

Memorandum: Transportation and Disposal Evaluation – Phase 1 Results

PREPARED FOR: Metro

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Currently, Metro contracts for the transportation and disposal of solid waste services. Those contracts will expire at the end of 2019, and Metro is in the process of evaluating different methods for procuring these services for solid waste requiring disposal at its Metro South and Metro Central Transfer Stations. After making key decisions about how best to organize the service contracts, Metro will proceed with a request for proposal process to select its preferred service providers.

CH2M HILL, Inc. (CH2M) is assisting Metro through a two-phase transportation and disposal evaluation project consisting of a series of evaluations, and then assistance during the procurement process. This technical memorandum summarizes the following results from Phase 1 of the project:

1. Analyzing Transportation and Disposal Logistics
2. Developing Transport and Disposal Scenarios
3. Analyzing Scenarios and selecting the preferred procurement approach

In preparing this analysis, the CH2M team also conducted a series of site visits and interviews with transportation and disposal companies that currently provide these services to Metro, or that may be interested in submitting a proposal for providing them to Metro in the future. A list of the interviews and site visits conducted is provided in the attachment.

1.0 Transportation and Disposal Logistics Analysis

The purpose of the logistics analysis is to investigate and research the various transportation modes (truck, rail, and barge) and disposal facilities that may be available to Metro. The results of this analysis will be used by Metro to ensure that its request for proposals will result in a system that integrates well with Metro's transfer station operations and best meets the values of the Metro region. The research, site visits, and meetings and interviews with the respective parties aided in the development and analysis of the waste and transportation scenarios discussed in Sections 2 and 3. A map showing the location of relevant disposal facilities within 200 miles from Metro's transfer stations is shown in Figure 1.

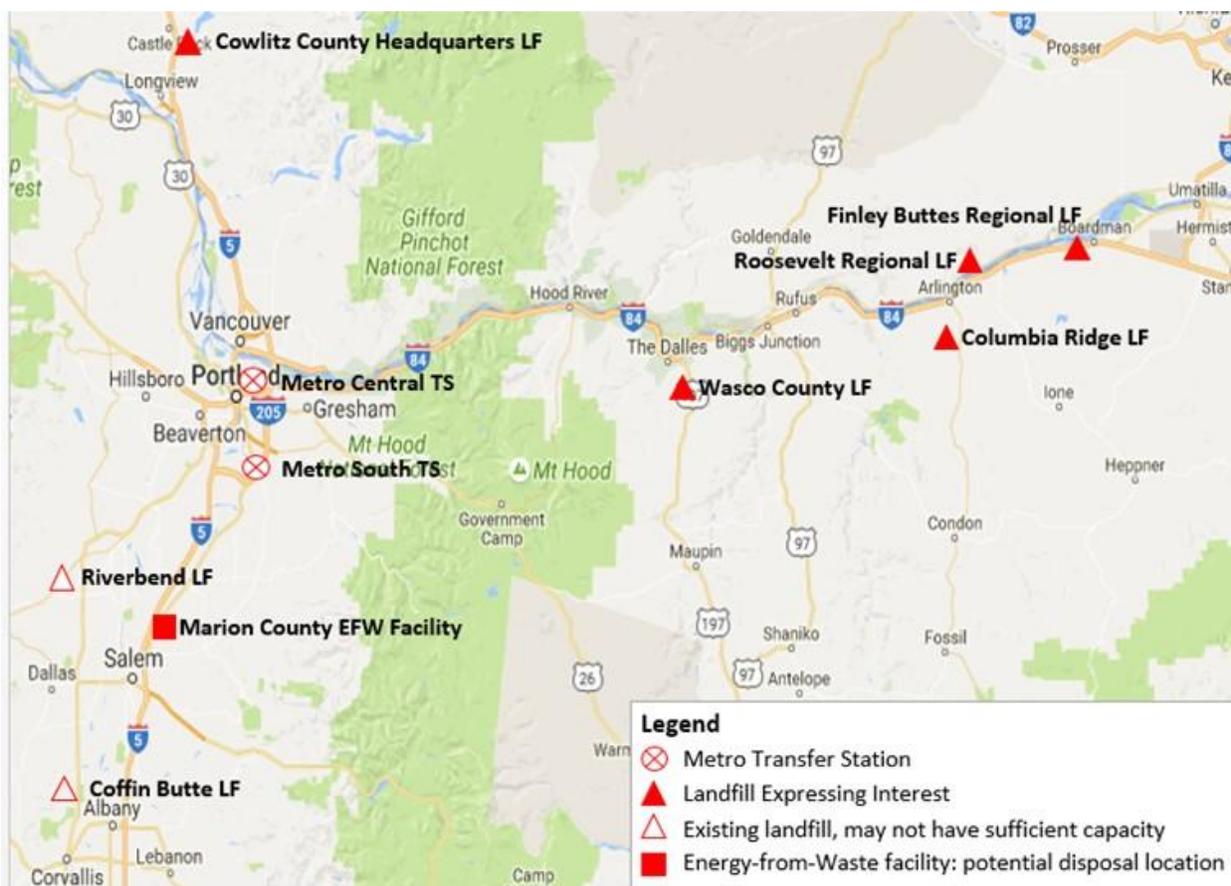


Figure 1: Map of Relevant Disposal Facilities

1.1 Site Visits and Interviews

The CH2M team visited the following facilities during the week of November 14, 2016, the week of December 19, 2016, and in March, 2017. Metro staff participated in the visits to many of the facilities and interviews and meetings. This section summarizes the results of the meetings, interviews, and the respective site visits held with industry representatives who have interest in the upcoming Metro transportation and disposal procurement. The representatives came from the following entities: Metro’s existing service providers, five medium to large regional landfills that serve the Metro region, trucking companies and barge and rail service providers that expressed interest in Metro’s upcoming procurement. The following list is a summary of the entities and their representatives, who were interviewed as part of this research:

