materials are easy to set out for pick-up or transport; containers and the means to handle them are readily available.	Either local processing or low-cost transport to processing is available	Markets are well-established and are generally strong, despite periodic fluctuations.	Relatively high volumes, either by weight or cubic yards, are generated and disposed.
M	Separation of this material could be achieved by combining it with another material already collected, possibly creating certain but not unreasonable contamination or handling problems.	Local processing or transport may be available under certain conditions such as moderate increases in cost.	Markets exist but are static and possibly weak due to oversupply or competing materials.	Relatively moderate volumes are generated and disposed.
L	Separation of this material would require special handling and/or equipment due to special properties such as size, bulk, consistency, moisture content and potential for significant contamination of other materials.	No local processing available; transport to processing very costly.	Markets do not exist or are in the early stages of development.	Low volumes are generated and disposed.

inches in diameter), or large volumes generated at one time (i.e., fall prunings). The County and Cities would assure that bulky yard waste collection service is available to households by choosing to provide on-call collection service, disseminate information about private sector chipping services and private yard waste collection depots that accept self-hauled loads of bulky yard waste, or sponsor collection events that accept bulky yard waste. Yard waste disposal limits at county facilities would encourage use of the services provided.

King County would develop countywide information for home owners which identifies private depots and chipping and hauling services that handle bulky yard waste. Cities may choose to develop and distribute information about local services. The County would also sponsor collection events that accept bulky yard waste.

The County would monitor bulky yard waste collection service so that the level of countywide service can be re-evaluated during the 1995 planning process. The need for required household collection of bulky yard waste would also be examined at that time.

- *Urban, household textiles collection service.* Many non-profit organizations provide on-call or depot collection of reusable and recyclable textiles (used clothing, leather goods, and natural household fabrics). Cities and the County would ensure additional collection opportunities by choosing to disseminate information which identifies the organizations that provide this service, by accepting reusable and recyclable household textiles at regular collection events sponsored by local governments, or by providing household collection of textiles on a regular basis. King County would work with the non-profit organizations to help coordinate collection efforts so that countywide service is ensured. The County would monitor textile collection service so that the level of countywide service can be re-evaluated during the 1995 planning process. The need for required household collection of textiles would also be examined at that time.

Costs of promoting available services can be managed within existing budgets. Special collection programs average $13,000 an event. Adding textiles to the list of recyclables to be collected at planned events can be managed within existing budgets. If the local government chooses to provide household collection, costs would vary according to the design of the program.

Table III.15 Designated Primary and Secondary Recyclables with Rankings

(L = low, M = medium, H = high)	Collectable A[1]	Collectable B[2]	Processing Capacity	Market Potential[3]	Diversion Potential[4]
Primary Recyclables					
Newspaper	H		H	H	H
Cardboard	H		H	M	M - H
High-grade office paper	H		M	M	L
Computer paper	H		M	M	L
Mixed Paper	H		L	L	H
PET & HDPE bottles (clear & colored)	H		L	M	L
Yard waste (< 3" in diameter)	H		H	M	H
Glass containers (flint, amber, green)	H		L - M	L[5] - M	M
Tin cans	H		H	M	L
Aluminum cans	H		H	H	L
Secondary Recyclables					
Polycoated Paperboard	L	L - M	L - M	H	L
Other plastics[6]		L	L	L	M
Bulky yard waste (> 3" in diameter)		L	M - H	L - M	L - M
Wood		M	M - H	H	H
Food waste		L	L	M	M
Appliances (white goods)	L	L - M	M	M	L
Other ferrous metals	L	L - M	H	M	M
Other nonferrous metals		L	H	M	L
Textiles		L - M	H	H	H

[1] Currently being collected in most household recyclables collection programs in King County.
[2] (1) Currently being collected in some programs or collected regularly through other means.
(2) Has the potential to be collected (curbside or otherwise). There are no technical reasons why it cannot be collected.
[3] Appendix D - Recycling Markets Assessment [4] Appendix B - Waste Characterization Study [5] green glass
[6] All plastics except PET/HDPE bottles, which are primary recyclables. These are PET (non-bottle), HDPE (non-bottle), vinyl, LDPE, polypropylene, polystyrene, and other plastics. These plastics also known by their SPI codes (1 through 7 respectively).

Rural collection programs would also include the following residential services:

- *Rural, drop-site, primary recyclables collection.* All single and multifamily residences would have collection of the same materials collected at urban households. Participation by rural residents would be voluntary. The County would provide recycling drop-sites or expand household collection service in unserved unincorporated rural areas. The Snoqualmie Valley cities drop-sites (provided through the Waste Not Washington grant) would continue to operate within their own jurisdictions.
- *Rural, single-family, yard waste collection.* Yard waste drop-sites would be required, at a minimum.
- *Review of minimum service level requirements.* In addition to the above minimum service levels, optional household collection of #3-7 plastics (vinyl, LDPE, polypropylene, polystyrene, and all other plastics), and polycoated materials (milk cartons, butter, and frozen food packages) would be considered for possible future inclusion in this Plan for urban areas. The County is evaluating the

following factors to determine the feasibility of collecting these materials: potential markets, potential diversion rates, additional collection and processing costs, and the impacts on collection and processing equipment. If this evaluation indicates that household collection of any or all of these materials is feasible, they would be added to minimum service requirements as early as 1994. If changes are made to minimum service level requirements, then a Plan amendment would be proposed by the County. The cities and the County may opt to collect these materials from all households sooner.

(2) Nonresidential Collection Minimum Service Levels

Alternative B recognizes the need to increase the amount of recyclables diverted from commercial generators. To increase diversion, additional collection services need to be available to businesses and institutions throughout King County, within the limits of local government authority.

The County's Business Recycling Program would continue to offer technical assistance to develop and implement WR/R programs for nonresidential generators. Waste consultations, telephone assistance, workshops, presentations, and written and video materials are among the services that would be offered.

The new primary nonresidential WR/R program included in Alternative B is the establishment and promotion of voluntary nonresidential recycling service guidelines based on an evaluation of gaps in existing services available to businesses. The guidelines would target materials that comprise the majority of the nonresidential waste stream currently being disposed *(King County Waste Characterization Study, Volume II, Appendix B)*. The guidelines would be voluntary because of limited local government authority to require commercial recycling services; however, the guidelines establish the minimum level of service needed to reach the WR/R goals.

Efforts would be made during the 1992 Plan period to pass legislation granting counties and cities the authority to set minimum standards for the collection of nonresidential recyclables. If such legislation is passed, the voluntary minimum service guidelines described in Alternative B would become the minimum service levels requirements, to the extent feasible, pursuant to the new legislation. Cities could develop their own programs and go beyond the voluntary guidelines as long as the minimum standards in the 1992 Plan would be met. Implementing ordinances passed by the County and cities would also be necessary under such new legislation.

Under the voluntary program, the cities and the County would be responsible for promoting and meeting the following nonresidential recycling service guidelines. Nonresidential service providers and the WUTC would be strongly encouraged to voluntarily comply with the service guidelines.

- Cities would ensure that businesses have minimum recycling services available to them. This can be done by initiating contracts to provide these services or by working with haulers, recyclers, and the WUTC. Cities would also be responsible for promoting nonresidential recycling services if they receive funding from the County.
- The County would work with haulers, recyclers, and the WUTC to ensure that businesses in the unincorporated areas have minimum recycling services. The County would also be responsible for promoting service guidelines in cities and unincorporated areas that are served through the Business Recycling Program. The County would also monitor recyclables diversion using data provided by haulers and recyclers.
- Haulers and recyclers would be encouraged to provide minimum recycling services to their customers. Businesses could select their service provider, but if recyclers or cities were unable to provide recycling services, a business' garbage hauler would provide the minimum level of services. Haulers and recyclers would also be requested to provide the County with monthly reports of nonresidential recyclables collected throughout the County.
- The WUTC would be encouraged to permit haulers and recyclers to establish rates and services that meet the minimum service requirements, and to work cooperatively with cities and the County in implementing service guidelines.

The nonresidential (commercial) recycling service guidelines would establish clear and uniform expectations of what constitutes reasonable recycling collection services for businesses in King County. They would recognize the roles of current service providers and the limitations of local government to mandate nonresidential recycling and work within the existing authorities. The guidelines would not be

within the existing authorities. The guidelines would not be intended to supplant current service providers. They would allow current service providers to continue collecting recyclables from current customers and encourage expansion of services to meet recommended service levels. Businesses and institutions would still be allowed to select the best recycling services they can find.

The Division would prepare a handbook to describe the service guidelines. There would be three major components:

1. *Areas to be served (targeted businesses).* Businesses would be targeted for collection service are based on their location and size (service areas are shown in Figure III.7). In primary service areas, all businesses regardless of their size would be targeted; in secondary service areas, businesses with 50 or more employees; and in rural service areas, businesses with 100 or more employees.
2. *Minimum services to be provided.* Minimum would be defined as providing services on a regularly scheduled basis; source-segregating materials to meet processing needs; promoting services to all targeted businesses; and establishing rates in which recycling and garbage services combined cost less than an equivalent level of garbage service alone.
3. *Materials to be collected.* The minimum services would include the collection of paper as described below and at least one other material category other than paper. Nonresidential recyclable materials to be collected would include at least two grades of paper (cardboard, high grade, mixed waste paper, and poly-coated paper). All nonresidential programs would also include at least one of the following categories: at least four types of containers (glass, tin cans, aluminum cans, plastic bottles, and poly-coated paperboard cartons), wood, metals, yard waste, and textiles.

The following options would be promoted among businesses not targeted for collection services because of their size or location:

- *Cooperative collection.* Recycling services would be coordinated for a group of businesses in a limited geographic area.
- *Self-haul to buy-backs and drop-sites.* Businesses would be encouraged to use and would be assisted in locating drop-sites and buy-back centers.
- *Case-by-case services.* Businesses would be assisted with collection alternatives on a individual basis.

King County would monitor the diversion of recyclables from the nonresidential waste stream using information provided by Ecology, haulers, and recyclers. Mandatory recycling measures would be evaluated in the 1995 Plan, and possibly instituted through disposal limitations, if these service guidelines do not result in sufficient diversion.

Under the voluntary service guidelines, no impact on rates is anticipated. Businesses and collection companies would continue to negotiate prices for collection of nonresidential recyclables. If state statutes are amended to give cities and counties authorities to set minimum collections standards for nonresidential recycling, city contracts could be affected.

(3) Recyclables Collection at Solid Waste Facilities

The objectives of establishing recyclables collection service at county transfer facilities and landfills are to:

- Provide the opportunity to recycle at all points of disposal.
- Provide recycling services to self-haul customers.
- Educate customers about recycling.
- Contribute to overall WR/R goals.
- Supplement and enhance private sector recycling facilities and services.

While the private sector would be relied on to provide most of the collection and processing of recyclables in King County, minimum services at county transfer stations would be developed according to the following criteria:

- All existing transfer stations and landfills would continue the current level of recyclables including yard waste services to provide adequate primary recycling services to self-hauler customers.
- All upgraded transfer stations would collect primary recyclables including yard waste, and other materials (from designated recyclables list, Table III.15) in order to fill identified private-sector recyclables collection service gaps.
- All new transfer stations would collect primary recyclables, including yard waste, to provide adequate basic recycling services to self-haulers, and would collect other secondary

materials (from designated recyclables list, Table III.15) in order to fill identified private-sector recyclables collection service gaps.

(4) Yard Waste Disposal Limitations Ban

Major diversion of yard waste is necessary to achieve the 50 and 65 percent WR/R goals. The 1989 Plan recommended a penalty fee for yard waste disposal (p. III-73, 1989 Plan) to encourage source separation of yard waste from the waste stream, beginning in January 1993. This penalty was not imposed because regulations and the necessary infrastructure were not in place to divert yard waste from the waste stream for all generators. Alternative B includes a yard waste disposal ban that would be initiated with a ban on residential collection of yard waste in refuse cans and would progress to banning residential and nonresidential yard waste from the disposal system.

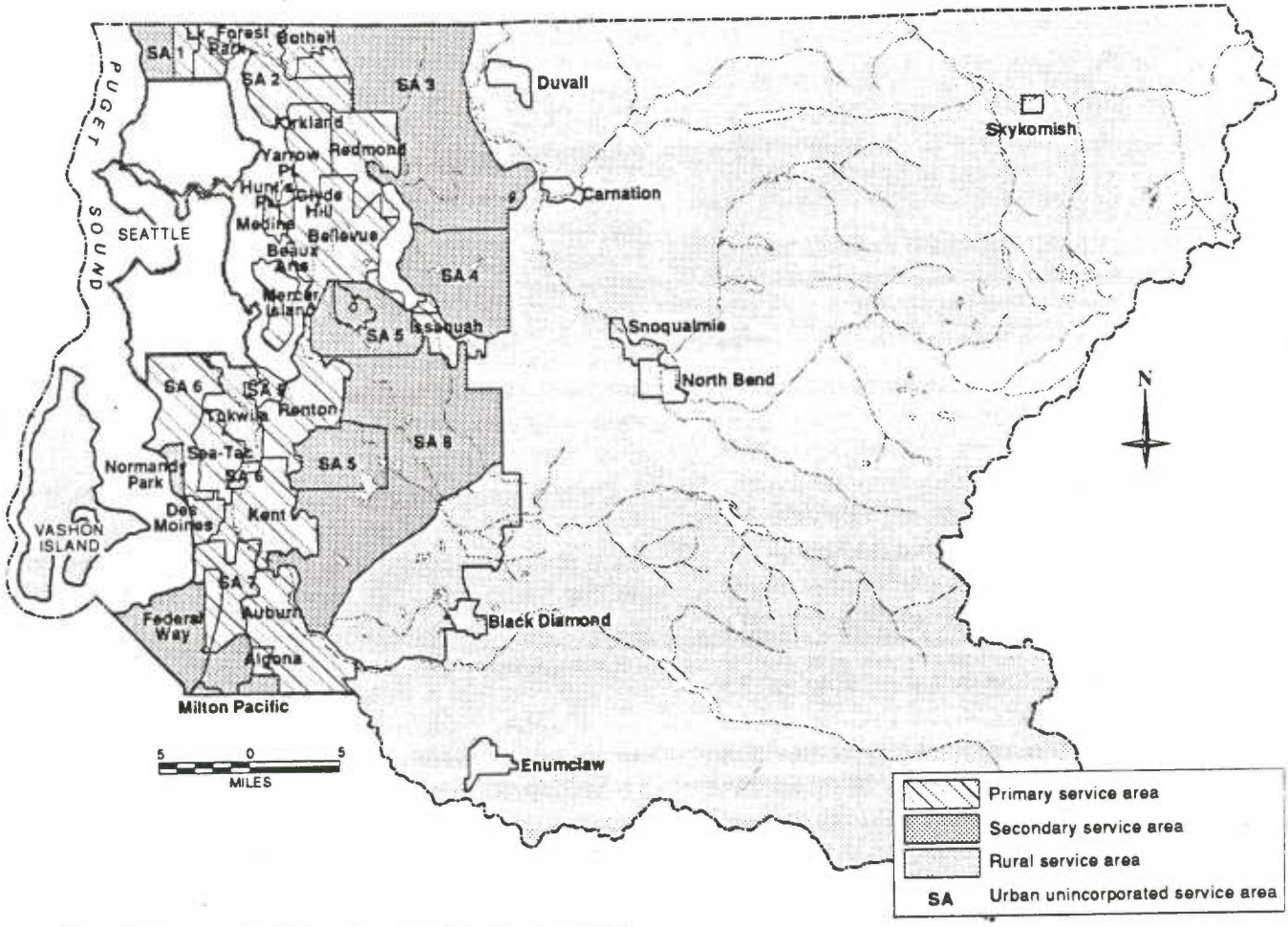


Figure III.7 Nonresidential recycling collection services, June 1992.

The impacts of a yard waste disposal ban on the transfer and disposal systems would be minimal. Facility engineering and operational plans have assumed a total ban on yard waste for the planning period so implementation of a ban would not cause unplanned tonnage decreases at the transfer stations or the Cedar Hills Landfill.

The yard waste disposal ban would be implemented in two phases. Phase 1 would be the implementation of a ban on the disposal of yard waste in refuse cans set out by residents for pickup by garbage haulers. The ban would be applicable to all unincorporated areas where yard waste collection services are available. Phase 2 would be implementation of a ban on disposal at all King County solid waste facilities which would affect both residential and nonresidential generators in the County and suburban cities.

The Plan recommends the extension of household collection service for all primary recyclables, including yard waste, to most households in the County. Therefore, an adequate collection system for Phase 1 of the yard waste disposal ban would be in place.

The residential yard waste disposal ban would consist of the following elements:

- The ban would go into effect in the unincorporated areas of the county during 1993 with the passage of an ordinance prohibiting disposal of yard waste in refuse cans set out for pickup by garbage haulers.
- Suburban cities with existing yard waste collection service programs would have until 6 months after Plan adoption to implement the residential yard waste disposal ban. Cities that are implementing new yard waste collection programs, as recommended by the Plan, will implement the residential disposal ban 6 months after they implement their household collection programs.
- Garbage haulers would enforce the ban by issuing warnings and refusing to collect cans containing yard waste.

Phase 2, a total yard waste disposal ban, would be implemented by 1995. This ban would affect all generators, including nonresidential and self-haul. Implementation of a total yard waste ban would occur only after an environmentally secure and convenient system of collection and processing is developed. The steps to be taken in developing the system would include:

- *Siting of interim yard waste depots* - The primary method of collecting yard waste from nonresidential and residential self-haul generators would be at interim recycling drop-off depots and recycling facilities at new county transfer stations as they are built. The County would revise the King County Zoning Code and work with the cities to revise their zoning codes to allow interim recycling depots as permitted uses in certain existing zones.
- *Interim yard waste depots funding* - Interim recycling depots for the collection of yard waste would be privately owned and operated. However, the County could help fund the cost of developing the depot system through the use of grant funds to ensure enough depots would be available to provide convenient collection service throughout the County.
- *Regulation* - To ensure an environmentally secure alternative to disposal for yard waste, the Health Department would regularly inspect the operations of the depots to assure compliance with health regulations.
- *Markets* - Active markets for composted yard waste already exist in King County. In 1992, 45 percent of the 113,500 tons of yard waste generated in the County was composted at private facilities and offered for sale. Working with the King County Commission for Marketing Recyclable Materials, the County would plan actions to expand markets prior to the implementation of a total yard waste disposal ban.

It is recognized that the greatest potential for compost market expansion is in the private sector. The County would seek to expand private sector demand for yard waste compost over time through its waste reduction and recycling education programs, Business Recycling Program, and other means as they are identified.

Another method of expanding compost markets would likely be changes in procurement policies for government agencies that would favor recycled products, including compost. Actions would include the development of procurement standards for compost products by the Marketing Commission and the incorporation of these standards into the King County recycled products procurement policy. The County would also

encourage the suburban cities to adopt the procurement standards.

The prospect of expanding compost markets to include government-sponsored capital improvement projects would be an incentive for processors to meet the compost quality standards. Private sector confidence in compost may also increase with the establishment of quality standards.

Implementation of Phase 2 of the ban is dependent upon successfully developing and adopting zoning and siting standards for yard waste recycling depots, private sector siting of collection depots, and evidence of an expanded market for composted materials. If these do not occur within the projected timeline, the implementation schedule and respective roles of the public and private sectors for the yard waste disposal ban would be re-evaluated by the County and the cities. Options considered during re-evaluation would include:

- Delaying implementation
- Developing an alternative yard waste depot siting process
- Reliance on new or existing County facilities for collection service
- Examination of the adequacy of the collection capacity of existing yard waste processing facilities as they may exist at the time of re-evaluation, and
- Examining other options for providing convenient collection locations for source separated yard waste.

The County and cities would cooperate in re-evaluating the total yard waste disposal ban options. Some of the criteria that are likely to be used to analyze and select the preferred option from the list above would be:

- Geographic diversity of built drop-off depots, recycling facilities at transfer stations, and processors as they exist at the time of re-evaluation;
- Operating capacity of depots, recycling facilities, and processors;
- Projected annual marketing capacity for yard waste compost;
- Ability of the yard waste collection system to meet or exceed environmental and public health regulations as they may exist at the time of re-evaluation.

(5) Additional County-sponsored Collection Services

- *Incentives to buy-back centers.* Under this program, the County would evaluate the feasibility of providing financial incentives to existing private buy-back centers to encourage them to collect and recycle secondary recyclable materials.
- *Optional secondary recyclables collection.* The County would coordinate countywide events (urban and rural) for the collection of secondary recyclables. These events are discussed under city optional programs, recommendation III.34 in the following section.
- *Clean wood collection.* The County would conduct a waste characterization study at the transfer stations to determine the volume and composition of clean wood waste, generator source, and type of generator using the transfer system.

After completion of the study, programs could be developed to improve waste reduction efforts and increase clean wood waste recycling for generators utilizing transfer stations. Some of the programs that could be offered are:

- collection of source-separated clean wood waste at newly constructed or expanded transfer stations where feasible
- a waste audit program for do-it-yourself remodelers
an education program on wood waste reuse and recycling
- distribution of a list of available recycling processors and businesses that accept clean wood for reuse to the construction trades and general public.

(6) Support

Alternative B includes the following support programs in addition to those in the 1989 Plan.

- *Data reporting requirements.* Haulers and recyclers would continue to provide collection data from household and commercial collection programs, which the County would maintain in a data base. For each city and urban unincorporated service area, the following information would be provided monthly on household collection: average pounds of recyclable and yard waste collected per set-out, program summary tonnage, contaminated recyclables and yard waste by receiving facility, and the number of single-family customers and multifamily complexes (and units) served. For commercial

collection, the following would be collected quarterly by the County: summary of tonnage, amount of contaminated recyclables and yard waste disposed of by receiving facility, and the number of businesses served.

(7) Regional Programs

Alternative B includes the following new programs in addition to those continuing from the 1989 Plan.

- *Primary Recyclables Education Campaign.* The County would develop and implement a campaign to educate the public in the urban unincorporated areas about the availability of household collection service for all primary recyclables. The program is intended to increase participation rates in household collection programs and increase the volume of primary recyclables recovered from the residential waste stream.
- *Single-family, household yard waste collection education program.* King County would implement a program designed to increase participation in the yard waste collection services available in urban unincorporated areas. This would help planned and recently implemented yard waste collection programs achieve their full potential more quickly. The campaign would emphasize waste reduction and composting first, signing up for yard waste service second. The program would be developed for the urban unincorporated area program, but would be available for the cities to use to promote their own yard waste programs.
- *Rural yard waste composting education program.* The County's backyard composting program would be expanded to include education efforts for rural populations. This program would help divert some of the increase in rural residential yard waste anticipated as a result of the PSAPCA burn ban which took effect in September 1992.
- *Multiethnic and other audience-specific materials.* The County would develop and coordinate a comprehensive media campaign to promote WR/R aimed at multiethnic and other groups. The information and promotional materials produced would be available to cities and the County.
- *School education and collection programs with cities and school districts.* The County would work with cities and school districts and haulers and recyclers in the delivery of school educational and collection programs.
- *City optional programs.* Two of the city optional programs recommended in the 1989 Plan would be implemented as regional programs. Backyard Composting Bin and Master Recycler/Composter programs would be offered only as regional programs administered by the County. Only one city opted to implement its own backyard composting program for one year. It would be more cost effective if these programs were implemented on a countywide basis.

The Business Recycling Program would continue to be city optional. In addition, urban and rural secondary recyclables collection events would become city optional. These events (such as "roundups") for the collection of secondary recyclable items, white goods, and other bulky items would be a coordinated program between the County and the cities. Special collection events would be held at regularly scheduled times at designated sites throughout the County. As a city optional program, cities could implement a special collection event with funding assistance provided by the County. In order to receive funding, cities would agree to have regularly scheduled events each year; allow non-city residents to attend; and collect a minimum of four materials from a list of secondary materials.

(8) King County Commission for Marketing Recyclable Materials

Under Alternative B, the King County Commission for Marketing Recyclable Materials would continue to foster the development and expansion of recycling markets in King County and the region with the activities under Alternative A. The Commission would step up efforts to gather and assess market information in order to address increasing volumes and types of materials collected. Such information would be used to set priorities for market development initiatives. For example, the impacts of increased collection of recyclables from residential and nonresidential sources would be more closely monitored to quickly address emerging market supply, demand, and capacity. This is particularly true for yard waste, due to the proposed disposal ban. The Marketing Commission would also work to complement the Solid Waste Division's messages in outreach programs, such as those for yard waste and other primary recyclables.

