King County

Department of
Natural Resources and Parks
Solid Waste Division

FACTORIA RECYCLING AND TRANSFER STATION

2010 FACILITY MASTER PLAN
VOL. I

NOVEMBER 2010

King County

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Natural Resources and Parks
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FACTORIA RECYCLING AND TRANSFER STATION
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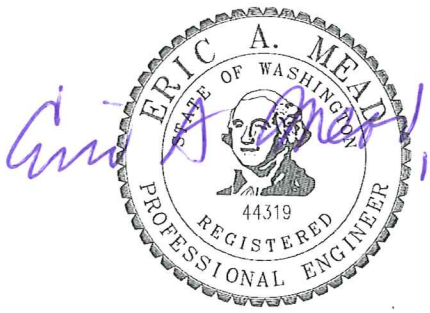
2010 Facility Master Plan
Factoria Recycling and Transfer Station

November 2010



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This document has been prepared under the supervision
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Acronyms and Abbreviations

ACM	asbestos-containing materials
ADA	Americans with Disability Act (of 1990)
CAC	citizen's advisory committee
CFR	Code of Federal Regulations
CHRLF	Cedar Hills Regional Landfill
city	City of Bellevue
council	King County Council
county	King County
CUP	Conditional Use Permit
EIS	Environmental Impact Statement
EPF	Essential Public Facility
Factoria RTS	Factoria Recycling and Transfer Station
FEMA	Federal Emergency Management Agency
FMP	Facility Master Plan
FSC	Forest Stewardship Council
HHW	household hazardous waste
HPA	Hydraulic Project Approval
HPU	hydraulic power unit
IT	information technology
KCC	King County Code

KCSWD	King County Solid Waste Division
LBP	lead-based paint
LED	light-emitting diode
LEED®	Leadership in Energy and Environmental Design
LOS	level of service
MSW	municipal solid waste
MSWMAC	Metropolitan Solid Waste Management Advisory Committee
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
OCC	old, corrugated cardboard
OSHA	Occupational Safety and Health Administration
SEPA	State Environmental Policy Act
SF	square feet
SWAC	Solid Waste Advisory Committee (King County)
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCLP	Toxicity Characteristic Leaching Procedure
TIA	Traffic Impact Analysis
TSO	transfer station operator
USGBC	U.S. Green Building Council

Glossary

bioswale	A landscaped ditch feature used to slow down surface water runoff and allow sediments to be deposited.
container chassis	A trailer that is a cargo container which is less expensive and more flexible than a transfer trailer.
decant area	Impervious surface/pad where liquids can be separated from solids.
Eco-Charrette	A meeting or series of meetings where all design team members and stakeholders meet to explore possible sustainable and high performance themes and strategies that can be applied to a project.
Factoria RTS	Name of the new Recycling and Transfer Station to be located in the Factoria area of Bellevue, Washington.
Factoria Transfer Station	Name of the existing Factoria transfer station in the Factoria area of Bellevue, Washington.
hot load	A waste collection vehicle with a load that contains material believed to be smoldering or on fire.
Immediate Occupancy Seismic Standards	Seismic performance level of a building that includes damage to both structural and nonstructural components during a design earthquake, to the extent that: (1) Damage is not life-threatening, so as to permit people to re-enter to live and/or work in the building after a design earthquake. (2) The damage is repairable while the building is occupied.
LEED®	A certification program sponsored by the U.S. Green Building Council to promote sustainable building projects.
level of service (LOS)	A measure of performance – either existing or desired.
payload	The quantity of waste material expressed in tons that is hauled in a transfer container or trailer.
pervious pavement	Driveway or walkway surface that some falling rainwater can pass through and infiltrate the subsurface rather than running off on the surface.
photovoltaic panel	A panel made of material capable of producing direct current electricity when exposed to sunlight.

preferred concept	The Factoria RTS design (site layout and associated floor plans) that meets the desired development criteria.
stationary preload compactor	Fixed equipment used to compress loose materials into dense bales for more efficient handling prior to transport.
rainwater harvesting	Process of collecting and beneficially using precipitation to displace use of treated potable water supply.
scalehouse	Building next to scales that is staffed with a scale operator who assists vehicles using the scales and transfer station.
stationary packer	Piece of equipment in the existing Factoria Transfer Station that is used by staff to assist loading and tamping of waste into open top trailers.
stormwater vault	Constructed feature (typically concrete) where collected stormwater is directed and detained.
tipping floor	Location within a transfer station where incoming waste materials are unloaded.
transfer trailer	Over-the-road piece of equipment that is pulled by a truck and contains consolidated loads of waste from the transfer station.
transfer vehicle	Generalized term for an over-the-road piece of equipment that is used to move consolidated loads of waste from the transfer station to a disposal location; may include a tractor and trailer combination.
vactor truck	Specialized, over-the-road vehicle having a tank and vacuum system that is used to clean stormwater features such as catch basins and culverts.

Executive Summary

The King County Solid Waste Division (KCSWD) prepared this Facility Master Plan (FMP) to implement recommendations from the *Solid Waste Transfer and Waste Management Plan* prepared by KCSWD in September 2006 and adopted by King County council (council) December 10, 2007. The FMP also implements recommendations from the *Final Comprehensive Solid Waste Management Plan* adopted by council October 15, 2001. This FMP advances the Environmental Sustainability and Service Excellence goals and reflects the Guiding Principles of the King County Strategic Plan (2010-2014).

The Factoria Transfer Station is part of King County's network of facilities where garbage from customers is consolidated from many small loads into fewer large loads for transporting to a disposal location. Commercial haulers, businesses, and residential self-haul customers use the station. KCSWD plans to replace the Factoria Transfer Station with a new facility on the existing KCSWD property that includes two adjacent commercial warehouse properties purchased for the new station. The facility needs to be replaced because the capacity of the existing 1960s-era facility has been exceeded and it does not meet most level of service (LOS) criteria established by KCSWD for transfer stations. Implementation of this FMP will result in a facility that will significantly increase recycling opportunities, implement efficient waste handling and processing operations, and decrease environmental and neighborhood impacts.

The existing Factoria Transfer Station is located in a light industrial area approximately one-quarter mile north of I-90 and one mile east of I-405 in King County, Washington. Because this location has positive attributes – room for expansion, property already owned by KCSWD, and zoning that accommodates the facility's use – the decision was made to replace the facility at its current site. A phased construction sequence will allow continued operation of the existing transfer station during construction of the new facility.

During the development of this FMP, KCSWD established design criteria for the new Factoria Recycling and Transfer Station (Factoria RTS), discussed lessons learned on recent transfer station projects, reviewed operating requirements for the facility, and considered a number of conceptual site layouts.

Features considered in development of the FMP included the following:

- Waste flow and vehicle forecasts
- Number of unloading stalls
- Emergency waste storage
- Traffic circulation and queuing
- Municipal solid waste processing
- Design for Immediate Occupancy Seismic Standards
- Vehicle maneuvering and parking
- Recycling and household hazardous waste facilities
- Tipping floor configuration
- Scalehouse facilities
- Public facilities
- Equipment maintenance
- Fueling facility
- Decant/hot load area
- Sustainable design (LEED® Certification)
- Salmon-Safe certification
- Public art

A public open house was conducted during development of the FMP to obtain community input on a preferred concept for the new Factoria RTS. Presentations were also made to the Metropolitan Solid Waste Management Advisory Committee and King County Solid Waste Advisory Committee regarding the project. In addition, representatives from several of the major commercial haulers reviewed draft concepts and provided feedback and suggestions. The process culminated in a preferred concept that will allow the new facility to meet peak traffic and tonnage projections and meet the LOS criteria established by KCSWD.

In the transfer building, stationary preload compactors will be used to compress loose waste into dense bales to increase transport payloads, while meeting legal road weight limits, and reduce the number of transport trips required to a disposal location, currently the Cedar Hills Regional Landfill. Sustainable features will be integrated into the Factoria RTS design in accordance with KCC 2.95, with the desire to attain a Leadership in Energy and Environmental Design (LEED®) Gold certification.

Constraints that will affect construction include steep slopes, limited staging areas, a gas pipeline on the east border, wetlands and streams, and the need to maintain existing transfer station operations while the new facility is built. Each constraint has been addressed in the preferred concept, and the new facility will be designed to handle the tonnages and customer transactions forecasted through 2030.

While the preferred concept will impact some on-site wetlands and streams, the Factoria RTS design will avoid impacts to wetlands in the northeast corner of the site. Mitigation planning will focus on enhancing and restoring wetland functions in that corner as well as in degraded wetlands and streams near the site in the same drainage basin.

Construction of the Factoria RTS is planned to commence in early 2013 and be completed in late 2014. The facility will be fully operational by early 2015.

1. Introduction

1.1 Purpose of the Facility Master Plan

The King County Solid Waste Division (KCSWD) prepared this Facility Master Plan (FMP) to implement recommendations from the *Solid Waste Transfer and Waste Management Plan* prepared by KCSWD in September 2006 and adopted by the King County Council (council) on December 10, 2007. The FMP also implements recommendations from the *Final Comprehensive Solid Waste Management Plan* adopted by council on October 15, 2001. This FMP advances the Environmental Sustainability and Service Excellence goals and reflects the Guiding Principles of the King County Strategic Plan (2010-2014).

KCSWD will use the FMP as a guide to replace the Factoria Transfer Station with the new Factoria Recycling and Transfer Station (Factoria RTS)[1] once the FMP is adopted by the council. King County Code (KCC) 4.04.210 requires the council to review, amend, defer, or adopt facility master plans pursuant to the provisions of the County Charter.

This FMP provides (1) background information regarding the project and project site, (2) development criteria considered for the project, (3) an overview of the process used to evaluate alternative concepts, and (4) a summary of the preferred concept.

1.2 Facility Replacement

KCSWD intends to develop the Factoria RTS on the property currently occupied by the existing Factoria Transfer Station and two adjacent warehouse properties. The project will also use a small portion of the division's Eastgate property (approximately 50 feet by 400 feet) that is located south of, and adjacent to, the existing Factoria Transfer Station, which will require a boundary line adjustment.

1.3 Solid Waste System Overview

KCSWD operates a system of eight transfer stations, two drop box facilities, and a regional landfill in King County, Washington. Waste collected throughout King County and from participating cities (except from the cities of Seattle and Milton) is hauled to the transfer stations and drop boxes, then transferred into large tractor-trailers and subsequently hauled to the Cedar Hills Regional Landfill (CHRLF) in Maple Valley, Washington. The transfer stations allow for cleaner, safer, and more environmentally friendly solid waste transport by reducing truck traffic on the region's roads.

[1] In this document, the existing facility is referred to as the "Factoria Transfer Station". The proposed facility is referred to as the "Factoria RTS".