- **Burlington Northern Santa Fe (BNSF) Railway**
 - Clinton Watkis, Manager of Sales for Industrial Products
- **Coffin Butte Landfill, Republic Services**
 - Jason Jordan, General Manager
 - Jennifer Stuber, Division Manager
 - Julie Jackson, Municipal Relations Manager
 - Cindy Dolezel, Municipal Relations Manager
 - Ian Macnab Environmental Manager

- **Columbia Ridge Landfill, Waste Management**
 - Alan Anderson, District Manager
 - Dean Kampf, Municipal Marketing
 - Kip Eagles, District Manager
 - Paul F. Burns, Director of Disposal Operations
- **Cowlitz County**
 - Don Olson, Solid Waste Manager
- **Finley Buttes Landfill, Waste Connections**
 - Eric Merrill, Vice President (VP), Governmental Affairs
 - Jason Hudson, Division VP
 - Dean Large, Sales Manager, Waste Connections
 - Kevin Green, Assistant District Manager
 - Jerry Friesen, Gas to Energy Engineer
- **Foss Maritime**
 - Tim Beyer, Director of Business Development, U.S. West Coast
 - Captain Paul Hendriks, Regional Operations Manager
 - Bo McCall, Commercial Manager
- **Lynden Transport Inc.**
 - Al Hartgraves, Business Development Manager
 - Chae Matt, Regional Operations Manager
- **Northwest Container Services**
 - Gary Cardwell, Divisional VP
 - Other NCS staff
- **Port of Portland**
 - Isaac Barrow, Business Development Manager
- **Roosevelt Regional Landfill, Republic Services**
 - Don Tibbets, General Manager, Washington Post-Collections
 - Art Mains, Washington Environmental Manager
- **Tidewater Barge Lines**
 - Bob Curcio, President and Chief Executive Officer (CEO)
 - Greg Zanavich, Business Development Manager, Grain and Project Cargo
 - Andy Stephens, VP Business Development
 - Neil Maunu, Business Development Manager, Infrastructure
- **Tidewater Terminal, Port of Morrow**
 - Greg Zanavich, Business Development Manager, Grain and Project Cargo
- **Union Pacific Railroad**
 - Melissa Maier, Senior Business Manager, Industrial Products

- **Walsh Trucking**
 - Bob Walsh, VP, Senior Operations Management
 - Bernie Walsh, VP, Senior Operations Management
- **Wasco County Landfill, Waste Connections**
 - Eric Merrill, VP, Governmental Affairs
 - Dean Large, Sales Manager, Waste Connections
 - Kevin Green, Assistant District Manager

For a complete account of the facility site visits and interviews and meetings with the various interested service providers for Metro’s transportation and disposal procurement, please refer to the attachment.

1.2 Metro Infrastructure Requirements

This section addresses the infrastructure requirements at the Metro transfer stations to support transportation of solid waste from Metro’s two transfer stations to a regional disposal facility. The requirements will vary somewhat depending on which transportation mode is selected, whether it be truck, rail, or barge, or a combination thereof.

1.2.1 Metro Central Station

Existing Infrastructure for Truck Transport

Currently, the Metro Central Station has limited parking and staging space for trailers on its footprint. As a result, the current provider, Walsh Trucking, leases adjacent land to the transfer station. This adjacent land can accommodate trailer storage of approximately 30 trailers, dependent on the trailer staging configuration within the property’s footprint.

With respect to the trailer interface with the preload compactors at Metro Central for compacting and loading waste into the Walsh trailers, Walsh’s trailers were designed with an inset mounted box or body that is set forward approximately 4 feet from the rear of the trailer to accommodate the overlap of the front opening (that is, the “mouth”) of the preload compactors and the rear doors of the trailers. This space is commonly referred to as the rear “deck” of the trailer. Thus, Walsh’s trailer fleet is fully compatible with the compactors and other interfaces at Metro Central. It is recommended that Metro include the general specifications of the preload compactors and the Walsh trailer fleet in its procurement. This will ensure that any trucking trailer fleets will be compatible with the existing infrastructure at the Metro Central Station.

Infrastructure Requirements for Rail and Barge Transport or New Truck Operator

As noted, Metro’s current transportation contractor, Walsh trucking, leases land adjacent to Metro Central for trailer storage. Any new contractor would need to make arrangements to lease that property (if available) or make arrangements for trailer storage at a location that allows trailers to be moved off-site in a manner that does not negatively affect operations at the Metro Central Station.