(9) Program Costs

Alternative B would call for the availability of new collection services that could result in added costs to local governments, residences, businesses, and the private sector. While precise costs of the additional WR/R efforts described in Alternative B are difficult to project, some that can be estimated are described below (complete cost estimates for Alternative B collection programs are summarized in Appendix K).

Existing programs (see Alternative A) would continue to incur public and private sector costs at current levels. Existing funding mechanisms would also be continued. Collection services would continue to be paid through city contracts or directly through fees charged to customers. Cities would continue to fund other WR/R programs and services with utility taxes, general fund revenue and grants. Regional programs and services offered by the County would continue to be funded through tipping fees charged at disposal facilities.

The new collection services would result in additional costs to the customer—and potentially the service provider—if the new services require the purchase of equipment or additional labor.

Some of the additional programs would not add significant costs. Ensuring that on-call multifamily yard waste collection is provided, for example, would expand a service which is already widely available to single-family residences. Implementation of the program will not cause overall collection rates to rise. Haulers can utilize existing equipment with additional operational costs covered through service fees paid by users of the service. Start-up promotional costs would be managed within existing budgets. Cities with contracts for services would need to include these new programs and could recover their costs through fees charged to customers or through other city revenue mechanisms. In areas of the County where recycling services are regulated by the WUTC, the additional costs would be passed on directly to the customer.

New city educational or promotional efforts would be funded by city utility taxes, general revenue funds, or grants. Regional programs, educational or otherwise, provided by the County would be funded through tipping fees charged at disposal facilities.

c. Alternative C, Mandatory Recycling Through Disposal Limitations

Under this alternative, most existing services and programs would continue, while a regulatory approach would be undertaken to increase recycling. This policy alternative is based on the recognition that it may be necessary to go beyond providing voluntary recycling services and waste reduction programs to achieve established WR/R goals. This approach might increase the WR/R level to 60 percent or more by banning disposal of recyclable materials in the county solid waste disposal system.

This alternative would limit disposal of one or any combination of the following: primary residential recyclables; metals and appliances; yard waste; and selected nonresidential recyclables. Table III.15 gives the diversion potential of the bans.

(1) Recyclables Collection

The materials that could be selected for bans comprise a major portion of the waste stream or are readily recyclable. The estimated diversion impact (Table III.15) is based on the amount of these materials currently disposed at county facilities (*King County Waste Characterization Study*, Volume II, Appendix B). King County would evaluate the feasibility of these bans in the same way it would evaluate the yard waste ban (Section III.A.3.b). In addition to yard waste, which would result in an additional diversion of nearly 8 percent, Alternative C would ban disposal of one or more of the following:

- *Primary residential recyclables.* Container glass, aluminum cans, tin cans, newspaper, mixed paper, and#1 and #2 plastic bottles (PET and HDPE). Despite extensive residential collection, these materials are still disposed in significant amounts. Loads containing these materials would not be accepted at transfer stations from haulers or self-haulers. This ban could result in an additional diversion of over 3 percent of the total waste stream by 1995.
- *Ferrous and nonferrous scrap metal and appliances.* Tin and aluminum cans are included in the ban on primary recyclables. A ban of these materials would result in an additional diversion of less than 2 percent by 1995.

• *Selected nonresidential recyclables—all paper, glass, metals, wood, and some plastics.* Banning materials commonly recycled in the nonresidential sector could result in an increased waste diversion of almost 13 percent by 1995. This assumes 80 percent of these materials would be diverted from the nonresidential sector.

Before a ban would be instituted, the County would assess the availability of disposal and recycling alternatives, the capacity of recycling markets to absorb additional materials, the effect on service costs, collection and processing facilities capacity and availability, and which public facilities would best fill any gaps.

Since disposal bans create markets for collection services from the private sector, this alternative assumes the County would be less involved in developing service options than in Alternative B. However, there would be a need for increased county personnel to monitor compliance by checking loads at transfer facilities or randomly surveying dumpsters and garbage cans.

(2) Support Programs

Under Alternative C, no new support programs would be implemented.

(3) Regional Programs and Markets

Programs promoting recyclables collection could be scaled down since garbage haulers would require their customers to source separate. However, substantial public education would still be needed, including programs to provide information on waste reduction, backyard composting, and recycling to educate the general public, particularly the nonresidential sector, about what materials cannot be disposed.

Banning disposal and increasing collection of recyclables would result in pressure on recycling markets to absorb more materials. Potential market impacts include:

• Significant price drops for some commodities, particularly in the short term.

• Insufficient capacity to process materials or use them to manufacture new products.

• Added incentives over the long term for remanufactures to increase the recycled content of products.

To address these and other market impacts, the County would increase its efforts to actively develop markets for materials targeted for a disposal ban. For example, the Marketing Commission would identify market barriers, encourage the private sector to increase local capacity to process recyclables and manufacture recycled products, work with wholesalers and retailers to increase availability of recycled products, and test recycled products in new and existing applications.

(4) Program Costs

Implementation of Alternative C would maintain public and private costs for existing programs at current levels. Existing funding mechanisms would also be used. Collection services would continue to be paid through city contracts or directly through fees charged to customers. Cities would continue to fund other WR/R programs and services with utility taxes, general fund revenue, and grants. Regional programs and services offered by the County would continue to be funded through tipping fees charged at disposal facilities.

Mandatory recycling measures could result in additional costs to the County and the private sector in enforcing disposal prohibitions. The County could incur additional costs of staff to monitor compliance with disposal bans. The private sector could also see increased cost through additional staff to ensure compliance or through penalties or fines paid. The magnitude of the costs to enforce disposal limitations would vary depending on the level of monitoring put in place

4. Recommendations

In order to reach 50 percent diversion by 1995, either voluntary services must be expanded (Alternative B), mandatory measures must be imposed (Alternative C), or a combination of the two alternatives must be implemented. Alternative B is the recommended approach because voluntary programs in many areas have only recently been implemented. These, as well as expanded programs, should be given a chance to work on a voluntary basis before a mandatory approach is considered. One exception is the proposed Countywide yard waste disposal

ban that requires the County and suburban cities to develop alternative collection methods for yard waste.

Alternative B (Table III.16) is recommended for several reasons:

- The expansion of services and facilities builds on the existing recycling system and supports the current approach of making recycling as convenient as disposal.
- These additional services and programs are clearly needed in order to reach the stated WR/R goal of 50 percent by 1995.
- This alternative fills needs not being met by the current recycling system. These include: ensuring high participation in multifamily recycling; expanding participation in all yard waste programs by establishing increased yard waste services for households, self-haulers and commercial generators to support the phased implementation of the yard waste disposal ban; establishing and promoting improved nonresidential recycling services; and providing more opportunities to collect secondary recyclable materials at home or through drop-off services.

The recommended programs and actions target the diversion of large portions of the waste stream, emphasizing materials with potential market value. In addition, Alternative B combines hauler and facility-based options to address service needs of self-haulers and businesses. It also provides service options, which result in the best coverage for recovery of materials that are not generated daily or that require multiple diversion options. Recyclable materials as defined in the 1992 Plan are listed in Table III.14.

5. Implementation

The implementation chart (Table III.17) provides information on program responsibility, and anticipated start times. Both new and continuing programs are shown.

Table III.16 1992 Recycling Recommendations

RECYCLABLES COLLECTION		Strategy	Implementation Responsibility
Required Collection			
Recommendation III.14	Urban household collection of primary recyclables	Provide household collection of paper, #1 and #2 plastic bottles (PET and HDPE), yard waste (less than 3 inches in diameter), glass containers, and tin and aluminum cans from all urban single- and multifamily residences	County, cities
Recommendation III.15	Rural drop box collection of primary recyclables	Provide rural single- and multifamily residences with drop-sites for collection of the same materials collected at urban households	County, cities
Recommendation III.16	Urban single-family household yardwaste collection	Provide household collection of yard waste (less than 3 inches in diameter) from urban single-family residences in unserved urban areas	Cities
Recommendation III.17	Urban multifamily onsite yardwaste collection service	Ensure yard waste collection service options are available to urban multifamily dwellings	County, cities
Recommendation III.18	Urban household bulky yardwaste collection service	Ensure household collection service options for yard waste too large or in excessive amounts for regular household collection are available	County, cities
Recommendation III.19	Urban household appliance collection service	Ensure large appliance collection service options are available to urban households	County, cities
Recommendation III.20	Urban household textiles collection service	Ensure collection service options are available for textiles on a regular basis	County, cities

1992 Recycling Recommendations (Continued)		Strategy	Implementation Responsibility
Recommendation III.21	Nonresidential recycling service guidelines implementation and promotion	Ensure that businesses have minimum recycling services available to them	County, cities
Optional Collection			
Recommendation III.22	Urban and rural household polycoated paperboard collection	Evaluate the inclusion of polycoated materials (milk cartons, butter and frozen food packages) in household collection programs	County, cities
Recommendation III.23	Urban and rural household collection of #3-7 plastics	Include #3-7 plastics (vinyl, LDPE, polypropylene, and all other plastics) in household collection programs	County, cities
Recommendation III.24	Rural household collection of primary recyclables	Collect primary recyclables at the household from rural single- and multifamily residences	County, cities
Recommendation III.25	Rural drop-site collection of yard waste	Provide on-call household or drop-site collection of yard waste	County, cities
Recommendation III.26	Rural household collection of appliances	Collect appliances from rural households	County, cities
Recommendation III.27	Rural household textiles collection	Collect used clothing and fabrics from rural households	County, cities
Recommendation III.28	Nonresidential recycling collection service contracts	Initiate collection contracts to provide minimum recycling services to businesses	Cities
Other County Collection Programs			
Recommendation III.29	Recyclables collection at King County Solid Waste Facilities	Continue current level of primary recyclables including yard waste services at existing facilities where feasible; collect these and other materials as needed at upgraded and new facilities	County
Recommendation III.30	Yard waste drop sites	Ensure the provision of yard waste drop sites or services in the northeastern, near-south, and eastside areas of the County	County
Recommendation III.31	Yard waste disposal ban	Implement a phased ban on yard waste disposal at County disposal facilities	County
Recommendation III.32	Incentives to buy-back centers	Evaluate the feasibility of providing financial incentives to existing private buy-back centers to encourage them to collect and recycle secondary recyclable materials	County
Recommendation III.33	Appliance recycling resource list	Maintain and distribute a resource list of appliance dealers and recyclers capable of accepting, collecting, or recycling used appliances and who meet the new Federal Clean Air Act CFC regulations	County
Recommendation III.34	Secondary recyclables collection events	Coordinate special collection events countywide (urban and rural) for secondary recyclables	County, city optional
Recommendation III.35	Primary Recyclables Education Campaign	Develop and implement a campaign to increase public awareness of household collection service of primary recyclables.	County

1992 Recycling Recommendations (Continued)

		Strategy	Implementation Responsibility
CITY/COUNTY SUPPORT PROGRAMS			
Recommendation III.36	Collection rate incentives	Continue to establish rate incentives for solid waste collection that encourage participation in recycling programs (see Recommendation III.13)	County, cities
Recommendation III.37	Procurement policies	Continue the adoption of procurement policies that favor the use of recycled or recyclable products	County, cities
Recommendation III.38	Recycling space standards for new construction	Continue to develop new construction standards that require onsite space for collecting and storing recyclables in multifamily and nonresidential structures countywide	County, cities
Recommendation III.39	City annual reports	Continue annual reports to the County on progress toward implementing the Plan's required programs and achieving established diversion goals	Cities
Recommendation III.40	Data reporting by haulers, recyclers, cities	Continue to provide collection data from household and nonresidential collection programs	County, cities
COUNTY REGIONAL PROGRAMS			
Recommendation III.41	King County Commission for Marketing Recyclable Materials	Continue to foster the development and expansion of recycling markets in King County and the region	County
Recommendation III.42	Business recycling program	Continue to assist businesses and institutions in developing and implementing WR/R programs in the workplace	County, city optional
Recommendation III.43	King County employee recycling program	Continue to provide recycling opportunities in the workplace to King County employees	County
Recommendation III.44	School education program	Continue to work with cities, school districts, haulers and recyclers in the delivery of school educational and collection programs	County
Recommendation III.45	Other WR/R education	Continue existing education programs and community events, develop new programs in the areas of yard waste and mixed waste paper collection, and develop and coordinate a comprehensive media campaign aimed at multiethnic and other groups	County
Recommendation III.46	Clean wood collection	Study and develop programs to increase waste reduction and recycling opportunities for clean wood waste.	County
Recommendation III.47	Master Recycler Composter program	Continue to train community volunteers in recycling and composting techniques	County
Recommendation III.48	Foodwaste research and development	Continue to implement a foodwaste collection, processing, and product testing project under a grant from Ecology	County

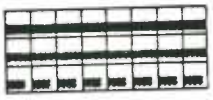
Table III.17 Recycling Implementation Table

	Program Name	Implementation Responsibility	1992	1993	1994	1995	1996	1997	1998
RECYCLABLES COLLECTION									
Required Collection									
III.14	Urban household collection of primary recyclables	C,CO							
III.15	Rural drop-box collection of primary recyclables	C,CO							
III.16	Urban single-family household yard waste collection	C,CO							
III.17	Urban multifamily onsite yard waste collection service	C,CO							
III.18	Urban household bulky yard waste collection service	C,CO							
III.19	Urban household appliance collection service	C,CO							
III.20	Urban household textiles collection service	C,CO							
III.21	Nonresidential recycling service guidelines implementation and promotion	C,CO							
Optional Collection									
III.22	Urban and rural household polycoated paperboard collection	C,CO							
III.23	Urban and rural household collection of #3-7 plastics	C,CO							
III.24	Rural household collection of primary recyclables	C,CO							
III.25	Rural household drop-site collection	C,CO							
III.26	Rural household collection of appliances	C,CO							
III.27	Rural household textiles collection	C,CO							
III.28	Nonresidential recycling collection service contracts	C							
Other County Collection Programs									
III.29	Recyclables collection at King County Solid Waste Facilities	CO							
III.30	Yard waste drop-sites	CO							
III.31	Yard waste disposal ban	Phase I CO Phase II P							
III.32	Incentives to buy-back centers	CO							
III.33	Appliance recycling resource list	CO							
III.34	Secondary recyclables collection events (city optional)	C,CO							
III.35	Primary recyclables education campaign	CO							

Recycling Implementation Table (Continued)

	Program Name	Implementation Responsibility	1992	1993	1994	1995	1996	1997	1998
CITY/COUNTY SUPPORT PROGRAMS									
III.36	Collection rate incentives	C,CO							
III.37	Procurement policies	C,CO							
III.38	Recycling space standards for new construction	C,CO							
III.39	City annual reports	C							
III.40	Data reporting by haulers, recyclers, cities	C,P							
COUNTY REGIONAL PROGRAMS									
III.41	King County Commission for Marketing Recyclable Materials	CO							
III.42	Business recycling program (city optional)	C,CO							
III.43	King County employee recycling program	CO							
III.44	School education program	CO							
III.45	Other WR/R education	CO							
III.46	Clean wood collection	CO							
III.47	Master Recycler Composter program	CO							
III.48	Foodwaste research and development	CO							

Cities = C
County = CO
Private sector = P



Planning period
Implementation period
Ongoing program

Chapter IV
Mixed Municipal Solid Waste Handling Systems

This chapter addresses the needs for solid waste and recyclables collection, transfer, and disposal, and for management of inactive landfills. A brief background discussion of energy/resource recovery (E/RR) is also included in this chapter, although E/RR is not included in the King County solid waste management system.

A. SOLID WASTE AND RECYCLABLES COLLECTION

This section examines solid waste and recyclables collection services in King County, identifies potential problems with meeting present and future needs, evaluates alternatives, and recommends policies and activities consistent with other portions of this 1992 Plan. Specifically, this section recommends legislation needed to clarify nonresidential recycling authority for counties and cities, further study of mandatory collection of solid waste to achieve other program goals, and adoption of incentives to encourage waste reduction and recycling (WR/R). The status of 1989 Plan recommendations is given in Table IV.1.

Table IV.1 Status of 1989 Plan Collection Recommendations

	Program	Recommendation	Implementation Status
III.C.4	Minimum service levels (County)	Require household collection of recyclables for urban areas and encourage it for rural areas, which may also be served by drop-sites. Require yard waste collection in urban areas. County must provide solid waste facilities in rural areas for collection of recyclables and yard waste.	Household collection of recyclables and yard waste is available throughout urban unincorporated King County. Most county solid waste facilities offer recycling services.
III.C.5	WUTC rate review change	Seek changes to WUTC rate review process to allow haulers to recover costs incurred from service level improvements in solid waste and recycling collection	Ongoing
III.C.6	WUTC variable rate change	Seek changes to the WUTC process to establish variable rates to encourage recycling.	Ongoing See 1992 Plan Recommendation
III.C.7	Solid Waste Division information line	Establish information line in SWD to answer questions and make referrals concerning haulers	Implemented 1990
III.C.8	Bulky item pickup	Establish convenient and affordable service for the pickup of bulky items through contracts and minimum service levels	Not implemented. See revised 1992 Plan recommendation

1. Existing Conditions

a. Legal Authority

Legal authority for solid waste and recyclables collection and disposal is shared among the state, acting through the Department of Ecology (Ecology) and the Washington Utilities and Transportation Commission (WUTC), the counties, and the cities.

(1) Ecology Authority

Under the Solid Waste Management and Recovery Act (RCW 70.95), local governments are given primary responsibility for solid waste handling. Counties plan for collection services through comprehensive solid waste management plans. Ecology reviews and approves plans to assure their compliance with state requirements.

(2) WUTC Solid Waste Authority

Concurrent with the Ecology review, the WUTC reviews the Plan cost assessment to determine the impact on collection rates (see Volume II, Appendix K, for complete WUTC cost assessment). Under RCW 81.77, the WUTC certifies and regulates garbage and refuse collection companies and requires compliance with local solid waste management plans and related implementation ordinances. However, this statute does not apply to operations of any collection companies under contract for garbage collection and disposal with any city or town, nor to any city or town that undertakes disposal of its own garbage.

If a county legislative authority comments to the Commission per RCW 81.77.120, the WUTC will monitor those comments concerning the adequacy of garbage and refuse collection service in unincorporated portions of a county or unregulated areas in cities and towns. All of unincorporated King County is served by collectors who operate under WUTC certificates of public necessity. Certificate holders have the exclusive territorial right to collect the type of solid waste within their service areas as stipulated in their franchise, except in those service areas that overlapped when RCW 81.77 was passed in 1961. Certificated haulers collect waste in the unincorporated sections of their franchise areas and in cities and towns that choose not to regulate collection themselves.

Certificates have market value and may be purchased from the existing holders. Certificates exist in perpetuity for the franchised area unless the certificate holder fails to provide adequate service. They are also issued for collection of different types of waste, which may lead to overlapping certificated areas (franchises) for collection of mixed municipal solid waste (MMSW). Franchise haulers are listed in Table IV.2; WUTC franchise areas for MMSW are shown on Figure IV.1.

(3) WUTC Recyclables Authority

Under RCW 70.95, residential recycling is regulated under the WUTC's solid waste statute (RCW 81.77), while commercial recycling is regulated under its motor freight laws (RCW 81.80). The distinction between the two has important rate design implications. Under RCW 81.77, haulers file their own tariffs to recover costs associated with unique characteristics of their collection services. Under RCW 81.80, the WUTC publishes a common set of tariffs, which all haulers must adhere to, unless they publish their own tariffs under special permission from the commission. Under RCW 81.77, solid waste haulers must comply with a local solid waste plan, but under RCW 81.80 there are no equivalent requirements for commercial recyclables collection.

(4) County Solid Waste Authority

RCW 36.58 authorizes counties to establish a system of solid waste disposal. Under certain conditions, as allowed by Chapter 36.58A RCW, counties may establish collection districts for the mandatory collection of solid waste. There are currently no solid waste collection districts in King County. Counties may also adopt regulations and ordinances governing the collection, transportation, storage, processing of solid waste, and establishment of bans or limitations on the disposal of certain materials. In establishing a ban for purposes of promoting

Figure IV.1 Overleaf: WUTC franchise areas for MMSW.

Table IV.2 King County Municipal Solid Waste Franchise Holders [certificate numbers in brackets]

Ronald Teed Island Disposal [G-32]
dba Island Disposal
1345 North Lake Way
Bremerton, WA 98312

Lawson Disposal [G-41]
Post Office Box 1220
Issaquah, WA 98027

Murrey's Disposal Company, Inc. [G-9]
dba Points Garbage Service
Post Office Box 399
Puyallup, WA 98371

Nick Raffo Garbage Company, Inc.
[G-16, G-35, G-185]
dba Federal Way Disposal, RST Disposal
Post Office Box 1877
Auburn, WA 98071-1877

Rabanco, Ltd.
[G-12, G-60]
dba Eastside Disposal, Kent/Meridian Disposal, Sea-Tac Disposal.
4730 - 32nd Avenue South
Seattle, WA 98118

Waste Management, Inc.
[G-43, G-63, G-67, G-126, G-140]
dba W.M.—Seattle, W.M.—Northwest, W.M.—Rainier, W.M.—Sno-King.
4020 Lake Washington Boulevard Northeast
Kirkland, WA 98033

Source: WUTC 1992.

recycling or some other operational objective, the County will coordinate implementation with the cities. (See King County Solid Waste Regulations, King County Board of Health Code [KCBOHC] Title 10.)

(5) County Recyclables Authority

RCW 36.58 authorizes counties to set minimum service levels and contract for collection of source-separated recyclables from residences in unincorporated areas. In addition, counties may impose fees on these services to fund WR/R programs. Counties can contract directly with haulers and recyclers (or allow WUTC franchise haulers to collect in these jurisdictions), but they do not have to collect commercial recyclables, which are regulated under RCW 81.80.

King County Code (KCC) 10.18, adopted in 1991, specifies minimum service level standards for residential recyclables collection and incentive rate structures in unincorporated urban areas. To permit the most efficient provision of services countywide, recyclables collection districts are delineated. Under the current structure, the WUTC continues to control rate-setting, but is required to allow for costs incurred due to service level requirements (see Chapter III, for further discussion of recycling implications).

(6) Cities and Towns Solid Waste Authority

Collection systems and the regulatory structure they fall under are summarized in Table IV.3. Cities may require mandatory collection, in which all residents and businesses subscribe to designated refuse collection services, or mandatory

Table IV.3 Collection System Regulatory Structure

	Certificated	License	Contract	Municipal
Collector	Private	Private	Private	Public
Collection Authority	WUTC	WUTC	Municipality	Municipality
Rate Approval	WUTC	WUTC	Municipality	Municipality
Billing	Collector	Municipality or collector	Municipality or collector	Municipality

payment for collection services. Under RCW 35.21.120, cities and towns may allow WUTC franchise haulers to collect in their jurisdictions or choose one of the following options for managing solid waste collection (none eliminates a citizen's right to haul his or her own waste, though they may be required to participate in a collection system and share the financial burden):

- *Certificated.* Newly incorporated cities must continue to use the present franchised hauler for at least five years (RCW 35.02.160), but this requirement does not preclude purchase of the WUTC franchise.
- *License.* Cities may issue licenses to collect solid waste. In a licensed system, WUTC certificates are augmented by city licenses, which grant the municipality revenue through fees.
- *Contract.* Cities and towns may enter into contracts with private haulers to collect residential and commercial wastes. The contracted hauler does not need to hold a certificate of public necessity or a franchise for that area. Contracts usually are awarded through an RFP or bid process. Occasionally, contracts are awarded through direct negotiations.
- *Municipal.* Municipalities may operate their own collection systems.

(7) Cities and Towns Recyclables Authority

Cities may contract directly with haulers or recyclers to collect recyclables and yard waste, provide the collection service themselves, or allow the WUTC to establish these services. No jurisdiction has been given the authority to enter into an exclusive contract for the collection of commercial recyclables, which are regulated under RCW 81.80. Cities may provide collection services for commercial recyclables, but businesses may choose an alternative service if they wish.

RCW 70.95 requires household collection of recyclable materials in areas designated urban. According to the requirements of the Plan, residents in areas designated rural must be served by drop-sites, buy-back centers, or mobile collection facilities for recyclables and yard waste.

b. Mixed Municipal Solid Waste

(1) Residential Collection of Solid Waste and Recyclables

Residential collection consists of the removal of recyclables and waste from individual residences and the transport of those materials to processing facilities, transfer stations, or disposal sites. In 1991 there were four major certificated haulers for MMSW in King County: Rabanco, Waste Management, RST, and Lawson.

The methods of collection, types of service available, and nature of the service vary throughout the County. Residential services available in each jurisdiction are summarized in Table IV.4.

In King County and nationwide the collection industry is moving toward more fully automated equipment that requires standardized containers. Automated and semi-automated collection decreases risk of injury to workers and is more cost-effective. For the most part, these containers are owned and maintained by the collection companies, and customers are charged a rental fee.