Based on current waste tonnage forecasts, it is anticipated that the CHRLF will reach capacity in 2019. As the CHRLF approaches its closure date, KCSWD may consider waste disposal options such as waste export to an out-of-county landfill or disposal in a waste-to-energy facility as considered in the *Draft 2009 Comprehensive Solid Waste Management Plan*.

1.4 Project Purpose and Justification

1.4.1 Transfer Station Standards

To help evaluate the performance of older facilities, KCSWD, working with representatives of cities that are part of the regional solid waste system, established standards for transfer stations, including level of service (LOS) criteria. Table 1 summarizes the results of the LOS criteria evaluation for the Factoria Transfer Station.

Table 1. Results of the Level of Service Criteria for the Factoria Transfer Station

Level of Service (LOS) Criteria	Rating Basis	Result
1. Estimated time to a transfer facility within the service area for 90 percent of users	< 30 minutes	Yes
2. Time on site meets standard for 90 percent of trips		
a. Commercial vehicles	< 16 minutes	No
b. Business self-haulers	< 30 minutes	No*
c. Residential self-haulers	< 30 minutes	Yes
* Meets criteria on weekdays but not weekend days.		
3. Facility hours meet user demand	Yes/No	Yes
4. Recycling services …meet policies in 2001 Solid Waste Plan		
a. Business self-haulers	Yes/No	No
b. Residential self-haulers	Yes /No	No
5. Vehicle capacity		
a. Meets current needs	Yes/No	No
b. Meets 20-year forecast needs	Yes /No	No
6. Average daily handling capacity (tons)		
a. Meets current needs	Yes/No	Yes
b. Meets 20-year forecast needs	Yes /No	No
7. Space for 3 days' storage		
a. Meets current needs	Yes/No	No
b. Meets 20-year forecast needs	Yes /No	No

Level of Service (LOS) Criteria	Rating Basis	Result
8. Space exists for station expansion		
a. Inside the property line	Yes/No	Yes
b. On available adjacent lands through expansion	Yes /No	Yes
9. Minimum roof clearance of 25 feet	Yes/No	No
10. Meets facility safety goals *The presence of these physical challenges does not mean that the station operates in an unsafe manner. It does mean that it takes extra effort by staff and management to ensure that the facility is operated safely, which reduces system efficiency.	Yes/No	No*
11. Ability to compact waste	Yes/No	No
12. a. Meets goals for structural integrity	Yes/No	Yes
b. Meets Federal Emergency Management Act immediate occupancy standards	Yes/No	No
13. Meets applicable local noise ordinance levels	Yes/No	Yes
14. Meets Puget Sound Clean Air Agency standards for odors	Yes/No	Yes
15. Meets goals for traffic on local streets		
a. Meets Level of Service standard	Yes/No	Yes
b. Traffic does not extend onto local streets 95 percent of time *Meets criteria on weekdays, but not weekend days. Yes or no rating based on evaluating all days within study period.	Yes/No	No*
16. 100-foot buffer between active area and nearest residence *Meets 100 feet from residence criteria, but businesses are within 100 feet.	Yes/No	Yes*
17. Transfer station is compatible with surrounding land use *Factoria is a 30+ year old facility in need of maintenance that has been deferred over the years. It is visible on the approach to adjacent businesses and meets the criteria on weekdays, but not on weekend days. Yes or no rating based on evaluating all days within study period.	Yes/No	No*

Source: KCSWD *Solid Waste Transfer and Waste Management Plan*, 2006

As shown in Table 1, the Factoria Transfer Station does not currently meet many LOS criteria. For instance, roof clearances are inadequate to allow for effective tipping of newer model garbage trucks, and opportunities to recycle items are non-existent with the exception of household hazardous waste (HHW) collection. The 1960s-era facility is also beyond its useful life and requires several improvements to address capacity, service, and operational needs. In addition, structural changes are necessary to improve emergency response and operational efficiency, as well as to meet desired safety goals and comply with current building codes.

While the Factoria Transfer Station requires improvement, the site it occupies has several positive attributes that led to the decision to replace the transfer station at its current location. For example, sufficient space is available at the site for expansion, the site is already owned by KCSWD, and there is already an operating transfer station at the location. In addition, the new station will be compatible with other businesses located in this light industrial land use zoned area.

1.4.2 Existing Tonnages and Transactions

Table 2 lists the annual tonnages and transactions by customer type for the Factoria Transfer Station in 2007, 2008, and 2009.

In 2009, the transfer station processed an average of 386 tons of waste per day based on 362 days of operation (the station is closed on Thanksgiving, New Years, and Christmas). Note that the 2007 numbers are higher than those for 2008 and 2009; the 2007 numbers reflect a positive economic climate rather than the economic downturn seen in 2008 and 2009.

Table 2. Factoria Transfer Station Tonnages and Transactions by Customer Type

	Self-Haul		Commercial Haulers		Total	
Year	Tons	Transactions	Tons	Transactions	Tons	Transactions
2007	35,243	115,693	132,100	23,164	167,343	138,857
2008	27,221	94,191	122,800	21,880	150,022	116,071
2009	26,564	89,226	113,247	20,930	139,811	110,156

Source: KCSWD Annual Reports for 2007, 2008, and 2009

1.4.3 Forecast of Future Needs

It is anticipated that the Factoria RTS will receive higher tonnages and will process more customers in the future. The Factoria RTS will be designed to process the forecasted tonnage for a 20-year planning period to meet the LOS criteria (see Table 1). Table 3 lists the forecasted tonnage for 2010 (current year), 2015 (year the Factoria RTS is scheduled to open), 2020, and 2030 (20-year planning period).

Table 3. Forecasted Annual Tonnage for the Factoria RTS

Year	Forecasted Tonnage	Year	Forecasted Tonnage
2010	124,500	**2020**	204,500
2015	127,000	**2030**	225,000

Table 4 provides more detailed information about the forecasted conditions for the Factoria RTS in 2030, the 20-year planning period.

Table 4. Anticipated Conditions for the Factoria RTS in 2030

Item	Commercial Haulers	Self-Haul	Total
Total Tonnage	180,000	45,000	225,000
Total Transactions	34,000	156,000	190,000
Average Weekday Tonnage	680	120	800
Average Weekend Day Tonnage	30	145	175
Average Weekday Transactions	125	430	555
Average Weekend Day Transactions	6	520	526

In addition to processing municipal solid waste (MSW) for transfer, the Factoria RTS will provide opportunities for recycling. Table 5 provides a forecast of the tonnages for recyclable materials expected to be delivered by Factoria RTS commercial and self-haul customers by the year 2030. The Factoria RTS will be designed with flexibility to process these materials to divert them from disposal.

Tonnage and customer use projections presented in this section are based primarily on forecasts of economic activity and population. Waste quantities and vehicle counts may vary in the future due to changes in the facility's service area, regional recycling rates, public policy, and implementation of programs directed toward waste reduction, diversion, and recycling.

Table 5. Projected Recyclable Materials from Commercial and Self-Haul Customers by 2030

Material	Annual Tons
Yard Waste*:	
Commercial Haulers	53,200**
Self-Haul	4,300
Clean Wood	4,200
Food/Compostable Paper	8,800
Scrap Metal	1,300
Appliances	200
Plastic Film and Bags	1,400
Carpet	1,000
Textiles	100
Asphalt Shingles	500
Furniture/Mattresses	400
Gypsum Wallboard	300
Old Corrugated Cardboard (OCC)	1,800

*Yard waste from both commercial and self-haul. All other recyclable materials from self-haul only.

**Yard waste quantity represents what can be expected if all yard waste collected in curbside collection programs in the Factoria RTS service area is brought to the facility. This quantity is a projection of the total yard waste quantity going directly to compost facilities in 2009.

1.4.4 Schedule

Table 6 shows the schedule for major activities associated with the Factoria RTS project. Construction of Factoria RTS is anticipated to be completed by late 2014 and the station is scheduled to be fully operational by early 2015. A more detailed project schedule is included in Appendix A.

Table 6. Factoria RTS Project Schedule

Date	Activity
January 2010 – November 2010	Facility Master Plan (FMP) development process
November 2010	Submit FMP to King County Council for approval
Early 2011 – Late 2012	Facility design, land use permitting and construction procurement, construction permits, building permits
Early 2013 – Late 2014	Phased construction of new facility; new transfer station operational while existing facility deconstructed
Early 2015	Project completion; facility fully operational

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2. Site Description

2.1 Facility Location and Background

The existing Factoria Transfer Station is an approximately 16,000-square-foot building located on 8.7 acres in a light industrial area approximately one-quarter mile north of I-90 and one mile east of I-405 (see Figure 1, page 53). The facility is centered at latitude 47° 34' 54.54" North and longitude 122° 9' 34.79" West and is located in Section 10, Township 24 North, Range 5 East. The address of the Factoria Transfer Station is:

13800 SE 32nd Street, Bellevue, Washington 98005

As noted in Section 1, the Factoria Transfer Station is part of KCSWD's network of facilities where garbage from customers is consolidated from many small loads into fewer large loads for transport to a disposal location, currently the CHRLF in Maple Valley, Washington. Commercial haulers, businesses, and residential self-haul customers currently use the station.

The *Solid Waste Transfer and Waste Management Plan* proposed using the current Factoria Transfer Station property (8.7 acres) and an adjacent 2-acre parcel that the county purchased for the new facility northwest of the existing facility. As previously discussed in Section 1.2, a small portion (approximately 0.5 acre) of KCSWD's Eastgate property will also be used for the Factoria RTS project. Therefore, the total project site available for the Factoria RTS project is 11.2 acres. A site aerial photo of the Factoria RTS property is shown on Figure 2 (see page 55).

2.2 Legal Description

The abbreviated legal description for the Factoria RTS project site is:

All of Tract 32 and the South 75 feet of Tract 31 of Mercer Slough Garden Tracts, according to the plat thereof filed in Volume 8 of Plats, page 91, records of King County, Washington; Except the West 70 feet of said Tract 31; Also except the North 17.5 feet of said Tract 32 for road purposes; Together with that portion of vacated SE 32nd Street lying adjacent; Also together with the West Half of the Southwest Quarter of the Southeast Quarter of the Northwest Quarter of Section 10, Township 24 North, Range 5 East, W.M.

2.3 Existing Operations

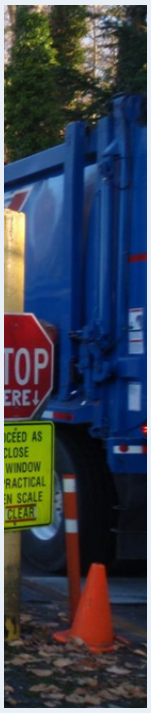
The Factoria Transfer Station is currently open between 6:30 AM and 4:00 PM Monday through Friday, and between 8:30 AM and 5:30 PM on Saturday and Sunday. Currently, access to the facility is from SE 32nd Street east of the SE 32nd Street/Richards Road intersection. In 2009, the transfer station processed an average of 386 tons of waste per day based on 362 days of operation.