Industry research and inspections of existing intermodal containers and their placement on the required chassis were conducted to assess requirements for effectively transporting containerized waste from Metro Central via barge or rail. The current configuration of the equipment being used elsewhere (such as Clark County, Washington by barge) would require either a rear deck shortening through a relocation of the intermodal container twist locks or bolsters, or an overall lengthening of the chassis to accommodate the payloads and to effectively interface with the preload compactors for proper loading of the intermodal containers. Because of these needed equipment modifications, a loss of waste payload would likely exist from the current average of 34 tons per truckload to meet local and state highway-use weight restrictions. On the basis of information from current operations in the Pacific Northwest, it is estimated that 3-4 tons of waste per load would be lost with the equipment modifications to accommodate Metro’s preload compactors i.e., a net payload of 30-31 tons.

This change would also increase the quantity of the containers and chassis necessary to accommodate transporting Metro’s waste volumes, resulting in an increased number of loads being transported daily and annually. Without having a container chassis reengineered by an industry manufacturer, it is not fully known how significant of a payload reduction would actually be realized. One potential way of increasing payload in a container/chassis combination would be to modify the preload compactors at the Metro stations. Metro is in the process of procuring new preload compactors and it’s possible it could work with the manufacturer to engineer a new design with a longer front-opening overlap to adjust for standard chassis deck lengths. Table 1 summarizes the potential payload impacts per load and the annual shipment impacts between trucking and rail or barge via containers.

Table 1. Potential Payload Impacts

Equipment	Legal Payload Capacity	Annual Loads ^a
53-foot Trailers (truck)	34 Tons	15,000
40- to 45-foot Containers (barge, rail)	30 Tons	17,000

^a Estimates are based on the latest daily average of combined loads from both Metro Central and South of 60 per day in November 2016 and 510,000 tons of waste transported annually on a 5-day work week, Monday to Friday.

If a rail or barge transportation mode were selected, given the longer transportation turnaround cycle times for both these modes in contrast to trucking, approximately a 2 to 1 (or greater) ratio of containers to trailers would be needed to accommodate the barge and rail modes. Thus, more land for storing containers and chassis would be required. While this is not specifically an issue for Metro, it would require barge and rail transportation firms to secure container storage and staging capacity and develop and implement the logistics required to shuttle containers to and from those facilities and the Metro transfer stations in an efficient manner. During industry interviews, barge companies cited approximately 4- to 4.5-day turnaround cycles on barges from the Portland area to the Port of Morrow in Boardman, Oregon. Rail could cycle one train possibly daily or every other day in a unit train format (a minimum of 50 double-stack railroad well cars or 100 containers). Table 2 summarizes a high-level estimate of the containers needed for rail or barge in contrast to the current number of dedicated trailers being used by Walsh Trucking to service Metro Central and Metro South combined. The truck estimates are based on the most recent report from Walsh Trucking on the daily average volumes for November 2016 of 60 loads per day from both transfer stations. The rail and barge estimates are based on our experience with these modes and the turnaround cycles noted above.

Table 2. Potential Container Requirements for Truck, Rail, and Barge Transport

Transportation Mode	Equipment Type	Estimate	Quantity	Cycle Time Assumption
Truck	53-foot Trailers	Current Actual	111	Daily
Rail	40- to 45-foot Containers	Estimate	240+	Every 1 to 2 Days
Barge	40- to 45-foot Containers	Estimate	336+	Every 4 to 4.5 Days

While the complete cycle times (time in transit from origin to disposal facility and return to Metro’s Stations) vary for rail and barge, the container quantity estimates for barge and rail are different because rail can move more than 100 containers in a 2-day cycle. Barge requires a 4- to 4.5-day cycle, and fewer containers can be transported in a move because of the barge configuration’s size restrictions (48 containers on each of 2 barges in a tow) through the locks along the Columbia River.

There is some uncertainty about what the exact cycle times would be for the rail transportation mode. In conversations with representatives of the BNSF Railway, which serves the Roosevelt Landfill, BNSF

expressed interest in transporting smaller quantities of containers on a daily basis, which would require fewer containers and result in faster cycle times. This is known as “manifest” service in the railroad industry. The Union Pacific Railroad, which serves Finley Buttes and Columbia Ridge Landfills, expressed interest in larger “unit” trains, where 50 or more double-stack railcars are connected with two containers per car to increase use of the railroad’s locomotives, railcars, and manpower. The unit train option requires more containers because the cycle times would be greater than the daily manifest service referenced during discussions with the BNSF Railway representatives.

1.2.2 Metro South Station

Existing Infrastructure for Truck Transport

Currently, the Metro South Transfer Station has limited parking and staging space for trailers on its footprint. The transfer station can accommodate trailer storage of approximately 10 trailers, depending on the trailer staging configuration within the property’s footprint. As a result, the current provider, Walsh Trucking, maintains a trailer shuttle between Metro South and its headquarters (and Walsh-owned trailer staging yard), located in Troutdale, Oregon. This allows Walsh to meet the daily needs of transporting an average of 31 loads per day from Metro South. Some loads are directly transported from Metro South to Metro’s current disposal contractor, the Columbia Ridge Landfill, located approximately 150 miles from Oregon City. The remaining loads are shuttled to Walsh’s Troutdale yard, approximately 23 miles away, where they are staged for subsequent delivery to the Columbia Ridge Landfill.