Individuals may choose to haul their own waste (self-haul) to transfer stations or rural landfills in lieu of regular collection service or in addition to receiving regular service. In 1990, self-haul accounted for 17 percent of total residential waste and 25 percent of commercial waste received at county facilities. Individuals who self-haul usually do so because of the material they are disposing of (for example bulky items), or because they live near landfills or transfer stations. With few exceptions, direct haul by individuals to the Cedar Hills Landfill is not permitted.

Residents may also self-haul recyclables, although household collection services are available in most urban areas. Recycling collection is being implemented or planned wherever possible at most King County transfer stations and rural landfills (see Chapter III, Section B for program descriptions).

Meeting collection needs where growth rates are significantly higher will require additional investment in equipment and service levels by haulers. Although the total population in King County is expanding rapidly, most growth is occurring in well-established urban and suburban areas. However, haulers note that increased population will facilitate

Table IV.4 Residential Solid Waste and Recycling Collection Service Summary

Jurisdiction	Form of Collection Regulation	Collector Solid Waste[a]	Mandatory Solid Waste Collection	Collector Recyclables	Cost of Recycling Included	Collection Rates[b] Mini-can	1 can	2 cans
Algona	contract	Sea-Tac (R)	yes				7.05	9.70
Auburn	contract	RST	yes	RST		6.50	7.90	15.80
Beaux Arts	certificate	Eastside (R)	no	Eastside	yes	8.80	9.70	11.95
Bellevue	contract	Eastside (R)	no	Fibres	yes	6.80	11.75	16.15
Black Diamond	certificate	Meridian Valley (R)	no	Meridian Val			8.10	10.15
Bothell	contract	SnoKing (WM)	yes	SnoKing	yes		10.00	14.00
Burien	certificate	Same as area 6						
Carnation	contract	Snoking (WM)	yes	SnoKing			11.15	15.00
Clyde Hill	cert/FA	Eastside (R)	no	Eastside	yes	8.89	10.43	14.22
Des Moines	certificate	Sea-Tac (R)	no	Sea-Tac			7.10	9.85
Duvall	certificate	SnoKing (WM)	no	SnoKing			7.62	8.90
Enumclaw	city	City	yes	RST		2 can min.		10.05
Federal Way	contract	Federal Way Disp (RST)	no	RST			7.10	9.85
Hunts Point	cert/FA	Eastside (R)	no	Eastside	yes	5.00	7.85	10.85
Issaquah	contract	Lawson	no	Lawson	yes	7.92	12.78	22.51
Kent	contract	Kent Disp (R), TriStar (RST)	no	Kent			7.60	11.35
Kirkland	contract	SnoKing (WM)	yes	SnoKing	yes	6.35	10.80	15.20
Lake Forest Park	contract	Eastside (R)	no	Eastside	yes	6.35	9.95	13.95
Medina	cert/FA	Eastside (R)	no	Eastside	yes	5.00	7.85	10.85
Mercer Island	contract	Eastside (R)	no	Eastside	yes	6.35	10.80	15.20
Milton	contract	Murrey's Disposal	yes				6.15	9.34
Normandy Park	cert/FA	Raffo(RST),	no	Fibres		5.60	7.40	11.10
		Sea-Tac (R)				3.95	7.30	10.60
North Bend	contract	Lawson	yes	Lawson	yes		10.00	
Pacific	contract	RST (R)	yes	RST		5.60	6.95	10.95
Redmond	cert/FA	SnoKing (WM)	no	Fibres		7.14	11.55	16.80
Renton	contract	Rainier (WM)	yes	Rainier	yes	3.60	8.90	14.90
SeaTac	certificate	Raffo (RST)	no	Raffo		5.60	8.35	11.75
		Sea-Tac		Sea-Tac				
Skykomish	city	City	yes				9.50	
Snoqualmie	contract	Lawson	yes	Lawson	yes		10.35	
Tukwila	certificate	Raffo (R)/	no	Raffo	yes	7.10	10.65	14.20
		Sea-Tac		Sea-Tac		5.75	9.10	12.40
Woodinville	certificate	Lawson	no	Lawson	yes	8.20	12.93	17.18
Yarrow Point	cert/FA	Eastside (R)	no	Eastside	yes	5.00	7.85	10.95
Unincorporated King County								
Service Area 1	certificate	WM, Northwest	no	WM, NW	yes	8.21	12.21	16.21
Service Area 2	certificate	Eastside	no	Eastside	yes	5.22	8.07	11.07
Service Area 3	certificate	Sno-King	no	Sno-King	yes	7.21	10.36	14.26
Service Area 4	certificate	Lawson	no	Lawson	yes	8.20	12.93	17.18
Service Area 5	certificate	Rainier	no	Rainier	yes	7.64	11.54	15.29
		WM-Seattle		WM-Seattle		8.27	12.32	16.87
		Sea-Tac		Sea-Tac		6.02	9.47	13.17
Service Area 6	certificate	WM-Seattle	no	WM-Seattle	yes	8.27	12.32	16.87
		Sea-Tac		Sea-Tac		6.02	9.47	13.17
		RST		RST		7.32	10.32	14.42
Service Area 7	certificate	RST	no	RST	yes	7.32	10.32	14.42
		Sea-Tac		Sea-Tac		6.02	9.47	13.17
Service area 8	certificate	Meridian Valley	no	Meridian Val	yes	6.05	9.60	13.35

[a] (R) = Rabanco companies, (WM) = Waste Management, (RST) = RST Disposal FA = franchise area
[b] 32-gallon owner containers, curb or alley pickup. Toter containers are billed at different rates.

collection, because higher density concentrates routes, thereby increasing cost-effectiveness.

(2) Commercial Sector Waste and Recyclables Collection Systems

Commercial collection consists of the removal of recyclables and solid waste from commercial and institutional buildings and some multifamily residences. Multifamily units are typically included under commercial collection due to the number of pickups required, the size of containers used, and billing procedures (charging the landlord rather than residents). However, the Plan requirement for household recyclables collection in urban areas does apply to multifamily dwellings. Municipalities may control commercial waste collection within their boundaries, and many cities that utilize licenses and contracts to regulate residential solid waste collection also choose to regulate the commercial sector.

Most of the certificated franchises in King County collect garbage from both residential and commercial customers. Some certificates also designate particular areas or types of wastes that may be collected. Table IV.5 is a summary of companies that collect commercial waste, types of materials they collect, and their areas of operation in the County.

Most commercial recyclables collection services are arranged directly between businesses or property managers and service providers. Currently, there are few municipally sponsored commercial collection programs in the County, although many cities are evaluating their options for initiating such programs. The 1989 Plan provided for a Business Recycling Program to assist in developing collection programs for recyclables. (See Section III.B.)

c. Collection Rates for Solid Waste and Recyclables

(1) Solid Waste

Refuse collection rates vary among municipalities and franchise areas. For the most part, recent rate increases reflect the rising cost of disposal and the imposition of a moderate risk waste surcharge by the Seattle-King County Board of Health. Rates are also affected by population size and density, size and type of commercial and industrial sectors, distance to the transfer station or disposal sites, age and size of the collection vehicle fleet, and any administrative and billing costs added by municipalities. Also, services may vary in numerous ways—free pickup of municipal garbage, length of the contract, and location of pickup, for example.

Solid waste rates are regulated by the WUTC for haulers with franchise certificates and by cities for haulers with contracts or licenses (Table IV.3). Table IV.4 shows solid waste collection rates for suburban cities.

(2) Waste Reduction and Recycling (WR/R) and Rate Incentives

Collection rates for recyclables are often included in residential solid waste rates. Consolidation of collection fees for recycling and solid waste into one bill is believed to have made residential recycling more successful because it is more efficient for haulers, more convenient for customers, and demonstrates to customers how minimizing disposal through WR/R can also reduce costs. This is particularly effective when haulers also use an incentive rate structure to encourage WR/R. Incentive rates include mini-can services, once-a-month garbage collection service, yard waste rates, and substantial cost differentials between service levels.

In 1990 the WUTC initiated a notice of inquiry on solid waste collection rate design, focusing on how to structure rates to encourage WR/R. The WUTC's current cost-of-service methodology does not produce significant incentive rate structures, but the commission is continuing to investigate this matter through workshops and public involvement. In 1991 King County worked with the WUTC to implement an incentive rate structure for household recyclables collection in urban unincorporated areas. Implementing rate incentives satisfies the requirements of the rate policy addressed in KCC 10.18.020.

2. Needs and Opportunities

The collection system is evaluated within the framework of the overall mission of the King County Solid Waste Division to protect the public health and environment through the proper management and disposal of waste. The goals for determining needs for solid waste and recyclables collection are

Table IV.5 Summary of Solid Waste Collection

(Companies affiliated with Rabanco are indicated by [R]; companies affiliated with Northwest Waste Industries are indicated by [NWWI] certificate numbers are in brackets)

Eastside Disposal [R] [G-12]
- Garbage in Auburn, Kent, and Tukwila areas, extending east to include North Bend and Black Diamond
- Garbage (commercial only) in White Center and Burien areas
- Scrap and refuse in Tukwila, part of Renton, Burien, and White Center
- Garbage and rubbish in North Bend, Snoqualmie west to Issaquah, and Kent
- Scrap and refuse in King County north of the line of South 180th Street extended and east of Lake Washington
- Scrap and refuse in Seattle and the northern part of Vashon Island

Sea-Tac Disposal [R] [G-12]
- Refuse and debris in the Auburn, Federal Way, Algona, Des Moines, and Kent areas
- Scrap and refuse in all of King County south of a line determined by 180th Street, extended east and west
- Garbage and rubbish in Auburn and Black Diamond.

Kent/Meridian Valley Disposal [R] [G-60]
- Garbage and refuse for western Kent, Auburn, Algona, Black Diamond, Issaquah east to Snoqualmie, Renton, and North Bend

Seattle Disposal [NWWI] [G-124]
- Garbage in Seattle
- Refuse throughout King County (and Washington State)
- Rubbish and debris in Seattle north of the ship canal and Lake Union

Waste Management of Seattle [G-140]
- Refuse in Seattle
- Garbage and refuse throughout King County (and Pierce, Snohomish, and Kitsap Counties)
- Debris and refuse in the southern half of Seattle
- Garbage and refuse in Seattle south of North 85th Street
- Garbage and refuse in Seattle south of North 145th Street
- Garbage in White Center and Skyway

Waste Management—SnoKing [G-126]
- Garbage and refuse in Bothell, Redmond, Duvall, and Carnation areas
- Rubbish in North City, Lake Forest Park, Kenmore, Kirkland, and Bellevue

Waste Management—Northwest [G-43]
- Garbage and refuse in Richmond Beach

Waste Management—Rainier [G-63, G-67]
- Garbage in an area to the west, south, and southeast of Renton, northeast of Auburn, and Skyway

Pontius Trucking [G-212]
- Non-metallic residue from Northwest Steel Rolling Mills

Lawson Disposal [G-41]
- Garbage and refuse in North Bend, Issaquah, and an area near Snoqualmie and North Bend

R.S.T. Disposal [G-185]
- Garbage in Algona, Kent, Auburn, and Federal Way areas
- Rubbish in Tukwila, Kent, Federal Way, Des Moines, and Burien areas

Nick Raffo Garbage Company [G-16]
- Garbage in Burien, White Center, and Federal Way areas

Federal Way Disposal [G-35]
- Garbage in Federal Way

Murrey's Disposal Company [G-9]
- Garbage and refuse in a small part of western Federal Way

The following haulers are certified to collect either a particular material or from a limited number of sites, or both

Northwest Recovery Systems [G-209]
- Garbage and refuse from NOAA facilities and the VA Medical Center

Resource Recovery [G-176]
- Liquid industrial wastes in the state of Washington
- Hazardous or chemical wastes in the state of Washington

Montleon Trucking [G-203]
- Construction and demolition debris in King, Pierce, and Snohomish Counties

Amalgamated Services [G-204]
- Hazardous waste and bulk liquid non-hazardous waste from King, Pierce, and Snohomish Counties

Fedderly-Marion Freight Lines [G-207]
- Kiln dust from Ideal Basic Industries

Environmental Transport [G-211]
- Extremely hazardous semisolid waste in Whatcom, Skagit, Snohomish, King, Kitsap and Pierce counties

Sure Way Medical Services (N.W. Waste Industries) [G-236]
- Medical waste from King, Pierce, and Snohomish Counties

to make collection services available to all county residents and to ensure compatibility with WR/R programs. (See also Chapter III, Section B.)

a. Urban Solid Waste and Recyclables Collection

Most large cities maintain contracts with collectors to provide recyclables and solid waste collection for their residents; the remaining cities and towns allow franchised haulers to collect under a license or certificate. The unincorporated areas are served by franchise haulers. These services appear to be adequate. A collection system for secondary recyclables, such as appliances, furniture, food waste, mixed plastics, and bulky yard waste is needed. Residential collection vehicles generally are not equipped to handle bulky items, and residents who are unable to transport them to transfer stations or landfills must arrange special pickup. Depending on the location, this can be costly. The consequences can be illegal dumping or donations to local charities which may then be burdened with unusable furniture and appliances. (See Chapter III, Section B.)

b. Rural Solid Waste and Recyclables Collection

Solid waste collection services are available countywide; however, a comprehensive system for collecting recyclables and residential and commercial yard waste is needed in some rural areas.

c. Nonresidential Collection

Although the Business Recycling Program has been effective in providing businesses with information about how to improve WR/R activities, collection services for commercial recyclables are often unavailable or expensive. Local governments have not been given explicit authority to set service levels.

Achieving an integrated collection and billing program for nonresidential solid waste and recyclables is difficult because different statutes regulate the collection of commercial solid waste and recyclables (see Section IV.A.2.b.) The WUTC believes that because RCW 81.80 and RCW 81.77 utilize different rate-setting methods, it is inappropriate to allow a single firm with both types of authority to use income from one type of operation to subsidize another (called "cross subsidization"). For example, solid waste collection income might be used to subsidize recyclables collection. If there are no significant increases in the volumes of recyclable materials collected in the nonresidential sector during 1992-93, King County may need to work with the WUTC to develop rate incentives, other forms of combined rates, or other means of stimulating commercial recyclables collection.

d. Institutional and Incentive Rates

Because the authorities and responsibilities for setting service level standards are shared among the WUTC, counties, and cities, there is a need for clear and coordinated goals in solid waste management and rate design. Aggressive recycling goals set by the state, counties, and cities need to be supported by a rate design process that allows haulers to provide WR/R incentives and recover costs associated with improving service.

The WUTC's current rate methodology calculates collection rates based on a strict adherence to a historic cost-of-service allocation model, which only allows for limited cost differentials between service levels. It is expected that as collection, processing, and disposal costs rise and as further rate incentives are established, most customers will practice more waste reduction and recycling. Rate design that includes substantial cost differentials between different service levels is needed to support these alternatives.

Current procedures and the risks and limitations imposed on cost recovery discourage haulers from investing in additional or upgraded equipment and have inhibited innovation in the area of recycling. The mechanism for providing assistance to the collection industry for service modifications to support recycling and other programs needs to be improved.

3. Alternatives

This section identifies alternatives that address the needs discussed above (Table IV.6 summarizes these alternatives). There are no unserviced areas in King County—the current system fulfills the first goal of ensuring availability of solid waste collection to all county residents. However, an increased

Table IV.6 Summary of 1992 Collection Alternatives

Alternative A	Status quo—voluntary collection system	Continue voluntary participation in recycling and solid waste collection services, and maintain current regulatory structure.
Alternative B	Voluntary collection system with regulatory changes	Mitigate institutional barriers created by the state-imposed collection franchise system through county involvement in rate and service evaluations and lobbying the WUTC to change its rate review process. Clarify collection authority of counties and cities.
Alternative C	Mandatory collection	Institute mandatory collection of solid waste.

service level is needed to meet the second goal of supporting WR/R programs.

a. Alternative A, Status Quo Voluntary Collection System

This alternative would continue implementation of the programs recommended in the 1989 Plan (See Table IV.1).

b. Alternative B, Voluntary Collection with Regulatory Changes

This alternative would expand upon the 1989 recommendations. The need for service improvements in nonresidential recycling highlights an area where collection authority needs to be clarified. Counties are not authorized to provide collection service, except as provided under RCW 36.58A regarding solid waste collection districts. State legislation is needed to delineate county and city authority to provide for nonresidential recycling programs in comprehensive solid waste management plans. The institutional barriers created by the state-imposed collection franchise system could be mitigated through continued county involvement in rate and service evaluations. Due to the complexity and limitations of WUTC rate evaluations, haulers have little incentive to upgrade curbside recyclables and solid waste collection. The County could provide support to improve service levels, particularly the compatibility of recycling and other programs, by continuing to provide documentation supporting increased service levels and incentive rate structures.

The County could also lobby the WUTC to change its rate review process to consider all reasonable costs in the purchase of new collection equipment (including financing costs). This would speed up the turnaround time between when costs are incurred and when they are recouped through increased rates. It would also provide for consideration of risk in recovering costs associated with service level changes when they are directly tied to programs recommended in an approved solid waste management plan.

King County recognizes that intervention and support for service level and rate changes may not be consistently successful. The primary purpose of intervention would be to ensure that private haulers can improve the level of service to be consistent with other elements of the Plan update.

c. Alternative C, Mandatory Collection System

Improved participation in recycling programs may require further changes in solid waste and recycling collection authority. Mandatory recycling could be initiated by imposing disposal limitations on materials that are readily recyclable or for which there are adequate recycling opportunities (Section III.B, Alternative C). Mandatory collection of solid waste could be initiated by requiring that all households in unincorporated King County be billed a minimum rate for collection. A rationale for implementing mandatory collection would be to limit self-haul activity, to limit illegal dumping and littering, and to distribute the costs of recycling and solid waste management among all city and county residents. However, the relationships between mandatory collection, self-haul, and illegal dumping activities are unknown. The County could study these relationships as a first step toward evaluating mandatory collection.

As noted in Section III.A.1.a, implementing mandatory collection under the present system would require the formation of solid waste collection districts, which require approval by the

county governing body and public hearings, or a change in state law to authorize counties to make this decision more easily. Cities would also be required to implement mandatory collection.

4. Recommendations

Alternative B is recommended to meet the goal of supporting WR/R programs by improving rate structures and clarifying nonresidential collection authorities. The specific recommendations that comprise alternative B are summarized in Table IV.7.

a. Authority

The cities and King County will implement and maintain rate incentives that encourage waste reduction and recycling. These include variable rates with substantial cost differentials between solid waste collection service levels; once-a-month garbage collection service; mini-can garbage service; and rates for recycling services only for non-garbage customers (see Chapter III, Recommendations III.1-4). To reach 50 percent diversion by 1995, King County should assist and support collection agencies and plan service modifications that are compatible with recycling and other solid waste programs and goals.

The County should pursue state legislation that clarifies authority of counties and cities to set minimum service standards for nonresidential collection of recyclables. (See Chapter III, Recommendation III.1.)

Although mandatory collection is not recommended at this time, the County should study the relationship between mandatory collection, self-haul activity, illegal dumping and participation in recycling programs.

b. WUTC Rate Review

The County should continue to seek changes through the WUTC rate review process that would allow haulers to recover costs related to nonresidential, recycling service level improvements called for in the 1989 Plan.

The County and cities should continue to implement rate incentives in residential solid waste collection. (See Chapter III, Recommendation III.[d]).

5. Implementation

The recommended actions for solid waste and recyclable collection focus on strengthening King County's ability to implement the 1992 Plan update through enhanced collection services. This would be accomplished by securing state legislation authorizing nonresidential minimum service levels and improving the WUTC rate review process to support and reinforce recycling. It would require an estimated one to two years to implement the desired collection practices.

Table IV.7 Summary of 1992 Collection Recommendations

Recommendation IV.1	Collection authority	Pursue state legislation to clarify nonresidential recycling authority of counties and cities to set recommended minimum service standards for nonresidential collection of recyclables.
Recommendation IV.2	Evaluate mandatory collection	Study relationships between mandatory collection, self-haul activity, illegal dumping, and participation in recycling programs.
Recommendation IV.3	WUTC rate review	Continue to seek changes in statutes and in the WUTC rate review process to allow haulers to recover costs related to nonresidential recycling service level improvements called for in the Plan.
Recommendation IV.4	Rate incentives	Continue to implement rate incentives that will encourage waste reduction and recycling (see also Chapter III, Recommendations III.13 and III.36).

B. TRANSFER SYSTEM

Approximately 84 percent of the refuse disposed in King County is processed through the King County transfer system. The system is a network of seven publicly owned transfer stations and two rural drop-boxes where residential customers and commercial haulers transfer loads from many small vehicles to fewer, large hauling vehicles that haul the waste to the Cedar Hills Regional Landfill (Figure IV.2). Some solid waste is also delivered to Cedar Hills from two privately owned transfer/recycling stations. Waste from Seattle's two transfer stations is no longer disposed at Cedar Hills, since Seattle withdrew from the King County system in May 1991.

In 1991, King County transfer facilities handled 842,083 tons of solid waste and received 821,722 visits from commercial haulers, businesses, and self-haulers. Transfer stations operated by the private sector and the City of Seattle handled 255,485 tons of mixed municipal solid waste (MMSW) in 1991. Special

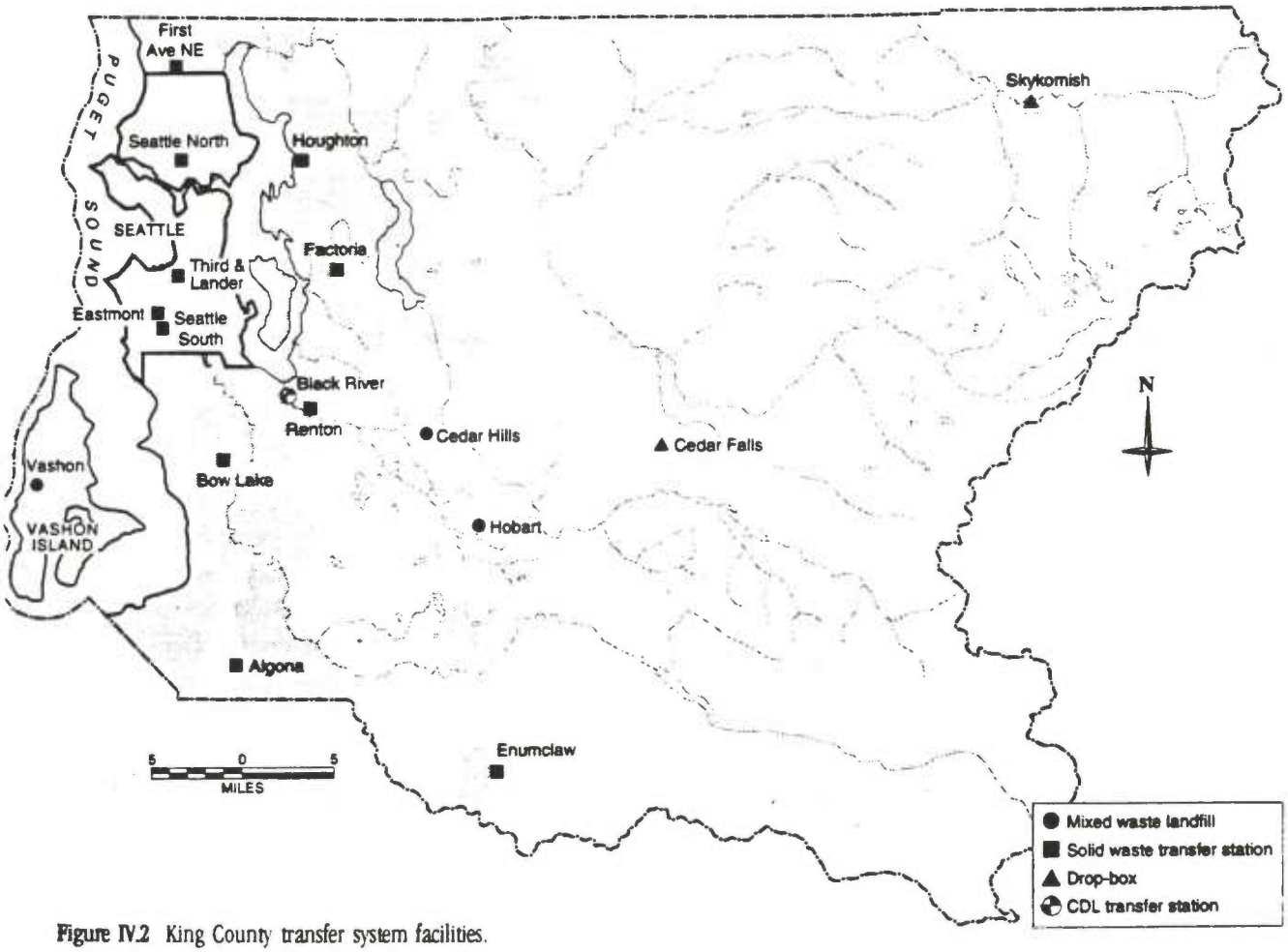


Figure IV.2 King County transfer system facilities.

wastes, such as asbestos, medical waste, contaminated soil, and others, require special handling and are not allowed in transfer stations. They are disposed at Cedar Hills, with special clearance (see Chapter V).