All customers weigh in at the scalehouse (see Photo 1 on following page) and then proceed to the transfer building to unload their materials. Self-haul and commercial customers are directed to opposite sides of a direct-dump pit (see Photo 2 on following page). A stationary packer is located adjacent to the direct-dump pit (see Photo on page 12) and is operated by a Transfer Station Operator (TSO) to distribute and tamp the refuse in an open top trailer. The area around the stationary packer is constricted and the TSO must exercise care to avoid damaging the building structure, chain railing, packer trucks, and self-haul vehicles in the proximity. The TSO also uses the stationary compactor to smooth out the top portion of waste in the open top trailer to help achieve a full trailer load and ease placement of the lid over the load. Loads received at the station with materials that could be recycled are currently loaded into the trailers for disposal at the landfill due to space constraints at the facility. After unloading, customers return to the scalehouse to complete the transaction. Commercial customers that have a recorded tare weight (i.e., truck weight when empty) are not required to rescale upon exiting.

The current Factoria Transfer Station operations staff includes three TSOs who operate the stationary packer, assist customers, and maneuver trailers into and out of the transfer station. In addition, there are two to three employees who staff the HHW area. A scale operator is also located at the scalehouse to handle transactions for customers using the facility.

The existing Factoria Transfer Station includes an HHW collection area, which was constructed in 2004. The HHW area is open between 8:00 AM and 4:00 PM Tuesday through Friday and between 9:00 AM and 5:00 PM on Saturday and Sunday. HHW is stored in specialized containers within a fenced-off area in the southeast corner of the transfer station. Drop-offs of HHW are limited to 5-gallon containers and a maximum drop-off per customer of 50 gallons per day.

Previously, the Factoria Transfer Station had a free drop-off area for recyclable materials. However, when the HHW area opened, the recycling drop-off service had to be eliminated because of space constraints.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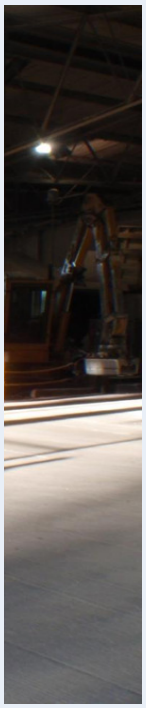

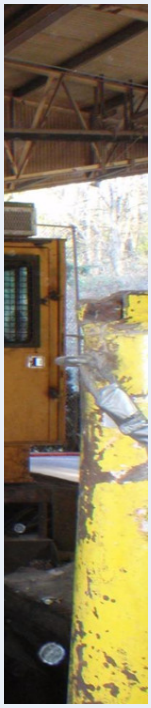

:t-dump pit

2.4 Adjacent Land Uses

The Factoria Transfer Station is bordered on the west by commercial buildings and on the east by an undisturbed hillside, the Olympic Pipeline, and electrical transmission lines. On the north, the Factoria Transfer Station is bordered by SE 30th Street and a vacant lot, and on the south by a steep hillside and parking lot on the Eastgate property (owned by King County) (see Figures 1 and 2, pages 53 and 55).

2.5 Potentially Significant Factors Affecting Site Development

Potentially significant project constraints identified for the Factoria RTS include the following:

- Steep slopes
- Wetlands/streams
- Site access (ingress/egress)
- Right-of-way and easements for utilities below and above ground, such as City of Bellevue water and sewer main lines, Puget Sound Energy, Olympic Pipeline
- Maintaining operation of the existing facility during construction of the new facility
- Regulatory and permit requirements
- Required construction completion schedule in relation to other KCSWD transfer station projects

Another potential impact is the Eastgate/I-90 Land Use and Transportation Study Project initiated in 2010 by the City of Bellevue (city). The study area includes the Factoria RTS project site and is generally bounded by I-405 on the west, Southeast 26th Street on the north, 161st Avenue Southeast to the east, and Southeast 38th Street to the south, along with an extension east to the Lakemont Boulevard interchange. In the study, the city intends to analyze transportation and land use scenarios that will support long-term economic vitality and encourage a mix of developments that will foster new business along the Eastgate/I-90 corridor. The study is intended to update and refine the city's vision for the area and could result in recommendations for changes to the land use zoning code. Also, the study will likely identify transportation issues and projects to facilitate implementation of the city's plan. KCSWD is working with the city to minimize any impacts to the Factoria RTS project.

Each constraint will be addressed as the project moves forward. For example, the presence of steep slopes may be addressed with additional shoring and bracing in order to construct the new transfer station while minimizing impacts to existing operations.

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3. Development Criteria

A list of development criteria was established to help guide preparation of alternative concepts for the Factoria RTS. The list of criteria was based on lessons learned from recent transfer station projects, LOS criteria, and operational requirements. This section summarizes the primary development criteria and features that will be incorporated in the preferred concept for the Factoria RTS.

3.1 Transfer Building

Design of the transfer station building will meet the following development criteria:

- No interior building columns on the tipping floor; clear span construction over the tipping floor
- Fully enclosed and unheated, metal building
- Push walls to assist in directing waste to appropriate locations such as the compactor hopper openings
- Minimum interior clearance height of 25 feet
- Sufficient water capacity to allow up to three washdowns of the tipping floor per day
- Federal Emergency Management Agency (FEMA) Immediate Occupancy Seismic Standards
- Factory Occupancy classification (F-1) due to the type of equipment
- Flexibility to modify traffic patterns and floor space within the building on weekends to accommodate a greater number of self-haul customers
- Separated entrances and exits for commercial and self-haul vehicles
- Opening in the tipping floor for one open top trailer to accept organic materials such as yard and wood wastes; also could be used for emergency top loading of waste
- Tire wash for commercial vehicles located at the exit of the tipping floor

3.1.1 Waste Flow and Vehicle Forecasts

The Factoria RTS will be capable of processing the tonnages and customer vehicles forecasted for the year 2030 (the 20-year planning period) and specifically for an average weekday of 800 tons of waste and 555 vehicles. The Factoria RTS will be designed with as much flexibility as possible in order to accommodate potential future changes in recycling and waste diversion opportunities, such as the types of commodities desired to be recycled. The Factoria RTS will also provide flexibility to accommodate changes that may occur to the county's transfer station system.

3.1.2 Number of Unloading Stalls

The Factoria RTS will provide a minimum of 11 unloading bays (stalls) for self-haul customers and a minimum of 3 unloading bays for commercial customers based on the number of peak hour vehicles, vehicle types, and desired unloading times. For example, commercial haulers' time on the site should average less than 16 minutes from weigh-in at the scale to exiting the site. The goal for self-

haul customers is less than 30 minutes on the site. The assumptions and calculation used to determine the minimum number of unloading bays for the Factoria RTS can be found in Appendix I.

3.1.3 Emergency Waste Storage

The Factoria RTS will be sized to provide emergency waste storage for a minimum of three average days of volume in the year 2030 (20-year planning period). For the Factoria RTS, an average day in the year 2030 is projected to generate 800 tons per weekday, resulting in a required emergency waste storage capacity of 2,400 tons. Emergency waste storage may occur both outside the new transfer station within enclosed containers and inside the facility on the tipping floor.

Overall, the Factoria RTS will include between 30,600 and 37,400 square feet of tipping floor space to accommodate emergency waste storage. The location and dimensions of emergency waste storage are flexible and may change based on how the transfer station is ultimately designed and operated. Appendix I includes the assumptions used to size the area (within the transfer station) necessary to accommodate emergency waste storage along with an example calculation.

3.1.4 MSW Processing

Stationary Preload Compactors

The Factoria RTS will include two stationary preload compactors. Appendix I presents the assumptions and calculation used to determine the number of stationary preload compactors for the Factoria RTS.

The stationary preload compactors will allow adjustment of the (compressed) bale's weight and optimum placement within a trailer/container to maximize axle weights and eliminate the possibility of overweight loads. The stationary preload compactors will result in higher transfer container payloads and fewer loads to be transported. For example, loaded, open top (reinforced steel with a walking floor) transfer trailers from the existing station (without a stationary preload compactor) typically have payloads of between 17 and 19 tons of waste. Transfer loads from the Factoria RTS (with stationary preload compactors) using container chassis will transport between 25 and 27 tons.

Including two stationary preload compactors for the Factoria RTS will provide redundancy in case one unit is down for maintenance or repair. The stationary preload compactors will be located at the lower level of the transfer station.

Waste Screening and Processing

The Factoria RTS will provide opportunities for screening of incoming waste materials for recyclables such as wood, scrap metal, and carpet. Recyclables may be placed into storage bins on the tipping floor and then taken by forklift to the primary recycling area.

Materials that could damage or jam the stationary preload compactor can be relocated by TSOs to another area of the tipping floor for further processing. Sufficient floor space will be required to allow for sorting, processing, and storage of screened waste. Bins will be clearly marked and positioned to avoid conflict with vehicles and machinery.

3.2 Tipping Floor Configuration

A tipping floor evaluation was performed for the Factoria RTS and is included in Appendix I. Transfer stations are generally constructed and operated with either a flat floor across the entire building or with some type of grade separation (multi-level) that provides a barrier between the self-haul customers and waste handling equipment. For the Factoria RTS, a continuous flat floor (for both commercial and self-haul vehicles) is desired based on the following anticipated benefits:

- More operational flexibility
- Better waste screening capability
- Easier cleaning of the tipping floor
- Faster unloading for customers

A specialized barrier such as a permanent low wall or row of temporary jersey barriers (k-rails) to delineate the self-haul area from the other areas of the transfer station may be used.

3.3 Traffic Circulation and Queuing

A key planning requirement for transfer station safety and efficiency is separating customer traffic (commercial and self-haul vehicles) from transfer vehicles and providing separate commercial and self-haul access and unloading locations, whenever possible. This usually means separate lanes from the property's entrance to exit. Depending on the configuration of the scale facility and number of scales, some lane sharing may occur at the scales.

For the Factoria RTS, adequate queuing space needs to be available at each point where customers may be required to wait, including the following:

- Inbound and outbound approaches to the scale facilities
- Entrance to the transfer station building
- HHW drop-off area
- Paid and free recycling areas

The Factoria RTS concepts considered these queuing requirements and minimized the potential for queues throughout the site. However, a more detailed on-site and off-site queuing analysis is anticipated to support the land use permit process.