The interface issues between the preload compactors and the Metro Central Station also apply at the Metro South Station.

Infrastructure Requirements for Rail and Barge Transport or New Truck Operator

As stated in the Infrastructure Requirements for Rail and Barge Transport for Metro Central, the same challenge exists for the interface of the combination of intermodal containers and chassis with the preload compactors at Metro South.

A challenge facing any new transportation provider (rail, barge, or truck) is the lack of staging for trailers or chassis/container combinations at Metro South. With only 10 staging spots at the transfer station, and 31 or more average loads to be transported daily, the provider will need to maintain a local staging yard where loaded containers can be shuttled and staged for subsequent transport to a nearby yard. A creative staging and shuttle operation will be needed to accommodate the needs of Metro South.

1.3 Mobilization of Equipment and Facilities

1.3.1 Mobilization Requirements

During the interviews and site visits with existing and potential service providers, the CH2M team documented issues related to how companies might mobilize staff, facilities, and equipment to provide transport and disposal services to Metro. Equipment vendors were also contacted regarding lead times for key equipment. This section reports on key findings from those interviews, including a recommendation about the time Metro should allow between contract execution and the project start date, to make sure that potential vendors can acquire and manufacture the required equipment and infrastructure.

For trucking, firms would need to procure light-weight tractors and trailers in order to maximize payloads, and design trailers that are compatible with Metro’s preload compactors. This can be accomplished by Metro issuing a performance specification that includes key aspects of the equipment provided by its current transportation vendor, Walsh Trucking.

For rail and barge, the railroad and barge firms contacted did not anticipate difficulty acquiring the power (locomotive or tug) or rail cars, barges, chassis, or containers required to provide service to Metro. They also expressed confidence that suitable terminal space was available or could be acquired reasonably proximate to the location of the Metro transfer stations for intermodal loading and

unloading of containers (truck to rail/barge). Some potential terminal locations (e.g., Tidewater’s facilities in Vancouver or Northwest Container’s facilities in Portland) are known, others were “options” held by providers or potential locations that would be finalized depending on the structure and specifics of Metro’s request for proposals.

For disposal mobilization, all five landfill owners interviewed cited having no limitations or mobilization requirements different from their current operating modes. The representatives did not cite any particular challenges related to accepting waste delivered by intermodal containers on chassis or by truck/trailer combinations.

Currently, all landfills use one to three trailer tippers at their facilities for “tipping” or unloading the waste loads. Representatives from these facilities said they could accommodate Metro’s waste volumes without much impact on their current daily operations. Some facilities may require an additional trailer tipper and labor to accommodate Metro’s waste volumes; however, they stated that these modifications are simple to make.

Representatives from the Roosevelt Landfill stated that while they prefer a rail transportation mode, they are in the process of permitting and constructing a new barge unloading dock on the Columbia River in Roosevelt, Washington and could receive Metro’s waste via barge, if that is the selected mode of transportation through Metro’s procurement.

1.3.2 Equipment Availability and Lead Times

Regarding equipment availability and lead times, Table 3 summarizes the findings from industry research with equipment manufacturers and the potential transportation and disposal companies about the required lead times for key equipment types.

Table 3. Equipment Availability and Lead Times

Equipment Type	Lead Time (in months)	Comments
Class 8 Tractors	3 to 6	Lead times vary slightly by manufacturer.
Transfer Trailers	6 to 9	Lead times vary slightly by manufacturer.
Intermodal Containers	4 to 6	Lead times vary slightly by manufacturer.
Railroad Locomotives	18+	If new engines meeting latest EPA emission standards (Tier 4) are required.
Railroad Railcars	12+	Assumes Husky double stack well cars.
Container-lifting Equipment	6+	Also known as “Top Picks”; lead times vary slightly by manufacturer.
Yard Goats	4 to 6	Also known as “trailer hostlers”; lead times vary by manufacturer.
Trailer Tippers	9 to 12	Lead times vary slightly by manufacturer.
Tugboats and Barges	18 to 24+	If new engines meeting latest EPA emission standards are required; lead times vary by manufacturer.

Note:

EPA = United States Environmental Protection Agency

Transportation and disposal companies interviewed said that a 12-month lead time in advance of the new contract start date of January 1, 2020 is adequate to design, order, and manufacture the equipment needed to begin transporting and disposing of total waste volumes from both Metro’s stations

(depending on if new EPA Tier 4 emissions-compliant locomotives or tugboats are required as noted above).

1.3.3 Other Lead Time Considerations

Engine Requirements

As identified in Table 3, if Metro’s procurement requires rail locomotives and tugboats to meet the latest EPA Tier 4 emissions requirements, the lead times for these modes would exceed the 1-year lead time to accommodate the start of Metro’s contract on January 1, 2020. If Metro decides to require Tier 4 engines, it could include a bridge type service agreement whereby Metro the railroads or tug and barge service providers would be allowed a 1- to 2-year lead time allowance to use existing equipment while new locomotives or tugboats are manufactured and placed into service.