The 1989 Plan recommended a number of improvements to the transfer system to increase capacity and provide better customer service. The recommended activities are proceeding on schedule and the status is reported in Table IV.8.

1. Existing Conditions

a. System Description

(1) King County Transfer Stations

There are nine King County transfer facilities: seven transfer stations and two rural drop-boxes. The seven transfer stations are located at First Northeast (north of Seattle), Houghton (in Kirkland), Factoria (in South Bellevue), Renton, Bow Lake (Tukwila), Algona, and Enumclaw (which opened in mid-1993). The two rural drop-boxes are at Skykomish and Cedar Falls. All solid waste from the County's transfer system is disposed at Cedar Hills.

Five of the seven existing transfer stations—Algona, Factoria, First Northeast, Houghton, and Renton—were built between 1963 and 1967 and are of the same basic design. They are direct load facilities, in which refuse is loaded directly into transfer trailers. The Bow Lake Transfer Station, constructed in 1977, is a push pit facility—refuse is unloaded into a pit, then pushed into waiting trailers. This design is more desirable because it provides some storage during peak use periods. At the time they were designed, these facilities represented the state of the art, however they do not meet current needs.

These transfer facilities were also constructed prior to the current emphasis on recycling, and some do not provide the recycling services that are desired. Where possible, drop-boxes have been added at the existing facilities to collect self-haul recyclables. They are in place at Bow Lake, Factoria, First Northeast, and Houghton, and facility plans were submitted for approval for Algona and Renton. Yard waste is collected during the second shift at Factoria, but adding it at the other facilities is difficult due to site constraints.

Table IV.8 Status of 1989 Transfer Plan System Recommendations

Facility	Recommendation	Implementation Status
Houghton	Complete compliance requirements. Replace with new facility.	Compliance completed by 1992; replacement scheduled for 1999.
Renton	Close—complete MFS requirements.	Will complete compliance in 1993, close by 2010 after Bow Lake expansion.
Algona	Close	Scheduled to close in 1998, replace with South King County.
1st Avenue NE	Upgrade	Upgrade to meet compliance requirements completed in 1992
Factoria	Expand or replace (expansion was deemed infeasible)	Upgrade to meet compliance requirements completed in 1992; replace with new facility in 1996.
Bow Lake	Upgrade or replace	Upgrade to meet compliance requirements implemented 1990.
Enumclaw	Open	Landfill final closure in 1993, replaced with new transfer facility in April 1993.
Hobart Landfill	Open	Landfill closure to begin in 1994. Facility services and capacity will be replaced by existing facilities.
Waste Management Northwest (formerly Snohomish Eastmont)	Get permitted	Not expected to become a part of the County's transfer system.
Skykomish Drop-box		Implemented

The new Enumclaw transfer station utilizes a modification of the push pit technology described above. It also provides a full range of recyclable collection services on site.

Construction is scheduled to begin in 1995 for the replacement of the Factoria Transfer Station, as recommended in the 1989 Plan, to increase capacity (see Table IV.8). This will be a push pit facility, which will include an area for self-haul recyclable materials, including yard waste. The facility will also be designed to provide for moderate risk waste collection though this service is not anticipated to begin in 1996 when the facility opens. This is consistent with the *Local Hazardous Waste Management Plan* (LHWMP) for Seattle-King County, which recommends that, as King County expands its solid waste facilities, permanent household hazardous waste (HHW) collection facilities be considered in the design. At the request of the Management Coordination Committee for the Local Hazardous Waste Management Program, inclusion of a moderate risk waste collection service has been made a part of the Environmental Impact Statement (EIS) for the Factoria Transfer Station replacement project. However, the Management Coordination Committee has recommended that this service not be provided initially, allowing for an assessment of collection needs before household hazardous waste collection services are offered at this site.

The Skykomish drop-box uses two containers that can be rolled on and off a truck and hauled to the Houghton Transfer Station for transfer to Cedar Hills. The Cedar Falls drop-box, serving the North Bend area, uses two containers for mixed waste and one for yard waste. They are hauled directly to Cedar Hills or to a yard waste composting facility.

Tables IV.9 and IV.10 summarize the transfer system's compliance with the King County Solid Waste Regulations (KCBOHC 10.08.030). All King County facilities are largely in compliance.

(2) Other Public and Private Transfer Facilities

This Plan reevaluates the possible use of the Waste Management, Northwest-Woodinville Recycling Transfer Station (formerly Snohomish Eastmont), a privately owned facility north of the King-Snohomish county line. Although the 1989 Plan recommended using the station, it is not operational because it has not been granted a permit by Snohomish County. Therefore, it is not included in that county's solid waste management plan.

In addition to King County's facilities and the Waste Management, Northwest-Woodinville Recycling Transfer Station, there are other solid waste facilities in Seattle outside the King County planning area. Two are owned and operated by the city of Seattle, and two are private. Waste from Seattle's transfer stations is not taken to Cedar Hills but is exported to a landfill in Oregon.

The two privately owned and operated transfer/recycling stations are the Regional Landfill Company's (formerly Rabanco) Third and Lander facility and the Waste Management of Seattle (formerly Eastmont) facility. Table IV.11 lists actual tonnages handled at these two transfer stations from 1986 through 1991. Records from Cedar Hills indicate that these two facilities handle waste generated both from within and outside Seattle. No other privately operated facilities are planned at this time in King County.

King County Ordinance 8771 (KCC 10.22.030.F) authorizes one privately owned and operated mixed waste processing facility (MWPF) in King County. (See Chapter III.B and Volume II, Appendix H.)

As a result of reevaluating current policy guidelines, the Solid Waste Division published an issue paper titled "Mixed Waste Processing Feasibility Analysis" in November 1991. It recommended delaying the Request for Proposal, while continuing to monitor the experiences of other jurisdictions that employ both an MWPF and source separation, and reevaluation of this technology in 1995 to supplement programmatic WR/R efforts.

b. Transfer System Operations

Table IV.12 shows the location, size, capacity, use, numbers of customers served, and waiting times associated with six County-operated transfer stations and the two drop-box sites. Information is not yet available for the new Enumclaw Transfer Station because it has only been in operation since April 1993.

Table IV.9 Transfer Station Compliance with King County Solid Waste Regulations (KCBOHC 10.30.030)

Standard	Algona	Bow Lake	Factoria	1st Ave NE	Houghton	Renton	Enumclaw
(a) Fenced and screened	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(b) Cleanable materials	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(c) Control rodents and harborages	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(d) Screened and litter controlled	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(e) Tipping floor covered	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(f) Buffer zone (50' to residential property)	N/A	N/A	N/A	No	N/A	N/A	Yes
(g) Comply with zoning	Yes[a]	Yes[a]	Yes[a]	Yes[a]	Yes[a]	Yes[a]	Yes
(h) Surface and groundwater control: 24-hr, 25-yr storm event + washdown	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(i) All-weather roads	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(j) Odor and dust control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(k) Prohibit scavenging	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(l) Have site attendants when open	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(m) Signage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(n) Access to emergency communications	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(o) Remove waste at closure.	N/A	N/A	N/A	N/A	N/A	N/A	Yes

[a]Nonconforming use—In operation before local zoning ordinances were adopted.

Table IV.10 Drop-box Transfer Facilities Compliance with King County Solid Waste Regulation (KCBOHC 10.08.030)

Standards	Cedar Falls	Skykomish
Constructed of watertight materials with lid, controlling loss of material during transport and access by rats and vermin	Yes	Yes
Serviced by all-weather roads	Yes	Yes
Serviced regularly to ensure adequate capacity	Yes	Yes
Signage	Yes	Yes
Remove waste at closure	N/A	N/A

Table IV.11 King County Transfer System Tonnages, 1986-1992

	1986	1987	1988	1989	1990	1991	1992
King County Transfer System	624,247	681,472	667,651	712,156	846,422	842,083	770,448
Regional Landfill Co., 3rd and Lander	151,000	170,000	138,000	127,000	91,000	75,000	not reported
Waste Management of Seattle (formerly Eastmont)	112,000	128,000	148,000	138,000	169,000	111,000	not reported
City of Seattle	9,691	291,791	267,483	208,460	221,621	70,155 [a]	0

[a] Withdrew from King County system May 31, 1991.

Table IV.12 Description of Transfer Facilities Operated by King County

	1st Ave NE	Houghton	Factoria	Renton	Algona	Bow Lake	Cedar Falls	Skykomish
Location	County	Kirkland	Bellevue	Renton	Algona	Tukwila	County	County
County planning area	North	North	Central	South	South	South	Rural	Rural
Type of transfer facility	Two-trailer direct unload transfer station					Push-pit TS	Drop-box	
Round trip miles to Cedar Hills	73	48	36	24	41	33	56	132
Acres occupied by site	12.5	8.4	7.8	9	4.6	16.9	3	1
Hours of operation per week	66.5	66.5	99	66.5	66.5	66.5	63	63
Design capacity/waste received (tons):								
Design capacity at one 8-hour shift per day (tons)								
Daily	275	275	275	275	275	750	44	44
Monthly[a]	8,300	8,300	8,300	8,300	8,300	22,625	1,333	1,333
Yearly[a]	99,550	99,550	99,550	99,550	99,550	272,000	16,000	16,000
Estimated actual capacity (tons)								
Daily average	350	350	350	350	350	750	44	44
Monthly[a]	10,560	10,560	10,560	10,560	10,560	22,625	1,333	1,333
Yearly[a]	126,700	126,700	126,700	126,700	126,700	272,000	16,000	16,000
Peak day of year	650	650	650	650	650	1,350	N/A	N/A
Waste received, 1991 (tons)								
Daily average	291	483	632	262	471	596	9	3
Monthly average	8,541	12,961	15,705	6,314	11,354	15,016	281	94
Peak month (July)	9,822	14,848	17,363	7,076	12,599	16,204	401	115
Yearly	102,488	155,538	188,465	75,773	136,251	180,197	3,372	1,130
Number of customers served:								
Peak day capacity[b]	850	850	850	850	850	1,900	N/A	N/A
Average daily vehicle capacity	387	387	387	387	387	900	N/A	N/A
Annual vehicle capacity[a]	140,000	140,000	140,000	140,000	140,000	326,000	N/A	N/A
Vehicles served, average month (1991)	13,618	12,829	11,925	7,070	9,899	13,337	1,244	20
Vehicles served, peak month (July 1991)	16,476	15,471	14,601	8,833	12,105	16,038	1,613[f]	25[g]
Weekend average (1991)	354	345	339	165	252	358	N/A	N/A
Weekday average (1991)	537	524	420	351	438	561	N/A	N/A
Waiting time/vehicle queue[c]:								
Longest wait, average weekend day (minutes)[d]	17	15	15	15	15	15	none	none
Longest wait, peak weekend day (minutes)[d]	105	123	66	20	29	30	none	none
Capacity of onsite queue (18 feet/vehicle)	54	43	16	47	19	31	none	none
No. of times queue extended offsite (year)[e]	17	10	0	1	43	1	N/A	N/A
Peak queue, average weekend day[e]	13	0	4	0	0	0	none	none
Peak queue, peak weekend day[e]	251	292	142	19	64	51	none	none

[a] 362 operating days per year.
[b] Number of vehicles that can be served in 1 day without offsite waiting lines.
[c] Estimates calculated from daily vehicle counts and assumptions about unloading times.
[d] For the year 1984-1985.
[e] From May 1984 through April 1985.
[f] August
[g] April and July

10

(1) Transportation Routes

Figure IV.3 shows the main haul routes between transfer stations and Cedar Hills. The transfer stations are located generally within one mile of interstate freeways. The Figure shows a haul route from the Factoria Transfer Station to Cedar Hills through Issaquah. This route is currently not in use because the City of Issaquah prohibits large trucks to travel along the route.

(2) Vehicle Capacity

Design peak vehicle capacity is the greatest number of vehicles a transfer station can handle without creating a waiting line that extends into the street. Design peak vehicle capacity is different for each site. It is influenced by the interaction of several factors, e.g., cashier transaction time, length of roadway between cashier/scale complex and transfer building, the actual mix of commercial/private vehicles using the facility at any particular time, and the length of time to

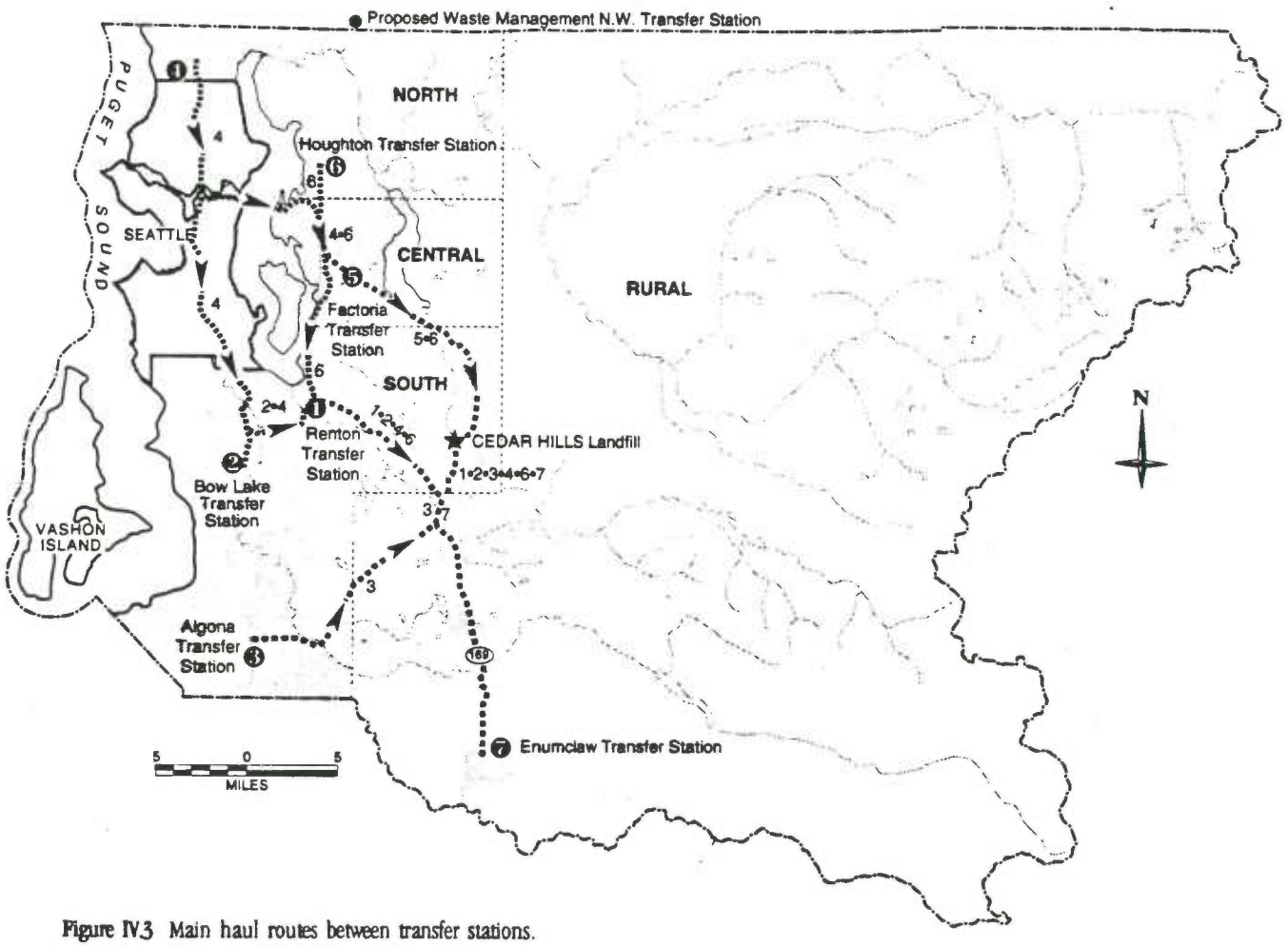


Figure IV.3 Main haul routes between transfer stations.

transfer or tip waste. There is also a significant difference between weekday and weekend vehicle capacity. This is due to the change in the mix of commercial and private vehicles and their very different unloading times.

The average daily vehicle capacity (Table IV.13) was estimated by multiplying the actual, single peak day's traffic by the historical ratio of average daily traffic to single peak day traffic count. The annual vehicle capacity was estimated by multiplying the average daily capacity by 362, the number of operating days in a year.

(3) Tonnage Capacity

Peak tonnage capacity is the total tonnage that can be handled during a single work shift. This includes unloading (tipping) by customers and loading into transfer trailers and hauling refuse off site. Capacity is exceeded if unacceptably long waits occur, if on-site storage capacity is exceeded, or unplanned for constraints develop.

(4) Variations in Service Demand

The busiest hours for traffic and tonnage at transfer stations are usually during midday but these fall off after 3:00 P.M. The busiest months are during spring and summer. The greatest traffic volumes occur on Saturdays and Sundays, because of the high number of passenger vehicles, but the busiest days measured by tons received are weekdays, when collection trucks are operating.

In 1991, the daily volume of waste received at King County transfer stations was three times higher on weekdays than on weekends, yet vehicle traffic on weekend days was one-third higher (greater) than on weekdays. July is the peak month of the year for both tons and customer activity. Both tonnage and traffic are higher in the summer and lower in the winter, although the difference between the two seasons is becoming less pronounced over time. During the slowest winter month (November), the transfer station daily tonnage was 84 percent of what it was in July.

c. 1989 Transfer System Development Plan

In the 1989 Plan, the County was divided into four planning areas: north, central, south, and rural. Thirteen alternative plans were evaluated, and one was selected for each planning area. This resulted in the *1989 Transfer System Development Plan* (summarized in Table IV.14 and Figure IV.4), Recommendations were made to replace facilities if either tonnage or customer service capacity was exceeded.

Table IV.13 Year Transfer Station is Estimated to Exceed Capacity[a]

	Tonnage Capacity			Vehicle Traffic Capacity		
Transfer Station	Rated Capacity	Year Capacity Exceeded [d]	Current Status	Daily Vehicle Capacity	Year Capacity Exceeded	Current Status
Houghton	350 tpd	1986	Exceeded	387	1984	Exceeded
First Northeast	350 tpd	2007		387	1984	Exceeded
Factoria	350 tpd[c]	1986	Exceeded	387[c]	1985	Exceeded
Algona	350 tpd	1990	Exceeded	387	1990	Exceeded
Bow Lake	750 tpd	2010		900	–[b]	
Renton	350 tpd	–[b]		387	–[b]	

[a] Tonnages based on the forecast shown in Section II.C
[b] Capacity is not expected to be exceeded within the 20-year planning period.
[c] Capacity is stated for the first weekday (M-F) shift and weekend operating hours. It does not include the second weekday (M-F) shift, when the station is open until 1:00 a.m.
[d] Weekday average tonnage capacity, assuming the County's 65% waste reduction and recycling goals is achieved.

d. Growth Management Legislation Impacts

Recent growth management legislation requires that the County develop comprehensive county-wide planning policies. These policies, coupled with the individual jurisdictions' comprehensive plan updates, are expected to encourage higher density growth in urban centers, while preserving the current rural character of much of King County. These new centers will become the target for increased employment and housing development.

Adoption of the County's *Growth Management Plan* by the County Council and the cities may alter implementation schedules for alternatives recommended in the 1989 Plan. Delineation of an urban growth boundary will be a significant factor in implementing level-of-service improvements within the service area. Upon adoption of the urban growth boundary line, the level of service for each sector will be defined for both urban and rural areas. The urban level of service is anticipated to remain as currently provided.

Both the 1989 Plan and 1992 update present alternatives that are consistent with proposed growth management planning. Specific modifications to the Plan will be addressed in greater detail in the 1995 Plan update.

2. Needs and Opportunities

Existing facility limitations indicate the need to expand or replace a number of transfer stations. Two main conclusions were reached in defining needs for the transfer system. First, regardless of the WR/R levels achieved, there are actions the County needs to take to address current transfer system demands. Second, the present uncertainty associated with the types and capacity of recyclable materials drop-off and storage units that will be needed at transfer facilities in the future requires a flexible approach to long-range facility planning.

Other key needs and opportunities for improving King County's transfer system operations are listed below and described in the subsections that follow.

- Evaluation of the role of the transfer system in solid waste management, e.g., service levels, changes in source-separated waste streams, and potential service improvements for specific customer groups.

Table IV.14 1989 Transfer System Development Plan

[brackets indicate year site study is scheduled to begin]

North County Area

Seek to permit the Snohomish Waste Management Northwest Transfer Station. Add a new facility in the Northeast Lake Washington Area when necessary. [1993]

Close Houghton after addition of the Northeast Lake Washington Area Transfer Station and expansion of the First Avenue Northeast Transfer Station.

Expand the First Avenue Northeast Transfer Station on site, as space allows.

Central County Area

Expand the Factoria Transfer Station on site or build a new facility at a nearby location, if necessary. [1989] (expansion was deemed infeasible)

South County Area

Build a new transfer station in the South County (Auburn) area. [1994]

Close the Algona Transfer Station after construction of the South County Area Transfer Station.

Study the feasibility of expanding the Bow Lake Transfer Station. Expand on site or, if necessary, site and build a replacement transfer station in the Tukwila area.

Close the Renton Transfer Station after the expansion or replacement of Factoria and Bow Lake or the addition of a Tukwila Area Transfer Station.

Rural County Area

Replace the Cedar Falls Landfill with a rural drop-box facility. When appropriate, site and construct a new transfer station near the intersection of I-90 and SR-18, closing Cedar Falls after completion of the new facility.

Replace the Enumclaw Landfill with a rural transfer station on or adjacent to the existing site. [1989]

Replace the Hobart Landfill with a rural transfer station in the vicinity of the landfill. [1990]

Build a new transfer station in the Northeast County Area. [1995]

- Adequate capacity.
- Increased tonnage capacity.
- Compliance with state and local regulations.
- Expanded recycling opportunities.
- Ability to accommodate new equipment and technologies.

- Facility master development plans.
- Updated system use data.
- Evaluation of the potential role, if any, of the private sector in the operation of the transfer system.
- Schedules for implementing facility decisions.
- Definition of the level of service to be provided in the rural portion of the County, upon completion of the growth management planning.

a. Role of the Transfer System

The transfer system is currently designed and managed to consolidate many refuse loads into fewer, larger transfer loads. It provides convenient access to the solid waste system and minimizes traffic entering the regional landfill. It is designed and operated to handle both small self-haul loads and large commercial haulers. The system has been retro-fitted where possible to provide for self-haul recyclables collection. New facilities will be designed for considerably higher recycling service levels.