Fees will be charged for accepting certain items for recycling such as yard waste, wood waste, and appliances. The fees for accepting these recyclables are typically different and lower than the fees

for MSW. Certain recyclable items may also be accepted without charge, such as cardboard and scrap metal. The Factoria RTS design and/or operating procedures will include a means to charge customers separately if they bring in combined loads to the facility (i.e., recyclables and MSW together). For example, one method may be to provide additional signage and driveways that allow self-haul customer vehicles to be re-weighed and/or re-enter the inbound queue so they may be assessed the appropriate fee for the different materials.

3.4 Vehicle Maneuvering and Parking

The Factoria RTS will provide a minimum of 150 feet to maneuver container chassis between the transfer station and parking stalls. A minimum of 18 parking spaces will be provided for use by either full or empty container chassis. The container chassis parking area will also be flexible to accommodate future transition to containers stacked at least two-high. On occasion, storage of open top trailers for organics (i.e., yard waste, wood waste) will be accommodated as well.

Separate parking areas for administrative, operations, and scalehouse staff members will be located near their respective workspaces. Parking spaces for visitors will be clearly marked with signs and located in areas outside the drive lanes for commercial and self-haul customers.

3.5 Recycling and Household Hazardous Waste Processing Facilities

The recycling area will be designed for flexibility. Drop boxes or bins will be provided to self-haul customers for free recycling of items such as cardboard and scrap metal. Commercial haulers may deliver yard waste and food scraps collected in the curbside collection programs. These loads can then be consolidated into open top transfer trailers to transport the materials to area compost facilities. Inappropriate dumping will be discouraged by locating the free recycling area where it can be visually observed by Factoria RTS staff.

Fees may be charged for processing some recycling items such as yard waste, wood waste, and appliances. A complete list of recyclable items for which a fee will be assessed has not yet been developed. Drop box containers may be used for the paid recycling items. Recyclable materials may also be dumped on the tipping floor for processing. The Factoria RTS will include a roof over the self-haul customer recycling and HHW areas.

HHW collection will continue to be provided at the Factoria RTS with construction of a dedicated HHW facility. A dedicated HHW facility will provide a safer means to collect, process, and store HHW. Small quantities of oil, oil-based paint, pesticides, herbicides, and general household cleaning products are popular drop-off items. Customers using the HHW facility will be responsible for unloading their materials onto carts, which will be wheeled by HHW staff into the facility for sorting and storage. The new HHW facility will also include space for a “swap room” where the public can take a limited number of items for personal use that have been turned in by other customers and have been reviewed and approved by HHW staff.

Design of a new HHW space for the Factoria RTS will adhere to Hazardous Occupancy (H Occupancy) Fire Code requirements, where applicable.

3.6 Scalehouse Plaza

Development criteria for the scalehouse plaza include the following:

- Three low-profile, above-ground scales; one inbound, one unattended outbound, and one reversible
- Parking for the scalehouse operators near the scalehouse
- Two work stations
- A combination safe that is located on an inside wall that is not visible from the outside
- Break room with a kitchenette
- Unisex restroom
- Nearby parking area for visitors who arrive separately to the site to assist a self-haul customer
- Minimize number of scalehouses

3.7 Public Facilities

Public Restrooms

The Factoria RTS design does not include public restrooms for use by customers. However, space will be designed into the facility to accommodate portable toilets such as a Porta-John.

Conference /Viewing Area

Transfer stations represent a learning opportunity for the community to see what happens to refuse after it leaves their garbage cans. The Factoria RTS will include windows within the conference/break room of the administration area to allow visitors to view the tipping floor from a safe location.

3.8 Maintenance Area

The Factoria RTS design will include a maintenance area for routine, preventive maintenance and repair of front-end loaders, yard goats (a motorized vehicle used to move container chassis within the transfer station and storage yard), forklifts, and open top tractor-trailers (associated with organics collection). Maintenance activities including oil changes and brake, belt, and hose replacements are envisioned in the maintenance area. Currently, major equipment repair is done at KCSWD's maintenance facility located at the CHRLF. When the CHRLF closes, each transfer station may be required to perform more of its own repair work on-site.

Space for storage of tools and spare parts will be included in the Factoria RTS design. Building maintenance storage (such as filters, light bulbs, belts, etc.) will also occur in this area. Understory container chassis parking could be converted to expand the equipment maintenance space as well.

This area will be easily accessible by large equipment but separated to avoid conflicts with the operation.

3.9 Fueling Facility

Equipment operating at the existing Factoria Transfer Station is regularly fueled by a KCSWD fuel truck, which is filled at the CHRLF. The Factoria RTS design will incorporate plans for a fueling facility to provide greater convenience and flexibility and to minimize the costs of transporting fuel. The fueling facility will consist of a 12,000-gallon diesel above-ground storage tank and dispenser with a canopy, occupying approximately 1,800 square feet. The fueling facility may be installed at a later time.

3.10 Decant and Hot Load Area

The Factoria RTS design will include an area that can be easily accessed by commercial haulers in the event that waste materials in their trucks are smoldering or on fire (otherwise known as a "hot load") and need to be removed from the truck. The hot load area will have a non-potable water supply source (i.e., harvested rainwater) for use in dousing hot loads. Stormwater collected from the area will be discharged to the sanitary sewer system.

A vactor truck decant area will be combined with the hot load area and would ideally be located in the container chassis yard for maximum separation from the general public. Use of the decant area is envisioned for only KCSWD-owned vactor trucks. The vactor trucks, used for activities such as street and catch basin cleaning, will discharge the liquid portion of their loads onto the decant area pad. The liquids will drain to the on-site treatment system and then be discharged to the sanitary sewer system.

3.11 Sustainable Design

Sustainable features will be considered and integrated in the Factoria RTS project during planning, design and construction phases, and during operation of the facility. The project will seek certification from both the LEED® and Salmon-Safe programs.

The LEED® Green Building Certification Program

The LEED® Green Building Certification Program is an internationally recognized green building certification system, providing third-party verification that a building is designed and built using strategies aimed at improving performance in energy savings, water efficiency, greenhouse gas emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to the project's impacts.

Developed by the U.S. Green Building Council (USGBC), LEED® provides building owners and operators a concise framework for identifying and implementing practical and measurable green

building design, construction, operations, and maintenance solutions. More about LEED® and USGBC can be found at http://www.usgbc.org/.

Points are earned in different categories and include eight prerequisites that are required to meet any level of certification:

LEED® Categories	Prerequisites Required	Total Points Possible
Sustainable Sites	1	26
Water Efficiency	1	10
Energy and Atmosphere	3	35
Materials and Resources	1	14
Indoor Environmental Quality	2	15
Innovation in Design Process	0	6
Regional Priority Credits	0	4
TOTAL	**8**	**110**

There are four levels of LEED® certification depending on the number of points earned by a project:

LEED® Rating Level	Points Required (out of 110)
LEED® Certified	40-49 points
Silver Level	50-59 points
Gold Level	60-79 points
Platinum Level	80+ points

A LEED® Gold certification has been established as a goal for this project.

Salmon-Safe Certification

Salmon-Safe is a regional organization that provides guidance for site developers, designers, and land managers interested in developing sites that demonstrate environmental stewardship by minimizing impacts to sensitive aquatic and upland resources. The organization has been certifying sites as "Salmon-Safe" since 1996, initially focusing on agricultural properties using peer-reviewed criteria and rigorous on-site inspections. In 2000, the Salmon-Safe organization began an initiative to apply the Salmon-Safe eco-label to urban restoration efforts and land management. Salmon-Safe implemented this initiative with the objective of significantly advancing urban restoration efforts while developing urban aquatic protection guidelines. The opportunity to incorporate Salmon-Safe ideas and treatments in the Factoria RTS will be further considered during concept development and design. More information on the Salmon-Safe organization can be found on their website at http://www.salmonsafe.org.

3.12 Public Art

In 1973, King County adopted legislation creating the 1 Percent for Art Program. The program requires that 1 percent of funds from capital construction projects be set aside for public artwork. Experience has shown that investments in public art benefit the community in many ways, from deterring vandalism to turning public facilities into better neighbors and community assets.

The artwork for the Factoria RTS may reflect a solid waste or recycling theme and will help promote greater public awareness regarding solid waste issues. The artist selected for the project is Al Price of Phoenix, Arizona. Mr. Price was selected by a citizen panel using a nationally recognized roster of pre-approved artists. Public art associated with King County construction projects is managed by 4Culture, the county's cultural services agency. More information about Mr. Price's work can be found at http://www.4culture.org/.

3.13 Other Development Criteria

In addition to the specific development criteria discussed above, the following additional criteria will be incorporated in the design of the Factoria RTS:

Administration Area

- Two levels
- TSO work space
- Supervisor office
- Multipurpose conference room that can be used for meetings, training, breaks, and viewing gallery for visitors to look out onto the tipping floor
- Three-stop elevator with access to lower level of the transfer station and both administration area levels

Recycling Area

- A baler to compact recyclables to be located on lower level
- A loading dock to facilitate shipment of recyclables
- Accessible from within the transfer station
- Flexibility to modify the types and methods of recyclables collected
- Shared driveway with the HHW facility

Site Features

- Fenced site perimeter with gates at entry points
- Flagpole, lighted as appropriate
- Visual screening and landscaping of the property to minimize view impacts to neighbors
- Landscaping will use a sustainable approach including native plants to significantly reduce or eliminate irrigation
- Potential pedestrian trail along the eastern portion of the property with a tie-in to Eastgate Way south of the property
- Retaining walls to provide grade separation and slope stabilization
- Maintain a 100-foot buffer between active areas and nearest residence
- Maximum of 6 percent for on-site roadway grades with a minimum lane width of 12 feet
- Traffic not to extend onto local streets 95 percent of the time
- Extensive use of concrete surfaces to accommodate heavy loads and meet sustainability goals
- Curb and gutter interior roadways to capture stormwater runoff from potential pollution-generating surfaces
- Entrance signage
- Mounted sign at the administration building
- On-site signage to provide information and direct customers to appropriate locations

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4. Preferred Concept Development

4.1 Developing the Concepts

Selection of the preferred concept for the Factoria RTS included review and consideration of more than 20 alternative site plans; two concepts were advanced because they best met the development criteria. Most concepts that were considered for the Factoria RTS would allow the existing station to remain open during construction. KCSWD considered options that would require complete closure of the existing station during construction of the Factoria RTS and found no substantial benefit in closing the facility. KCSWD also believes that closure of the station during construction would be a major inconvenience to the public, who would be forced to drive greater distances to an alternative station such as the Renton Transfer Station (approximately 7 miles south). In addition, the closest stations to the Factoria Transfer Station (Houghton Transfer Station and Renton Transfer Station) are already undersized and would be negatively affected by handling the additional traffic.

All concepts considered for the Factoria RTS would preserve the northeast portion of the project site where a wetland and steep slope are located. All concepts considered would also avoid development along the eastern boundary of the site where underground and overhead utilities exist. All concepts assumed that the scale plaza would be moved – in most cases, farther east to increase queuing space and potentially to the south onto the Eastgate property to facilitate phasing and to add space for a reversible/emergency lane.

