

# Regional Solid Waste System

# Wet Waste Allocation Study

September 2008



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# Wet Waste Allocation Study

## Final Draft Report

### September 2008

The practical purpose of this report is to make recommendations on the amount of putrescible ("wet") waste that should be authorized in four transfer station franchises that are due to expire at the end of this calendar year. The main deliverables are (1) a set of wet waste tonnage allocations for these four private facilities; and (2) any ancillary conditions needed to meet the broader goals of the project and protect the public interest.

The policy purpose behind these allocations is to continue realizing the environmental and energy savings that are obtained by reducing the vehicle miles traveled and time that waste collection trucks spend on the road. The time savings also translate directly into cost savings for ratepayers.

The reductions are accomplished by authorizing privately-owned transfer stations throughout the region to accept wet waste, thereby shortening the distance between a hauler's route and his disposal site. However, private transfer stations remain limited in the amount of waste they can accept. These limits are determined by balancing the benefits of the time reductions against the cost of stranding investment in the public transfer stations and the public interest in maintaining reasonable prices for disposal services.

### Objectives of the Project

- Sustainability goals
  - o Energy savings and reduction of environmental impacts from off-route travel by waste collection vehicles.
  - o Other sustainability measures (*e.g.*, reduction in self-haul vehicle miles traveled).
- Realize economic savings that translate into cost savings for ratepayers.
- Protect the public's investment in solid waste infrastructure.
- Maintain Metro's market influence as established in Metro's 2006 Disposal System Planning project.

## **Executive Summary**

The putrescible ("wet") waste disposal system currently consists of two classes of facilities under Metro code: (1) large-scale Regional Transfer Stations, of which only one is privately-owned (the other two are the Metro stations); and (2) limited-scale Local Transfer Stations, of which there are currently three, all privately-owned.. Metro has franchised one other Local Transfer Station, but it is not yet in operation and its franchise is not up for renewal this year.

A summary of the findings, recommendations and options follow.

### **Local Transfer Stations**

The Local Transfer Station system is largely working, and needs only minor adjustments to continue meeting the objectives set forth in this study. This judgment is based primarily on the finding that the miles that waste collection trucks travel to-and-from their collection routes (vehicle miles traveled, or VMT) has been reduced by 10.8 percent from the time when Metro and Forest Grove transfer stations were the sole providers of wet waste disposal services. The economic benefit from reduction of time that trucks spend on the road translates into at least a 9.9 percent reduction in off-route travel costs.

The current caps are set at 65,000 tons for the life of the franchise. Static caps do not accommodate growth: VMT increases because the new waste must travel to a more-distant facility. Accordingly, if the caps were adjusted to allow for growth, the system could continue to sustain the reductions in VMT.

### **Recommendations**

- Continue to allow local transfer stations.
- Set initial caps to about 70,000 tons/year to reflect growth.
- Allow an annual increase indexed by a local growth index.
- Continue assessing fees and taxes on "back door" waste; *i.e.*, on disposal.
- Continue with no cap on dry waste to maintain processing capacity and market.
- Additional economic regulation—*e.g.*, rate regulation—is not needed to protect the ratepayer.

### **Options**

- If the Council does not wish to provide a growth allowance, the impact on VMT reduction would be relatively small—less than 1 percent.
- If the Council remains concerned about the need for economic regulation, please see the recommendation provided for Regional Transfer Stations, below.

## Regional Transfer Stations

At present, there is only one privately-owned Regional Transfer Station—Forest Grove Transfer Station—but it makes a significant contribution to the reduction of VMT. If this facility were capped at the level of a Local Transfer Station, staff estimates that VMT would increase by 7.2 percent over the status quo, and economic cost would increase by at least 6.4 percent. This takes back almost all of the reduction realized from the operation of the three Local Transfer Stations.

However, the combination of low service obligations and no rate regulation has led several stakeholders to question whether the system allows tip fees at Regional Transfer Stations to rise above underlying costs. And absent caps on throughput, this situation could lead to above-normal profits overall.

Metro does not presently have the information to confirm or refute these concerns. Such information would have to come from the Regional Transfer Station's own financial records. On the basis of this information Metro could determine whether any further action is warranted and cost-effective. Such action might take the form of a further initiative to establish a regulatory mechanism over rates. Staff is led to recommend such a rate review to determine the level of risk that disposal prices could usurp some or all of the savings from transport cost reductions.

## Recommendation

- On January 1, reauthorize Regional Transfer Stations with no cap or a high cap.
- Make Regional Transfer Stations subject to rate review.  
*The meaning of this recommendation is expanded below.*
- Re-examine policies toward service obligations and revise as necessary.
- Include "reopener" clauses in the January 1, 2009 franchises that allow Metro to revise franchise provisions in mid-term to allow implementation of new policies.

**Expansion on the "Rate Review" recommendation.** To determine if any form of economic regulation is warranted, Metro should:

1. Commission an independent analysis of Regional Transfer Station's financial records during 2009 to verify costs, compare overhead and rates of return against industry averages, determine if the tip fee is reasonably related to these costs, and judge the materiality of differences, if any.
2. Based on this information, Metro would be in a position to decide whether or not to proceed with some form of economic regulation. As implementation of economic regulation would require an ordinance and regulatory procedures, there would be an open public process in which the potentially regulated parties could participate.
3. If some form of rate regulation is warranted, simple and relatively low-cost approaches should be considered. One such approach, Rate Cap Regulation, involves setting a rate in some base period, then not revisiting the issue as long as subsequent rate changes are consistent with an independent index such as the consumer price index.

## Methodology of the Study

### Allocation Amounts

To facilitate analysis, staff modeled four main configurations of the wet-waste system:

1. Three Facilities—Metro Central, South and Forest Grove. This represents the wet waste system before the Metro Council authorized Local Transfer Stations.
2. Status quo—the three regional and three local transfer stations currently operating.
3. A system in which all private stations are Local Transfer Stations, subject to tonnage caps.
4. A system in which all private stations are Regional Transfer Stations, not subject to caps.

By varying the tonnage authorizations of the facilities, staff was able to model the change in traffic and tonnage flow among all facilities, and measure the changes in the miles and time that collection trucks spend traveling off-route.\* The scenario with the greatest reduction in VMT and hours on the road is "best" or optimal, based on the evaluation criteria (below). To perform this work, solid waste staff used a version of the department's Flow Simulation Model, a spatial interaction system based on Metro's traffic zone system, updated specifically for this study.\*\*

### Allocation Methods

Once the optimal tonnage amounts for each facility were determined, staff evaluated various methods by which the waste could be allocated among the facilities. The options were:

- Metro-determined optimal allocation
- Cap-and-trade
- Zero-based re-entry
- Auction/bid for tonnage authority
- Exclusive franchises

These methods are described in Appendix B of this report, together with an analysis, discussion of findings and conclusion for each. To summarize: the Metro-determined optimal allocation method performs the best. At its core, this method entails Metro authorizing the allocations that minimize VMT, economic costs and other criteria according to the modeling step described above.

### Evaluation Criteria

**Quantitative Criteria.** The results of the various allocation scenario models were compared along two primary dimensions: the number of miles traveled, and the time spent in off-route travel by waste collection vehicles. These two measures were used to evaluate the performance of each scenario against the sustainability and economic objectives, respectively.

- Vehicle miles traveled (VMT) is a shorthand measure of several environmental and transportation-related benefits, including reduction of particulate matter, greenhouse gasses and other emissions, and highway congestion.
- Time spent in off-route travel is directly proportional to the economic cost of the system.

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\* That is, from the home yard to the route, from the route to the disposal facility, and back to the home yard

\*\* For further information on the scenarios, the model, and results see Appendix D.

**Qualitative Criteria.** The outcomes of all scenarios were compared against the conditions and desiderata that were identified by the Council, solid waste industry, local government solid waste staff and independent haulers, and confirmed by the Council during the scoping phase of this project. While the quantitative criteria drove the main recommendations on the allocation amounts, the qualitative criteria led to important recommendations on sustainability, service provision and economic regulation that take the form of franchise clauses and "reopeners" that also provide the Council with flexibility to implement changes in the future.

## **The Wet Waste System: Policy and Analysis of Options**

Prior to 1999, wet waste could be delivered only to Metro Central, South and Forest Grove transfer stations. By 1998, the time and cost to haul waste to these three stations was becoming one of the fastest-growing components of collection rates. The extra haul time that trucks spent on the road increased vehicle miles traveled, with the associated impacts on energy use and the environment.

In 1998, Metro adopted an Omnibus Policy Package for the disposal system ("OPP"), under which Metro began allowing other solid waste facilities to accept wet waste. By providing the system with more disposal options that were more geographically distributed, vehicle miles traveled and haul times fell. As a direct consequence, the system became more sustainable, and economic costs were reduced.

The system was designed with two classes of facilities for wet waste: Local Transfer Stations and Regional Transfer Stations.

### **Local Transfer Stations**

**Policy Background.** By policy design,

- Local Transfer Stations are of relatively small scale in order to:
  - o Serve a local market;
  - o Minimize the impact on the host community; and
  - o Reduce barriers to siting.
  - o Throughput is currently limited to 65,000 tons of wet waste per year.
- There should be at least two in each market to provide choice and introduce competition.
- They can specialize in commercial hauler traffic (self-haul is authorized, but not required).
- Local Transfer Stations are subject to minimum requirements for recovery of materials.
- Local Transfer Stations are not subject to rate regulation for the following reasons:
  - o The ability to realize above-normal profits is constrained by the tonnage caps themselves. The 65,000 ton limit is *de facto* **quantity** regulation that limits the amount of revenue (and therefore, profit) that can be realized at the facility.
  - o The minimum requirements that Metro places on dry waste recovery induces additional costs that further limit the profitability of the enterprise.
  - o The policy of allowing at least two facilities in a watershed fosters price competition.