Landfill Gas to Energy Facilities

In addition to emissions from transportation, Metro is considering requiring any landfill that accepts waste from Metro transfer stations to convert landfill gas to energy as a means of minimizing greenhouse gas emissions. Currently, four landfills Metro has spoken with (Columbia Ridge, Roosevelt, Finley Buttes, Coffin Butte) use landfill gas to generate electricity sold to the grid. Other landfills, such as the Wasco County Landfill and the Cowlitz County Headquarters Landfill, do not yet have that capability but their respective owners have expressed interest in developing that capability in the future.

Most landfill gas to energy projects take a number of years to complete including preparing a market study for end-use options, developing end-use contracts, air quality permitting, facility design, equipment procurement, through to construction and start-up. Assuming specific favorable circumstances such as the status of existing landfill gas capture infrastructure, it is possible that a landfill gas to energy project could be developed in as little as 12 to 18 months.

In its procurement process, Metro will need to evaluate the extent to which it will require energy generation at the time of contract start, or allow for some phasing mechanism to be included in the contract. If Metro is interested in allowing phased implementation for landfills without an operating system, one possible phasing approach would be to require submittal of a landfill gas to energy feasibility study and defined project milestones for contract compliance as part of the proposal. Metro could then include an assessment of the soundness of that plan as part of its overall evaluation of landfill proposals.

Terminal Development

Another item that could have a long lead time is development of terminal facilities for loading Metro’s waste volumes. As noted above, most trucking firms would need a terminal in the greater Portland area to accommodate trailers that cannot be stored at Metro South. This could most likely be accommodated within a 12-month startup period.

For rail and barge, all parties interviewed, with the exception of Northwest Container Services and perhaps Tidewater Barge Lines, would need to identify an intermodal loading facility in the greater Portland metropolitan area or establish a lease agreement or purchase property to accommodate the storing, staging, and handling of intermodal containers on and off railcars or barges via container lifting equipment “top picks.” With the exception of the Wasco County and Coffin Butte landfills (which can receive waste by truck haul only), all of the landfills have rail intermodal handling facilities either at or near their disposal facilities. Although the Cowlitz County landfill has an intermodal facility on-site, the County representative stated that they would prefer to receive Metro’s waste by truck.

Any new terminal development requiring permitting, design, and construction would likely require at least 12-24 months to be ready and operational. Terminals that are fully permitted and operational could be ready to accept waste from Metro in less than 12 months.

1.4 Labor Issues

As part of the interviews, meetings, and site visits the CH2M team conducted, interested suppliers for both transportation and disposal were asked about whether they have any specific issues or concerns about labor agreements and availability in general. Table 4 summarizes the findings from the interviews specific to transportation (note that none of the disposal facilities cited concerns about labor shortages at their facilities).

Table 4. Labor Issues

Transportation Mode	Labor Agreement in Effect	Availability of Labor	Other Concerns
Trucking	No	Driver shortage continues to be a significant issue in the industry	<ul style="list-style-type: none"> • Not as many of younger generations are entering the driver field as a career • Excessive driver turnover and competition for drivers among trucking companies • Baby Boomer generation is retiring now, leaving vacancies in the driver pool
Rail	Yes – Combination of Unions	Stable	<ul style="list-style-type: none"> • Some concern about new locomotive engineers' availability with younger generation
Barge	Yes – Combination of Unions	Stable	<ul style="list-style-type: none"> • Nothing cited in interviews

1.5 System Component Interface Requirements

System component interfaces refers to how facilities and equipment must be aligned between Metro's transfer stations, the transportation mode, and the landfill. Currently, Metro's system uses trucks specially designed to accept waste loads from preload compactors at Metro's two transfer stations. At the landfill, trucks are tipped using a landfill tipper owned and operated by the trucking contractor. Trucking is a fairly direct delivery method of "load and go," and it is straightforward with minimal complexity. Continued use of trucks as a mode of transport would require no substantive change to current system interfaces.

In contrast, rail and barge transportation modes would require more system infrastructure and more complex interfaces in terms of land, facilities, and equipment. These modes are more complex because of the requirements of handling each loaded container four to six times per round trip from the Metro Stations to the disposal site. The number of times handled depends on whether a container can be loaded directly onto an awaiting railcar or barge on both the shipping and receiving ends at origin and disposal destination, or whether the container needs to be staged for short-term storage until the next railcar or barge is available.

In addition, rail and barge transportation would require an interface between the main mode and trucking. These modes need the intermodal containers shuttled via container chassis to and from the Metro stations to a railyard or dock for loading the containers on awaiting railcars or barges. Moreover, trucking is needed on the receiving end from the railyard or dock to the disposal facility for unloading the containers.

1.5.1 Metro Transfer Stations Operations Overview

Metro owns and operates two solid waste transfer stations for receiving and transferring regional residential and commercial garbage, and certain source-separated materials (such as commercial and residential organics for the region). The Metro facilities operate daily. Metro Central is located at 6161 NW 61st Avenue, Portland, Oregon, and Metro South is located at 2001 Washington Street, Oregon City, Oregon. Table 5 summarizes the current Metro Stations’ operations.