4.2 Stakeholder Outreach

Vigorous stakeholder outreach efforts were undertaken during development of the FMP and selection of the preferred concept, including a public meeting and briefings to key stakeholders. Public involvement for the Factoria RTS is an ongoing process that provides an opportunity for customers, area residents, and other interested parties to learn about the facility replacement project and to offer comments on the planned improvements. KCSWD has developed the Web site listed below where interested parties can receive project updates and provide comments:

http://your.kingcounty.gov/solidwaste/facilities/factoria-replacement-project.asp#top

The specific outreach efforts during development of the FMP are discussed below.

Affected Stakeholders

The City of Bellevue was engaged early in the FMP process and discussions included the possibility of forming a citizen's advisory committee (CAC) for the Factoria RTS. It was determined through further discussions that a CAC was not the best way to obtain constructive feedback for the Factoria RTS due to the facility's location; existing land use and zoning, and type of facility.

Meetings were held with city staff during development of the FMP on February 22 and August 4, 2010. City staff also attended a concept review workshop and the public meeting.

The purpose of the February 22, 2010 meeting with the city was to introduce the project, discuss previous efforts to replace the station, and lay out the direction and ideas for the transfer station replacement. The city's critical area requirements, mitigation preferences, and conditional use permit process were also discussed.

The second meeting with city staff on August 4, 2010 included an update on the FMP progress and discussion regarding the need for a Non-Project State Environmental Policy Act (SEPA) action. As the project moves into more detailed design stages, additional meetings to discuss specific technical issues, architectural considerations, and environmental mitigation planning will be conducted.

Public Meeting

On May 12, 2010, an Open House was held for the Factoria RTS project to provide information to the public and receive community feedback on two alternative concepts (see Appendix J). Feedback from the public meeting indicated that most concerns from the community were addressed in the conceptual plans and site layouts. Several meetings with interested stakeholders were held to provide updates on the project and address specific comments. For example, individual meetings were held with adjacent property and business owners and with representatives of Olympic Pipeline to discuss any concerns about the project.

Community involvement and feedback are also anticipated at several future points during the project including the following:

- Issuance of the Facility Master Plan
- Design
- Environmental review
- Land use permitting

Advisory Groups

During development of the FMP for the Factoria RTS, the (King County) Solid Waste Advisory Committee (SWAC) and the Metropolitan Solid Waste Management Advisory Committee (MSWMAC) were briefed on the project. MSWMAC includes representation from a number of Eastside cities that are in the Factoria Transfer Station service area.

Commercial Haulers

Representatives from the commercial haulers – including Waste Management, Allied, and CleanScapes – attended a meeting on August 5, 2010. During the meeting, draft concepts for the Factoria RTS were presented to the representatives. Feedback from the commercial haulers was positive with particular appreciation expressed for the proposed vehicle separation. The commercial haulers believe it will help the efficiency of their operations and improve safety. The commercial haulers also provided feedback regarding traffic circulation, queuing lengths, and the flat tipping floor configuration. Feedback from the commercial haulers was incorporated into the preferred concept.

4.3 Sustainability Elements

One of KCSWD's primary goals for the Factoria RTS project is to incorporate sustainability measures in the design and operation of the facility and pursue a LEED® Gold (Version 2009) certification. To incorporate this goal into the conceptual design process, an Eco-Charrette was held. The preliminary LEED® scorecard is included on page 91 of the FMP. As the Factoria RTS project proceeds through design, sustainable elements and LEED® strategies will be reviewed and updated as necessary.

A Salmon-Safe Site Design Evaluation and Assessment was performed for the Factoria RTS. The evaluation is included in Appendix B. The recommendations are summarized below:

1. Comprehensive understanding of hydrologic and watershed processes in the project area prior to implementation of surface and groundwater management systems.

2. Treatment of 95 percent of the annual surface water runoff volume, in addition to meeting the Washington State Department of Ecology's minimum requirements for stormwater treatment.

3. Implementation of stream and wetland restoration measures on the project site and adjacent properties that protect and improve salmon habitat in the watershed.

The recommendations will be further considered during design of the Factoria RTS. Costs and benefits associated with the recommended measures will be evaluated as the design progresses.

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5. Preferred Concept

5.1 Summary Description of the Preferred Concept

As mentioned in Section 4, two concepts for the Factoria RTS were advanced for final consideration. The preferred concept was selected because it will result in lower construction costs, greater operational efficiencies, a safer traffic circulation pattern, larger container chassis parking area, and better orientation of the recycling/HHW area for self-haul customers. The preferred conceptual site plan for the Factoria RTS is depicted on Figure 3 (see page 57).

The primary building areas for the Factoria RTS will include the following:

- Transfer Building Tipping Floor Level – 51,000 square feet
- Transfer Building Lower Level – 27,500 square feet
- Administration Area (two levels) – 5,200 square feet (2,600 square feet per level)
- Recycling Area – 5,400 square feet
- HHW Area – 4,800 square feet

The new 51,000-square-foot (building footprint) transfer building will be located in the center of the site. The recycling area and HHW building will be on the east side of the transfer building; the customer entrance, scale plaza, and access roads will be to the south; and the container chassis storage yard will be to the north. The administrative area will be on the south side of the transfer building.

The preferred concept will affect on-site wetlands and streams, but will minimize the impact on the large, Class III wetland in the northeastern portion of the site (see Appendix D for the Summary of Wetland and Stream Findings). The site slopes steeply from the southeast to the north, so many retaining walls will be required to make the site accessible.

The site has been divided into two overall levels: the southern (upper) level and the northern (lower) level. Major earthwork will be required for construction of the preferred concept, with approximately 38,000 yards of fill assumed for the initial phase of construction followed by an estimated 129,000 yards of cut for the later construction phases. The site is constrained to the east by high-pressure gas lines owned by Olympic Pipeline. The facility design incorporates the terms of the gas line easement and maintains a 50-foot setback from the gas lines.

Figure 4 (see page 59) shows the site traffic circulation plan associated with the preferred concept. All transfer station customers will access the site from SE 32nd Street as they currently do. After passing through the scale plaza, commercial vehicles will turn north and enter the transfer station at the southwest corner of the building. Self-haul customer traffic will pass through the scale plaza and continue east to the southeast corner of the transfer station building. Self-haul customers with mixed loads of recyclables and MSW will be able to use the looped road on the east side of the

facility that provides access to the recycling area, HHW building, and the transfer station. All customers will merge in the southeast area of the site prior to exiting the site through the scale plaza.

An access road connecting the upper (southern) level and the lower (northern) level of the site will be located west of the transfer building. This road is intended only for occasional traffic from county-owned equipment or commercial vehicles with hot loads. For safety purposes, KCSWD container chassis maneuvering will be kept completely separate from transfer station customers by using a separate site entrance to the north off SE 30th Street.

Transfer Building

The 51,000-square-foot transfer building will consist of a multi-level, cast-in-place concrete substructure and floor system with a clear span metal building superstructure. The main axis of the building will be orientated east–west to maximize the interior building area and the external container chassis maneuvering area. The building design will provide a minimum 25-foot clearance on the tipping floor level for customers unloading waste materials and a 17-foot clearance on the lower level for loading the stationary compactors. Figures 5 and 6 (see pages 61 and 63) show detailed floor plans of the tipping floor and lower level, respectively. Figures 7 through 12 (see pages 65 through 75) are architectural renderings showing the proposed site buildings and features from various perspectives.

Two preload MSW compactors will be installed in the northern portion of the transfer station. The compactors will also likely be used for organics. A top-load chute for an open top container will also be installed in the northwest building extension of the transfer station. The open top may be utilized for clean wood or yard waste, if desired, or may be covered with steel plates and the area can be used for additional materials storage.

Tipping Floor Level

The transfer station tipping floor will be a flat, concrete floor at the same elevation across the entire building. Commercial and self-haul traffic and unloading areas in and around the transfer station will be separated to the maximum extent possible to allow for efficient operations and increased safety for all customers. The western portion of the transfer building will be utilized by commercial traffic. Commercial trucks will enter the transfer building's southwest corner, unload toward the center and the north side of the building, and exit through a separate door directly adjacent to the entrance. A vehicle inspection area will be available to the side of the building entrance. Every commercial vehicle that exits the building will drive over a wheel wash. The center portion of the building will be designated for MSW and organics storage during the day.

The eastern portion of the building will be for self-haul customers, separated from the commercial unloading area by daily MSW and organics storage areas. A permanent or temporary barrier may also be installed to separate self-haul traffic from commercial vehicles and transfer station equipment. There will be up to 11 unloading stalls oriented north–south for residential self-haul customers. Self-haul customers will enter the transfer building from the south and exit the building on the north before looping around the recycling/HHW area. Self-haul and commercial vehicles will merge east of the scale plaza to re-weigh and pay prior to exiting the site. On the weekends when high volumes of self-haul customers and very few commercial customers use the transfer station, the self-haul unloading stalls may be reoriented east–west to allow additional customers to unload simultaneously, minimizing the queuing time. Self-haul traffic may utilize the commercial entrance/exit on the weekends depending on the unloading area orientation.

The two hoppers to feed the stationary compactors will be located near the north-central exterior wall of the tipping floor. Reinforced push walls will be adjacent to the hopper openings and angled (curved) towards the hoppers to help direct waste. The open top container opening will be located in the northwest building corner.

Lower Level

The lower level, or load-out level, will be located beneath the tipping floor of the transfer station. A tunnel approximately three-quarters of the depth of the building will be located on the central north side of the load-out level and will house two side-by-side, stationary MSW preload compactors. To the west of the compactors will be five covered, back-in trailer parking stalls, and a maintenance area. North of the maintenance area will be the open top container, which will include a scale to manage weights of the top-loaded open top trailers to ensure that the loads are under highway axle-weight limits. The open top area may be used as a storage area when the open top container is not used.

East of the compactors at the load-out level will be two additional container chassis parking stalls and the recycling baling and storage area. An employee break area including a warming area and restrooms will be located between the eastern container chassis parking stalls and the recycling area. Behind the two compactors to the south, hydraulic power units (HPUs) that provide power to the two compactors will be located in an enclosed service room on the lower level of the transfer building. Providing an enclosed HPU room separate from the compactors provides a clean environment, which is beneficial to the life of the equipment and shields occupied spaces from the noise of the HPU equipment. Access to the HPU room will be from the north through the compactor tunnel or south down a hall from the administrative elevator.

An elevator and a stairwell will connect the two tunnels to the upper floor levels for operations access and for emergency egress purposes. A separate emergency egress stairwell required by code will be provided at the rear of the compactor tunnel.