- o Ratepayers are protected from excess pricing by local rate-making processes that review the costs of collection including the amount of disposal charge that can be passed on to customers. If a hauler is not allowed to recover his full cost of disposal at a transfer station, he is motivated to seek out another facility where the rates are acceptable to the local government rate-makers. This generates a supply-demand market where facilities are motivated to compete on price (and/or services) to retain business.

Accordingly, under the 1998 policy thinking, rate regulation is not required to protect the public economic interest at Local Transfer Stations.

Currently, there are three Local Transfer Stations operating: Pride Recycling in Sherwood, Troutdale Transfer Station, and WRI in Wilsonville. Citistics (now closed) used to operate in Beaverton. Columbia Environmental (franchised, not yet open) will be located in Northeast Portland.

**Analysis.** Based on staff's modeling work, the number of miles that waste collection trucks travel to-and-from their collection routes has been reduced by 10.8 percent from the time when Metro and Forest Grove transfer stations were the sole providers of wet waste disposal services. The economic benefit from reduction of time that trucks spend on the road translates into at least a 9.9 percent reduction in off-route travel costs.

The current caps are set at 65,000 tons for the life of the franchise. Static caps do not accommodate growth: VMT increases because the new waste must travel to a more-distant facility. Accordingly, if the caps were adjusted to allow for growth, the system could continue to sustain the reductions in VMT.

**Recommendations.** Based on these facts and finding, staff concludes that the Local Transfer Station system is working with respect to the evaluation criteria, and needs only minor adjustments to continue meeting the objectives set forth in this study. Those adjustments would take the form of an increase in the initial cap to account for growth since the caps were last set, and indexing the cap to a growth indicator during the life of the franchise.

In summary:

- Continue to allow local transfer stations.
- Set initial caps to about 70,000 tons per year to reflect growth.
- Allow an annual increase based on a local growth index.
- Continue assessing and taxes on “back door” waste; *i.e.*, on disposal.
- Continue with no cap on dry waste to maintain processing capacity and market.
- Additional economic regulation—*e.g.*, rate regulation—is not needed to protect the ratepayer. However, if Council wants to consider the alternative, please see the discussion in the recommendations for Regional Transfer Stations, below.

## **Regional Transfer Stations**

Through most of the 1998 Omnibus Policy Package project, policy makers operated under the assumption that there would be two classes of facilities: public transfer stations owned by Metro, and private transfer stations of low scale and with limited obligations—that is, the Local

Transfer Stations as described above. However, in 1998 the Forest Grove Transfer Station was only one year into a new 10-year franchise, and that franchise did not reflect many of the policies that emerged from the 1998 OPP. The Metro Council decided to grandfather-in the Forest Grove franchise and redefine the first class of facilities as "Regional Transfer Stations." This class included both Metro stations, and Forest Grove for the duration of its franchise.\*

For these reasons, Regional Transfer Stations were not comprehensively specified in the 1998 OPP. The general policy was that Regional Transfer Stations would be modeled after the Metro operations: full-service, comprehensive facilities that would be required to admit all customers and accept all transfer-station-type wastes. Rates at privately-owned Regional Transfer Stations would not be subject to regulation as long as the full range of services was provided and the tip fees "resembled" the tip fees at Metro facilities. However, the Council never adopted this set of policies and as a result, Metro code does not place any formal obligations on Regional Transfer Stations beyond the requirement that they accept all customers—commercial haulers and self-haul—and provide a venue for Metro hazardous waste collection events. In particular, no form of economic regulation is imposed (no caps, no rate-setting)

Accordingly—and in contrast to Local Transfer Stations—under Metro code, Regional Transfer Stations:

- Are not limited in the scale of operation;
- Are not subject to any conditions designed to foster competition directly
- Do not have to perform material recovery\*\*
- Are not subject to tonnage caps or any other form of economic regulation.
- Must accept all customers
- Must provide space for hazardous waste collection events.

In adopting these provisions, the Metro Council expressed its expectation that a set of policies on Regional Transfer Stations would be adopted before the expiration of the 10-year franchise in 2007. However, this project was never undertaken.

This latter point is addressed in the Recommendations section, below.

**Analysis.** At present, there is only one privately-owned Regional Transfer Station. The modeling work shows that if this facility were capped, VMT would increase by 7.2 percent over the status quo (taking back almost all of the reduction from the 1998 OPP project) and economic cost would increase by at least 6.4 percent. Clearly, this one Regional Transfer Station is a significant contributor to the VMT-reduction objective, and capping this particular facility would score very low on the main evaluation criterion.

Staff also modeled the performance of the system if none of the private facilities were capped—that is, all private stations are Regional Transfer Stations. Under this scenario, an additional 2.4

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\* That franchise ran through 2007 and was renewed on the same terms for one year, through 2008.

\*\* This is now addressed by Metro's Enhance Dry Waste Recovery Program (EDWRP). Forest Grove's current proposal is to reload dry waste to a material recovery facility in lieu of doing it on site.

percent reduction in VMT and 3.1 percent reduction in economic costs is possible. On further analysis, it turns out that over 99 percent of this reduction comes from the transport of waste delivered to Troutdale Transfer Station—waste that is nearest to Troutdale but could not be delivered if the facility was capped. If Columbia Environmental were to come on line (this is the fourth franchised Local Transfer Station, not yet operational) then much of this VMT reduction would be captured. However, if Columbia Environmental does not come on line, the Metro Council may want to revisit its policy on Local vs. Regional Transfer Stations, especially as they apply in the eastern part of the region.

However, during the scoping phases of this project, various Councilors and stakeholders raised concerns about the economic consequences if private Regional Transfer Stations remain uncapped or new ones are permitted to enter the system. Specifically, because privately-owned Regional Transfer Stations are not obligated to perform as full a range of services as Local Transfer Stations, stakeholders assume their operating cost should be lower than at other transfer stations. Yet Regional Transfer Stations may match Metro's tip fee without significant risk of losing business or having that rate disallowed in local government rate-setting situations.\* Stakeholders' specific concern was that the tip fees at Regional Transfer Stations might not reflect costs, and that ratepayers would subsidize the excess if local government regulators allow the full tip fee in their collection rate-setting models. Some Metro Councilors voiced concern that this mechanism could allow private facilities to usurp some or all of the economic benefit from the reduction of transport costs when Metro authorizes the operation of privately-owned transfer stations.

To address whether in fact there is validity to this issue, Metro would need more information. Specifically, Metro would need to know the costs of operating private Regional Transfer Stations in the present environment, and then would need to determine if the observed tip fees are reasonably related to these costs. In the next section, staff makes specific recommendations to address this issue, and the next steps.

### **Recommendation**

- On January 1, reauthorize Regional Transfer Stations with no cap or a high cap.
- Make Regional Transfer Stations subject to rate review.  
*The meaning of this recommendation is expanded below.*
- Re-examine policies toward service obligations and revise as necessary.
- Include "reopener" clauses in the January 1, 2009 franchises that allow Metro to revise franchise provisions in mid-term to allow implementation of new policies.
- If the fourth Local Transfer Station, franchised but not yet open, does not materialize, then the Council should review the whole Local-Regional Transfer Station policy to determine if a different model for the system might perform better on sustainability and economic objectives—for example, an expansion of Regional Transfer Station authority.

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\* This behavior would be consistent with economic expectations and findings in *Metro Transfer System Ownership Study* ("Disposal System Planning 1" project), June 2006.

**Expansion on the "Rate Review" recommendation.** To determine if any form of economic regulation is warranted, Metro should take the following steps:

1. During 2009, Metro should commission an independent analysis of Regional Transfer Station's financial records. The purpose of this analysis would be
  - o To verify costs, and to determine where the facility's expenses, capital costs, rates-of-return and similar allocated quantities fall, relative to industry averages and ranges;
  - o To determine if the tip fee is reasonably related to these costs; and
  - o To judge the materiality of any differences.
2. Based on this information, Metro would determine whether it should proceed with some form of economic regulation. In making this decision Council would consider that there is a wide range of approaches to (and costs of) economic regulation, from "regulation light" to full regulation. For example:
  - o Review and Publish On an annual or period basis, Metro could commission an independent review of the financial records of Regional Transfer Stations, and simply publish the key rate components. Then, any customer or local government rate-setter would have access to pricing information and could make their own decision whether to use the facility or not. This is the simplest form of "rate transparency."
  - o Rate-Cap Regulation. Under this model, a reasonable rate is established in some base period. Then, so long as the tip fee remains consistent with an independent index such as the consumer price index, the regulator (Metro) would not be compelled to take any action until the next periodic review. This form of regulation is increasingly being used formally in lieu of rate-of-return or cost-plus regulation, as it is comparable in performance and considerably less expensive than more traditional methods.
  - o Full regulation. Under traditional models, costs and capital are inventoried and audited. Rates are based on cost-plus allowances or rates of return on capital. Traditional models are very expensive and are generally warranted only for large-impact industries such as utilities.
3. Implementation of economic regulation would require an ordinance and regulatory procedures, so there would be an open public process in which the potentially regulated parties could participate.
4. A form of franchise "reopener" language for rate regulation might take the following form:

*The rates charged to customers of the franchisee for the acceptance of solid waste (including without limitation tip fees, acceptance fees, processing fees, transaction fees and environmental charges) are not subject to regulation unless and until a duly adopted ordinance of the Council extends Metro's rate regulation authority over the franchisee, at which time this franchise shall be amended to implement the code and process specified by said ordinance.*



# Wet Waste Allocation Study

## Final Draft Report

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### APPENDICES

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#### **Appendix A. Private Transfer Station Description and Statistics**

Local Transfer Stations

Pride Recycling, Sherwood

Troutdale Transfer Station, Troutdale

Willamette Resources, Inc., Wilsonville

Regional Transfer Stations

Metro Central and South (publicly-owned facilities)