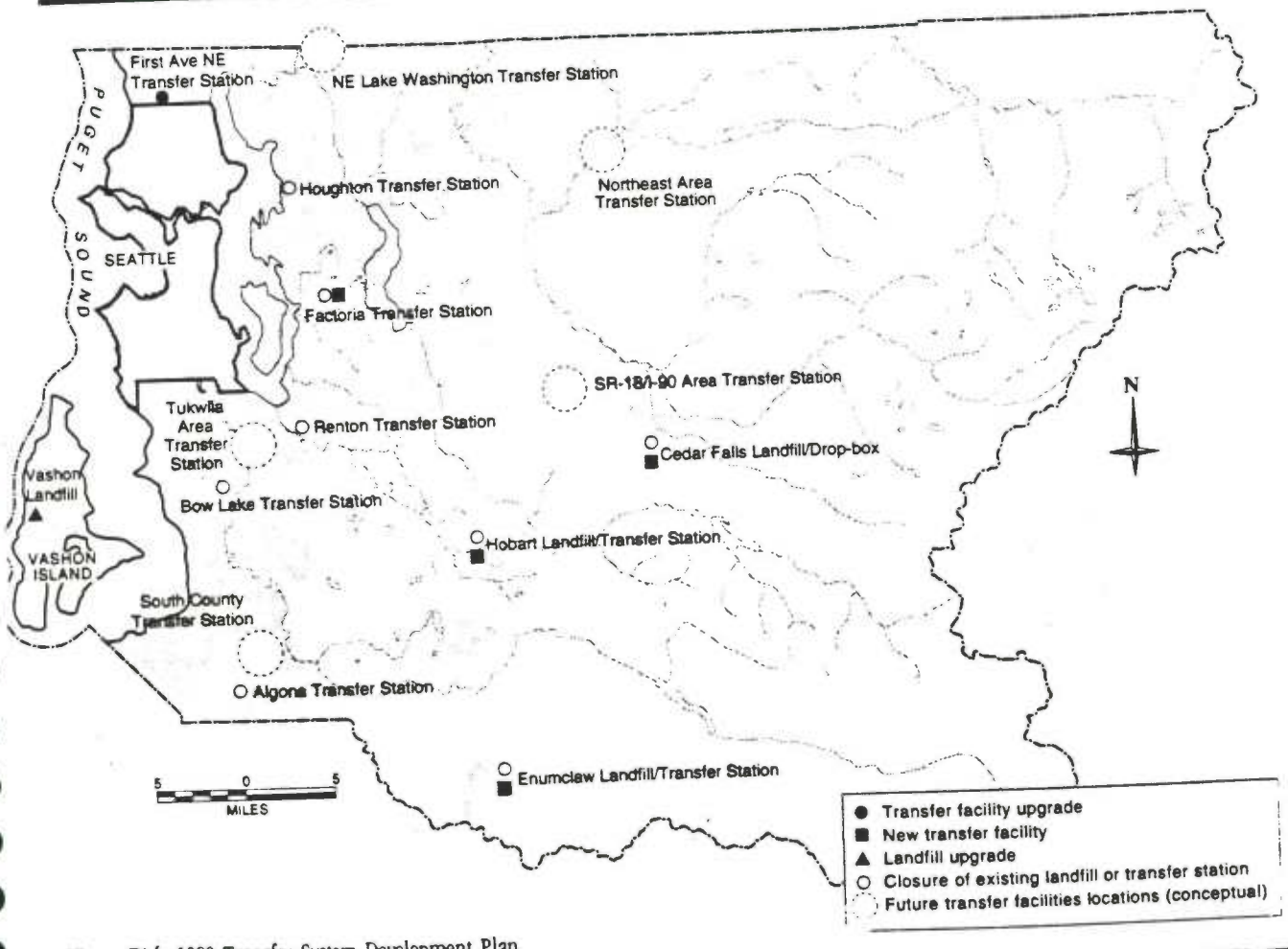


Figure IV.4 1989 Transfer System Development Plan

As changes occur in the County's demographic makeup, especially in relation to high-density growth patterns, changes in self-haul patterns, recyclables source separation and levels and types of service to be provided all need to be evaluated. This will include reevaluating service levels to be provided in urban and rural areas, and targeting potential improvements to specific types of customers (e.g., commercial haulers) by providing improved access to transfer facilities and reduced waiting times.

A role of the transfer station study will be conducted in 1993. The results of the study will be used to review and develop capital improvement plans for the transfer system as well as operational practices at the facilities. No changes recommended by the study will be implemented without public review and input from the hauling industry and the public.

b. Tonnage Capacity

Existing King County transfer stations lack capacity for projected waste quantities. This capacity, defined as tonnage capacity, is the amount of refuse that can be handled at a facility on an average day. Based on the 20-year forecast, which assumes a Countywide 65 percent waste reduction and recycling rate by 2000. Table IV.13 shows when each station is expected to reach tonnage limits if no additional capacity is added to the system. The Houghton, Factoria, and Algona transfer stations already operate at or near capacity; the First Northeast and Bow Lake stations are projected to reach tonnage capacity between 2006 and 2010.

Table IV.12 shows that the First Northeast, Algona, Factoria, Houghton, and Renton transfer stations have approximate capacities of 350 tons per day (126,700 tons per year), and Bow Lake is 750 tons per day (272,000 tons per year).

Acquisition of a new or replacement facility requires a minimum of five years to site, design, and construct. To ensure that adequate facilities are available when needed, implementation of a new or replacement facility should begin when tonnage exceeds target levels. Target levels are defined as that tonnage which will result in surpassing facility capacity within the five year implementation time-frame, based on tonnage projections produced by the Solid Waste Division.

Implementation begins with project authorization, site identification, and property acquisition. Once project authorization is given, the process is governed by the *King County Solid Waste Facility Siting Plan* summarized in Chapter II, Section C. (The complete text of the siting plan is given in Volume II, Appendix C.). The siting plan also defines the criteria to be used in the selection of potential sites. These siting activities can occur concurrently with continual evaluation of need. Any land that is acquired will be available for future use.

A siting study for a new facility to replace the Renton Transfer Station will be needed when tonnage levels reach the target level of 285 tons per day (103,000 per year). Contingent on the completion of Master Facility Plans at First Northeast and the Bow Lake Transfer Station, siting studies for new facilities may also be necessary. This would allow the five years needed to construct a new or replacement facility, consistent with the tonnage growth rate projected in the County's planning forecast (Chapter II, Section C).

c. Customer Service Capacity

Waiting lines at several transfer stations are long and are expected to lengthen as use increases. Additional services, such as recycling, may also affect waiting times. Table IV.13 shows when each station is expected to reach customer service capacity, defined as the number of vehicles that can be accommodated at a given facility without unacceptable impacts, such as off-site queuing. Vehicle traffic was projected by multiplying the 1991 average vehicles per ton at county facilities (0.98) by the tonnage projections presented in Chapter II, Section B. Since these projections are based on historical use patterns, they may fall short of actual future use as WR/R rates increase. If there are significant volumes of recyclable materials deposited at transfer stations, vehicle traffic may increase faster than disposed tonnage.

Algona, Houghton, First Northeast, and Factoria stations have already reached or exceeded capacity. Long waiting times and queues of vehicles extending onto nearby streets at these three stations frustrate users, create safety problems, and may encourage illegal dumping.

A survey of transfer facilities from May 1984 through April 1985 indicated that customers spent 15 minutes on an average weekend day waiting in line and unloading. On the busiest weekend day, some customers waited up to two hours. On these days, waiting and unloading ranged from 20 minutes at Renton to 123 minutes at Houghton. In 1989, design criteria, including service levels, were developed for the replacement transfer stations.

Maximum queuing during any stage of the disposal process for self-haul customers should be 30 minutes or less. For commercial haulers, the maximum queue should be 5 minutes or less. Maximum time required in the facility, excluding tipping floor time should be 60 minutes for self-haulers and 10 minutes for commercial haulers. In 1993, a study of actual through-put times at the transfer facilities will be conducted in order to validate the present maximum queue time assumptions. The study recommendations will be evaluated by the Division and representatives of the hauling industry and will be incorporated into the 1995 King County Solid Waste Management Plan.

During implementation of the 1989 Plan, public comments received indicated that customer service capacity for the northeast county area is less convenient, due to the closure of the Duvall and Carnation landfills and that plans for providing more convenient disposal service within the area should be accelerated. The need for new facilities and other methods of providing disposal service within the northeast county area will be addressed as a part of the role of the transfer station study to be conducted by the Solid Waste Division in 1993. The Study will examine the impact of the County's growth management policies when developing a recommended service level for the northeast county area.

d. Compliance with State and Local Regulations

Some transfer stations did not fully comply with King County Solid Waste Regulations (KCBOHC Title 10); however, the Health Department has either granted waivers or compliance measures are being implemented. Table IV.9 shows the compliance status for the six transfer stations. Responsibility for enforcement of these measures rests with the Seattle-King County Department of Public Health (the Health Department; see Chapter VI). Transfer station compliance with Title 10 was evaluated in 1991. Noncompliance areas included insufficient buffer zones and lack of surface water and groundwater pollution controls. The Health Department established a schedule to complete improvements to meet the standards. The Solid Waste Division received a waiver from buffer requirements for existing facilities. All other compliance measures have been completed, except for improvements to the surface and groundwater management system at the Renton Transfer Station. Upgrades to correct this single remaining noncompliance condition are scheduled to be completed by the end of 1993.

e. Recycling Facilities

Existing transfer stations were not designed to include space for recycling facilities. Some have been retro-fitted with recycling collection, and the feasibility of adding it at or near other existing transfer stations is under examination. Space and design constraints may limit the type and capacity of recycling facilities that can be installed. The limitations may preclude expanding services to meet new program goals, such as public education and collection of recyclable items not currently picked up through household collection programs. Expansion of the yard waste program presents particular problems because of the need for large dumping and holding areas. Despite these limitations, transfer stations are convenient locations for recycling, and providing this service is consistent with the emphasis on waste reduction and recycling (WR/R). The role of the transfer station study will examine which types of recycling services can be provided efficiently at new or retrofitted facilities as they are designed and constructed.

f. Accommodation of New Equipment

Since King County's transfer stations were constructed between 1963 and 1977, they do not accommodate the newer, larger waste collection vehicles now in use. Ceiling clearances are low and maneuvering space is severely limited for the five transfer stations designed and constructed in the 1960s. The tipping floors are small and movement is further constrained by several structural roof support columns on the tipping floor. These limitations restrict efficiency and capacity and present difficulties for drivers and operators trying to maneuver newer,

larger trucks and equipment inside the stations. In some cases, the size of newer vehicles has resulted in damage to both trucks and buildings. More unobstructed floor space, higher roofs, or differently designed vehicles are needed to maneuver and unload. Self-haulers using trailers also experience difficulty in positioning their vehicles to unload.

g. Master Facility Plans

Existing transfer station sites are also constrained by existing space configurations and the space required by new programs, such as recyclables collection.

Facility plans are needed to make optimal decisions for each facility and to coordinate planning system-wide.

(1) Facility Expansion

Some sites, such as Bow Lake and First Northeast, potentially can be expanded. Such expansions require master facility plans to ensure that available space and resources are allocated to the highest priority uses.

(2) Physical Facilities for Waste Export Transfer

Decisions to implement waste export (long haul to out-of-county disposal facilities) may also change demands on the transfer system. Such decisions are important to future transfer station expansion or replacement because payloads must be maximized when using long-haul disposal. The recently completed *Pre-load Compaction/Densification Feasibility Study* (CH2M Hill, March 1992) pointed out that significant facility modifications would be required at existing stations. For most of them it is not economically feasible to incorporate this new technology. Compaction equipment will be installed at new or replacement transfer stations, making them compatible for future long-haul operations.

(3) Recycling and Materials Recovery

One of the objectives for transfer station upgrades and master facility plan design is to accommodate the collection of source separated recyclables to the maximum extent possible. The option of postcollection material recovery is not being considered at this time.

(4) Technological Obsolescence

Technological obsolescence is another factor to be considered amid growing concerns about the age of county facilities and their ability to meet current and future King County Solid Waste Regulations as well as more stringent sewer, storm water, and groundwater quality regulations.

As new transfer stations using pre-load compaction technology come on line, it will also become uneconomical to operate separate components of the transfer trailer fleet. In essence, there will be two separate operating subsets of the transfer system: one system will include transfer stations using compactor-based technology and the other will be composed of transfer facilities using the current transfer trailer fleet. Up to twice as many top-loaded trailers as compactor-loaded trailers would have to be operated for the same tonnage. This would also increase the number of truck driver positions required and demands on maintenance and support facilities.

h. Implementation Schedules

(1) Short-term Needs and Opportunities

The facility openings and closure decisions identified in both the 1989 Plan and the 1992 update are generally not affected by the WR/R levels achieved by the County. Due to the long lead time involved in implementing capital project decisions (e.g., site selection, property acquisition(s), project design, permitting, and construction), implementation schedules for capital projects extend over several years, and in some cases, well beyond the six-year CIP planning horizon. Decisions made now may not come to fruition or even achieve major project milestones during the current Plan update period. Accordingly, when projections indicate tonnage or customer activity limits will be reached or exceeded, future year CIP projects should be implemented.

The First Northeast and Bow Lake transfer stations have capacity for a number of years beyond the present CIP planning horizon. Both of these facilities were identified in the 1989 Plan as having the potential for expansion. The first step in determining the full potential of these facilities for expansion and upgrade would be to develop a master facility plan at each site. Issues that should be considered include site development

restrictions, operational characteristics limiting expansion, and ability to accommodate new services and technologies.

(2) Long-term Needs and Opportunities

The County's WR/R goals imply significant changes in disposal behavior and may require changes in solid waste handling methods and facilities. It is difficult to predict long-term facilities needs with sufficient accuracy to make detailed cost estimates or to plan reasonable implementation schedules. As WR/R levels increase, they will significantly affect the timing and size of transfer system modifications.

The 1992 Plan seeks to balance the possibility of prematurely expending funds for facilities that might be too large if WR/R goals are achieved against the possibility that system capacity could be insufficient if those goals are not met. To do this, needs and functional requirements of facilities (tonnage capacity, customer activity capacity, physical facilities for long-haul transfer, or recycling) and technological obsolescence for 1997 through 2008 need to be continually assessed. The County will proceed with planning activities when any one of the four criteria is not satisfied by the existing system.

i. Private and Public Sector Interactions

Two privately operated transfer/recycling stations deliver waste to the King County system. The County has not supported additional private sector facilities because of concern that they may not provide the desired level of service, could erode the rate base, and could conflict with existing labor agreements.

j. System Use Data Collection

The Solid Waste Division conducted a detailed field analysis of transfer system use patterns in 1985. These data are the basis for several assumptions used in Plan development. New services have been implemented since that time and no additional data have been collected to date. These data will be updated in 1993. Data collected in 1984 and 1985 indicate that nearly all existing transfer stations were at vehicle and tonnage capacity, except Bow Lake and Renton, which had near-term reserve capacity (within six years). Since these data were collected, both tonnage and customer activity have increased. There has been no appreciable relief for the over-capacity transfer stations, while reserve capacity of the two under-capacity stations has been reduced significantly. Despite the success of recycling efforts, population growth in King County has more than offset the gain.

k. Growth Management Legislation Impact

After the County's growth management policies are implemented, service levels will be defined for the urban areas as a part of the role of the transfer station study. Current urban service levels at the six existing transfer stations will then need to be examined and any shortfalls identified. Services planned at the new Factoria Transfer Station are expected to meet most, if not all, required service levels.

After the urban growth boundary line is adopted, rural levels of service will also be developed. The County needs to adopt rural service levels consistent with the growth management policies.

3. Alternatives

Several alternative Plan recommendations are available for the transfer system. They are the status quo 1989 system plan, updated 1992 system plan, privatization, and smaller facilities alternatives. These are summarized in Table IV.15 and discussed in further detail in the subsections that follow.

Alternative A generally carries forth the 1989 Plan recommendations and implementation schedules. Alternative B primarily modifies the implementation schedule based on events that have occurred since the 1989 plan was prepared. Alternative C concerns involving the private sector in transfer

Table IV.15 Transfer Station Alternatives

Alternative A	Continue with implementation of 1989 recommendations as scheduled.
Alternative B	Continue with implementation of 1989 recommendations and amend implementation schedule per changed conditions.
Alternative C	Privatize the transfer system.
Alternative D	Develop smaller facilities.

stations operations, and alternative D considers the question of scale (more, smaller scale transfer facilities). Alternatives C and D address two new issues that have emerged since the 1989 Plan was adopted.

a. Alternative A, Status Quo System Plan

This alternative is the implementation of recommendations exactly as identified in the 1989 Plan. They are identified as the *1989 Transfer System Development Plan (see Section IV.B.1)*. Their selection was based on the criteria listed below. The criteria are not presented in order of relative importance and no attempt was made to resolve any conflicts among them.

- *User convenience.* Combined travel and waiting times for most users should be sufficiently low to discourage illegal dumping. Increased opportunity for tipping at the transfer facility is a major factor in reducing queuing (waiting) time.
- *Community impacts.* Transfer station siting and operation may have adverse impacts on nearby communities, which should be reasonably mitigated. Consistent with King County Code 10.08.030, these impacts should be shared equitably among communities of solid waste facilities, rather than concentrated in only a few.
- *Facility cost.* The desired level of service should be provided at the minimum capital and operating cost for the total life of the facility. Economies of scale will generally make fewer large facilities less costly to construct and operate than a large number of small facilities (see Section IV.C.3.d).
- *Transportation cost.* The desired level of service should be provided, while minimizing haul costs from transfer facilities to regional service facilities.
- *Regulatory compliance.* Transfer facilities must be sited and operated in compliance with King County Solid Waste Regulations (Title 10, KCBOHC).
- *Uniform facility size, design, and operation.* Reduced costs for staff training and maintenance should be achieved, and the ability of operators to shift among the facilities increased.
- *Facility size.* To increase the efficiency of operations, facilities should be large enough to accommodate push-pit type designs and other facility design features that minimize risks to the public during loading of transfer trailers.
- *Facility siting.* The number of new facilities should be minimized and maximum use should be made of existing facilities (see Section IV.C.3.d).
- *Integration with regional service facilities.* Distribution of transfer facilities should be compatible with future plans for the development of the Cedar Hills Regional Landfill or potential out-of-county (long-haul) disposal proposals.
- *Compatibility with collection system.* Improved interface with enhanced collection technologies should be provided, e.g., larger collection vehicles, and be consistent with increased source-separation of recyclables.
- *Compatibility with waste reduction and recycling objectives.* The system should be flexible to accommodate any new source-separated materials or new processes and methods to achieve WR/R goals.

Some of the 1989 recommendations are no longer appropriate. Changes in tonnage forecasts, delays, and the continued non-operational status of the Waste Management, Northwest-Woodinville Recycling Transfer Station have affected implementation schedules.

The recommendations correspond to each geographic planning area, e.g., North, Central, South, and Rural (see Figure IV.5). The specific recommendations for each planning area are summarized in Table IV.14 and are described as follows:

(1) North County Area

- Seek to permit the Waste Management, Northwest-Woodinville Recycling Transfer Station. Add a new facility in the Woodinville area when necessary.
- Close the Houghton Transfer Station after addition of the Woodinville Area Transfer Station and expansion of the First Avenue Northeast Transfer Station.
- Expand the First Northeast Transfer Station on site, as space permits.

(2) Central County Area

- Replacement of the Factoria Transfer Station

(3) South County Area

- Build a new transfer station in the South Green River Valley (Auburn) area.
- Close the Algona Transfer Station after construction of the Auburn Area Transfer Station.
- Study the feasibility of expanding the Bow Lake Transfer Station. Expand on site or, if necessary, site and build a replacement transfer station in the Tukwila area.
- Close the Renton Transfer Station after the expansion of Factoria and Bow Lake or the addition of a Tukwila Area Transfer Station.

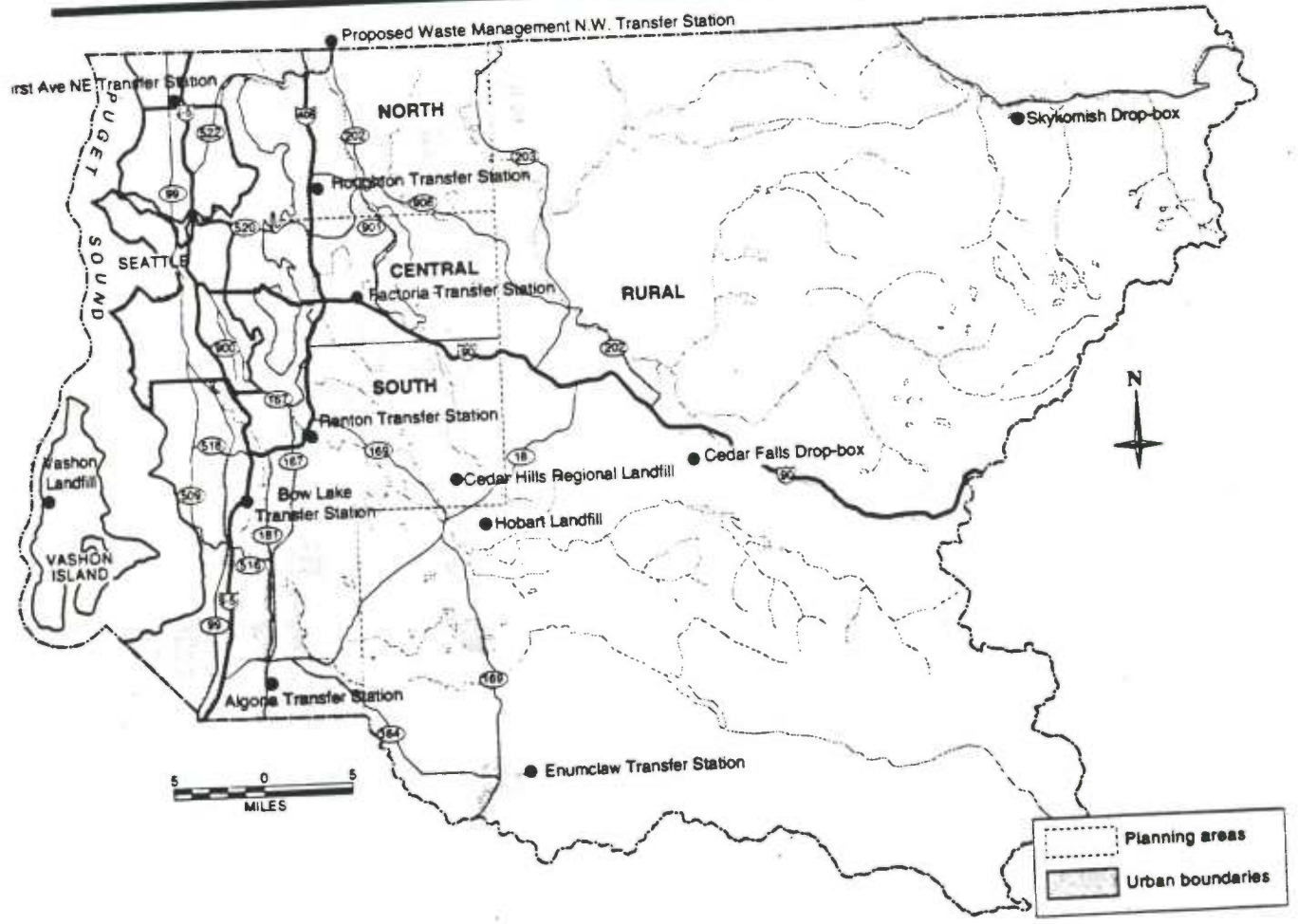


Figure IV.5 1992 planning areas.

(4) Rural County Area

- Replace the Cedar Falls Landfill with a rural drop-box facility. When appropriate, site and construct a new transfer station near the intersection of I-90 and SR-18, closing Cedar Falls after completion of the new facility.
- Replace the Enumclaw Landfill with a transfer station.
- Replace Hobart Landfill with a transfer station.
- Build a new transfer station in the northeast county area.

b. Alternative B, Updated System Plan

Alternative B is nearly identical to Alternative A except for the modifications to the transfer station development plan schedule and the additional planning activities.

Selected actions for Alternative B are based on responses to evolving conditions resulting from implementation of the status quo alternative described above and refinements to program goals. Execution of the 1989 Plan has demonstrated that the proposed time tables were too optimistic, and actual time frames have been longer than anticipated. Evolving federal and state regulations have placed additional restraints on specific elements of the CIP Program. The inability to reach closure on whether the Waste Management, Northwest-Woodinville Recycling Transfer Station would be granted an operating permit played a major role in determining which new transfer stations should be scheduled and planned.

In 1989, a decision was made to proceed with the Factoria Transfer Station replacement project, even though the Houghton Transfer Station was operating above capacity in both vehicle and tonnage categories. This was based on the expectation that the Waste Management Northwest-Woodinville Recycling Transfer Station could provide transfer service by early 1990, and that its opening would provide immediate capacity relief to the Houghton Transfer Station. Similarly, the South King County Area Transfer Station project was scheduled to begin in 1992, in order to be on-line to replace Algona in 1997. Houghton's replacement, the Northeast Lake Washington Area Transfer Station project, was planned to start in 1994.

Because the Waste Management, Northwest-Woodinville Recycling Transfer Station is not expected to become a part of the County's transfer system, the decision was made to begin work to site the N.E. Lake Washington Transfer Station and defer the South King County Transfer Station Project until 1994.

As part of the 1989 Plan recommendation to expand or replace the Bow Lake and First Northeast transfer stations, and the need to execute several major (non-CIP) facility plan projects at these two facilities, facility master plans (FMP) studies have been proposed in the 1993 budget. These FMPs would identify major development conflicts and provide feasible alternative recommendations for site redevelopment and expansion.

The service data obtained in 1984-1985 may not accurately reflect current disposal practices, customer usage, initiation of source-separated recyclable collection services, or recent changes in disposal regulations, e.g., bans on CFC-containing appliances and household hazardous waste. An updated waste stream analysis has also been proposed in the 1993 budget.