Administration Area

A two-story administration area of approximately 5,200 square feet will be located on the south side of the transfer building. Figure 13 (see page 77) shows the floor plans for the first and second levels of the administration area. The first floor level will include a lobby/entrance area, employee locker rooms, an equipment room, a laundry room, a vending area, and an electrical room. The administration area will include elevator and stairway access to the load-out level of the transfer station.

The second floor level of administration area will be accessed via stairs (on the west end) and an elevator (on the east side). The second floor level will include a multi-use room for education, training, and meetings, TSO room, two offices, restrooms, and an information technology (IT)/storage area. The TSO room, offices, and multi-use room on the north side of the building will all have windows with a direct view onto the tipping floor to allow observations for operational and educational purposes. The south side of the hall area will incorporate many windows for natural lighting.

The administration area will be accessed from a parking lot for visitors and employees and from a walkway southeast of the transfer station. Additional parking will be located north of the recycling building and at the scale plaza. Employee and visitor parking will accommodate sustainability principles and LEED® criteria, which offer preference to energy-efficient vehicles and carpools.

Recycling Area

The recycling area will be located inside the transfer building east of the self-haul unloading area (see Figure 5 on page 61). The recycling area will be open to the self-haul area to allow movement of materials between areas. The recycling area will have an exterior building wall to the east with multiple overhead doors for the public to access the recycling bins from the covered canopy area, shared with the HHW facility. This recycling scenario will allow the public to access the recycling area from within the transfer station for those with mixed loads, and also from the covered, drive-through canopy for those with only recyclable loads. The recycling area may include small (1-yard) mobile bins where the public can place recyclables. For collection and transport, the small bins could be loaded by the county into larger (20- to 40-yard) containers also located in the recycling area. Space for four to six large recycling containers will be provided for commodities such as white goods (appliances), wood waste, cardboard, and scrap metal. Heavier items, such as appliances, will be placed in the bin by county staff using a fork lift. Space for recycling of materials typically collected by commercial haulers curbside (e.g., glass, paper, plastic) has not been specifically programmed into the Factoria RTS design but could be provided as space allows.

The recycling area includes a hopper opening leading to a baler located in the lower tunnel level (see Figure 6 on page 63). Bales of materials such as cardboard will be stored at the lower level east of the compactor tunnels beneath the recycling area. An at-grade loading dock will be located north of the bale storage area in the container chassis yard for loading bales by forklift.

Household Hazardous Waste Facility

The HHW facility will be located on the east side of the transfer station building across the covered canopy from the recycling area. Figure 14 (see page 79) shows the preliminary floor plan for the HHW facility. The approximate 4,800-square-foot HHW facility will provide for collection, processing, and storage of hazardous materials that should not be disposed of in the MSW stream. The existing Factoria HHW facility is open Tuesday through Friday from 8:00 AM to 4:00 PM, and Saturday and Sunday from 9:00 AM to 5:00 PM. The HHW facility may continue to be operated during limited hours different than those for the main transfer station because staffing of the HHW facility is required at all times while open to the public.

The HHW facility accepts materials from the public and small quantity generator businesses. Materials accepted at the current and future HHW facilities include automobile batteries and fluids, gasoline, oil-based paint, household cleaners, chemicals and adhesives, pesticides, and thinners and solvents. Material storage areas for the new facility were sized based on an assumed 25-percent increase from 2007 collection volumes.

The drive-through area will include three lanes – one for recycling customers, one for HHW customers, and a center drive-through lane – and will be able to accommodate unloading/queuing of at least three vehicles in each of the outside lanes under the canopy to protect customers and employees from inclement weather. It is anticipated that customers accessing the recycling area will unload their own materials; however, current KCSWD policy requires that transfer station staff monitor customers unloading HHW materials from their vehicles. The HHW facility may include a manual or automated conveyor to assist with material movement from the unloading area into the processing area. The new HHW facility will also include a "swap room" where the public can look over and take home a limited number of items for personal use that have been turned in by other customers. Such items may include oil-based paints, stains, automotive products (e.g., antifreeze, brake fluid), and household cleaners and will be individually reviewed and approved by HHW staff to be eligible for reuse.

The HHW facility will include an open processing area in the center of the building that can be modified as needed based on the types of materials received in the future. A combined employee office/break area will be located at the front of the facility with a direct view of the drive-through area. The office/break area will include a desk with computer access and space for HHW paperwork processing as well as a table, microwave, etc. Employee amenities in the HHW building also include locker room and shower facilities. The HHW facility will also have a storage room for consumables and an electrical/mechanical room.

Material storage areas within the facility will be divided into the following categories: acids, bases, inerts, flammables, oxidizers, poisons, compressed gases, propane tanks, reactives, and unknown cabinets. Certain materials including paints, antifreeze, and motor oil may be consolidated from individual containers prior to storage. Some materials, including flammables stored in drums and

empty, new drums, will be stored outside the building in an approximate 1,300-square-foot paved area enclosed within a perimeter fence located north of the HHW building. An at-grade loading dock will be located north of the outdoor storage yard for load-out of materials using a forklift. The general material flow in the building will be from the west to the north, including material acceptance, processing, storage, and finally load-out. It is anticipated that materials will be transported using a 30-foot box truck at least every week. An updated HHW Operations Plan including a description of various material handling, bulking, storage, transport, and employee training information will be developed prior to opening the new HHW facility.

Flexible space in the recycling/HHW area will be included (inside recycling area, canopy, HHW swap room, parking, and at-grade loading dock) to allow hosting of public events such as periodic material collection drives.

Scale Plaza

The scale plaza will be located on the south side of the property, east of the existing scalehouse, to allow for additional vehicle queuing off SE 32nd Street. The scale plaza will include inbound and outbound scales serviced by a staffed scalehouse, as well as a third automated, reversible scale with service provided by a remote tube system similar to the system currently used at the KCSWD Algona Transfer Station for account customers. For the final design, reuse of the existing scalehouse may be considered in the new facility construction. The scale plaza will also include a parking area for scale attendants as well as visitor parking for people who drive extra vehicles to the station to assist others with unloading their self-haul loads without needing to pass over the scales.

The location of the scale plaza with three scales will require a boundary line adjustment from the City of Bellevue. The boundary line adjustment will request that approximately 50 feet of the Eastgate property (directly adjacent to the Factoria RTS property to the south, also owned by the county) be re-appropriated as part of the Factoria property. The boundary line adjustment is required to provide sufficient space and appropriate driveway grades for vehicles maneuvering between the scale plaza and transfer station. Preliminary dialogue with the City of Bellevue has indicated that the proposed boundary line adjustment should be achievable. A memorandum detailing the boundary line adjustment process and requirements is included in Appendix I.

Maintenance Area

A 2,500-square-foot maintenance area is located on the northwest side of the transfer building on the lower level. It is anticipated that routine, light maintenance of the on-site mobile equipment will be conducted in this area, including lubrication and fluid changes, replacement of minor parts, and other preventive maintenance activities. The maintenance bay will include space for storage of consumables and small spare parts. The maintenance area will be accessed on the lower level, south of the open top trailer opening. It is expected that maintenance staff will visit the site on a periodic basis to carry out routine maintenance activities in the near term.

Container Chassis Storage Yard

A large, paved, container chassis maneuvering and storage yard will be located north of the transfer building, as shown on Figure 3 (see page 57). The station layout allows for 20 back-in container chassis parking areas, of which 7 stalls are located under the north side of the transfer building, and 13 stalls are located along the north edge of the site adjacent to SE 30th Street. The container chassis yard was designed to allow for 150 feet in front of each back-in stall (indoor/outdoor parking, open top, compactors, and recycling dock) for maneuverability. Typical truck maneuvering paths are shown in Figure 4 (see page 59). A top pick loader or reach stacker could be used to unload empty containers and load full containers by accessing from the south in the maneuvering area.

The container chassis storage yard will also include a hot load/decant area to the west and a fueling island to the northeast.

Hot Load/Decant Area

An area northwest of the transfer station in the chassis storage yard will be designated as a combined hot load and decant area. The hot load area provides a location for a vehicle to discharge its load if the load is smoldering or on fire. The vehicle can dump its load directly onto the pavement surface. The hot load/decant area will be sloped to channel liquids toward a center drain that flows to on-site water treatment before discharging to the sanitary sewer system. When a hot load is received, a valve controlling sewer discharge will be closed and the liquids from the hot load will be contained in a small vault below the hot load/decant area until it is confirmed that it is safe to discharge the liquids. The hot load/decant area will be located at the foot of the west road connecting the upper and lower levels of the transfer station for easy accessibility for trucks with hot loads from either level.

During typical operating conditions, the hot load area could also be used as a decant area for county-owned vactor trucks. The vactor trucks, used for activities such as street and catch basin cleaning, will pour their loads onto the sloped paved area to allow the solids to separate on the pavement surface while the liquids drain to the on-site treatment and sanitary sewer system. It is anticipated that the hot load/decant area will be approximately 2,000 square feet.

Fueling Island

A fueling facility may be located north of the transfer building in the container chassis parking area to provide fuel for on-site equipment. The fueling facility will consist of an above-ground tank and dispenser with a canopy. The fueling equipment will be designed to record fuel volumes for cost tracking purposes.

Public Facilities

Community amenities to educate the public about facility operations are an important part of the Factoria RTS development. The administration area will include several public education

opportunities including a conference room that may be used as a community meeting room, a viewing gallery to observe waste transfer operations, and informational opportunities to observe and learn about the sustainable features incorporated into the Factoria RTS. Sustainable features visible for public education in the administration area could include a green roof, bioswale and landscaping, rainwater harvesting features, and recyclable materials, among others. Information regarding the services offered at the site and regarding the county's solid waste management system can be presented in the administration area, as well as at other locations including the recycling and HHW areas. If possible, the final station design may also incorporate other public benefits including a hiking/biking trail connection outside the transfer station operations to nearby regional trail systems.

Utilities

The Factoria RTS will incorporate utility services including water, storm and sanitary sewer, electrical, telephone, fire protection, security, and data systems, all of which will be constructed as underground systems. The new utilities will connect to the main lines along SE 30th Street and SE 32nd Street, similar to the existing station.

A conceptual stormwater management plan has been prepared for the preferred Factoria RTS concept (see Appendix C) and is anticipated to include both flow control and water quality treatment. Stormwater discharge from the Factoria RTS can be classified into one of four categories: sanitary sewer, storm system, dispersion, or harvested rainwater (see Figure 1 of Appendix C). Separate collection and management of the stormwater flows will help minimize sanitary sewer discharge quantities in order to remain below the National Pollutant Discharge Elimination System (NPDES) permitted flow rate. For example, stormwater runoff from impervious areas that does not contact waste materials will be treated and discharged via the storm system outlet. Stormwater runoff from impervious areas that may be contaminated through contact with waste will be discharged to the sanitary sewer in compliance with the county's Industrial Wastewater Discharge Pretreatment Limits.