Forest Grove Transfer Station, Forest Grove

#### **Appendix B. Analysis of Allocation Options**

Metro-determined optimal allocation

Cap-and-trade

Zero-based re-entry

Auction/bid tonnage authority

Exclusive franchises

#### **Appendix C. Costs, Rates, Economic Regulation**

#### **Appendix D. Model Results**

Scenarios

Three Facilities

Status Quo

Private Facilities: All Local Transfer Stations

Private Facilities: All Regional Transfer Stations

Analysis

#### **Appendix E. Selected Environmental Impacts**

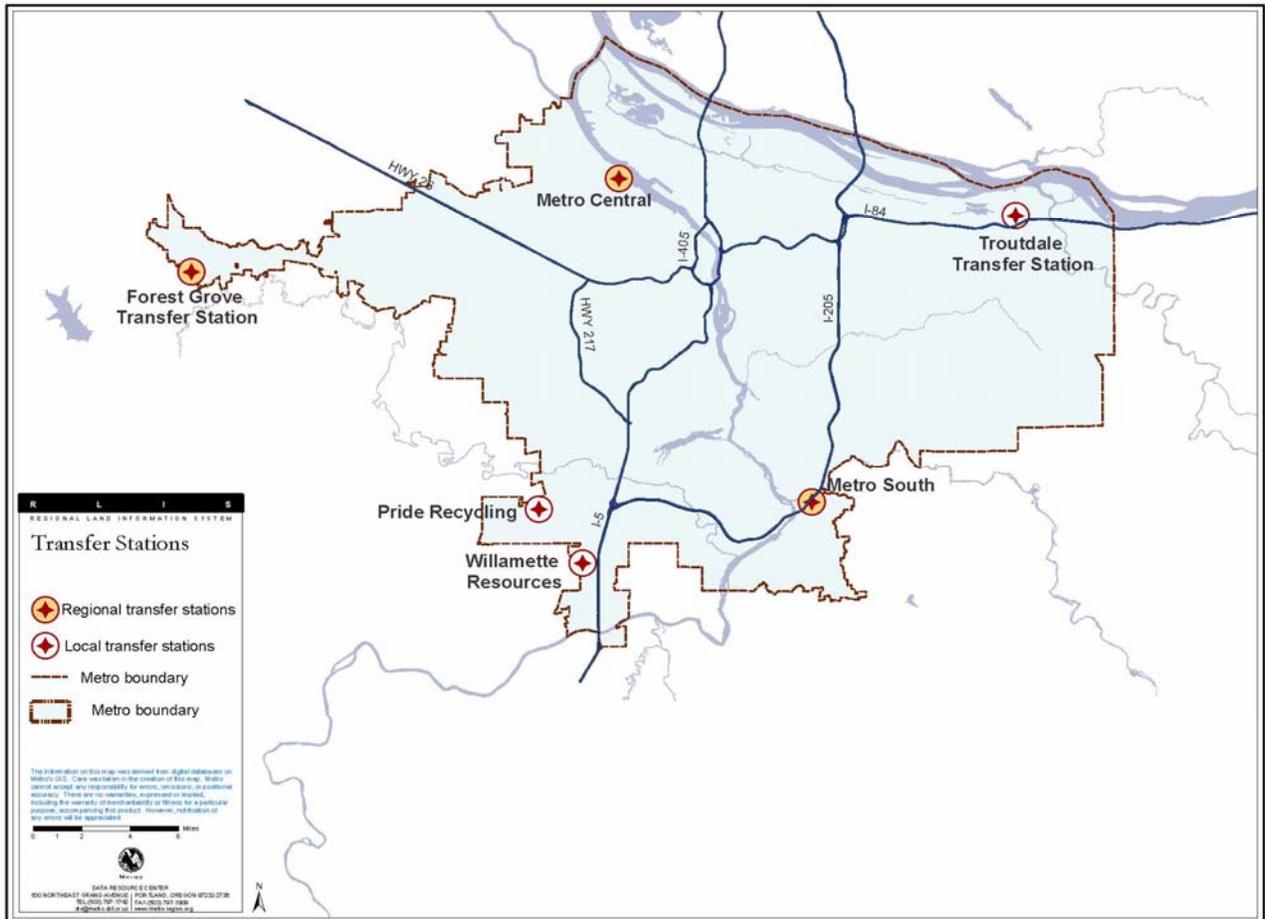


## Appendix A

### Private Transfer Stations

To familiarize the reader with the transfer station system, this appendix provides descriptions and recent statistics for each privately-owned facility. The transfer station system is comprised of:

Local Transfer Stations	Location	Owner
Pride Recycling	Sherwood	Pride Recycling
Troutdale Transfer Station	Troutdale	Waste Management
Willamette Resources, Inc.	Wilsonville	Allied Waste Services
Regional Transfer Stations		
Metro Central Station	Portland	Metro
Metro South Station	Oregon City	Metro
Forest Grove Transfer Station	Forest Grove	Waste Management



## Local Transfer Stations

### Pride Recycling

Owner.....Pride Recycling  
 Location .....Sherwood  
 Opened .....1990 as a reload; Local Transfer Station since 1999  
 Capacity .....Physical: 234,000 tons per year\*  
                           Regulatory: 65,000 tons per year (*Metro tonnage cap*)  
 Disposal at.....Riverbend Landfill  
 Affiliates .....Collection: Pride Disposal  
                           Disposal: no affiliated companies

Pride Recycling opened in 1990, primarily to serve as a sort center and reload for Pride Disposal, a locally-owned hauler operating in Sherwood and Tigard. Although franchised as a transfer station at the time, in fact Pride Recycling was limited to accepting waste only from its own affiliated hauling companies. Putrescible waste was consolidated into reload trailers and delivered to Metro transfer stations. Non-putrescible waste was subjected to material recovery at the owner's option; Metro did not set recovery requirements for Pride. Most of the dry waste residual was disposed of at Lakeside Reclamation.

After the Metro Council adopted its new transfer station regulations as part of the Omnibus Policy Package in 1998, Pride applied to become a Local Transfer Station. The application was granted, and Pride began operating under its new authority on January 1, 1999. The principal changes from its previous operation were (a) Pride could now accept 3<sup>rd</sup>-party (non-affiliated) haulers, (b) putrescible waste could be delivered directly to a landfill, and (c) material recovery activities were now subject to a minimum recovery rate.

Pride currently handles almost 70,000 tons per year of wet and dry waste—mainly from its affiliated haulers, but also from some third-party haulers. Pride recovers material from both waste streams and delivers its residual to Riverbend Landfill in Yamhill County under authority of a non-system license from Metro.

Pride pays the Metro Regional System Fee and excise tax on the solid waste it delivers to Riverbend. The local government (Sherwood) does not levy any solid waste fees or taxes. Pride Disposal is not affiliated with any landfill or disposal site.

<b>Pride Recycling</b>					
Year	Incoming Waste			Recovery Rate	Landfilled Tonnage*
	Wet	Dry	Total		
2004	38,576	21,294	59,870	24%	54,707
2005	27,835	19,995	47,830	28%	41,708
2006	34,821	16,996	51,817	36%	44,700
2007	41,794	25,357	67,151	26%	59,823

\* Source: Metro, *Regional Transfer Capacity Study*, June 2004.

## Troutdale Transfer Station

Owner.....Waste Management of Oregon  
Location .....Troutdale  
Opened .....1997 as a material recovery facility; Local Transfer Station since 1999  
Capacity .....Physical: 312,000 tons per year\*  
                          Regulatory: 65,000 tons per year (*Metro tonnage cap*)  
Disposal at.....Columbia Ridge Landfill  
                          Riverbend Landfill  
Local  
Affiliates .....Collection: Waste Management of Oregon (*many franchises throughout the region*)  
                          Transfer: Forest Grove Transfer Station  
  Clackamas County Garbage & Recycling Transfer Station\*\*  
                          Other: Tualatin Valley Waste Recovery (*mixed waste recovery facility*)  
  [*under construction at Hillsboro Landfill*]  
                          Disposal: Columbia Ridge Landfill, Gilliam County  
  Riverbend Landfill, Yamhill County  
  Hillsboro Landfill, Washington County (*dry waste only*)

Troutdale Transfer Station opened in August 1997 as Recycle America, a material recovery facility limited to accepting dry waste only. Metro regulated Recycle America under an early form of dry waste franchise that did not set tonnage limits or regulate rates, but did impose high material recovery standards—usually in the 35 to 45 percent ranges. These standards were not uniform among similarly situated facilities.

After the Metro Council adopted its new transfer station regulations as part of the Omnibus Policy Package in 1998, Recycle America applied to become a Local Transfer Station. The application was granted, and Recycle America began operating under its new authority on January 1, 1999. The principal changes from its previous operation were (a) Recycle America could accept putrescible waste and could deliver it directly to a landfill; and (b) material recovery activities were now subject to a standard minimum recovery rate, consistent with the rate that Metro required at all material recovery facilities.

Later renamed Troutdale Transfer Station, the facility currently handles almost 80,000 tons per year of wet and dry waste from its affiliated haulers and third-party haulers. Troutdale Transfer Station delivers its most of its waste to Columbia Ridge Landfill, but on occasion sends waste to Riverbend Landfill under authority of a Metro non-system license, and to Hillsboro Landfill.

Troutdale Transfer Station pays the Metro Regional System Fee and excise tax, and a local (City of Troutdale) excise tax of 65¢ per ton on the solid waste that Troutdale Transfer Station delivers to any landfill. There are no host community fees at the facility.

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\* Source: Metro, *Regional Transfer Capacity Study*, June 2004.

\*\* Owned by Clackamas County; formerly Sandy Transfer Station. Waste Management is the contract operator only.