(1) North County Area

- The Waste Management, Northwest-Woodinville Recycling Transfer Station is not expected to become a part of the County's transfer system. The transfer station implementation schedule will be accelerated to begin the Northeast Lake Washington transfer station project in 1993 instead of 1994. The design for the South County station would then be delayed to begin in 1994 or later.
- The new transfer facility would be named the Northeast Lake Washington (rather than the Woodinville Area Transfer Station) to better define the potential site search area.

(2) Central County Area

- A collection facility for moderate risk waste may be added at the Factoria replacement facility, if feasible.

(3) South County Area

- The schedule for South County transfer facility design work would begin in 1994 or later.
- The new transfer facility would be renamed South County to better define the potential site search area.

(4) Rural County Area

- A new transfer facility near the intersection of I-90 and SR-18 and a new facility to serve the Northeast County area would be further evaluated pending the outcome of growth management planning and the completion of the role of the transfer station study.

c. Alternative C, Privatization

It has recently been suggested that the County look into the role of the private sector in operation of the transfer system. The options range from complete privatization to an exclusive franchise to operate a transfer station within a specific service area. At this time, very little is known about the potential for and possible impacts of privatizing transfer service in King County.

King County could evaluate the feasibility of privatization and potential impacts on the existing transfer system, including impacts on the rate base, different staffing criteria for publicly versus privately operated transfer stations, levels of service, legal issues (such as considerations involved in contracting), and enforcement issues.

To date, privatization has not been formally analyzed. Preliminary evaluations indicate that transfer station tonnage revenues would decrease significantly faster than would a corresponding reduction in total system costs, e.g., not all operational or administrative costs could be reduced at the same rate as tonnage could be diverted for private disposal. An evaluation of the impacts to the overall solid waste system would be needed before a formal recommendation on privatization could be made.

d. Alternative D, Smaller Facilities

This alternative develops the concept of more, smaller capacity transfer stations in lieu of fewer, larger ones. Implementation of the 1989 Plan has provided some opportunity to evaluate the feasibility of this alternative by comparing the new Enumclaw and proposed Hobart transfer stations (which are smaller) to the new larger Factoria transfer station. Based on actual bid results and a completed design for the Enumclaw Transfer Station, there does not appear to be any significant cost savings between the two sizes of facilities.

The physical size of a transfer station is almost unaffected by rated tonnage. Vehicle turning radii, desired queue times, inclusion of recycling opportunities for a wide variety of materials, and compliance with King County Solid Waste Regulations (KCBOHC Title 10) requirements preclude major reductions in the physical plant. Temporary on-site storage of MMSW will primarily affect the shape and size of the surge pit and the amount of space dedicated to trailer parking, but these do not have a big impact on total size. Approximately 20 acres or more for each transfer facility is desirable to meet the transfer station program objectives.

Preliminary analysis shows that it would cost significantly more to build several smaller transfer facilities to provide the same rated tonnage and/or vehicle capacity than it would for fewer, larger transfer facilities. Siting costs such as EIS's and site searches, are the same for large or small facilities. There are no apparent significant reductions in staffing on an overall system basis. In addition, tonnages are projected to decline beginning in 1993 through 2000 when they begin to increase again (Table II.1). It will be important to keep system-wide costs down during this period of declining tonnage.

It appears that it would be more prudent to provide for fewer, larger new transfer facilities in lieu of having several large parcels devoted to the construction of smaller transfer stations.

4. Recommendations

Alternative B is recommended to be implemented as the *1992 Transfer System Development Plan*. The basis for the recommendation is that Alternative A is no longer valid because it included the assumption that the Waste Management Northwest-Woodinville would become a part of the County transfer system, which is no longer correct. Table IV.16 and Figure IV.6 summarize the recommendations. Based on current population growth projections, Alternative B identifies geographic areas that will require facilities and recommends construction schedules. This alternative also recommends surveys and analytical studies needed for long-range planning and transfer station master facility plans. Privatization of the

transfer system will be studied with the role of the transfer system.

a. 1992 Transfer System Development Plan

(1) Service Area Changes

Figure IV.6 shows the approximate locations of the recommended facility constructions, closures, and upgrades. If the County solid waste system continues to meet its WR/R goals, many of the actions shown in Figure IV.6 could be deferred until after the year 2008. Progress toward these goals and customer activity at facilities will be reported in the Solid Waste Division annual report. An implementation schedule for the first six years of the planning period is provided in Table IV.17. It assumes the Waste Management, Northwest-Woodenville facility will not become a part of the County's transfer system. Therefore, the schedules for the Northeast Lake Washington and South County facilities have been modified. Northeast Lake Washington will be accelerated and South County will be delayed.

(2) General Changes in the System

The recommended alternatives include changes to the solid waste facilities evaluated in this plan, including two closures, three replacements, and six new facilities. It is unlikely that all these facilities will be built within the 20-year planning period. The Skykomish drop-box will not be changed.

Plans for closed transfer station sites will not be included in the 1992 Plan. Closed transfer system sites will require several years of monitoring for health and environmental risks before they could be used for any other purpose.

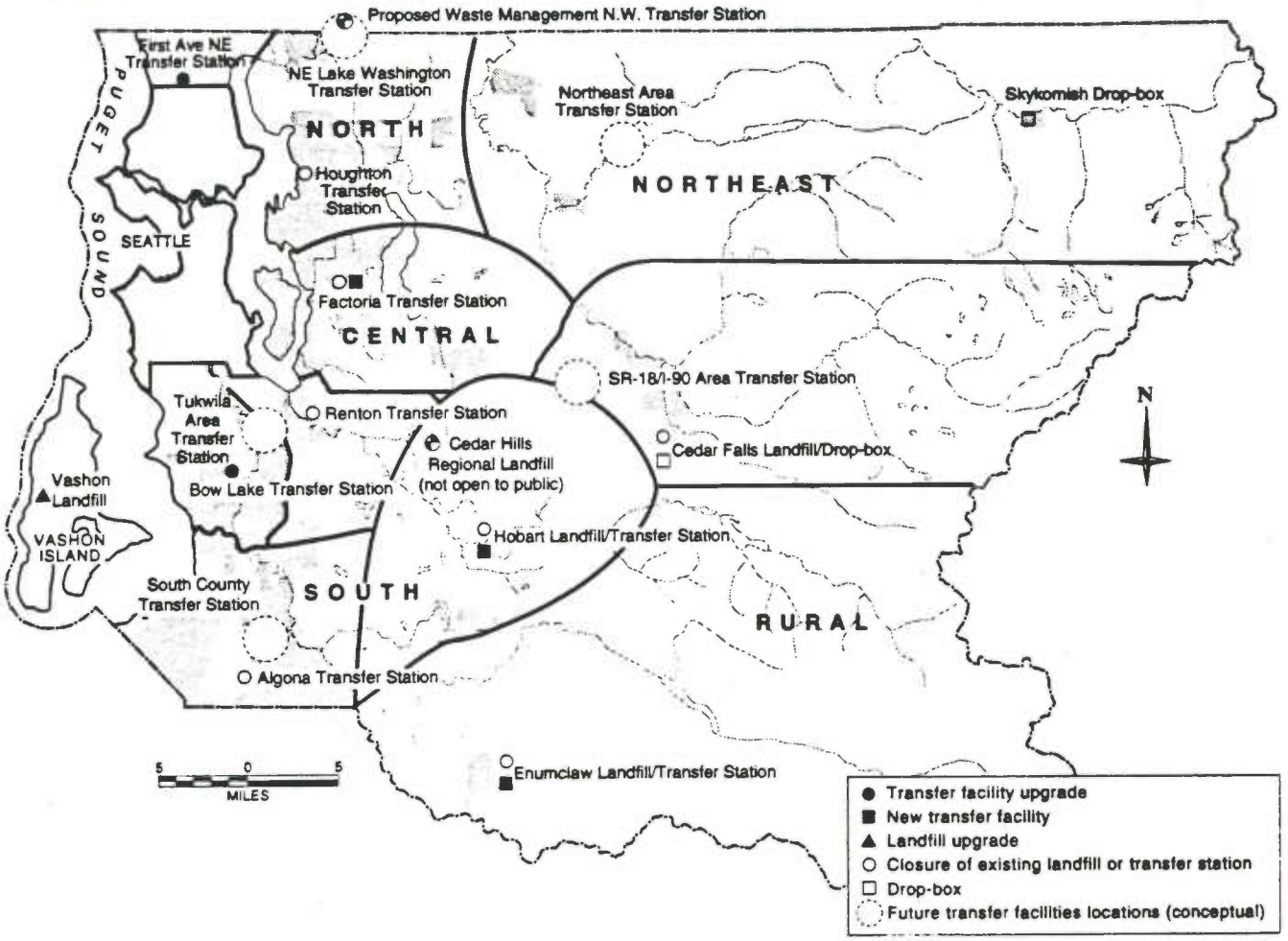
The Waste Management, Northwest-Woodinville facility is not expected to become a part of the County's transfer system. Therefore, the Northeast Lake Washington Transfer Station will need to be sited and built sooner than previously anticipated and will need to have a larger capacity than previously envisioned.

5. Implementation

The implementation schedule for the 1992 transfer system development plan is shown in Table IV.17.

Table IV.16 Summary of 1992 Transfer System Recommendations

	North Area	
Recommendation IV.5	Waste Management Northwest	Not expected to become a part of the County's transfer system.
Recommendation IV.6	Northeast Lake Washington	Begin site selection in 1993, completion in 1999.
Recommendation IV.7	Houghton	Close in 1999, after new Northeast Lake Washington is completed.
Recommendation IV.8	First Northeast	Develop Master Facility Plan. Expand if feasible.
	Central Area	
Recommendation IV.9	Factoria	Build new facility. Add MRW services if feasible.
	South	
Recommendation IV.10	South County	Build new transfer station. Begin site selection in 1994.
Recommendation IV.11	Algona	Close after new South County Transfer Station is completed in 2000.
Recommendation IV.12	Bow Lake	Develop Master Facility Plan. Expand if feasible, or build a replacement in Tukwila area.
Recommendation IV.13	Renton	Close Renton after Factoria and Bow Lake expansions or Tukwila replacement facility is built.
	Rural	
Recommendation IV.14	Enumclaw	Landfill closed. Replaced with new transfer station in 1993.
Recommendation IV.15	Hobart	Close landfill in 1994.
Recommendation IV.16	New transfer facilities	Place on hold pending the outcome of Growth Management Act initiatives
	Other Recommendations	
Recommendation IV.17	Role of Transfer System	Develop a study on the role of the transfer system.
Recommendation IV.18	System Use Data Collection	Collect current data on transfer system usage, programs, and regulations.



TRANSFER STATIONS

CLOSE
- Houghton Transfer Station
- Renton Transfer Station
- Algona Transfer Station

UPGRADE
- First Northeast Transfer Station

UPGRADE OR REPLACE
- Factoria Transfer Station
- Bow Lake Transfer Station

RURAL LANDFILLS TO BE CLOSED AND REPLACED WITH TRANSFER STATIONS
- Hobart Landfill

NEW TRANSFER STATIONS
- Northeast Lake Washington Area
- Factoria Area
- Middle Snoqualmie
- Intersection of SR-18 and I-90
- Tukwila Area (if Bow Lake cannot be upgraded)
- South County Area
- Hobart

Figure IV.6 King County Solid Waste Division service areas and facility recommendations.

Table IV.17 Transfer Station Implementation Schedule

Program Name	1992	1993	1994	1995	1996	1997	1998
Enumclaw Transfer Station							
Complete design and begin construction							
Complete construction							
Begin operation							
Factoria Transfer Station							
Complete EIS							
Begin site acquisition							
Begin preliminary design							
Complete property acquisition							
Begin final design							
Complete final design							
Begin construction							
Complete construction							
South King County Area Transfer Station							
Begin site selection							
Begin EIS							
Complete EIS							
Complete site selection							
Begin design							
Complete design							
Begin construction	After 1998						
End construction	After 1998						
Northeast Lake Washington Area Transfer Station							
Begin site selection							
Begin EIS							
Complete EIS							
Complete site selection							
Begin design							
Complete design							
Begin construction							
Bow Lake Transfer Station							
Begin Master Facility Plan							
Complete Master Facility Plan							
First Northeast Transfer Station							
Begin Master Facility Plan							
Complete Master Facility Plan							
Northeast Area Transfer Facility							
Begin siting study							
Begin site selection							

C. DISPOSAL

King County's disposal system for mixed municipal solid waste (MMSW) consists of the regional landfill at Cedar Hills, and two rural landfills at Hobart and Vashon (Figure IV.7). This 1992 Plan update evaluates the adequacy of this system and recommends appropriate actions to ensure that adequate disposal capacity is available and environmentally sound. Specific state and county requirements of the Plan include:

- Use of a 20-year planning horizon for disposal capacity.
- Inclusion of a six-year capital construction plan.
- Demonstration of compliance with the King County Solid Waste Regulations (King County Board of Health Code, KCBOHC Title 10) for solid waste handling or demonstration of a compliance plan.
- Demonstration of financial assurance for compliance with King County Solid Waste Regulations, specifically closure and post-closure maintenance.

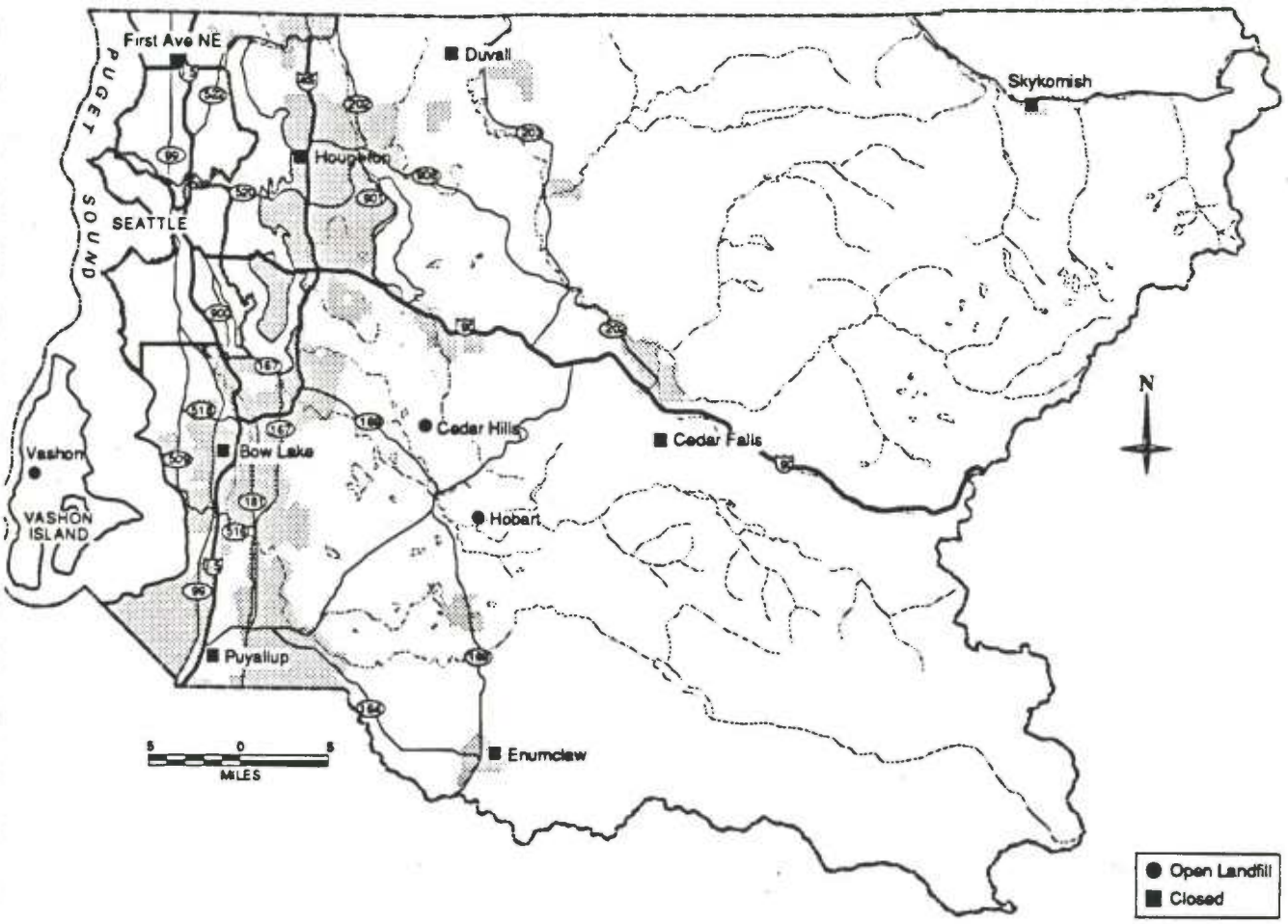


Figure IV.7 Existing and inactive landfills. Note: The First Northeast facility was built on the Corliss site.

1. Existing Conditions

a. Disposal Facilities and Capacity

The Cedar Hills Regional Landfill receives over 97 percent of the municipal solid waste generated in the King County system (which excludes the city of Seattle). The rural landfills receive waste from large but sparsely populated rural areas in their immediate vicinity.

The 1989 Plan recommended closing all of the rural landfills except Vashon and replacing them with drop-boxes or transfer stations (1989 Plan recommendations are summarized in Table IV.18). Waste collected at these new transfer stations will be transported to Cedar Hills for disposal.

Completion of the Enumclaw transfer station has brought all of the King County solid waste disposal system (excluding Vashon Island) into the Cedar Hills service area.

(1) Cedar Hills

Cedar Hills has six years of built capacity remaining and room to construct additional capacity for the 20-year planning horizon. Its remaining permitted capacity (land use permit and soils balance) is approximately 45 million cubic yards. This capacity may need to be reduced depending on a planned facility needs assessment (see Master Facility Plan, Section IV.C.1.c).

Figure IV.8 illustrates how the three planning forecast scenarios described in Chapter II, Section B would impact the remaining capacity of the Cedar Hills Landfill. Under the 1987 planning forecast (trends) scenario, the County could anticipate a remaining capacity of approximately 18 years without the implementation of aggressive WR/R goals. Conversely, if the County reaches its WR/R goal of 65 percent in the year 2000, Cedar Hills' remaining capacity increases significantly—to 27 years (2019). The 35 percent WR/R scenario would mean a remaining capacity of 21 years (2013) while the 50 percent scenario equates to a closure date of 2016, or 24 years of remaining capacity.

The *Cedar Hills Regional Landfill Draft Site Development Plan* (Site Development Plan, CH2M Hill, 1987) and associated Draft Environmental Impact Statement (Draft EIS) were completed in December 1987. The draft Site Development Plan was prepared concurrently with a Draft EIS that compared relative environmental impacts of development alternatives. Its purpose was to provide sufficient information to support a modified land use permit, if required.

Table IV.18 Summary of 1989 Plan Disposal Recommendations

Recommendation	Description	Implementation Status
Hobart	Close, replace with transfer station	Landfill closure to begin in 1994. Complies with MFS. Landfill will be replaced with existing facilities.
Enumclaw	Close, replace with transfer station	Closed
Cedar Falls	Close, replace with drop-box	Implemented 1989
Vashon	Upgrade	Implemented 1989, complies with all MFS except Performance Standard Groundwater
Wet-site landfill standards	Meet state wet-site landfilling standards for any out-of-county disposal sites.	Not applicable
Transshipment facility study	Continue to examine development of a transshipment facility in cooperation in one or more other Puget Sound governments.	Preliminary data shows not enough data to complete.
Regional landfill site availability study	Evaluate available land suitable for siting a new regional landfill.	Analysis was not performed. Evaluation for CDL site mapped areas of county suitable for siting a landfill
Cedar Hills Regional Landfill	Continue operation as the primary disposal facility.	Complies with MFS except for Performance Standard Groundwater and Performance Standard Gas in older areas of the landfill. Remediation projects are nearing completion.

The preferred alternative would modify the use permit to allow placement of support facilities in the 1,000-foot buffer zone and allow soils stockpiling in the southern and western buffers. The proposal maintained 250 feet of existing buffer in its natural state around the perimeter and a 1,000-foot buffer from any areas of landfilling. It would have increased the area available for landfilling to 355 acres and increased the remaining capacity to approximately 45 million cubic yards. It included development of eight separate disposal areas, four of which have already been constructed. A second stage of landfill development was proposed that would involve placing two to four lifts of refuse on top of the eight disposal areas. A western buffer stockpile would have been constructed during the construction of Refuse Area 5.

The proposed expanded capacity—to 45 million cubic yards—is based on a revised soils balance that would increase the life of the landfill by increasing the depth of excavation and therefore capacity. The draft Site Development Plan proposed moving support facilities, such as the administrative offices and the operation and fleet maintenance facilities, to the property's southern buffer. These modifications would require a revised land use permit.

(2) Hobart Landfill

The Hobart Landfill has a remaining capacity of approximately 100,000 cubic yards and is projected to close in 1994. To preserve its remaining capacity, commercial haulers and vehicles with greater than 8,000-pound gross capacity are prohibited from using the site. A replacement is not planned for Hobart as there is adequate service capacity at other facilities in the area.

(3) Enumclaw Landfill

The Enumclaw Landfill was granted a variance by the Seattle-King County Department of Public Health (the Health Department) from some of the King County Solid Waste Regulations (Section IV.C.1.b and KCBOHC Title 10) that allowed it to remain in operation until May 1993. The landfill is no longer accepting waste and closure is now in progress.

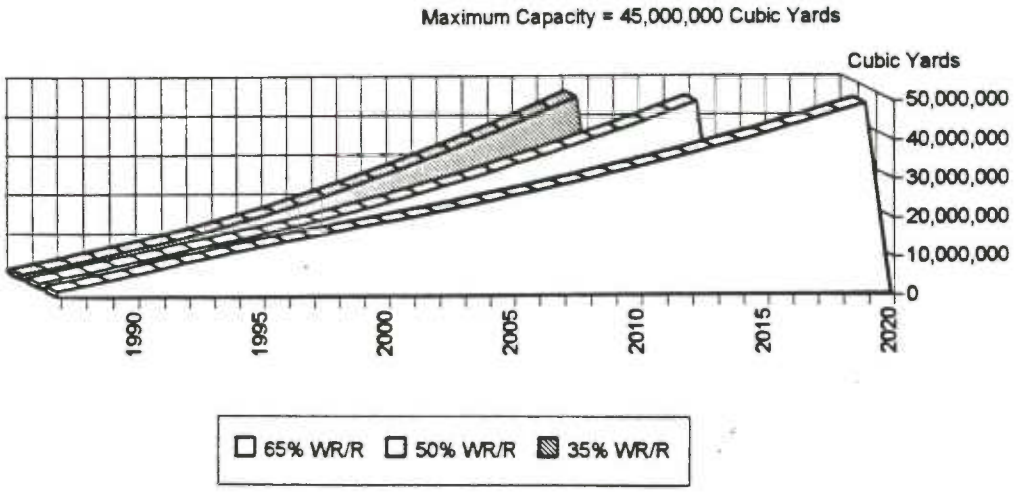


Figure IV.8 Projected Cedar Hills lifespan using alternative disposal forecasts.

(4) Vashon Landfill

New disposal capacity has been developed at the Vashon Landfill consistent with the 1989 Plan (see Table IV.18). The Vashon Landfill has over 10 years of built capacity remaining and room to construct additional capacity for the 20-year planning horizon. The service area for the Vashon Landfill is Vashon Island.

An application for designation as a sole source aquifer has been filed for Vashon Island with the U.S. Environmental Protection Agency (EPA). There are no provisions prohibiting landfills over sole source aquifers in federal regulations, but the King County Solid Waste Regulations have a location standard, which states that "no landfill shall be located over a sole source aquifer" (KCBOHC 10.32.020.B.2). It is unclear how this standard would apply to facilities that existed before a sole source designation was made.

(5) Waste Export Evaluation

The 1989 Plan, in accordance with King County Ordinance 8771 (KCC 10.22.030) recommended that the County continue to operate Cedar Hills and develop and evaluate a Request for Proposals (RFP) for exporting a portion of the County's MMSW stream. If a waste export proposal were selected for implementation, the 1989 Plan recommended that Cedar Hills continue to be operated at a level adequate to allow its use as a back-up facility in the event of an emergency (Table IV.18).

During 1991, the County conducted a preliminary feasibility analysis of the waste export option. It was decided that before an RFP could be issued, the County would need to evaluate:

- Which loads would be targeted for Cedar Hills and waste export.
- Specific transfer facility and transportation fleet requirements for an out-of-county system.
- Equipment, personnel, and contracting options needed to allow use of Cedar Hills as a back-up facility.
- The effectiveness of Seattle's and Snohomish County's transition to an out-of-county landfill.