A number of sustainable features including rooftop rainwater harvesting and pervious pavement will be incorporated into the station design to minimize the amount of stormwater runoff collected for treatment and discharge. Pervious areas of the proposed development will be designed to maximize infiltration through the use of engineered rain gardens, bioswales, and other applicable infiltration features as allowed by the City of Bellevue Code and Standards (2010). Harvested rooftop stormwater will be conveyed to a cistern to use for tipping floor washdown, landscape irrigation, and other non-potable uses. Excess rainwater that is harvested will not require water quality treatment, but will be attenuated in the flow control system before discharge via the storm system outlet.

A stormwater treatment and detention vault will be used to attenuate peak stormwater runoff events at the Factoria RTS due to the limited site area available for surface ponds. The stormwater vault will be located below the container chassis yard north of the transfer station and will discharge to the sanitary sewer system along SE 30th Street. The vault dimensions are estimated to be

approximately 170 feet by 170 feet by 8 feet tall. A scenario where stormwater runoff management from the Eastgate property south of the project site is combined with stormwater from the Factoria RTS may also be evaluated during detailed facility design.

For emergency use, a standby engine generator sized to handle most of the site's electrical load, except for high electrical demand equipment such as the stationary preload compactors, is proposed south of the recycling facility. The final location for the generator will be determined in design and may be an area with closer access to the electrical room. The electrical power demands for the new facility will increase significantly compared with those of the existing facility due to the compactors, the upgraded administration area, and the increased building lighting load.

A photovoltaic generation system and the use of green power (renewable energy purchased from the electrical utility provider) will be considered as part of the sustainable building features evaluated during design to help achieve the county's goal of a LEED® Gold Rating. The photovoltaic array would likely be mounted on the south-facing section of the transfer building roof.

5.2 Architectural Approach and Materials

The architectural approach for the Factoria RTS is to create a presence that emphasizes a Northwest style while modulating sections of the building to break up the large mass of the facility. Figures 7 – 12 (see pages 65 through 75) provide a visual reference for the descriptions below.

The color palette on any project can take many directions and is subjective. The color selections for the Factoria RTS design include natural hues of browns and grays that are intended to be subtle and complementary with the natural treescape of the surrounding slopes. For example, a dark charcoal gray can be used to highlight and contrast the façade features, including main steel columns, secondary framing, and window framing. Carefully located color accents suggesting wood tones of fir or cedar can also add vitality to the color scheme.

Primary and secondary steel structural framing will project from the wall plane to provide fine shadow lines and create a layer of texture and detail not typically found in a flat surface. The sides of the building will integrate two contrasting metal panels with tinted translucent wall panels for a visually interesting composition. Canopies will be provided at vehicle access points to the building for weather protection and additional architectural character. Openings on the south side of the building will also be defined by vertical wall "fins" that will partially screen views to the interior and help deflect wind from the southwest.

Exterior walls for portions of the building (e.g., lower level) will be concrete or concrete masonry, which will provide durability and lasting quality to the structure. On the tipping floor level, precast concrete walls will be used for their functionality (i.e., push walls to maneuver waste materials) and will double as exterior surfaces that will be set behind the exterior columns. At the north side of the

building where the understory load-out presents additional height to the transfer station, the cast-in-place concrete structure will be designed as a "base" to the building and will have reveal patterns and pilasters.

The Roof as a Feature

Due to existing office buildings east of the site and a future potential office complex to the south (the Eastgate property) at elevations higher than the Factoria RTS property, the roof of the new facility will be very prominent. The roof represents a good opportunity to incorporate sustainable site features including a green roof and photovoltaic panels. The roof will also be designed to accommodate ease of maintenance as well as meet code requirements such as snow loads.

The roof for the Factoria RTS will consist of a contemporary, single, low slope structure. The roof will slope upward from south to north to allow capture of light from the north and to provide a viable exposure for south-facing solar panels. Rooftop equipment will be screened with architectural treatment.

A gray roof color that is visually neutral is planned. Roof overhangs at the building perimeter further express the roof slope and help diffuse direct summer sun on high wall glazing, while the wall shadows help flatten the overall height of the structure.

Recycling/HHW Area

The recycling/HHW area will have a drive-through drop-off area with a high clearance canopy for weather protection for all seasons. This canopy will have exposed steel framing and will "float" above the adjacent lower HHW structure to the east. In addition to high bay lighting, optimal use of skylights will create a light-filled space comfortable for public use on a daily basis. Signage at the recycling/HHW area, as well as at the transfer station self-haul entry/exit, will present information in a clear manner and be consistent with the project's architectural themes.

Administration Area

A two-story administration area will be located along the south side of the transfer station to allow staff excellent visibility and quick access to the tipping floor. The south side of the administration area will also provide natural lighting and will create an open, contemporary appearance at the most publicly visible side of the transfer station.

The architectural elements of the administration area will frame the visitor entry to simplify identification of the entrance and lobby, which will be functional and inviting. At the entry door, paving may incorporate site rock and recycled concrete from on-site demolished structures. The design will be organic in character and expand the environmental themes of the facility. The lobby will include tall glass to bring natural light into the 400-square-foot, two-story open space.

The lobby will also act as a transition to staff areas. On the second level, a corridor will link all key areas with dual pane "low-e" (low emissivity) glass on the south side; this passageway will become an attractive hall filled with natural light. Staff support areas will be attractive as well as functional with an emphasis on low maintenance. The elevator will conveniently serve the load-out level for easy staff access to lower level equipment and maintenance areas.

Forest Stewardship Council (FSC) certified cedar architectural beam elements, bamboo veneer paneling, concrete floors, and light emitting diode (LED) lighting will all compose an interior quality that will enhance the facility's message of sustainability. Potential displays will offer insight into recycling and provide an educational opportunity regarding sustainable practices and solid waste operations. A conference room/viewing gallery on the second floor will provide a protected view out onto the tipping floor. Adjacent to the conference room/viewing gallery, the elevator/stair landing will provide a view of the top side of a canopy that runs the length of the south side of the administration area.

5.3 Environmental Considerations

The preferred concept for the Factoria RTS will have impacts to some on-site Category III and IV wetlands and two non-fish bearing streams. However, the Factoria RTS design will generally avoid impacts to the northeast corner wetland and stream. The northeast corner wetland is also rated a Category III wetland, but due to its size and connection to nearby habitat, it scored high for habitat function and moderate for habitat diversity and interspersion compared with the other on-site wetlands. The stream flowing through the northeast corner wetland is considered non-fish bearing by the City of Bellevue. The Summary of Wetland and Stream Findings is included in Appendix D. Mitigation planning is ongoing, but a focus will be to enhance and restore wetland function in that corner of the property as well as in degraded wetlands and streams near the site in the same drainage basin (see Figure 15 on page 81).

The overall site topography slopes down toward the northwest with a grade change of approximately 100 feet. Areas not currently used for transfer station operations or the warehouse structures are heavily vegetated with cedars, Douglas fir, vine maple, cottonwood, alder, Himalayan blackberry, and English ivy.

Environmental review through SEPA will be conducted in two stages:

- A non-project SEPA checklist and determination will be processed by the county on the FMP document and preferred site plan prior to formal adoption by the council.
- As part of the land use permit approval process, further analysis and documentation as well as a project-specific SEPA checklist will be prepared to evaluate potential impacts of the construction and operation of the transfer station.

The project will comply with all local, state, and federal environmental regulations. Project compliance with the National Environmental Policy Act (NEPA) will be analyzed by the U.S. Army Corps of Engineers through its Section 404 wetland fill permit process. A list of anticipated permits required by the new facility is provided below in Section 5.5. The county will also work with the City of Bellevue to establish appropriate mitigation measures to offset project impacts.

5.4 Traffic Impact

A Traffic Impact Analysis (TIA) was completed for the Factoria RTS and is included in Appendix E. The TIA documents potential impacts on the transportation infrastructure associated with the Factoria RTS and recommends mitigation, if necessary, for those impacts. The evaluation reviews the anticipated traffic characteristics of the project and provides an assessment of operating conditions of the transportation infrastructure serving the project site, both with and without the proposed expansion.

Currently, the site is accessed from the SE 32nd Street/Richards Road intersection by all vehicles using the facility. For the Factoria RTS, KCSWD transfer vehicles (i.e., container chassis trailers) will access the site from the SE 30th Street/Richards Road intersection, while customers will continue to access the site from the SE 32nd Street/Richards Road intersection. The number of trips for KCSWD transfer vehicles will initially be reduced when the Factoria RTS is opened due to the improvement in compaction efficiency. As the tonnage of waste processed increases over time, the number of trips for transfer vehicles will increase, but it will still be lower than it would have been without the compactors.

A PM peak hour LOS analysis was conducted of the following signalized intersections in the project area to evaluate traffic impacts based on forecasted traffic from the Factoria RTS:

- Richards Road/SE 30th Street
- Richards Road/SE 32nd Street
- Richards Road/SE Eastgate Way
- Richards Road/SE 36th Street

The PM peak hour period was studied because it is typically the time period when the local street system experiences the highest volumes of traffic and worst operations. For the Factoria RTS, the 4:00 PM to 5:00 PM period is considered the peak hour for traffic within the project area. Current and forecasted vehicle counts for the Factoria RTS for the 4:00 PM to 5:00 PM period are summarized in Table 7.

Table 7. Vehicle Trips for the Factoria RTS for the 4:00 PM to 5:00 PM Weekday Peak Hour

	Year		
Vehicle Type	**2008**	**2014**	**2042***
Customer (Self-haul and commercial total)	74	112	170
Transfer Vehicle	4	6	10

Note: Trip counts include in and out, i.e., 74 trips means 37 vehicles in and 37 vehicles out.

*Year 2042 volumes from Bellevue-Kirkland-Redmond regional traffic forecasting model.

In terms of traffic analysis, the LOS refers to the degree of congestion on a roadway or at an intersection, measured in average control delay. An LOS A represents free-flow conditions (motorists experience little or no delay and traffic levels are well below roadway capacity), while an LOS F represents forced-flow conditions (motorists experience very long delays and traffic levels exceed roadway capacity). LOS B to E represents decreasingly desirable conditions.

In 2042 (the long-range planning forecast year for the TIA), all the studied intersections are anticipated to be at the same LOS with, or without, the Factoria RTS. As a result, at this stage of the project, no traffic mitigation is anticipated for the project; however, the City of Bellevue may impose a traffic impact fee based on additional future PM peak hour trips. This fee (if any) will be determined during the conditional use permit process.