**Troutdale Transfer Station**

Year	Wet	Dry	Total	Recovery Rate	Landfilled Tonnage*
2004	61,702	18,086	79,789	33%	70,196
2005	69,878	16,915	86,793	22%	82,033
2006	62,165	14,896	77,062	37%	73,167
2007	65,490	14,392	79,882	39%	77,269

**Willamette Resources, Inc.**

Owner.....Allied Waste Services  
 Location .....Wilsonville  
 Opened .....1995 as a material recovery facility; Local Transfer Station since 1999  
 Capacity .....Physical: 192,000 tons per year (*local land use limit*)  
                                   Regulatory: 65,000 tons per year (*Metro tonnage cap*)  
 Disposal at.....Coffin Butte Landfill  
                                   Riverbend Landfill  
                                   Marion County Waste-to-Energy Facility

Local  
 Affiliates .....Collection: Rossman's†  
   United Disposal Services†  
   Keller Drop Box†  
                                   Transfer: *contract operator*, Metro Central & Metro South Stations  
                                   Disposal: Coffin Butte Landfill (Benton County)  
   Roosevelt Regional Landfill (Klickitat County, Washington)

† Recently renamed *Allied Waste Services of Lake Oswego*; and *Allied Waste Services of Clackamas and Washington Counties*, respectively. *Allied also operates in the unfranchised City of Portland commercial collection market.*

Willamette Resources, Inc. (WRI) was developed by an Oregon company, Waste Control, in response to Metro's procurement of a new transfer station in Washington County. in the early 1990s.\* Because of the changing environment toward management of solid waste, emerging investment in source-separated recycling and concerns over the growing cost of the disposal system, Metro cancelled the procurement shortly after announcing award of the bid to WRI. Because WRI had already made a sizeable investment in soft costs and procured a site and financing, the company decided to proceed with its plan to build a solid waste facility. After downsizing the facility and revising the business plan, WRI applied to Metro for authority to operate as a dry waste material recovery facility. The Metro Council approved the application and WRI began operations as a material recovery facility in September 1995. Initially, Metro established a minimum recovery rate of 40 percent over all waste accepted at the facility. Most of the dry waste residual was disposed of at Lakeside Reclamation. WRI was acquired when

\* The 1988 Regional Solid Waste Management Plan called for at least four full-service transfer stations throughout the region. Of these, only Metro Central and Metro South were built. Metro cancelled procurement of the others.

Browning Ferris Industries (BFI) purchased Waste Control; and then became part of Allied Waste Services when BFI merged with Allied in 1999.

After the Metro Council adopted its new transfer station regulations as part of the Omnibus Policy Package in 1998, WRI applied to become a Local Transfer Station. The application was granted, and WRI began operating under its new authority on January 1, 1999. The principal changes from its previous operation were (a) WRI could now accept putrescible waste and deliver it directly to a landfill; and (b) material recovery activities were now subject to a lower minimum recovery rate, consistent with the rate that Metro required at all material recovery facilities.

WRI currently handles over 90,000 tons per year of wet and dry waste from its affiliated haulers and third-party haulers; and accepts dry waste from commercial self-haulers. WRI delivers its dry residual to a Metro Designated Facility—Coffin Butte Landfill—in Benton County. WRI delivers up to 45,000 tons per year of putrescible waste to Coffin Butte under authority of a Metro non-system license. The non-system license limits the amount of putrescible waste to Coffin Butte in order for Metro to remain in compliance with its contractual guarantee to direct at least 90 percent of regional putrescible waste to landfills owned by Waste Management. Accordingly, WRI delivers any putrescible waste in excess of 45,000 tons per year to Riverbend Landfill (owned by Waste Management) in Yamhill County under authority of a non-system license. WRI also delivers some putrescible waste to the Marion County Waste-to-Energy facility in Brooks, Oregon.

WRI pays the Metro Regional System Fee and excise tax on the solid waste it delivers to Coffin Butte, Riverbend, and the Marion County burner. The local government (Wilsonville) does not levy any solid waste fees or taxes.

**Willamette Resources, Inc.**

Year	Incoming Waste			Recovery Rate	Landfilled Tonnage*
	Wet	Dry	Total		
2004	67,298	46,502	113,800	28%	96,226
2005	61,991	44,236	106,228	26%	103,231
2006	58,414	36,088	94,502	27%	119,185
2007	59,527	33,883	93,409	30%	98,318

**Regional Transfer Stations**

**Metro Central Station and Metro South Station**

The Metro-owned stations are classified as Regional Transfer Stations under Metro Code. They are both full-service stations and have no limit on the amount of solid waste that may be accepted. As publicly owned stations, they are not subject to franchising.

## Forest Grove Transfer Station

Owner.....Waste Management

Location .....Forest Grove

Opened .....1980s as an unregulated reload, Regional Transfer Station since 1997.

Capacity .....Physical: 132,000 tons per year\*

Regulatory: no limit (*Metro does not impose a tonnage cap*)

Disposal at.....Riverbend Landfill

### Local

Affiliates .....Collection: Waste Management of Oregon (*many franchises throughout the region*)

Transfer: Troutdale Transfer Station

Clackamas County Garbage & Recycling Transfer Station\*\*

Other: Tualatin Valley Waste Recovery (*mixed waste recovery facility*)  
*[under construction at Hillsboro Landfill]*

Disposal: Columbia Ridge Landfill, Gilliam County

Riverbend Landfill, Yamhill County

Hillsboro Landfill, Washington County (dry waste only)

**Forest Grove Transfer Station** opened in the 1980s as a reload and transfer facility for a local hauler with collection businesses in western Washington County and Columbia County. After several changes of ownership, the facility was acquired in 1998 by Waste Management through its merger with USA Waste.

St. Johns Landfill was still in operation when Forest Grove Transfer Station (FGTS) opened, and FGTS continued in operation while Metro designed and implemented the current transfer/long-haul/remote disposal system that replaced St. Johns in 1991. In fact, the reason that the flow guarantee in Metro's disposal contract is 90 percent (not 100 percent) derives from a 10 percent set-aside to allow the (then-independent) owner of FGTS to remain in operation.

The FGTS franchise with Metro was only one year into its 10-year term when the Metro Council adopted its transfer station policies in 1998. Throughout those policy discussions, the Metro Council had operated under the assumption that there would be two classes of facilities: public transfer stations owned by Metro, and private transfer stations of low scale and with limited obligations—Local Transfer Stations. The working policy was that the public stations would be full-service, comprehensive facilities that would admit all customer accept all transfer-station-type wastes, while the private facilities would be free to specialize and service local markets. In the end, however, the Metro Council grandfathered-in the Forest Grove franchise and redefined the first class of facilities as "Regional Transfer Stations"—but never formally adopted its working policies toward Regional Transfer Stations. For these reasons, Metro code does not place any formal obligations on Regional Transfer Stations beyond the requirement that they

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\* Source: Metro, *Regional Transfer Capacity Study*, June 2004. The study's 132,00-ton throughput capacity is based on deliveries in packer trucks holding from 5 to 7 tons per load. In fact, the average load size at Forest Grove is larger; and in addition, Forest Grove accepts big reload trailers (23+ tons per load) from 3<sup>rd</sup>-party haulers that it transports directly to the landfill without unloading and reloading. For these reasons, the Forest Grove throughput level is higher than the estimates for all deliveries based on standard-sized commercial loads.

\*\* Owned by Clackamas County; formerly Sandy Transfer Station. Waste Management is the contract operator only.

accept all customers—commercial haulers and self-haul—and provide a venue for Metro hazardous waste collection events.

Forest Grove Transfer Station (FGTS) accepts mainly putrescible waste from Waste Management and many independent haulers in western Washington County. Waste from cities outside the Metro boundary—such as Banks, Gales Creek and Gaston—is also delivered to FGTS. FGTS provides self-service drop-off service for commercial and residential self-haul customers and also at Metro's request hosts collection events (sponsored and staffed by Metro) for household hazardous waste. FGTS receives relatively little dry waste, as Waste Management and many local haulers deliver most of their drop boxes directly to Hillsboro Landfill (a limited-purpose—dry waste only—landfill in Hillsboro, also owned by Waste Management). No material recovery is performed at FGTS. FGTS takes all of its waste to Riverbend Landfill in Yamhill County.

FGTS collects the Metro Regional System Fee on all solid waste that is generated within the Metro boundary and accepted at the transfer station; and collects the Metro excise tax and a Rehabilitation and Enhancement Fee (host community fee) on all solid waste accepted at the transfer station regardless of where that waste was generated. FGTS remits the Regional System Fee, excise tax and host fee revenue to Metro. This arrangement is different than Local Transfer Stations which are exempt from imposing fees and taxes on their customers, but are themselves liable for payment of Metro fees and taxes "out the back door"—that is, on the waste that is delivered to any disposal site.\*

#### Forest Grove Transfer Station

Year	Wet	Dry	Total	Recovery Rate	Landfilled Tonnage
2004	144,580	--nr--	144,580	0%	144,580
2005	161,310	--nr--	161,310	0%	161,310
2006	164,295	--nr--	164,295	0%	164,295
2007	152,380	1,713	154,093	0%	153,975

*Note: "nr" means "not reported" separately from wet. Dry tonnage is included in the total.*

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\* This arrangement at FGTS is consistent with the practice at Metro's Regional Transfer Stations where the Regional System Fee, excise tax and host fee are collected from customers "at the front door"—that is, on waste received. The policy reason for the difference is to support material recovery at Local Transfer Stations by exempting fees and taxes on waste that may contain recoverable materials. On the other hand, Metro defines Regional Transfer Stations as disposal sites (direct-to-landfills); therefore, fees and taxes are levied on waste received.



## Appendix B

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### Analysis of Allocation Options

During the scoping for this project, the Metro Council and other stakeholders asked staff to investigate various models and methods for allocating waste among private transfer stations. Five principal options were identified, several having sub-variants. In this appendix, each option is described and analyzed, and a conclusion provided.