Table 5. Metro Station Operating Details

Metro Station	Operating Hours	Peak Times (Inbound waste volumes)
Central	8:00 am to 5:00 pm daily	8:00 am to noon daily with peak volumes days on Mondays and Wednesdays
South	7:00 am to 7:00 pm daily (Mar. 1 to Sept. 30)	8:00 am to noon daily with peak days on Mondays and Wednesdays
	7:00 am to 6:00 pm daily (Oct. 1 to Feb. 28)	

1.5.2 Metro Waste Volumes

In fiscal year 2016, total tonnage delivered to Waste Management (the operator of Columbia Ridge landfill) from Metro’s two transfer stations increased by 10.4 percent compared to the prior year (see Table 6). Peak inbound waste volumes vary monthly; however, in Years 2013 to 2016, peak volume months were typically December, and May to August.

Table 6. Metro Solid Waste Deliveries to Waste Management

	MSS	MCS	Total
FY16	260,888	224,340	485,228
FY15	242,881	196,729	439,610
Annual change	7.4%	14.0%	10.4%

1.5.3 Metro Transfer Station Emergency Waste Flows

During the course of the next contract, it is expected that a number of disruptions to the transport system will arise to which contingencies need to be developed. In recent years, Metro’s current use of the trucking mode has been disrupted because of forest fires, landslides and ice storms closing the Columbia River Gorge transport route. For example, in January 2017 ice and snow related closures of I-84 through the Gorge, snow and ice in greater Portland, and a shortage of trucking labor and equipment because of Columbia River Locks closure combined to result in multiple weeks of limited truck movements, high volumes of waste stored at Metro’s two transfer stations, and waste being sent to alternate landfills. While truck transport has provided some flexibility to use alternative routes, these events tend to limit the free flow of waste transportation and result in the need to stockpile waste at the stations and implement complex emergency logistics operations.

Both barge and rail systems face similar challenges in the greater Portland area. Over the years, rail transport has been subject to disruption resulting from derailments and spikes in demand. For barge transport, the Columbia River Locks schedule annual maintenance that requires the locks along the river to be closed. The annual lock closures typically occur in March and last between 2 and 3 weeks each year. Tidewater Barge Lines, which transports Clark County Washington’s waste via barge to Finley Buttes landfill, uses third-party trucking providers to truck the waste from Vancouver to the disposal facility during the lock closures. The annual lock closure was extended to allow for required

maintenance from December 12, 2016 to March 20, 2017. A similar extended lock closure occurred 6 years ago, and it is anticipated that another longer closure for maintenance will occur sometime during Metro’s next transportation contract (assuming a 10-year contract term).

Looking to the future, Metro should expect similar disruptions to the chosen transportation mode(s) and should ensure that appropriate contingency plans to address emergencies are included in the contract with its transportation provider.

1.6 Host Community Issues

As part of the research for the potential disposal facilities, the CH2M team acquired copies and reviewed the local host County Agreements from the respective interested disposal companies. Table 7 provides a summary of the respective host agreements.

Table 7. Disposal Facility Host Communities Summary

Landfill	Host County	Current Host Fee	Length of Agreement	Annual Adjustment	Other Key Terms/Conditions
Columbia Ridge (Waste Management)	Gilliam, OR	\$2.25 / ton plus 3 cents per ton fee for road maintenance	9 years & 10 months - currently through 12/31/2025	75% of annual CPI HALF1 to HALF1 of Portland–Salem, OR-WA, CPI as published by the Bureau of Labor Statistics	Guaranteed Minimum host fee payment based on 600,000 tons per year. Minimum payments to County are \$50,000 / mo. Tonnage based road use maintenance fee of \$0.03 per ton
Cowlitz County (Cowlitz County)	Cowlitz, WA	None – County owned	N.A.	N.A.	None
Finley Buttes(Waste Connections)	Morrow, OR	\$2.134 / ton & \$0.511 / ton for road fund maintenance	Evergreen Terms. Agreement with Morrow County remains in full force and effect for the effective useful life of the Finley Buttes Landfill.	100% of CPI. License Fee is increased incrementally based on annual CPI increase or decrease for Portland, Oregon, years of operation and inbound out of county tonnage with an additional \$0.25 / ton License Fee increase should Finley Buttes’ inbound out of county tonnage exceed 1,000,000 tons	Host Fee does not include DEQ fees. Road Fund (Maintenance of Bombing Range Rd.) \$0.511 / ton
Roosevelt (Republic Services)	Klickitat, WA	\$3.783 / ton	It is automatically extended through 2037 (20 years), however the County and Republic are in current discussions	The CPI with the County is an average of all the landfill’s long-term contracts, a long-term contract is considered anything over 5 years. Currently it is running at about	Annual Additional Costs include: Economic Development: \$43,626.92; Administrative Fee: \$504,424.32; Recycling Education Fees: \$19,440.16; Scholarships: \$20,000

Table 7. Disposal Facility Host Communities Summary

Landfill	Host County	Current Host Fee	Length of Agreement	Annual Adjustment	Other Key Terms/Conditions
			about extending that out even further	80%.	
Wasco County (Waste Connections)	Wasco, OR	\$1.52 / ton (for tons received from outside of Wasco, Hood River or Sherman Counties); License Fee (Annual) 2017 - \$110,183.00	The current agreement with Wasco County is for thirty (30) years following the end of the first Contract Agreement, which was entered into on November 13, 1996	85% of CPI Annually	Landfill pays host County \$75,000 annually (plus escalators). Host Fee does not include DEQ fees. Per the Agreement, Wasco County may seek an additional Host Fee (Supplemental Host Fee) for road maintenance, infrastructure, personnel, etc. The County has never asked for an additional Host Fee. Rather, in recent discussions with the County, Waste Connections have agreed to assist them in this area on a case-by-case basis.