Preliminary analysis indicates that to obtain maximum benefits from an out-of-county option, compaction units would need to be installed at transfer stations identified for waste export disposal. The feasibility of retrofitting existing transfer stations was examined in the *King County Preload Compaction Feasibility Study* (CH2M Hill, 1992). The County found that it would not be cost-effective to install compaction units at any existing transfer stations except for Bow Lake and First Northeast. Bow Lake is the only facility for which the potential benefits of retrofitting for preload capability exceed the costs of required modifications for the existing system of transfer and disposal. The study also recommended that any new transfer stations (Section IV.B) and planned transfer station facility replacements be designed with preload capability to improve the existing system's performance.

If waste export were to be implemented, King County would need higher payloads per trailer in order to be economically justifiable. Only those loads originating at transfer stations with compaction capability could be economically designated for out-of-county disposal.

The Solid Waste Division is continuing to evaluate the pros and cons of waste export, in 1993. Specifically, the Division is conducting analyses to:

- Evaluate the effectiveness of Seattle and Snohomish County out-of-county contracts, which do not include local backup capacity.
- Evaluate the equipment and personnel needs and contracting options necessary to allow use of Cedar Hills as a backup facility.
- Evaluate system alternatives for targeting how loads could be distributed between Cedar Hills and an out-of-county facility.
- Define specific facility and transportation fleet requirements required for a transition to partial out-of-county landfilling.
- Assess the financial impacts and the effects on rates by the waste export strategy.

(6) Land Availability for Future Landfills

Although the impacts of a new regional landfill were discussed in the Programmatic Environmental Impact Statement (PEIS), Ordinance 8771 (KCC Title 10) did not give specific policy direction to evaluate this alternative in the 1989 Plan. That Plan stated that the need for a new regional landfill would depend on the status of any out-of-county disposal

proposal and evaluation of the need for local back-up capacity. The 1989 Plan recommended deferring evaluation of these factors to the Plan update, though it did recommend evaluating the availability of land suitable for siting a new regional landfill. This analysis was not performed. However, an evaluation of land in King County suitable for development of a construction, demolition, and landclearing (CDL) debris landfill was performed by R.W. Beck and Associates (1991) as one of several studies in support of the County's ultimate decision regarding CDL waste handling. The study was limited to mapping areas of the County that would be suitable or unsuitable for siting a landfill, based on locational criteria. The study found that central King County contains large areas that, on a regional basis, would meet locational criteria. It did not look at the suitability of specific sites.

b. King County Solid Waste Regulations Compliance Demonstration

Pursuant to RCW 70.95.090, The Department of Ecology's (Ecology) *Guidelines for the Development of Local Solid Waste Management Plans and Plan Revisions Planning Guidelines* (Ecology Guidelines, WDOE 90-11, 1990) require that the Plan demonstrate that existing facilities are in compliance with the requirements and standards for solid waste handling facilities or recommend a program to ensure that solid waste facilities meet them.

The requirements and standards that apply to all solid waste handling facilities—landfills, transfer stations, compost facilities, and surface impoundments—are found in King County Solid Waste Regulations (KCBOHC Title 10) and the state Minimum Functional Standards (MFS, WAC 173-304). Subsections that apply to disposal facilities include location standards, general facility requirements, surface impoundment standards, landfilling standards, and groundwater monitoring requirements. The status of each of King County's operating landfills with respect to these standards is presented in Table IV.19.

c. Capital Construction Plan for Disposal Facilities

The Solid Waste Division has a six-year capital improvement program (CIP) that includes capital projects to upgrade existing facilities and maintain or expand service levels and disposal capacity (see Volume II, Appendix K). The CIP is funded by bond proceeds and revenue deposited in a landfill reserve fund (LRF). In general, the LRF finances new disposal area development, closure, and post-closure maintenance. The remainder of the CIP is funded through bond proceeds. Projects related to disposal facilities and projected expenditures from 1992 through 1997 are given in Table IV.20.

The cost estimates are based on standard engineering estimating techniques, estimates prepared for the draft Site Development Plan, bids for similar projects, engineering reports, and actual bids. They reflect the 1992 adopted CIP budget.

The Solid Waste Division prepares project status reports quarterly (more frequently when needed). The reports include funding sources, cumulative authorizations, projected total budget, original commitment, approved changes, current commitment and obligation, pending changes, expenditures, estimated expenditures to completion, cost at completion, variance budget, variance authorization, unencumbered authorization, and unobligated authorization. Individual projects are described in Table IV.20.

d. Financial Assurance Demonstration

The King County Solid Waste Regulations have requirements related to financial assurance for public facilities owned or operated by municipal corporations that relate to closure and post-closure maintenance. Closure and post-closure maintenance costs are to be estimated and financial assurance funds for them generated by transferring a percentage of facility disposal fees to a nonexpendable trust fund or one established with an entity that can act as a trustee and whose trust operations are regulated and examined by a federal or state agency. King County has adopted the latter method of financial assurance.

Table IV.19 Status of Conformance with County and State Standards

	Cedar Hills	Hobart	Enumclaw	Vashon
Location Standards				
Geology constraints	Conforming	Conforming	Conforming	Conforming
Groundwater constraints	Conforming [a]	Conforming [b]	Conforming	Conforming
Sole source aquifer constraints	Conforming	Conforming	Conforming	Conforming [c]
Down-gradient drinking water supply well constraint	Conforming	Conforming	Conforming	Conforming
Flooding constraints	Conforming	Conforming	Conforming	Conforming
Surface Water constraints	Conforming	Conforming	Conforming	Conforming
Slope constraints	Conforming [d]	Conforming	Conforming	Conforming [d]
Land Use constraints	Conforming	Conforming	Conforming	Conforming
General Facility Requirements				
Plan of operation	Conforming	Conforming	Conforming	Conforming
Recordkeeping	Conforming	Conforming	Conforming	Conforming
Reporting	Conforming	Conforming	Conforming	Conforming
Inspections	Conforming	Conforming	Conforming	Conforming
Surface Impoundment Standards	Conforming	Conforming	Conforming	Conforming
Landfilling Standards				
Performance standard groundwater	Nonconforming [e]	Conforming	Conforming	Nonconforming [f]
Performance standard gas	Nonconforming [g]	Conforming	Nonconforming [h]	Nonconforming [i]
Performance standard surface water	Conforming	Conforming	Conforming	Conforming
Daily cover	Conforming	Conforming	Conforming	Conforming
Noncontainerized liquid prohibition	Conforming	Conforming	Conforming	Conforming
Surface water run-on control	Conforming	Conforming	Conforming	Conforming
Surface water run-off control	Conforming	Conforming	Conforming	Conforming
Leachate collection system	Conforming [j]	Conforming [k]	Conforming [l]	Conforming [m]
Leachate pretreatment	Conforming	N/A	N/A	Conforming
Liner design	Conforming [j]	N/A [k]	N/A [l]	Conforming [m]
Closure design	Conforming	Conforming	Conforming [j]	Conforming [j]
Gas control	Conforming	Conforming	Conforming	Conforming
Recycling	N/A [n]	Conforming	Conforming	Conforming
Groundwater Monitoring Requirements	Conforming	Conforming	Conforming	Conforming

Notes:

[a] New refuse areas being developed at Cedar Hills will have greater than a 10-foot separation between the bottom of the refuse and the uppermost aquifer capable of yielding significant amounts of groundwater to wells or springs. New areas at Cedar Hills may not provide a 10-foot separation between the bottom of the liner and saturated lenses capable of yielding monitorable quantities of water to an approved monitoring device. Ecology Technical Information Memorandum No. 88-2, (October 24, 1988) defined *monitorable quantity* to be the locational standard, while the Solid Waste Division believes the *significant amounts* definition is the standard established by rule. However, new areas will be constructed with underdrain systems to prevent any buildup of hydrostatic pressure under the liner.

[b] In the past, seasonally high groundwater-saturated portions of the in-place waste at the Hobart Landfill. A slurry wall and groundwater extraction system have been subsequently constructed. This system lowers groundwater levels within the refuse, and prevents the movement of water through the slurry wall, effectively isolating groundwater beneath the landfill from the surrounding aquifer.

(Notes continued on next page)

Notes (continued):

[c] A sole-source aquifer petition was submitted to EPA for Vashon Island. It is unclear how this provision will apply to existing landfills.

[d] With respect to slope and land use, the active and closed areas of the Vashon and Cedar Hills landfills are not located where slopes are unstable. Ecology Technical Memorandum 89-1 (February 15, 1989) considers existing refuse to be unstable while the Solid Waste Division does not believe this to be a proper extension of the intent of the prohibition as established by rule.

[e] Impacts to shallow groundwater from older waste areas have been observed at Cedar Hills. Remedial measures in the form of improving existing leachate collection and closing completed areas have been completed in the previous plan period. Others, including collection and treatment of shallow groundwater impacted by landfilling activities, are in progress and ongoing. Groundwater quality is monitored to observe improvements.

[f] Impacts to shallow groundwater from older waste areas have been observed at Vashon Landfill. Remedial measures in the form of closing completed areas were completed in the previous plan period. Groundwater quality is being monitored to observe improvements.

[g] Although an in-waste active gas collection system was installed, landfill gas migration is occasionally observed during periods of low pressure. A series of migration controls were recently installed with a source of vacuum independent of the in-waste extraction system. Since installation, no migration has been observed; however, a prolonged low-pressure period has not occurred since installation.

[h] Although an active gas collection and flare system was installed in the closed (northern half) section of the landfill, landfill gas migration is occasionally observed during periods of low pressure. Final closure in 1992 will entail the construction of gas collection facilities in the southern half of the site.

[i] Although a passive in-waste gas collection system was installed, gas migration is occasionally observed during periods of low pressure. A consultant has been retained to make recommendations regarding improving performance of the gas extraction system.

[j] All areas at Cedar Hills designed, constructed, and operated subsequent to September 1986 are in conformance with the design requirements of MFS. Areas operated prior to the adoption of this regulation were not constructed in conformance with the liner and leachate collection requirements of the 1985 update. Consistent with the requirements of this regulation, these areas have been closed. An apparent leachate mound was observed in the main refuse hill, one of the closed areas. Horizontal borings and leachate extraction wells were installed to reduce this mound. Their performance is monitored to establish whether other measures are necessary.

[k] The Division applied for a variance from liner design standards in 1989. The Seattle/King County Department of Public Health advised that a variance was not required because, in their opinion, the slurry wall qualified as an equivalent design under WAC 173-304-460 (3) (c) (iii) in that it minimized the migration of solid waste constituents or leachate into groundwater and functioned at least as effectively as the standard and alternative designs allowed by the code.

[l] The Solid Waste Division proposes to close this facility in 1994. The Division has received a 3-year variance from the effective date of the landfilling standards (November 1989). Specifically, these are WAC 173-304-460(3)(b), *Leachate Systems*, and WAC 173-304-460(3)(c), *Liner Designs*. Partial closure incorporating a geomembrane cover system and the construction of surface water and combustible gas control are expected to mitigate impacts during continued operation. These improvements were completed in 1989.

[m] The area currently being filled at the Vashon Landfill has been designed, constructed, and operated in conformance with the design requirements of the MFS. Areas operated prior to the adoption of this regulation were not constructed in conformance with the liner and leachate collection requirements of the 1985 update. Consistent with the requirements of this regulation, these areas were closed.

[n] Cedar Hills Landfill is not open to the general public and is therefore not required to provide recycling opportunities for the general public.

Table IV.20 Estimated Costs of Disposal System Improvements

Project Description	Prior Expenditures	1992 Budget	1993	1994	1995	1996
Cedar Hills Projects:						
Construction of Refuse Area 5	(see Table IV.21)					
Construction of Refuse Area 4	20,457,433	1,342,665	completed			
Closure of Refuse Area 2/3	456,696	7,883,204	completed			
Closure of SW Main Refuse Hill	241,429	8,795,771	completed			
Leachate pretreatment	174,686	6,050,314	construction delayed			
Leachate head reduction	2,950,033	648,207	monitoring			
Active gas collection	20,497,383	1,150,261	completed			
Water supply	802,925	1,505,096	completed			
Retention/detention	549,491	550,509	completed			
Eastside leachate system improvements		1,004,500	completed			
Expanded aquifer monitoring		355,270	completed			
Master facility plan		250,000	completed			
Vashon Projects:						
Vashon closure	4,521,857	344,968	completed			
Vashon new area development			97,000	402,000	5,371,000	110,000
Vashon final cover				68,400	325,000	4,116,000
Enumclaw Projects:						
Enumclaw closure	2,431,520	2,800,786	completed			
Hobart Projects:						
Hobart closure	8,654,838	3,016,806	370,000	1,188,430		
Group NPDES Permit for Landfills		226,000	completed			

King County has developed an LRF funded through disposal fees. Contributions are determined in the rate study process. Specific reserve accounts related to currently active disposal sites are:

- Cedar Hills New Area Development Account
- Cedar Hills Facility Relocation Account
- Cedar Hills Closure Account
- Cedar Hills Post-closure Maintenance Account
- Cedar Hills Replacement Landfill Development Account
- Vashon New Area Development Account
- Vashon Closure Account
- Vashon Post-closure Maintenance Account
- Hobart Closure Account
- Hobart Post-closure Maintenance Account
- Enumclaw Closure Account
- Enumclaw Post-closure Maintenance Account

Contributions to these accounts are adjusted in every rate period and are evaluated more often as appropriate. Each account is funded through a dedicated component of the disposal fee, which takes the form of a fixed dollar assessment per ton. A disposal fee component is calculated that will make the present value of projected expenditures equal the present value of projected revenue over the life of the landfill.

Of the landfill reserve accounts, only closure and post-closure accounts are required by state law. King County has elected to provide financial assurance for other activities, such as new area development and facility relocation, through the same mechanism. (The financial status of the various accounts is presented in detail in Volume II, Appendix K.)

2. Needs and Opportunities

King County solid waste disposal needs fall into several categories: facilities availability and capacity, compliance with King County Solid Waste Regulations (KCBOHC Title 10), capital improvement, and closure and post-closure activities and funding. Disposal facilities are needed to serve all areas of the County. Their capacity or that of their planned replacements must be adequate to meet this need over the next 20 years. While the Cedar Hills Landfill has sufficient capacity, additional disposal capacity should be planned for the future.

Existing and planned disposal facilities must comply with the KCBOHC Title 10. There are also some specific facility needs independent of capacity or KCBOHC Title 10 compliance. Capital projects are necessary to upgrade existing facilities and maintain or expand service levels and disposal capacity. Closure and post-closure maintenance activities must be planned and adequate funding ensured.

a. Disposal Capacity

(1) Cedar Hills

The draft Site Development Plan for Cedar Hills needs to be updated and finalized. The Cedar Hills Special Use Permit, issued by the King County Board of Commissioners in 1960, requires that a 1,000-foot buffer strip surrounding the entire site be maintained in its natural state. This buffer limits the area of land currently available to be landfilled to approximately 300 acres. Excluding the solid waste already in place, the site has a remaining capacity of 45 million cubic yards under existing permit conditions.

After the draft Site Development Plan and Draft EIS were published, the Solid Waste Division identified several factors that will require modifications to these two documents:

- Comments received on the draft Site Development Plan and associated EIS.
- Revised operating assumptions.
- Revised tonnage forecasts.
- Changing regulations governing solid waste disposal facility design.

Comments received from the public on the draft Site Development Plan were very critical of two elements: (1) developing a stockpile in a buffer zone bordering on a residential neighborhood and (2) the concept of a second stage of development. Residents preferred filling to a higher initial height than a second stage of filling, and requested additional information regarding noise, traffic, and property values in the vicinity.

Revised operating assumptions are also expected to result in modifications. The draft Site Development Plan assumed that refuse densities, solid waste settlement, and daily and interim cover used would be similar to those recorded in the past at other facilities. Since publication of the draft Site Development Plan, the Solid Waste Division's operating statistics indicate that in-place densities being achieved at Cedar Hills are higher than draft Site Development Plan assumptions, that settlement is lower, and that daily and interim cover use are higher.

Revised tonnage forecasts are likely to impact the number and size of future disposal areas. Based on tonnage assumptions of the draft Site Development Plan, disposal areas were planned to have a two- to four-year capacity. This capacity reflects a balance between the need to keep disposal areas as small as practicable to minimize leachate production and the need to allow time for design and construction for subsequent disposal areas. Current tonnage forecasts are considerably lower than forecast, which—using the criteria above—is likely to result in modifications to include more, but smaller, disposal areas.

Planned disposal areas need to be revised based on modifications to operating assumptions and public comment. Support facility needs and proposed locations need to be reevaluated and included in the draft Site Development Plan revisions, and modifications may need to be obtained for the land use permit.

(2) Hobart Landfill

Hobart landfill has 100,000 cubic yards of capacity remaining and is expected to close in 1994. It has been established that there is adequate service capacity in the area without replacing the Hobart facility. Cedar Hills, Renton, and Bow Lake landfills are in close proximity to the Hobart service area.

(3) Enumclaw Landfill

The Enumclaw Landfill has been replaced by the new Enumclaw Transfer Station. The landfill is no longer accepting waste and the closure process has begun.

(4) Vashon Landfill

The Vashon Landfill has over ten years of built capacity remaining and room to develop additional capacity. However, there are outstanding issues related to the use and cost of this capacity.

An application for designation as a sole source aquifer has been filed for Vashon Island with the U.S. Environmental Protection Agency (EPA). There are no provisions prohibiting landfills over sole source aquifers in federal regulations, but the King County Solid Waste Regulations have a location standard, which states that "no landfill shall be located over a sole source aquifer" (KCBOHC 10.32.020.B.2). It is unclear how this standard would apply to facilities that existed before a sole source designation was made. This issue must be clarified, and continued use of the Vashon Landfill should be evaluated.

Leachate transport and treatment must also be considered. Leachate currently collected at the Vashon Landfill is stored in an aerated lagoon, then hauled via tanker truck and ferry and discharged to the Metro wastewater treatment system in West Seattle. This is sometimes a problem because leachate can only be hauled when ferries are operating. There is a need to either provide additional storage to anticipate ferry down times, or develop an alternative treatment facility on the island.

In evaluating the impact of a sole source aquifer designation and leachate handling alternatives for the Vashon Landfill, King County should determine whether the landfill should be replaced with a transfer station.

(5) Waste Export

The projected life of the Cedar Hills Landfill is 27 years if the 65 percent recycling goal is met in the year 2000. Because Cedar Hills is expected to be the last MMSW landfill of its size to be operated in the County, there is a need to extend the life of the landfill beyond the 27-year projection. Although studies indicate that land maybe available for future landfills (Section IV.1.a.6), environmental issues and community resistance make siting a new in-county landfill unlikely.

Exporting a portion of the County's MMSW waste stream is a possible method of extending the life of the landfill. King County is continuing to examine a waste export strategy (Section IV.1.a.5) in order to complete an evaluation of the impacts of waste export before an RFP is issued.

b. King County Solid Waste Regulations Compliance

There are four areas of noncompliance and one area of potential noncompliance with the regulations that need to be addressed. These are described below.

(1) Cedar Hills Groundwater

Impacts to shallow groundwater from older unlined waste areas have been observed at Cedar Hills. This shallow groundwater is not a source or potential source of drinking water and the extent of the area of the impacted shallow groundwater formations and their impacts is limited to the Cedar Hills site. Remedial measures (improved existing leachate collection and closing of completed areas) have been completed. Others, including collection and treatment of shallow groundwater impacted by landfilling activities, are in progress and ongoing. Leachate extraction wells and horizontal borings were installed into the waste and are being monitored to determine the effectiveness of the remedial measures. Also, in response to impacts to shallow groundwater observed on the east side of the landfill near a gap in the leachate collection system, groundwater extraction wells were designed and are expected to become operational in the second quarter of 1993. There will be a continuing need to monitor and evaluate the effectiveness of these systems.

(2) Cedar Hills Landfill Gas

Although an in-waste gas collection system was installed at Cedar Hills, landfill gas migration has been observed during periods of low barometric pressure. A series of migration control wells was installed with a source of vacuum independent of the in-waste gas extraction system. Since installation, no migration has occurred. However, a prolonged period of low pressure has not occurred since the control wells were installed. There is a continuing need to monitor and evaluate the in-waste and migration control gas extraction systems.

(3) Enumclaw Landfill Gas

An active gas collection and flare system was installed in the closed (northern half) section of the Enumclaw Landfill; however, gas migration has been occasionally observed during periods of low barometric pressure in the southern part of the site. Closure of the southern half of the landfill will be completed in 1993 and will entail constructing active gas collection facilities there. The effectiveness of the existing and planned extraction system will need to be monitored and evaluated to determine if additional measures are required.

(4) Vashon Island Landfill Groundwater

Impacts to shallow groundwater from older waste areas have been observed at Vashon Landfill. Remedial measures in the form of closing completed areas are concluded. There is a continuing need to monitor and evaluate these measures.

(5) Vashon Landfill Sole Source Aquifer Designation

Since a sole source aquifer designation was applied for with respect to Vashon Island's water supply, there is a need to clarify the effect of such an action on the compliance status of the Vashon Landfill, particularly with respect to the locational constraint to sole source aquifers in the King County Solid Waste Regulations (KCBOHC Title 10).

c. Capital Construction Plan for Disposal Facilities

There is a need to update the *Capital Construction Plan* described in Section IV.C.1.c. As identified in Table IV.21, there is a need to accelerate development of Refuse Area 5 at Cedar Hills because of short-term changes in forecasted tonnage due to closure of the Newcastle Landfill. There is a parallel need to reevaluate its planned size and capacity.

Although a recent capacity assessment indicates that Vashon new area development and final cover projects can be delayed from the schedule in Section IV.C.1, these projects need to be reevaluated in relation to the possible sole source aquifer designation. A capital project to support modifications to the existing leachate handling and transport system also needs to be developed. This need will have to be addressed regardless of whether or not the Vashon Landfill is replaced by a transfer station.

It is essential to address the impact of new and pending regulations on facility capital costs. Amendments to Subtitle D of the Federal Resource Conservation and Recovery Act (RCRA) have included new design criteria that will impact capital costs. The primary impact of this regulation on capital construction program costs are closure costs for Refuse Area 4 and future landfill units at Cedar Hills. This need will be addressed under Section IV.C.2.d, Financial Assurance.

The Solid Waste Division also needs to continue to monitor and evaluate the impacts of proposed revisions to the MFS (WAC 173-304) on its *Disposal System Capital Construction Plan*.

Developing regulations resulting from recent amendments to the federal Clean Air Act may also impact capital construction planning, specifically, the design of gas extraction and leachate treatment facilities. Until proposed regulations are developed, it is difficult to assess the impact these might have on capital construction planning.

d. Financial Assurance

As described under existing conditions, King County has established a landfill reserve fund with several individual accounts, each held in trust and funded by fixed fees per ton.

Table IV.21 Disposal System Project Descriptions and Status

Cedar Hills Projects:	
Construction of Refuse Area 5	This is not currently included in the six-year CIP. However, new tonnage forecasts indicate the need to begin design in the current six-year period. Funds are available to be reprogrammed from unobligated project balances to support design of this project.
Construction of Refuse Area 4	Construction of Cedar Hills Refuse Area 4 has been completed. Remaining activities associated with this project are support to operations in the form of an erosion control plan, gas collection plan, stormwater collection plan, and lift sequencing plan. Warranties and guaranties are also being tracked. Remaining activities were completed in 1992.
Closure of Refuse Area 2/3	Design has been completed for the closure of Cedar Hills Refuse Area 2/3 and a contract has been awarded. This project was completed in December 1992.
Closure of SW Main Refuse Hill	Design has been completed for the closure of the Cedar Hills Southwest Main Refuse Hill and a construction contract has been awarded. This project is expected to be completed in December 1992.
Leachate Pretreatment	This project is phased to construct additional leachate pretreatment steps at the Cedar Hills Landfill in response to Metro costs and pretreatment standards. Conceptual design alternatives have been evaluated for this project. The total project cost will be reestimated after final design.
Leachate Head Reduction	This is a project that has been phased to evaluate the feasibility of extracting leachate from the Main Refuse Hill at Cedar Hills. Leachate extraction wells and horizontal borings have been constructed and are being monitored to determine their effectiveness. Residual project balance is being used to support monitoring and additional facility recommendations if required.
Active Gas Collection	This was a project to construct an active gas collection system for the landfill and closed unlined areas at Cedar Hills. It was phased over several years and closure projects were completed in 1990. Remaining work being performed under this project relates to improving the landfill gas migration control system, which will be completed in 4th quarter 1994.
Existing Water Supply	The existing water supply at Cedar Hills was inadequate to meet current nonpotable needs and is not in conformance with some Health Department potable water requirements. Specifically the water supply well was located closer to existing refuse than allowed by code. A potable water supply line connecting Cedar Hills to Water District 90 has been constructed and connected. A nonpotable water supply reservoir to supply fire protection to Cedar Hills and the Alcoholism Treatment Center has been designedand will be completed in August 1993.
Retention/Detention	This project involved improvements to Cedar Hills stormwater collection and retention/detention systems in response to King County Surface Water Design Standards, Minimum Functional Standards, and National Pollutant Discharge Elimination System (NPDES) requirements. Several surface water retention/detention systems have been completed and the remaining project balance is being held to support modifications that may be required by an NPDES Permit (see later discussion of group NPDES Permit for Landfills).
Eastside Leachate System	This is a project developed in response to observation of some impacts to shallow groundwater on the east side of the Cedar Hills Landfill near a gap in the leachate collection system. Design of a series of groundwater extraction wells has begun and construction is expected to be completed in 2nd quarter 1993.