#### Summary

The following summaries provide a brief description of each option and the main conclusion. Detailed descriptions and the analysis behind each conclusion make up the balance of the appendix.

#### **Metro-determined optimal allocation**

*Description.* Metro determines the tonnage authorization for each transfer station based on optimizing policy objectives and the public interest.

*Conclusion.* This approach gives Metro the most control over its own and the public interest, and at far less administrative cost than the other options. For these reasons, this is the approach taken in this project.

#### **Cap-and-trade**

*Description.* Metro makes an initial allocation to each facility, then fosters a market in tonnage caps that allows each facility to trade (buy-and-sell) the amount of cap that meets business needs.

*Conclusion.* Because of the size of the market and the tactical value of the tonnage authorizations to individual enterprises, it is unlikely that a market in tonnage caps would emerge.

#### **Zero-based re-entry**

*Description.* The renewal process would be competitive with no guarantee that a franchise would be granted ("legacy is not entitlement" in the term of the Metro Council).

*Conclusion.* Metro's franchises have been granted with *expectation of renewal* clauses, which are fairly standard when the government relies on private industry to provide a vital public service *and when* that industry is characterized by high and/or specialized fixed capital costs. Both characteristics are true in the case of solid waste disposal. If the Metro Council wants to explore franchises without an expectation of renewal, then staff recommends that Council direct that work be done well in advance of a future renewal cycle to provide sufficient lead time for investment planning and impact assessment.

### **Auction tonnage authority**

*Description.* This option would have Metro accept bids for tonnage authority—for example, auctioning-off wet waste caps in bundles of (say) 5,000 tons. In this case, a facility needing 50,000 tons would bid on 10 bundles.

*Conclusion.* An unconstrained auction would tend to optimize private interests, which might not align with the public interests for allocating tonnage authority in the first place. Or, in a less-than-ideal case, a single firm might seek to attain a monopoly position by outbidding all competitors. In short, Metro would need to impose various constraints on the auction (*e.g.*, reserve prices, purchase caps) in order to leverage public objectives. It would be best to identify such objectives through a thorough system review before considering whether auctioning tonnage authority is a reasonable option for achieving these objectives.

### **Exclusive Franchises**

*Description.* Under exclusive franchising, Metro would grant a facility the monopoly right to provide disposal services within a defined franchise area. With the grant of monopoly, Metro would specify service levels, set performance requirements, and regulate prices (tip fees).

*Conclusion.* The facilities that make up the current system are not sited under any kind of master plan. Accordingly, it is impossible to draw geographic franchise areas that simultaneously meet the public objectives of this project and that are efficient for collection and provide sufficient scale of operation for all existing facilities. In short, this option founders on feasibility.

## **Detailed Descriptions and Analysis**

### **Metro-Determined Optimal Allocation**

*Description/Analysis.* Under this option, the Metro Council would establish the public interests and policy objectives that the allocations were to serve. Then Metro would determine the allocation that best met the objectives. For example, during the scoping for this project, the consensus objectives included environmental sustainability of the system, geographically equitable distribution of disposal services, continuity of service, opportunity for the private sector to achieve normal (but not extraordinary) profit, and rate transparency for waste generators and local government regulators. Staff then determined the allocations that best met the sustainability objective (in this project, quantified by vehicle miles traveled), *subject to* meeting the other stated objectives. This is a classical least-cost planning approach.

*Conclusion.* This approach provides an objective result; is readily understandable, flexible and replicable; and provides continuity with past approaches to the allocation question. For these reasons, this is the approach taken in this study.

### **Cap-and-Trade**

*Description.* Under this option, Metro would initially allocate an equal amount of tonnage authority to each private station, but then would allow these facilities to exchange or sell authority among themselves over time. In principle, the market would allocate tonnage authority

dynamically, in response to supply and demand. To help motivate an active market, Metro could use a mechanism such as levying an annual franchise fee on each facility's cap authority—for example, a dollar-amount per ton of authority. Under this mechanism, a facility with, say 65,000 tons of authority but only 45,000 tons of demand might seek to sell up to 20,000 tons of authority and thereby unburden himself of the franchise fee on these 20,000 tons. Another facility with 85,000 tons of demand but only 65,000 tons of authority would seek to buy the tonnage authority it needs to meet demand.

*Discussion/Analysis.* The fundamental problem with applying a cap-and-trade approach to the Local Transfer Station market is the low probability of achieving objectives. In the current market environment, Local Transfer Stations would tend to hold onto tonnage authority—either as a reserve to ensure they can meet future demand, and/or to withhold market share from competitors. It would be extremely difficult for Metro to set the franchise fee high enough to motivate the market: (a) a high franchise fee could usurp profit margins and render the whole policy unworkable; and (b) the size of the fees would be constrained by legal restrictions that require Metro's solid waste fees to be reasonably related to costs. In addition, the market is not large enough (3 to 5 firms) to guarantee that cap authority would be readily available for sale or purchase as needed.

*Conclusion.* While attractive in theory, this option is unlikely to be successful in practice.

### **Zero-Based Re-Entry**

*Description.* During the scoping for this project, the Council asked staff to examine a full re-application process at the end of each franchise cycle instead of a renewal process ("legacy is not entitlement"). Under this approach, the Council would make full re-allocation decisions at the start of each franchise period.

*Discussion/Analysis.* A point of departure for this option is to note that all Metro's franchises are designed and granted with an *expectation of renewal*. Unless an operator has continually violated his franchise conditions or is in non-compliance in a manner that impacts the public's health, safety and welfare, the operator has a presumption that his operating authority will be renewed. This is conventional practice in licensing or franchising enterprises that (a) are characterized by large investments in fixed or specialized capital and (b) provide an essential public service or are needed to maintain the public health safety and welfare. Conventional examples are hospitals and utilities.

The main reason for providing an expectation of renewal is to provide sufficient time for the investment to be amortized. That is, an *expectation of renewal* is needed to leverage the investment in the first place. Furthermore, because of the specialized nature of most such investments, they cannot be readily liquidated in the event the authority is revoked. This risk raises an additional barrier to investment. Such "expectations" clauses are not generally needed for situations in which the capital is shorter-lived or non-fixed. For example, in solid waste collection franchises, most of the investment is in rolling stock which typically can be depreciated during the 7 to 10-year length of the franchise, and can be readily resold at the end of each franchise cycle.

*Conclusion.* For the reasons stated above, public contracts or franchises on solid waste facilities are typically long-term arrangements. If the public interest is better-served by short-term

contacts or franchises, then they are typically granted with an expectation of renewal. Historically, Metro has taken the latter course. If the Metro Council wants to explore operating authority instruments (franchises and licenses) without an expectation of renewal, then staff recommends that Council direct that work be done well in advance of a future renewal cycle to provide sufficient lead time for investment planning and impact assessment.

### **Auction/Bid Tonnage Authority**

*Description.* This concept would have Metro accept bids for tonnage authority—for example, auctioning-off wet waste caps in bundles of (say) 5,000 tons. In this case, a facility needing 50,000 tons would bid on 10 bundles. Under this option, supply and demand would provide the dynamic by which both (a) the total amount of tonnage authority; and (b) the method of allocating tonnage authority among the various private facilities would be determined.

*Discussion/Analysis.* The critical characteristic of this option would be the design criteria or constraints on the auction process to ensure that the outcome serves the public interest, and not private interests exclusively. For example, in an unconstrained auction, the outcome would tend to optimize private interests, which might not align with the public interests for allocating tonnage authority in the first place. Or, in a less-than-ideal case, a single firm might seek to attain a monopoly position by outbidding all competitors. To avoid these types of outcomes, Metro would have to limit bidding rights to ensure that the auction results in a distribution of operating authority. In fact, Metro would have to design constraints to assure that all of the objectives of this study were met. For example, attaining a geographic distribution of tonnage authority that will help minimum VMT and provide equitable access might require that each facility bid for a specified minimum of tonnage authorization (which may be above the level it would bid in an unconstrained auction). To avoid the monopoly example above, Metro would need to limit the number of successful bids.

*Conclusion.* An unconstrained auction would not necessarily optimize public objectives. Metro would need to impose various constraints on the auction (*e.g.*, reserve prices, purchase caps) in order to leverage public objectives. Until such objectives have been identified through a thorough system review, the auction approach may not best meet the public interest.

### **Exclusive Franchises**

*Description.* Under an exclusive franchise, Metro would grant a facility the sole right (monopoly power) to provide disposal services within a defined market area. With the grant of monopoly, Metro would have to specify service levels (*e.g.*, hours of operation, self-haul), set performance requirements (*e.g.*, material recovery targets), and regulate tip fees. Operational decisions within the service, performance and price guidelines would typically be left to the operator.

*Analysis.* Exclusive franchises are most suited for industries in which market forces would lead to redundant capital investment and/or congestion. Exclusive franchises are common for utilities and solid waste collection where an open market would lead to multiple (and redundant) transmission lines, pipelines and truck traffic in public rights-of-way. Exclusive franchises are also appropriate for distribution systems in which the location and investment of individual firms has been determined through a planned and structured process to cover the market territory. This is most common in private-sector franchising (*e.g.*, fast food chains).

*Discussion.* The advantage of this approach to Metro would be a high level of control over certain operational features—such as pricing and hours of operation—that are only subject to Metro's influence in a non-exclusive system. Disadvantages include administrative cost, potential slow response to change, and reliance on cost review instead of market forces to set prices. However, the main disadvantage derives from the fact that the existing facilities were not sited under any kind of master plan.\* Accordingly, it is impossible to draw geographic franchise areas for the existing system that simultaneously meet the public objectives (VMT reduction, equitable distribution of services, *etc.*), are efficient for collection, and that provide sufficient scale of operation for all existing facilities.