It should be noted that all solid waste disposed of in Washington State landfills (including Cowlitz County and Roosevelt) are subject to a 3.6 percent refuse collection tax. For solid waste generated out of state, the tax is levied at the landfill (rather than on the collection company).

1.7 Service Provider Comparison and Evaluation

1.7.1 Transportation Mode Evaluation

An evaluation of the barge, rail, and truck modes for transporting solid waste from Metro’s transfer stations to disposal sites is provided in Table 8. The criteria shown in the table were developed in conjunction with Metro staff as a representation of Metro values that may be important to evaluating transportation proposals (see more complete discussion in Section 3).

The evaluation is relatively general because the extent to which a mode meets many criteria important to Metro will vary depending on specific proposals made by individual firms (e.g., greenhouse gases and other air emissions). Many factors, such as air quality, will be evaluated in more detail during the proposal evaluation phase when specific details about the mode, location, and equipment used for transportation will be available; and specific metrics will be developed by Metro to measure the criteria.

Table 8. Transportation Mode Evaluation

Draft Criteria	Barge	Rail	Truck
1. Protect human health and the environment	Like rail, low fuel use per ton for line haul: emissions depend on tugboat engine used (e.g., EPA Tier 1 vs. Tier 4) and extent of drayage by truck on each end of line haul. Added emissions during two-week barge closure because of truck haul which may be less efficient than “optimized” full-time truck haul.	Issues similar to barge but no two-week closure. In 2008 CH2M transportation study ^a , lowest CO2e emissions of the three modes.	More fuel use per ton for line haul, but efficient “door-to-door” service. In 2008 CH2M transportation study ^a , overall CO2e was similar to barge (because of barge’s truck drayage), and truck had lower NOx and PM10 emissions than barge or rail because of required engine emission controls that did not apply to barge or rail.
2. Be adaptive and responsive to changing needs and circumstances	Somewhat less adaptive because of fixed nature of river and truck-barge interface. But less affected by I-84 closures than trucking.	Less adaptive because of fixed location of rail tracks, history of occasional delays during peak times, and truck-barge interface. But less affected by I-84 closures than trucking. Further, both railroads expressed an unwillingness to entertain longer-term pricing agreements (e.g., UPRR stated that more than a 3-year agreement would be difficult and that it would be unlikely they would entertain longer than 5 years).	Most adaptive of the three modes.
3. Enhance Metro’s role in the regional transfer system	Not relevant to transportation mode.		
4. Implementation ease	Relatively little difference among modes considering the lead times Metro is planning for its procurement.		
5. Administration ease and cost	Relatively little difference among modes.		
6. Equity	Relatively little difference among modes: Both barge and rail have some trucking which provides potential for diversity and inclusion in transportation: likely to be some differences by firm.		
7. Minimize cost to Metro customers	Depends on specific business strategy and relationships. In 2008 transportation procurement, trucking was generally cheaper than the barge mode.		

^a CH2M HILL. *Metro Solid Waste Transportation Study, Final White Paper*. 2008.

1.7.2 Disposal Facility Comparison

A comparison of relevant details and procurement preferences for the four privately-owned landfills that may be interested in participating in Metro’s procurement is provided in Table 9. The table provides a comparison rather than an “evaluation” because there is relatively little difference among the landfills in criteria of importance to Metro with the possible exception of greenhouse gas emissions and cost. As shown, three of the four landfills have extensive landfill gas to energy systems (and the effectiveness of those systems is highly technical and subject to substantial uncertainty), and the cost of each landfill cannot be evaluated accurately at this time and will be revealed during the proposal process.

Table 9. Comparison of Privately-Owned Landfills

	Columbia Ridge Landfill (Waste Management)	Finley Buttes (Waste Connections)	Wasco County Landfill (Waste Connections)	Roosevelt (Republic Services)
Permitted acres	760	510	213	915
Annual disposal (tons per year)	2.6 to 2.7 million	700,000	700,000	2.2 to 2.4 million
Remaining capacity at current fill rate	121	200+	100	100
Host fee	\$2.25/ton plus 3-5 cent per ton fee for roads	\$3/ton		Just under \$4/ton: all county residents tip free
Gas to energy capacity (MW)	12 MW	4.8 MW	No system in place. Expressed willingness to install a system.	26 MW
Current gas to energy generation (MW)	not provided	3.6 MW		20 MW
Preferred bundling	No strong preference; might prefer bundled transportation and disposal	Bundled transportation and disposal; separate contracts from each transfer station		Bundled transportation and disposal; separate contracts from each transfer station
Preferred contract term	None stated	7-year minimum; 10-20-year better		10 years with two 5-year extensions
One year mobilization OK?	Yes	Yes		Yes

Note: MW = megawatt

There are two other potential options not shown in the table. First, is the Cowlitz County’s Headquarters Landfill located about 53 miles north of the Washington-Oregon border. That landfill currently accepts about 550,000 tons per year and is permitted to accept 1 million tons per year. The County estimates that the landfill has 44 years of remaining capacity at its maximum permitted 1 million-ton-per-year fill rate. Regarding landfill gas, the landfill currently produces 700 cubic feet per minute (cfm) of 48 percent methane that is flared off in enclosed ground flare. The County is interested in pursuing the use of landfill gas to generate electricity, but further study would be necessary before it could commit to energy recovery. The County expressed interest in exploring an inter-local agreement for accepting waste from Metro.