[continued on next page]

Project Descriptions and Status (Continued)

Vashon Projects	
Expanded Aquifer Monitoring	This project supports construction of additional monitoring wells at Cedar Hills. It is currently in the consultant selection phase and is projected to be completed in 1st quarter 1993.
Cedar Hills Master Facility Plan	This plan will provide a guide for locating, siting, and constructing administrative, operating, and maintenance facilities at Cedar Hills. Its purpose is to anticipate and plan for facilities in a logical and fiscally sound manner. The consultant contract has been signed. Draft alternatives are expected to be completed in the 2nd quarter of 1993.
Vashon Landfill Closure	The Vashon Landfill Closure project provided for construction of a low-permeability cap over the existing landfill in conformance with the King County Solid Waste Regulations (KCBOHC Title 10). Leachate handling facilities, landfill gas control, surface water control, and a scale were also included. The remaining project balance is being used to support preliminary design of leachate transport and pretreatment alternatives. Leachate is currently being trucked off the island.
Vashon New Area Development	This project supports the design and construction of additional capacity at the Vashon Landfill. A recent capacity assessment indicates that this project can be delayed from the schedule shown.
Vashon Final Cover	This project supports closure design and construction of the existing disposal area at Vashon Landfill. As was the case with Vashon New Area Development, a recent capacity assessment indicates that this project can be delayed form the schedule shown.
Enumclaw Projects	
Enumclaw Closure	This is a two-phase project involving the closure design and construction of the Enumclaw Landfill. Phase I closure was completed in 1989; Phase II closure is scheduled to be completed in October 1993.
Hobart Projects	
Hobart Closure	This is another two-phase project. Phase I closure was completed in 1989 and Phase II closure is planned to occur in 1994.
Group NPDES Permit	
NPDES Permit Application	The Solid Waste Division has received baseline general permits for the Cedar Hills and Vashon landfills. Stormwater Pollution Prevention Plans are currently being developed and should be completed in the third quarter 1993. Additional projects may result from Stormwater Pollution Prevention Plan development.

There is a need to evaluate the adequacy of this fixed-fee contribution in light of system changes contemplated in this Plan. The current contribution to each account is based on adopted solid waste disposal fees for 1992 through 1994. The *Capital Construction Plan* presented in Section IV.C.1, differs somewhat from the assumptions used to develop rates and may require adjustments. Similarly, any proposed changes to the *Capital Construction Plan* in response to needs presented above may result in changes to the contributions to the individual accounts (See Appendix K).

3. Alternatives

This section describes activities to meet state and local planning and regulatory requirements (facilities compliance, a capital improvement plan (CIP), and financial assurance). It considers the disposal capacity needs of the existing King County solid waste management system and presents some discussion of two other capacity alternatives; a new regional landfill and waste export (out-of-county landfilling).

a. Ongoing Requirements

(1) King County Solid Waste Health Regulations Compliance

Alternatives to complying with the King County Solid Waste Health Regulations (KCBOHC Title 10) are not being considered. The Plan does recommend specific actions to achieve and maintain compliance at all facilities.

(2) Capital Construction Plan

The Capital Construction Plan presented in Appendix K has been proposed in response to legal and capacity requirements. Alternative capital construction plans are not being considered in the 1992 Plan.

(3) Financial Assurance

Financial assurance requirements are established through WAC 173-30-467 and -468. Alternative financial assurance mechanisms are not being considered by the 1992 Plan.

b. Disposal Capacity

There are three major alternatives for future MMSW disposal in King County, which are summarized in Table IV.22. Although the current King County solid waste management system is expected to provide adequate capacity for the 20 year planning period, the policy issues raised in these alternatives also begin to consider longer-term disposal needs and the preservation of existing capacity at the Cedar Hills Regional Landfill.

(1) Alternative A, Existing Facilities

Under this Alternative, the Cedar Hills landfill is recognized as a limited resource. The Solid Waste Division would continue to implement initiatives that would extend the life of Cedar Hills so that it could serve the County's disposal needs beyond the 20-year planning horizon. Hobart Landfill has little remaining capacity and is expected to close in 1994. The Enumclaw Landfill closed in April 1993 and has been replaced by a new transfer station. Under this scenario, all of the King County solid waste planning area except Vashon Island would be a part of the Cedar Hills service area. The Vashon Island Landfill is the only rural landfill that would continue operation. The option to export waste as a means of extending the life of the Cedar Hills landfill would be further evaluated.

Specific activities would include:

- *Cedar Hills.* The draft Site Development Plan and associated Draft EIS would be modified and reissued prior to being finalized. Modifications are underway to respond to revised tonnage forecasts, operating experience, public comment, and potential partial out-of-county disposal. Support facility needs and their proposed locations would be reevaluated. The County's waste reduction and recycling program would be expanded to meet the established WR/R goal of 50 percent by 1995. The major development would be expansion of yard waste collection and processing services available in the County. These would include extending curbside collection to all urban residents, development of a yard waste collection depot system and phased implementation of a yard waste disposal ban. In total, expanded yard waste collection and processing service is estimated to divert an additional 47,000 tons of waste annually by 1995. A separate management system for CDL management that increases waste reduction and recycling and restricts landfilling of CDL at Cedar Hills would also be implemented.
- *Hobart Landfill.* Existing load restrictions would stay in place until the landfill is closed. Periodic assessments would be made to determine if additional load restrictions are warranted.

Table IV.22 Summary of 1992 Disposal Alternatives

Alternative A	Continue to dispose MMSW at Cedar Hills
Alternative B	Dispose MMSW at a new regional landfill
Alternative C	Dispose MMSW in an out-of-county landfill

• *Vashon Landfill.* The impact of a sole source aquifer designation for Vashon Island on the continued operation of the Vashon Landfill should be determined in any alternative scenario. Specific areas of clarification that should be sought are (1) continued use of existing built landfill capacity once a sole source designation is made, and (2) if use of the existing landfill built capacity were to be discontinued, the period of time operation would continue to be allowed. If the sole source designation prohibits continued use of existing built capacity, the Vashon Landfill would be replaced with a drop-box or transfer station.

Replacement of Vashon Landfill with either a transfer station or drop-box would be evaluated both in terms of the economic merits (independent of a sole source aquifer designation) and in terms of the potential impacts of such a designation.

The Solid Waste Division would evaluate additional leachate storage, transport, and treatment alternatives for the Vashon Landfill, and select an alternative.

• *Waste Export.* Although Alternative C outlines a fully developed waste export alternative, Alternative A also includes some analysis of waste export. The economics of waste export alternatives should be compared with the continued operation of Cedar Hills. A back-up level of operation at Cedar Hills would be developed as part of the economic analysis of the three waste export options discussed in Alternative C (Section IV.3.b.1).

• *King County Solid Waste Regulations Code Compliance.* King County Solid Waste Regulations compliance should continue to be monitored in any alternative.

• *Capital Construction Plan.*

The development of Refuse Area 5 at Cedar Hills would be accelerated from the schedule shown in Section IV.C.1.

The schedule for Vashon new area development and final cover projects would be delayed from the schedule shown in existing conditions.

The costs associated with the Capital Construction Plan would be adjusted to be consistent with the updated estimates presented in Volume II, Appendix I.

• *Financial Assurance.* Contributions to individual accounts would be adjusted in the next rate period.

(2) Alternative B, New MMSW Regional Landfill

The requirements for developing a new regional landfill in King County have been explored in the *Solid Waste Facility Siting Plan* (R.W. Beck, June 1989), *In-County Regional Landfill Study,* (R.W. Beck, February 1989), and the *Programmatic Final Environmental Impact Statement of Solid Waste Management Alternatives* (Parametrix, September 1988). Additional information was developed in a related study of land in King County suitable for development of a CDL facility (Technical memorandum from R.W. Beck to Mike Wilkins dated February 4, 1991, WW-1640-EA7-DA). Further consideration of a new regional landfill in King County is not authorized by policy established for the Plan (KCC 10.22.030[1]).

(3) Alternative C, Waste Export

Pursuant to King County Code (KCC 10.22.030[F]) which authorizes out-of-county landfilling of a portion of the waste stream as part of the County's solid waste system, a portion of the County's waste would be exported. Under this Alternative, the County would continue operating Cedar Hills Landfill at an adequate level to allow its use as a back-up system in case of emergencies or failure of the waste export alternative.

The existing King County transport and transfer system is not currently designed to support out-of-county landfilling. Previously considered waste export disposal alternatives have involved some component of rail haul, but the existing transportation fleet (specifically the existing trailer fleet) is not compatible with this method. Existing transfer stations would require modifications involving installation of pre-load equipment to increase the payload of individual trailers. Major facility modifications would be required to allow installation of pre-load compaction equipment (the economics of long haul require that loads be compacted).

King County would assess the level of operation needed at Cedar Hills to maintain it as an emergency backup to waste export and evaluate three possible facility configurations for implementing a waste export strategy. The options are:

• Phased transition to out-of-county disposal as new transfer stations with compactors and existing transfer stations retrofitted with compactors become operational;

- Development of a central transfer and pre-load facility where loads from existing transfer stations could be loaded into suitable containers for rail haul; and,
- Transfer of waste to a private vendor for compaction and transport to a long-haul receiving station.

When the facility configuration and level of operation studies are completed, King County would then assess the financial impact of the preferred waste export strategy on solid waste management activities and the effect the strategy would have on the rate structure.

4. Recommendations

Alternative A, Existing King County Disposal System is recommended for implementation during the planning period. This alternative provides adequate disposal capacity for the entire King County solid waste planning area. It is coordinated with development of the King County transfer system and WR/R goals. It also provides for the continued evaluation of long-term capacity beyond the 20-year planning period by continuing to analyze the feasibility of waste export during the planning period. Based on the results of the analyses conducted, an implementation decision for the waste export program (Alternative C) will be made during the next update to the Plan in 1995.

A summary of disposal recommendations is listed in Table IV.23.

a. Ongoing Requirements

(1) King County Solid Waste Regulations Code Compliance

King County Solid Waste Regulations compliance should continue to be monitored.

(2) Capital Construction Plan

The development of Refuse Area 5 at Cedar Hills should be accelerated from the schedule shown in Section IV.C.1.

The schedule for Vashon new area development and final cover projects should be delayed from the schedule shown in existing conditions.

The costs associated with the Capital Construction Plan should be adjusted to be consistent with the updated estimates presented in Appendix I.

(3) Financial Assurance

Contributions to individual accounts should be adjusted in the next rate period.

b. Disposal Capacity

(1) Cedar Hills

The draft Site Development Plan and associated Draft EIS should be modified and reissued prior to being finalized. Modifications are underway to respond to revised tonnage

Table IV.23 Summary of 1992 Disposal Recommendations

Recommendation IV.19	KCBOHC Title 10 compliance	Continue monitoring compliance.
Recommendation IV.20	Capital construction plan	(a) Accelerate development of the Refuse Area 5, Cedar Hills. (b) Delay Vashon new area development and final cover projects. (c) Adjust costs associated with Capital Construction Plan with updated estimates.
Recommendation IV.21	Financial assurance	Adjust contributions to individual accounts in next rate period.
Recommendation IV.22	Cedar Hills Regional Landfill	Modify draft Site Development Plan and associated Draft EIS.
Recommendation IV.23	Hobart Landfill	Maintain existing load restriction and continue operation until capacity is reached. Close in 1994.
Recommendation IV.24	Enumclaw Landfill	Landfill closed. Closure process initiated.
Recommendation IV.25	Vashon Landfill	(a) Seek clarification on impact of a sole source aquifer designation for Vashon Island on the continued operation of the Vashon Landfill. (b) Evaluate replacement options for the Vashon Landfill. (c) Evaluate leachate storage, transport, and treatment alternatives and select alternative.
Recommendation IV.26	Waste export	Evaluate economics of out-of-county alternatives with continued operation of Cedar Hills; include back-up level operation necessary for Cedar Hills.

forecasts, operating experience, public comment, and potential partial out-of-county disposal. Support facility needs and proposed locations are being reevaluated.

(2) Hobart Landfill

Existing load restrictions should stay in place until the landfill is closed.

(3) Vasbon Landfill

The impact of a sole source aquifer designation for Vashon Island on the continued operation of the Vashon Landfill should be determined. Specific areas of clarification that should be sought are (1) continued use of existing built landfill capacity once a sole source designation is made, and (2) if use of the existing landfill built capacity were to be discontinued, the period of time operation would continue to be allowed, pending transition to another disposal site. If the sole source designation prohibits continued use of existing built capacity, the Vashon Landfill should be replaced with a drop-box or transfer station.

Replacement of Vashon Landfill with either a transfer station or drop-box should be evaluated both in terms of the economic merits (independent of a sole source aquifer designation) and in terms of the potential impacts of such a designation.

The Solid Waste Division should evaluate additional leachate storage, transport, and treatment alternatives for the Vashon Landfill, and select an alternative.

(4) Waste Export

The economics of two waste export alternatives should be compared with the continued operation of Cedar Hills. A back-up level of operation of Cedar Hills should be developed as part of the economic analysis of the three waste export options discussed in Alternative C (Section IV.3.b.1).

5. Implementation

The implementation schedule is shown in Table IV.24.

Table IV.24 Disposal System Implementation Schedule

	Program Name	1992	1993	1994	1995	1996	1997	1998
IV.19	KCBOHC Title 10 compliance - continue monitoring							
IV.20a	Capital construction plan - accelerate Cedar Hills Refuse Area 5 development							
IV.20b	Capital construction plan - delay Vashon new area and final cover projects	beyond 1998						
IV.20c	Capital construction plan - adjust costs							
IV.21	Financial assurance - adjust constructions to individual accounts in next rate period	as required						
IV.22	Cedar Hills - modify draft site development plan and associated draft EIS							
IV.23	Hobart Landfill - maintain existing load restrictions and operation until closed							
IV.24	Enumclaw Landfill - closure process							
IV.25a	Vashon Landfill - seek clarification on sole source aquifer designation							
IV.25b	Vashon Landfill - evaluate replacement options							
IV.25c	Vashon Landfill - evaluate and select leachate storage, transport, and treatment alternatives							
IV.26	Evaluate the economics of waste export							

D. INACTIVE LANDFILLS

1. Existing Conditions

King County has custodial responsibility for seven inactive landfills: Cedar Falls, Duvall, Corliss, Bow Lake, Houghton, and Puyallup/Kitt Corner and Enumclaw (Figure IV.7). The Seattle-King County Department of Public Health (Health Department) inspects each of these facilities. The County's obligations toward these landfills depends on their closure dates. For landfills closed prior to adoption of the Minimum Functional Standards (MFS) for Solid Waste Handling in 1972, the County has no specific responsibilities as defined by solid waste rules and regulations. Requirements for landfills closed after 1972, defined by the date of closure, include groundwater, surface water, and gas monitoring, and maintenance of the facility and its structures.

The Corliss, Bow Lake, Houghton, and Puyallup/Kitt Corner landfills, referred to as "abandoned landfills" in the past, were operated and closed prior to adoption of the 1972 MFS. They were studied in the *Abandoned Landfill Study in King County* (Health Department, 1985) and *Abandoned Landfills Toxicity/Hazard Assessment Project* (Health Department, 1986).

The city of Carnation is responsible for the closure of the Carnation Landfill, which the city operated until 1989 and still owns. The city operated the landfill from the early 1920s to November 1, 1989, when Ecology required its closure due to noncompliance with the minimum standards for landfill operation. The landfill discontinued operations on the November 1989 date and entered into an interlocal agreement with King County for shipment of MMSW to Cedar Hills.

The city of Carnation plans to pay for the landfill closure through the use of fees and grants, and meet their financial assurance obligations through surcharges on garbage collection. King County has no responsibility for the Carnation Landfill and will have no recommendations regarding its closure

a. Cedar Falls Landfill

The Cedar Falls Landfill, located near North Bend, was operational from the early 1950s through 1989, when it was closed in conformance with present MFS. Continuing Solid Waste Division activities performed on this site include quarterly groundwater monitoring, cover maintenance, security, maintenance of a passive gas collection and surface water control systems, and monthly inspections. Certain groundwater monitoring wells dried up following closure, and new wells are planned to replace the dry ones.

b. Duvall Landfill

The Duvall Landfill accepted waste from the early 1950s through 1981. In 1981 the closure process began and it was completed in 1984. The Duvall site conforms with the 1972 Minimum Functional Standards. It has leachate collection and storage tanks; the leachate is trucked to a Metro discharge point on Northeast 128th Street. Continuing Solid Waste Division activities performed on this site include maintenance of a leachate collection and storage system, and quarterly groundwater monitoring, surface water control systems, cover maintenance, security and monthly inspections. Groundwater monitoring wells were installed in 1983. Some of them are dry and new ones are planned to replace them.

c. Corliss Landfill

The Corliss Landfill in the Shoreline area operated from the 1940s until it was closed by the construction of Interstate 5 in 1959. The First Northeast Transfer Station was built on the northern half of this site, and the Metro North Operating Base was constructed on the southern half. Refuse was removed during construction of the Metro North Operating Base. The Division continues to perform cover maintenance, security, surface water control systems maintenance, and inspections.

d. Bow Lake Landfill

This landfill, located in Tukwila, was operated from the early 1940s until it was closed by the construction of Interstate 5 in the late 1950s. The Bow Lake Transfer Station was subsequently built on a portion of the site. The Division also continues to perform cover maintenance, security, maintenance of surface water control systems, and inspections.

e. Houghton Landfill

The Houghton Landfill is located near Bridle Trails State Park and was operated from the 1940s through 1965. The Houghton Transfer Station was built on part of this site in 1965. Another portion of the site has been used as a ball field by the Kirkland Little League. Continuing Division activities include cover maintenance, gas monitoring, security, surface water control systems maintenance, and inspections.

f. Puyallup/Kitt Corner Landfill

The Puyallup/Kitt Corner Landfill, located in south King County, was operated from the 1940s until shortly after the Algona Transfer Station opened in 1967. Continuing Division activities include cover maintenance, gas monitoring, security, surface water control systems maintenance, and inspections.

g. Enumclaw Landfill

The Enumclaw Landfill is the most recent County landfill to close. It closed in April of 1993 and was replaced with a new transfer station. The closure process is just beginning at the landfill.

h. Financial Assurance

For landfills closed prior to adoption of the King County Solid Waste Handling Regulations, King County has no financial assurance requirements. For those closed after 1972, these requirements were defined by the regulations in place at the time of closure. Generally the requirements are that sufficient funds be set aside and deposited in a post-closure financial assurance account to support the costs of ongoing monitoring and maintenance for a minimum of 20 years.

The Cedar Falls Landfill has a post-closure maintenance reserve fund of over $3 million held in an interest-bearing account. The amount is based on estimated average yearly expenditures for post-closure maintenance of $161,000 (1992 dollars). A post-closure maintenance reserve fund of over $1.6 million in an interest-bearing account established for the Duvall Landfill is based on estimated average yearly expenditures for post-closure maintenance of $82,000 (1992 dollars). The Corliss, Houghton, Bow Lake, and Puyallup/Kitt Corner landfills were closed before post-closure maintenance funds were required. Continuing activities at these sites are funded through the Division's annual operating budget.

In August 1991, a solid waste environmental reserve fund was created through King County Ordinance 10056. This fund supports remediation costs related to active and closed solid waste handling facilities the Division owns or has custodial responsibility for. It will be used to support environmental investigations and any required remediation at the Corliss, Houghton, Bow Lake, and Puyallup/Kitt Corner landfills. This fund was created through a one-time transfer of funds and is not rate supported. When it was created, the Division recommended waiting until initial investigations were completed to assess whether additional contributions were required to support remedial measures. Sufficient funds existed to support preliminary investigations and remedial alternatives development, and the potential magnitude of costs could not be adequately estimated until these activities were completed.

Volume II, Appendix I contains detailed information regarding the Duvall and Cedar Falls post-closure maintenance accounts and the solid waste environmental reserve fund.

2. Needs and Opportunities

a. Site Evaluation

The needs and opportunities associated with the inactive landfills vary by site and generally depend on previous evaluations. The Cedar Falls Landfill has been thoroughly studied in the past, but additional information is needed regarding groundwater flow direction and quality. Since placement of final cover at this site, some groundwater monitoring wells have gone dry and need to be replaced.

The Duvall Landfill has leachate collection and storage; however, due to its remote location, there have been difficulties in the past in transporting the leachate, particularly when snow or flooding close routes to the site or considerably slow traffic. Additional leachate storage capacity is needed at the site, or leachate generation needs to be reduced. Also, since final cover was placed at this site, some of the groundwater monitoring wells have gone dry and need to be replaced.

The Houghton, Puyallup/Kitt Corner, Bow Lake, and Corliss landfills were studied for surface impacts but have not had hydrogeologic studies performed to assess whether they might be impacting groundwater and whether landfill gas is being generated and if it is migrating. These studies may indicate that further actions are warranted at these sites.

b. Financial Assurance

The Duvall and Cedar Falls landfills' post-closure reserve funds must periodically be evaluated to determine if they are adequate to fund continued post-closure maintenance (see Volume II, Appendix I). If additional funds are required, contributions through the next rate study should be considered.

The environmental reserve fund contains sufficient funds to support initial investigations at the Houghton, Puyallup/Kitt Corner, Bow Lake, and Corliss landfills and day-to-day maintenance. However, upon completion of environmental studies, the need for additional contributions to this fund should be evaluated.

3. Alternatives

Alternatives for site evaluation and financial assurance needs would be generated pending further study and evaluation.

4. Recommendations

The County should conduct further study and evaluation to determine what actions may be necessary to manage inactive landfills (see Table IV.25).

E. ENERGY/RESOURCE RECOVERY

1. Existing Conditions

In August 1986, the King County Council indicated the County's intent to proceed with plans to develop Energy/Resource Recovery (E/RR) facilities. Although the County was moving to increase WR/R levels, E/RR was viewed as a technology which could reduce reliance on landfilling and mitigate its impacts.

The Council approved the King County E/RR Management Plan in June 1987 and the Solid Waste Division began the siting process for an E/RR facility. Seven alternative sites were proposed. Public scoping meetings were held at all seven sites and extensive public comment was received. Two major concerns were: (1) that the County was proceeding with extensive siting studies for an E/RR facility before adequately evaluating other program alternatives (specifically W/RR); and that (2) E/RR, particularly a mass burn facility of the size proposed, posed an unacceptable risk to human health.

The King County Council directed reevaluation of the E/RR program with passage of Ordinance 8383 in January 1988. A Programmatic Environmental Impact Statement for Solid Waste Management Alternatives (PEIS) was conducted on policy choices for waste reduction, processing, and disposal.

Although the final PEIS (September 1988) reached no conclusions on environmental impacts associated with incineration, the information was used to develop the *Executive Report on Solid Waste Management Alternatives*. The Executive Report, released in October 1988, recommended against solid waste incineration as a waste management strategy.

Table IV.25 1992 Inactive Landfill Recommendation

Recommendation IV.27	Inactive Landfills	Conduct further study and evaluation to determine what actions may be necessary to manage inactive landfills.

King County Council review of the PEIS and the Executive Report led to the adoption of Ordinance 8771 in December 1988 (see Related Legislation at the end of this volume). It found the PEIS to be adequate and concurred with the Executive's recommendation against including solid waste incineration in the Plan. The 1989 Plan thus did not recommend incineration.

There is no need to include E/RR in the solid waste strategy at this time since the County's waste reduction and recycling goals are being achieved. In 1991, the WR/R programs implemented by the County and suburban cities reached a 32 percent diversion rate. The Cedar Hills Regional Landfill is expected to be an adequate landfill resource for the 20-year planning period. In addition, waste export is scheduled to be evaluated for the 1992 Plan period.

2. Needs and Opportunities

Since WR/R goals are being met and landfill resources remain adequate, there is no need to address E/RR facilities.