*Conclusion.* This option founders on feasibility.

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\* There are also legal questions whether Metro has sufficient authority—its solid waste regulatory authority, flow control authority and its general grant of government—to fully implement exclusive franchises as described above.



## Appendix C

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### **Costs, Rates, Rate Regulation**

During the scoping phase of this project, the Metro Council and various stakeholders raised issues about disposal rates charged at private transfer stations. The main question behind these issues is: do tip fees reflect underlying costs? Local government solid waste staff are particularly interested in this question because they must decide the amount of disposal costs to allow in regulated collection rates.

Metro's Disposal System Planning 1 project of 2005-06 (DSP 1) addressed private disposal rates in part. In that study, one of the factors supporting Metro's continuing participation in the disposal market was the moderating effect of Metro's rates on private tip fees. As long as Metro participates in the disposal system, rates could not deviate too far from market rates. However, the DSP analysis was based on a generic private system; it did not distinguish among the different classes of regulated facilities—specifically, the difference between Local and Regional Transfer Stations.

Because privately-owned Regional Transfer Stations are not obligated to perform as full a range of services as other transfer stations, their operating cost should be lower than at other stations. Yet Regional Transfer Stations may match Metro's tip fee without significant risk of losing business or having that rate disallowed in local government rate-setting situations.\* Stakeholders' specific concern is that if the tip fees at Regional Transfer Stations do not reflect costs, then ratepayers would subsidize the excess when local government regulators allow the full tip fee in their collection rate-setting models. In addition, some Metro Councilors voiced concern that this mechanism could allow private facilities to usurp some or all of the economic benefit from the reduction of transport costs when Metro authorizes the operation of privately-owned transfer stations.

To investigate these issues further for this study, Metro staff estimated the costs of operating each private transfer station in the current system. That work, together with options for further investigation and action, are covered in this appendix.

#### **Transfer Station Operating Costs**

Table C.1 shows Metro staff's estimates of the cost to operate each privately-owned transfer station. These estimates are based on the assumption that each operator sets his disposal charges to recover the cost of transporting waste to the landfill, dispose of waste at the landfill, government charges, and the cost of station operation including general and administrative costs

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\* This behavior is predicted in *Metro Transfer System Ownership Study* (report of the Disposal System Planning 1 project), June 2006.

and profit. The latter costs can be estimated by simply subtracting transport, disposal and government fees and taxes from the effective tip fee.

These calculations are summarized in Table C.1 The derivation of components is documented in a subsequent section of this appendix.

*Note. The figures in this appendix are estimates prepared by Metro staff. They are based on the assumptions and calculations shown in tables C.2, C.3 and C.4. In preparing these estimates, Metro staff did not consult, or have access to, any financial records or proprietary data of any privately-owned transfer station.*

Table C.1  
Estimates of Transfer Station Operating Costs  
Including General & Administrative Costs and Profit  
(average cost per ton)

Component*	Forest Grove	Local Transfer Stations			Subtotal
		Pride	Troutdale TS	WRI**	
<b>Revenue (effective tip fee)</b>	<b>\$74.64</b>	<b>\$74.50</b>	<b>\$75.38</b>	<b>\$72.64</b>	<b>\$74.18</b>
Disposal Costs					
Tip fee at landfill	\$25.65	\$28.67	\$18.60	\$27.02	\$24.13
Transport to landfill	8.49	7.50	19.08	10.16	12.99
SW fees & taxes	24.05	23.55	24.20	23.55	23.81
<b>Total Disposal Costs</b>	<b>\$58.19</b>	<b>\$59.72</b>	<b>\$61.88</b>	<b>\$60.72</b>	<b>\$60.92</b>
<b>Operating cost, G&amp;A, profit</b> <i>(Effective Tip Fee - Disposal Costs)</i>	<b>\$16.45</b>	<b>\$14.78</b>	<b>\$13.50</b>	<b>\$11.91</b>	<b>\$13.26</b>

\* For derivation of components see tables C.2, C.3 and C.4

\*\* The landfill and transport costs at WRI are weighted averages based on delivering 71.5% and 28.5% of the wet waste to Coffin Butte and Riverbend landfills, respectively.

## Observations

Based on figures in Table C.1, Local Transfer Stations appear to operate within a range of about \$11.90 to \$14.80 per ton, with an average of \$13.25. Although the components are different, this is in line with Metro's cost of approximately \$13 for commercial traffic.\*

The one Regional Transfer Station, Forest Grove TS, shows an operating cost of \$16.45 per ton—3.20 per ton above the average for Local Transfer Stations.

However, the estimates in Table C.1 are not sufficient to draw a firm conclusion. To address this issue, Metro would need more information. Specifically, Metro would need to know the specific

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\* For example, Metro does not have to pay property taxes or show a profit. However, the public cost of labor and construction is typically higher than in the private sector, and Metro is committed to extended hours of operation for the public's convenience, which further raises costs.

costs of operating private Regional Transfer Stations in the present environment, and then would need to determine if the tip fees charged to customers are reasonably related to these costs.

One approach to accomplish this task would entail Metro commissioning an independent analysis of the Regional Transfer Stations' financial records. The purpose of this analysis would be to:

- o Verify costs, and to determine where the facility's expenses, capital costs, rates-of-return and similar allocated quantities fall, relative to industry averages and ranges;
- o Determine if the tip fee is reasonably related to these costs; and
- o Judge the materiality of any differences.

The use of the information derived from an independent analysis is addressed in the concluding section of this appendix.

### Documentation of Components

The assumptions and calculations supporting the figures in Table C.1 are described in this section.

**Effective Tip Fee.** The effective tip fee is the average revenue per ton of incoming waste. It is derived from the tip fee charged to commercial haulers, plus any fixed fees divided by the average incoming load size. This estimate is shown in Table C.2.

Table C.2  
Calculation of Effective Tip Fee

Component	Forest Grove	Local Transfer Stations		
		Pride	Troutdale TS	WRI
Fixed Fee*	\$4.00	\$0.00	\$6.00	\$7.50
<i>divided by:</i> Load size**	6.28	5.46	5.83	6.12
<i>equals:</i> Fixed Fee (per ton basis)	0.64	0.00	1.03	1.23
<i>plus:</i> Tip Fee (per ton)	\$74.00	\$74.50	\$74.35	\$71.41
<b><i>equals:</i> Effective Tip Fee</b>	<b>\$74.64</b>	<b>\$74.50</b>	<b>\$75.38</b>	<b>\$72.64</b>

\* May be called *transaction fee*, *environmental charge* or similar.

\*\* Average size of incoming commercial loads of putrescible waste, in tons.

It is important to note that the estimates in Table C.2 are not based on examinations of revenue. Accordingly, the effective tip fee may deviate from average audited revenue due to any number of factors—such as discounts for volume or early payment, surcharges for special handling, write-offs for bad debt, and other factors.

**Transport Costs.** Derivation of transport costs is self-documented in Table C.3 on the next page. The source of the average transport cost per hour is based on examination of public contracts, procurement documents, and conversations with knowledgeable operators.

Table C.3  
Estimates of Transport Cost to Landfills

Component	Forest Grove	Local Transfer Stations			Units	
		Pride	Troutdale TS	WRI		
<i>To Landfill</i>	<i>Riverbend</i>	<i>Riverbend</i>	<i>Col.Ridge</i>	<i>Riverbend</i>	<i>Coffin Butte</i>	
Round trip	57.4	54.2	262.0	64.8	115.8	miles
<i>divided by: Average speed</i>	32.5	32.5	52.0	32.5	44.0	miles/hour
<i>equals: Transit time</i>	1.8	1.7	5.0	2.0	2.6	hours
<i>plus: Queuing &amp; tipping time</i>	0.3	0.3	0.3	0.3	0.3	hours
<i>equals: Total Time per Trip</i>	2.1	2.0	5.4	2.3	3.0	hours
<i>multiplied by: Transport cost</i>	\$103	\$103	\$104	\$103	\$103	dollars/hour
<i>equals: Cost per load</i>	\$216	\$206	\$558	\$240	\$306	dollars
<i>divided by: Payload*</i>	25.50	27.50	29.25	28.25	28.25	tons
<b><i>equals: Cost per Ton</i></b>	<b>\$8.49</b>	<b>\$7.50</b>	<b>\$19.08</b>	<b>\$8.49</b>	<b>\$10.82</b>	

\* Average size of outgoing loads of putrescible waste, in tons.

**Government Charges.** Fees and taxes levied by Metro, DEQ and local governments are shown in Table C.4. Any charges specific to a particular landfill are included in the 'tip fee at landfill' component in Table C.1.

Table C.4  
Government Solid Waste Fees and Taxes

Agency/Fee	Forest Grove	Local Transfer Stations		
		Pride	Troutdale TS	WRI
<b>Metro</b>				
Regional System Fee	\$14.08	\$14.08	\$14.08	\$14.08
Excise tax	8.23	8.23	8.23	8.23
<b>Local</b>				
Host fee	0.50	----	----	----
Local excise tax	----	----	0.65	----
<b>DEQ fees</b>				
	1.24	1.24	1.24	1.24
<b>Total</b>	<b>\$24.05</b>	<b>\$23.55</b>	<b>\$24.20</b>	<b>\$23.55</b>

NOTE. Local government charges at the destination landfills are included in "tip fee at landfill" in the main table.

## Materiality

In any policy discussion in which public action is an option, the materiality of the issue is a key decision factor. Table C.5 (next page) shows the dollars attributed to station operation, general and administrative costs, and profit for each private transfer station. These figures are based on the per-ton estimates from Table C.1 and throughput of putrescible waste in 2007.