During development of the FMP, a routing evaluation was conducted to assess travel times along several routes from the Factoria Transfer Station to the intersection of I-405 and Coal Creek Parkway. The evaluation concluded that the current route used by transfer vehicles is typically the fastest from the transfer station to the I-405 and Coal Creek Parkway intersection. A technical memorandum summarizing the results of the routing study is included in Appendix I. Further evaluation of transfer vehicle routes will be performed during the design (and permitting) phase.

5.5 Permit Requirements

The project team reviewed and assessed the permits likely to be required from local, state, and federal agencies. The preliminary list of permits and other requirements include the following:

City of Bellevue

- Boundary Line Adjustment
- Conditional Use Permit (CUP)
- Design Review Permit
- Critical Areas Land Use Permit
- Clear and Grade Permit

- Retaining Wall and Vault Permits
- Building Permits

King County

- Project-Specific SEPA
- Solid Waste Transfer Station Operating Permit

State

- Water Quality 401 Certification
- National Pollutant Discharge Elimination System permit (NPDES) for stormwater during construction
- Hydraulic Permit Approval (HPA)
- Notice of Construction from the Puget Sound Clean Air Agency

Federal

- U.S. Army Corps of Engineers 404 Permit for wetland fill (includes NEPA and Section 106 compliance)
- Endangered Species Act Concurrence

The City of Bellevue considers the Factoria Transfer Station an Essential Public Facility (EPF). EPFs are typically not regulated by standard land use code and often are uses of regional importance such as a transfer station. EPF proposals in the City of Bellevue are subject to a Process I Conditional Permit.

See Appendix F for a summary of the purpose, submittal requirements, decision criteria, and processing timeline and fees for the permit requirements, including the submittal requirements for the Design Review Permit.

5.6 Geotechnical Considerations

A site subsurface exploration program was conducted between June and August 2010. Extensive grading at the site will be performed during phased construction of the Factoria RTS. Excavation at depths of up to 50 feet will occur on the south and east sides of the property, which will result in the need for permanent retaining walls through a variety of subsurface conditions.

Subsurface Conditions

The exploration determined that the upper slope on the east side of the site generally consists of medium dense to very dense advance outwash sand underlain by very dense, glacially overridden fluvial deposits. Fill was placed to construct the terraces where the existing station and access roads are located. This fill is generally underlain by native soils consisting of medium dense to dense layers of sandy silt and silty sand, and dense to very dense sand and gravel deposits.

Loose to medium dense recent alluvium and fill deposits were encountered near the ground surface at the central portion of the site in the vicinity of the proposed transfer station building and hot load lot to the north. Local peat seams and other soft/loose soils were encountered in borings within the proposed hot load lot and container chassis parking areas. These deposits are generally underlain by more competent recessional outwash and older fluvial deposits. The slope adjacent to and south of SE 32nd Street is generally comprised of very loose to loose, relatively clean, sandy fine gravel fill overlying dense to very dense sand and gravel deposits.

The subsurface investigation determined possible artesian conditions at the site. The subsurface behind the proposed retaining walls, access road, and building excavation contains an aquifer that discharges to the existing slope. The transfer station building site is located over a shallow aquifer that may be hydraulically connected to the aquifer at the retaining wall location and possibly to shallow confined aquifers. Groundwater observations indicate that groundwater is generally flowing to the northwest, following the site topography.

Effects on Design and Construction

The effects of site subsurface conditions on the design and construction of the Factoria RTS and associated retaining walls can be summarized as follows:

- Spread footing foundations bearing on dense to very dense native soils and densely compacted engineered fills will be appropriate for the transfer station structures.
- The project is located in an active seismic zone. Liquefaction hazard due to seismic shaking is estimated to be low and discontinuous across the site. No specific engineering mitigation for liquefaction hazard is required.
- Vertical soldier pile walls can be used for permanent walls or for shoring of temporary cuts where required due to space limitations and the presence of existing structures.

In general, the Factoria RTS site contains hydrogeologically complex conditions that will significantly affect construction and permanent dewatering. Construction of the project will also require temporary drainage and discharge features, and permanent groundwater drainage control features.

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6. Construction

6.1 Project Schedule and Construction Phasing

Construction is planned to commence by early 2013 and be completed in late 2014, with all facilities fully operational in early 2015. A key goal for the Factoria RTS project is to maintain operation of the existing transfer station during construction of the new facility. Therefore, the existing facility will remain in place, likely operating with limited services, and construction will occur in phases to minimize disruption to facility operations.

Challenges of a phased construction sequence include substantial topography variation, limited construction staging areas, temporary service limitations, and temporary access and operational changes. The financial and convenience benefits to KCSWD and its customers outweigh the challenges posed by phased construction. Consideration was also given to closing the facility and reconstructing the entire site at one time; however, due to the physical site constraints, access, and facility requirements, the use of phased construction will not affect the final site layout and transfer station design. While a construction schedule has not yet been developed, the likely phases of the project are described below and shown in Figures 16 – 19 (see pages 83 through 89).

Phase 1

- Remove and salvage or recycle existing warehouse buildings and prepare the site for construction.

Phase 2

- Bring up the grade on the northwest side of the site.
- Construct the container chassis maneuvering and parking area of the site, and the retaining walls along the container chassis access and along the west side of the property.
- Construct the road to connect the lower container chassis area to the upper tipping floor level of the building and build as close to the existing transfer station area as possible.
- Construct part of the Factoria RTS as far east as possible. A temporary wall may be built on the east end to minimize impact to existing operations.
- Construct the administration area.
- Install the two compactors.
- Install temporary scales and scalehouse in the container chassis parking area.
- Obtain Operating Permit and Occupancy Permit for the Factoria RTS transfer building and administration area.
- Provide a temporary collection means for HHW facility or potentially use Wastemobile special events.
- Open portion of new transfer building.

Phase 3

- Route transfer station customers to the SE 30th Street entrance, direct traffic across the temporary scales and up the hill to the commercial entrance, and direct customers to locations for unloading their materials. All vehicles will exit from the commercial exit, back down the hill, across the temporary scales.
- Remove and recycle or salvage the existing transfer facility.
- Install retaining walls on the south and east sides of the site along SE32nd Street, and then lower the site grades.

Phase 4

- Construct a new entrance road and new scale plaza; tie the road into the commercial entrance.
- Route customers back to the SE 32nd Street entrance.
- Remove temporary scales.
- Construct the rest of self-haul and recycling facility.
- Remove temporary wall.
- Construct the HHW facility and the canopy over the drive area.
- Install baler.
- Install fueling facility.
- Obtain Occupancy Permit for the recycling and HHW facilities.
- Open entire campus for business.

6.2 Hazardous Materials Survey

A Hazardous Materials Survey was conducted on the four existing buildings on-site, including two warehouses, the transfer station building, and the scalehouse, to determine potentially hazardous materials that would need to be mitigated in anticipation of demolition of these structures (see Appendix G). The on-site buildings were surveyed for asbestos-containing materials (ACMs), lead-based paint (LBP), and other hazardous materials including light fixture ballasts, fluorescent bulbs, mercury switches, and exit signs.

No ACMs were detected in any of the buildings surveyed. LBP was detected in four samples collected from the main transfer station building. The painted exterior sheet metal, painted metal support pillars, and painted concrete bollards associated with the support pillars should be considered to have LBP unless proven otherwise. Painted beams, trusses, and trim near the roof line of the main transfer station building were not accessible during the survey and should be assumed to have LBP unless proven otherwise.

According to the Washington Department of Commerce Lead-Based Paint Program, abatement of LBP before demolition is not necessary. However, if any LBP abatement or demolition activities are to take place, they must conform with the Occupational Safety and Health Administration (OSHA) Lead in Construction regulations found in 29 CFR Part 1926.62, which require the employer to provide worker protection. In addition, the waste stream will need to be analyzed for hazardous

characteristics (lead) by the Toxicity Characteristic Leaching Procedure (TCLP) prior to disposal to determine if it contains a characteristic hazardous waste.

6.3 Existing Buildings Deconstruction

A waste management plan will be developed during design and incorporated into construction documents to achieve effective demolition, diversion, and recycling of the existing buildings. Deconstruction of the warehouses and existing transfer station will be conducted in a manner that preserves the feasibility of reusing materials and optimizing the amount of materials recycled, therefore minimizing the amount of waste generated. The western-most warehouse is in good condition and of a construction type that could be disassembled, relocated, and re-used.

6.4 Cost Estimates

6.4.1 Construction

A preliminary construction cost estimate was prepared for planning purposes for the Factoria RTS and is included in Appendix H. The cost estimate will be further refined as the project design proceeds. The estimated construction cost as shown in Appendix H is $45.7 million (in 2012 dollars). Based on the level of detail in the FMP, it is anticipated that the construction cost will range between $41.1 million and $50.3 million (in 2012 dollars). This estimate includes sales tax, but does not include the costs for mobile equipment for the transfer station such as front-end loaders. The estimate also does not reflect costs of mitigation measures that may be imposed on the project by permitting agencies.

6.4.2 Annual Operations and Maintenance

Annual operations and maintenance (O&M) costs for the Factoria RTS were estimated to be between $1.70 million and $1.96 million in 2015 dollars (the year facility is expected to be opened). As with the construction costs, the preliminary O&M cost estimate was prepared for planning purposes and will vary as the project design becomes better defined. A more detailed preliminary O&M cost estimate is included in Appendix H.

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7. References

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Figures and LEED® Scorecard

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Figure 1. Project Vicinity Map

Figure 2. Site Aerial Photo

Figure 3. Preferred Site Plan

Figure 4. Traffic Circulation Plan

Figure 5. Transfer Building Tipping Floor Plan

Figure 6. Transfer Building Lower Level Floor Plan

Figure 7. View to the Southwest

Figure 8. View to the Northwest

Figure 9. View to the Northeast

Figure 10. View to the Southeast

Figure 11. View to the Northwest near Administration

Figure 12. Elevated View to the North

Figure 13. Administration Area Floor Plan

Figure 14. Household Hazardous Waste (HHW) Facility Plan

Figure 15. Wetlands and Streams in the Study Area

Figure 16. Phase I Construction

Figure 17. Phase II Construction

Figure 18. Phase III Construction

Figure 19. Phase IV Construction

Factoria Recycling and Transfer Station - LEED® Version 2009 Preliminary Scorecard 3/30/10

Appendix A – Project Schedule

Appendix B – Eco-Charrette Report

Appendix C – Conceptual Stormwater Management Plan

Appendix D – Summary of Wetland and Stream Findings

Appendix E – Traffic Impact Analysis

Appendix F – Permits and Approvals Summary

Appendix G – Hazardous Materials Survey

Appendix H – Facility Cost Data

Appendix I - Miscellaneous White Papers, Memoranda, and Calculations

Appendix J - Stakeholder Outreach