The key lesson of Table C.5 for materiality is the magnitude of the total operating cost. A public action such as rate regulation would focus on these numbers. If, for example, as much as 10

percent of the total cost were found to be disallowable, this would result in a ratepayer cost reduction of only \$60,000 to \$90,000 per Local Transfer Station. For the Regional Transfer Station, \$250,000. Before making any decision, the cost of the public action (*e.g.*, rate regulation, to continue this example) should be weighed against the return.

Table C.5  
Estimated Operating Cost by Transfer Station

Transfer Station	Throughput (tons)	Dollars	
		Per Ton	Total
Forest Grove	154,000	\$16.45	\$2.533 million
Pride	41,800	\$14.78	\$0.618 million
Troutdale	65,500	\$13.50	\$0.884 million
WRI	59,500	\$11.91	\$0.709 million
<b>All Local TSs</b>	<b>166,800</b>	<b>\$13.26</b>	<b>\$2.211 million</b>

Figures are based on per-ton rates from Table C.1 and 2007 throughput, and include estimates of general & administrative costs and profit.

## Conclusions

**Local Transfer Stations.** The empirical evidence suggests that the tip fees at Local Transfer Stations are reasonably related to costs. For this reason, Metro need not require rate review or rate regulation as a condition of franchise renewal.

There are other factors that support this position:

- The ability to realize above-normal profits is constrained by the tonnage caps themselves. The 65,000 ton limit is *de facto* **quantity** regulation that limits the amount of revenue (and therefore, profit) that can be realized at the facility.\*
- The minimum requirements that Metro places on dry waste recovery induces additional costs that further limit the profitability of the enterprise.
- The policy of allowing at least two facilities in a waste shed fosters price competition among Local Transfer Stations.\*
- Ratepayers are protected from excess pricing by local rate-making processes that review the costs of collection including the amount of disposal charge that can be passed on to customers. If a hauler is not allowed to recover his full cost of disposal at a transfer station, he is motivated to seek out another facility where the rates are acceptable to the local government rate-makers. This generates a supply-demand market where facilities are motivated to compete on price (and/or services) to retain business.

\* However, the tonnage caps have another system-level consequence: they limit competition in general. As will be discussed in the next section, Regional Transfer Stations are not subject to regulation of quantity (tonnage) or price. A customer who might be dissatisfied with price or service at a Regional Transfer Station may not be able to use an alternative facility if nearby Local Transfer Stations are already at their tonnage limits and cannot accommodate him. By making some customers effectively captive to Regional Transfer Stations, Metro's transfer station policy confers a competitive advantage on the Regional Transfer Stations. The Metro Council may wish to explore this issue through pricing limits on Regional Transfer Stations; or a broader review of the whole policy interplay between local and regional transfer stations.

**Regional Transfer Stations.** The empirical evidence suggests that the operating cost recovered in the tip fee at the private Regional Transfer Station is greater (on a per-ton basis) than at Metro or Local Transfer Stations. Because Regional Transfer Stations are not subject to tonnage caps, the tonnage throughput would magnify the cost to ratepayers of any deviation of the tip fee from underlying costs.

However, Metro does not presently have the information to confirm or refute these suggestions. Such information would have to come from the Regional Transfer Station's own financial records. This information would reveal the true relationship of the tip fee to costs; and from it, Metro could determine whether any further action is warranted and cost-effective.

**If** such a financial review is undertaken; **and if** it reveals that further action should be considered, there is a range of rate regulation mechanisms available to help match action to materiality, from "regulation light" to full utility-type rate regulation. For example:

- *Review and Publish* On an annual or period basis, Metro could commission an independent review of the financial records of Regional Transfer Stations, and simply publish the key rate components. Then, any customer or local government rate-setter would have access to pricing information and could make their own decision whether to use the facility or not. This is the simplest form of "rate transparency."
- *Rate-Cap Regulation.* Under this model, a reasonable rate is established in some base period. Then, so long as the tip fee remains consistent with an independent index such as the consumer price index, the regulator (Metro) would not be compelled to take any action until the next periodic review. This form of regulation is increasingly being used formally in lieu of rate-of-return or cost-plus regulation, as it is comparable in performance and considerably less expensive than more traditional methods.
- *Full regulation.* Under traditional models, costs and capital are inventoried and audited. Rates are based on cost-plus allowances or rates of return on capital. Traditional models are very expensive and are generally warranted only for large-impact industries such as utilities.

## Appendix D

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### Model Results

The results of the empirical modeling are summarized in this appendix. The analysis was done with the Solid Waste & Recycling Department's *Flow Simulation Model*.<sup>\*</sup> This is an optimizing model that predicts the tonnage that would be delivered to each facility, the time it takes, and the miles that had to be traveled—all subject to user-specified parameters and constraints such as tonnage caps and tip fees at each facility. For this project, the optimizing assumption was minimization of off-route<sup>\*\*</sup> travel by commercial haulers. This assumption mirrors the predominant behavior in the industry. For this project, tip fees were set equal at all facilities to isolate the effect of the time-cost of travel and the tonnage caps.

#### Primary Scenarios

Four primary configurations of the wet waste disposal system were specified for analysis:

*Three Facilities.* This is a baseline scenario in which the two Metro stations and Forest Grove Transfer Station are the only facilities in the wet waste system. The purpose of this scenario is to provide "before" statistics that can be compared with the *Status Quo* scenario, which includes three additional local transfer stations. "Before" refers to 1999, when Metro implemented its local transfer station policies.

*Status Quo.* The current system of three Regional Transfer Stations and three Local Transfer Stations (see Appendix A for descriptions). This configuration serves as the reference scenario for this project. That is, all alternative scenarios are compared against the *Status Quo* to judge whether they perform better or worse than the current system.

*All Local Transfer Stations.* In this scenario, all privately-owned transfer stations are capped at the current level for Local Transfer Stations. Metro stations remain uncapped.

*All Regional Transfer Stations.* In this scenario, no transfer station is subject to a cap; that is, all facilities can accept all the waste that flows to them.

These configurations are summarized in the table at the top of the next page.

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<sup>\*</sup> This is a spatial interaction model based on Metro's traffic zone system. It estimates disposal demand "on the ground" and simulates flow among disposal sites under a variety of user-specified assumption and conditions. The model uses activity variables (household and employment counts) from the Data Resource Center, and interzonal traffic times and distances from the transportation planning model in the Planning Department. Documentation of the model is available on request.

<sup>\*\*</sup> That is, from the home yard to the route, from the route to the disposal site, then back to the route or home yard.

Tonnage Caps in each Primary Scenario

Scenario	Transfer Station					
	Central	South	F.Grove	Pride	Troutdale	WRI
Three Facilities	no cap	no cap	no cap	--	--	--
Status Quo	no cap	no cap	no cap	65,000	65,000	65,000
All Local	no cap	no cap	65,000	65,000	65,000	65,000
All Regional	no cap	no cap	no cap	no cap	no cap	no cap

Other sub-scenarios were run when necessary to isolate various components of the main scenarios above. Each of these are described in **Interpretation of Results**, below.

### Model Results

Table D.1 shows model results for the four principal scenarios. For example, under *Status Quo*, the model indicates that all wet-waste collection trucks together travel at least 2.842 million off-route miles per year, spending at least 97,400 hours in transit,\* and costing approximately \$11 million in direct economic costs.\*\*

Table D.1  
Annual Miles, Time and Costs Spent in Off-Route Transit  
by Wet Waste Collection Vehicles

Scenario	Truck Miles (VMT in millions)	Time (hours)	Economic Cost (\$millions)
Three Facilities	3.185	108,200	\$12.150
Status Quo	2.842	97,400	\$10.950
All Local TSs	3.046	103,650	\$11.650
All Regional TSs	2.773	94,300	\$10.600

Source: Solid Waste & Recycling Department, Flow Simulation Model, 2008

### Interpretation of Results

To utilize the model results in Table D.1, the user needs only to take the difference between the numbers of interest for any two scenarios. Suppose, for example, that the difference between (hypothetical) Scenario A and (hypothetical) Scenario B is the imposition of a cap on one facility. Further suppose that VMT is 100,000 miles more under Scenario B. Then under the assumptions for this project, Scenario B is "worse" than Scenario A because of the increase in VMT. Of course, other criteria may ultimately render Scenario B as the preferred choice, but these criteria and judgments are applied outside the model.

\* This figure represents the time spent in transit only. Excluded are times spent queuing at transfer stations, tipping time, driver's break and meal time, and truck inspection time. The time taken for all these activities together constitute the "disposal cycle time" referenced in *Metro Transfer System Ownership Study* ("DSP 1"), June 2006, p. 45.

\*\* Costs are for time spent in transit only at a fully-loaded rate (cost + overhead) of \$112.30 per hour.

It should be noted that the change in costs between any two scenarios is understated, for two reasons: (1) the estimates of economic costs are conservative, as explained in the next paragraph; and (2) external and environmental costs and benefits are ignored. On the latter issue, see Appendix E, which presents estimates of selected health benefits from the reduction of VMT by diesel collection trucks for the principal scenarios of this study.

The change in economic costs in this appendix are understated because they consider only the cost or savings from the hours that trucks spend in off-route transit. Haulers are able to realize additional benefits when their disposal cycle time is reduced in the form of routing efficiencies, rolling stock reductions and so forth. These economic benefits (or costs, in the case of disposal cycle increases; refer to the "All Local" scenario) are not captured in the figures below.\*

**Effect of Current Policy.** Metro's current transfer station policy has resulted in three more Local Transfer Stations than existed in 1998. This is the difference between the *Three Facilities* scenario and the *Status Quo* scenario—inclusion of the three Local Transfer Stations: Pride, Troutdale and WRI.

As shown in Table D.2, VMT drops by over 340,000 miles per year, or 10.8%. The time-in-transit falls by almost 11,000 hours, or 9.9% and the economic cost drops by \$1.2 million per year. In a phrase, this means that the current policy that admitted three new disposal options has reduced off-route collection vehicle VMT by as much as 10.8%, and has saved approximately \$1.2 million in costs that can be passed on to ratepayers.

Table D.2: Effect of Current Policy

VMT	Change In	
	Hours	Cost
-343,600	-10,800	-\$1,200,000
-10.8%	-9.9%	-9.9%

Sub-scenarios of the *Status Quo* were developed in order to test the sensitivity of VMT to changes in Local Transfer Station caps. The recommendation that caps be increased to 70,000 tons with an annual growth allowance emerged from this analysis.

**Cap on Forest Grove.** The *All Local Transfer Station* scenario differs from *Status Quo* only by the presence of a cap on Forest Grove Transfer Station. Therefore, the difference between the two scenarios isolates the effect of a cap on Forest Grove (see Table D.3, next page).

\* The DSP 1 report (see footnote, page D-2) addresses these issues. For residential collection, changes of 5 to 15 minutes in disposal cycle time results in 1.2 to 4.4 percent changes in costs. For commercial collection, 5 to 15 minute increases result in cost increases of 2.6 to 15.6 percent, while 5 to 15 minute reductions allow 2 to 10 percent reductions in cost. [*Metro Transfer System Ownership Study*, "Collection Impacts," pp. 49—51].

Table D.3: Cap on Forest Grove

Change In		
VMT	Hours	Cost
204,600	6,200	\$700,000
7.2%	6.4%	6.4%

As might be expected, VMT, time-in-transit and costs rise when a facility is capped and haulers must travel to more-distant disposal sites,. In this case, the magnitude is large—a cap on Forest Grove takes back almost 60 percent of the reductions achieved with the current policy.

**Additional Opportunity.** The main use of the *All Regional Transfer Stations* scenario is to determine the opportunity for further VMT reductions. In fact, under this scenario, VMT, hours and costs should be minimum for a six-facility system at the current locations. This is simply because all haulers can use their preferred facility without concern for tonnage caps. As shown in Table D.4, further reductions of 2.4 percent in VMT and 3.2 percent in time and costs appear to be possible in the current system. Of course, in decision-making, these benefits would have to be balanced against the costs that would emerge if tonnage caps were removed at all transfer stations.

Table D.4: Additional Opportunity

Change In		
VMT	Hours	Cost
-68,900	-3,100	-\$350,000
-2.4%	-3.2%	-3.2%

Sub-scenarios revealed that virtually all of the potential reductions would be realized if the cap was removed at Troutdale Transfer Station only. This is logical, given its isolated location in east county. However, a second Local Transfer Station in east county\* would produce similar reductions. So a key policy question for Metro in the future—if the second Local Transfer Station does not emerge—is whether another Local Transfer Station or a new Regional Transfer Station is in the best public interest for the area. The fact that the region currently supports about twice the amount of wet waste transfer capacity it needs would be a key factor in that decision.

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\* That is, Columbia Environmental, franchised by Metro in 2005 but still not open.

## Appendix E

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# Selected Environmental Impacts From Reduction in VMT by Collection Trucks

### Introduction

Throughout this project, vehicle miles traveled (VMT) is used as a summary performance indicator for external and environmental effects—reduction of particulate matter, greenhouse gases and other emissions, highway congestion, deadweight losses of time, etc. This appendix documents a method to further quantify some selected health benefits of reduced vehicle emissions associated with reduced VMT. The mass of emissions is estimated for nitrogen oxides (NO<sub>x</sub>), particulate matter (PM) and carbon dioxide (CO<sub>2</sub>)<sup>1</sup>, and those masses are then multiplied by published dollar-per-ton values to monetize the health benefits.

### Background

The health effects of NO<sub>x</sub> and PM emissions are well documented. In particular, PM contributes to respiratory illness and cancer (*e.g.*, Downing, 2007). When combined with volatile organic compounds (VOCs), sunlight and other compounds, NO<sub>x</sub> creates ozone, the principal component of smog, which also contributes to respiratory problems (*e.g.*, Draft Metro Retrofit Program Plan, 2006).

McCubbins and Delucchi (1999) have studied the health-related costs associated with various components of diesel fuel emissions. Among the most significant costs are those associated with human respiration of NO<sub>x</sub>-related ozone and PM. A midpoint estimate of NO<sub>x</sub>-related healthcare costs—utilized by the Oregon DEQ—is about \$11,300 per ton of NO<sub>x</sub>; and healthcare costs of PM are about \$109,000 per ton. The market price of a metric ton of CO<sub>2</sub> offsets ranges widely, from as low as about \$4 on the Chicago Climate Exchange (July 24, 2008 closing price), to over \$20 for some project-specific offsets (Climate Trust staff personal communication, January 7, 2008). For the purposes of this analysis, we utilize the Climate Exchange portfolio average of \$11 per metric ton (see, for example, <http://www.climatetrust.org/donate.php>).

### Method

Vehicle travel time reductions (in hours) associated with each system configuration relative to a base case are applied to estimates of the hourly health-related benefits of emissions reductions. This is calculated as shown in Equation (1) on the next page.

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<sup>1</sup> This technical appendix does not explore the health-related costs of atmospheric CO<sub>2</sub> concentrations. As a surrogate price per ton of CO<sub>2</sub> figure, we use the market price of a CO<sub>2</sub> offset.

$$H_i \sum_{j=1}^3 P_j \quad (1)$$

where  $H_i$  is the total vehicle hours reduced between the  $i^{\text{th}}$  system alternative and the base case, and  $P_j$  is the per truck-hour health benefits associated with reducing emissions of the  $j^{\text{th}}$  chemical.

For the chemical compound  $\text{CO}_2$ , the hourly price of emissions reductions is calculated as

$$TPG \left( \frac{\left( \frac{MPY}{HPY} \right)}{MPG} \right) PPT \quad (2)$$

where TPG is the tons of  $\text{CO}_2$  emitted per gallon, PPT is the estimated price per ton of health care related externalities, and MPY, HPY and MPG are the number of miles driven per year, the number of hours of operation, and the estimated miles per gallon of an average solid waste truck operating in the Metro region, respectively.

About 22.4 pounds of  $\text{CO}_2$  are emitted per gallon of diesel fuel burned, assuming perfect combustion (*e.g.*, [http://en.wikipedia.org/wiki/Carbon\\_tax](http://en.wikipedia.org/wiki/Carbon_tax)). As noted above, the price of a carbon offset is approximately \$11 per ton (The Climate Trust, July 2008). Data compiled by Emissions Advantage (Draft Metro Retrofit Program Plan, 2006) document that the number of miles driven per year by solid waste vehicles in the Portland metro region ranges widely, from an average in the City of Portland fleet of about 21,000 miles per year to an average 14,000 miles per year in suburban parts of the Metro region. This analysis will utilize the midpoint of those two averages, 17,500 miles. The analysis also assumes that the average solid waste truck operates about 250 days per year, 7 hours per day (1,750 hours per year), and has an average fuel economy of about 5 miles per gallon.

For the  $\text{NO}_x$  and PM chemicals, the hourly price of emission reductions is calculated as

$$\left( \frac{EPY}{HPY} \right) PPT \quad (3)$$

where PPT and HPY are as given in equation 2, and EPY is the emissions (tons) per year of an average solid waste truck operating in the Metro region.

McCubbin & Delucchi (1999) estimate the per ton health-related costs of  $\text{NO}_x$  and PM to be about \$11,300 and \$109,000, respectively. In terms of emissions per year, a fleet survey completed for Metro by Emissions Advantage (2006) demonstrates that the average solid waste truck emits about .32 tons of  $\text{NO}_x$  and .03 tons of PM per year.

## Results

The health-related benefits associated with a reduction in CO<sub>2</sub>, NO<sub>x</sub> and PM emissions is \$.40/hour, \$2.05/hour and 2.03/hour, respectively. The value of CO<sub>2</sub> emission reductions could actually be as low as \$.18/hour and as high as \$.26/hour, depending on which value of driving miles per year is used for the average solid waste truck. The total price per hour of reductions in emissions of all three chemicals is therefore \$4.30/hour.

Applying these figures to the hourly reductions in vehicle travel time associated with each system configuration yields the results shown in Table E.1.

Table E.1  
Dollar-Amount of Selected Environmental Benefits / (Costs)  
From Change in Vehicle-Miles-Traveled Under Principal Analytic Scenarios

Scenario	Reference Scenario	Hours (Reduced) / Added	Monetized Health Benefits / (Costs)
Status Quo	Three Facilities	(10,800)	+\$46,300
Private Facilities:			
All Local (capped)	Status Quo	+ 6,200	( \$26,700)
All Regional (no caps)	Status Quo	( 3,100)	+\$13,400

### Notes

- See Appendix D for description of scenarios.
- Hours and Monetized Health are the changes *from* the Reference Scenario *to* the indicated Scenario.

## Limitations

It is important to note that these calculations consider only the health-related externalities associated with CO<sub>2</sub>, NO<sub>x</sub> and PM emissions from solid waste collection vehicles. There are a number of other benefits associated with travel time reductions that are beyond the scope of this analysis, such as reduced traffic congestion, reduced water pollution from street runoff, *etc.*

## References

- Downing, Kevin, 2007. *Oregon Clean Diesel Initiative Background*.  
Article available at: [www.deq.state.or.us/AQ/diesel/docs/background.pdf](http://www.deq.state.or.us/AQ/diesel/docs/background.pdf).
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- McCubbin, D.R. and Delucchi, M.A., 1999. "The health costs of motor-vehicle related air pollution," *Journal of Transport Economics and Policy*, v. 33 (3), pp. 253-286.  
Full article at: [www.bath.ac.uk/e-journals/jtep/pdf/Volume\\_33\\_Part\\_3\\_253-286.pdf](http://www.bath.ac.uk/e-journals/jtep/pdf/Volume_33_Part_3_253-286.pdf).