Second, is the Coffin Butte Landfill just north of Corvallis, Oregon owned and operated by Republic Services, which is about 70 miles south of the Metro South Station. This landfill was toured by Metro staff in February, 2017.

2.0 Transportation and Disposal Scenario Development

The evaluation methodology used for this project is based on the principles of multi-objective decision analysis (MODA), which is a method that provides insight into alternative courses of action. CH2M has used this method for a number of similar evaluations for Metro, including an evaluation of transportation modes in advance of the 2008 procurement of Metro’s current waste transportation contract.

Using information that was gathered in the project kickoff meeting to “frame the problem” and knowledge gained during the site visits and interviews, a series of transfer station / transportation mode

/ landfill combinations (scenarios) were identified. The eight different scenarios identified are shown in Table 10, along with the corresponding number of contracts that would be associated with each scenario.

Table 10. Draft Scenarios

	Transportation	Disposal	No. of Contracts
1. Status quo	1 provider	1 provider	Two
2. Consolidated	1 provider for transportation and disposal		One
3. Combined transportation and disposal from each station	2 providers for transportation and disposal		Two
4. One transportation, two disposal	1 provider	2 providers	Three
5. Two transportation, one disposal	2 providers	1 provider	Three
6. Decentralized	2 providers	2 providers	Four
7. One transportation, three disposal ^a	1 provider	3 providers	Four
8. Menu approach	Proposers may submit any combination		

^a25 percent of tons to each of top 3 ranked disposal facilities, additional 25 percent to lowest combined transportation + disposal cost with the 25 percent rebid periodically

The first six transportation and disposal procurement scenarios are logical combinations of transportation and disposal from each of Metro’s two transfer stations.

Scenario 7 would have one transportation contractor for transportation of waste to the three top-ranked landfills resulting from the procurement process. Each of the top-ranked disposal firms would receive 25 percent of the solid waste from the Metro stations, with the remaining 25 percent allocated to the low-cost provider (transportation + landfill) in a bidding process conducted annually.

Scenario 8 would be implemented using a flexible menu-based procurement approach.

These scenarios were further reviewed and refined during the evaluation process. The evaluation process and outcomes from that exercise are summarized in Section 3.

3.0 Evaluation of Scenarios

3.1 Evaluation Methodology

Well-defined evaluation criteria and performance measures provide the framework for comparing alternatives and making sound decisions. Table 11 shows a set of evaluation criteria and performance measures for each criterion that were established during the first workshop for this project. Criteria were compiled based on Metro’s solid waste system values, together with critical success factors identified by Metro staff at the project kickoff meeting, and suggestions based on the CH2M team’s experience with similar procurement activities. Performance measures for each criterion were defined using qualitative measures, which are typically used for decisions like this, which relate more to policy than engineering or financial matters. For this analysis, a simple 1 to 5 scale was envisioned for each criterion. Table 11 shows the measures for the endpoints of that scale (that is, the worst and best outcomes for each criterion).

Table 11. Draft Criteria and Performance Measures for Procurement Scenarios

Draft Criteria	Worst Outcome (1)	Best Outcome (5)
1. Protect human health and the environment	Relatively likely to result in a mode of transportation and configuration which would increase emissions based on the amount and emissions profile of modes.	Relatively likely to result in a mode of transportation and configuration which would result in fewer emissions than the current system.
2. Be adaptive and responsive to changing needs and circumstances		
2a. Responsive to fluctuating output and other requirements of Metro transfer stations	Multiple contracts for transportation, which make coordination somewhat more challenging for addressing Metro transfer station requirements.	One contract for transportation, which provides the most flexibility to address Metro transfer station requirements.
2b. Ability to implement alternative measures during emergency	One large contract likely to go by barge or rail could make it more difficult to respond in an emergency.	Multiple separate contracts allowing for more firms available to implement alternative measures if needed.
2c. Operational ease	Separate transportation contracts would make it more difficult for the transfer station operators.	Bundled transportation would result in more efficiencies and the ability to shift equipment from one station to the other. Unbundling transportation from disposal allows Metro to leverage the two service providers to get better overall value, both in terms of cost and services.
3. Enhance Metro’s role in the regional transfer system	The more service provided by a single contractor, the more that contractor would have the opportunity to exert power and market influence on the transfer system.	Contracts with each of the three firms that are vertically integrated i.e., they own both collection companies in the Metro region and landfills served by waste from the Metro region. Recognize transfer station configuration realities.
4. Implementation ease	Separate contracts from transportation and disposal from each station would make communication and up-front planning a bit more challenging.	The more service provided by a single transportation and disposal contractor would streamline communication and up-front planning.
5. Administration ease and cost	Separate contracts for transportation and disposal from each station would make communications and up-front planning a bit more challenging.	The more service provided by a single transportation and disposal contractor would streamline communication and up-front planning.
6. Equity	No ability to affect promotion of equity in how transportation and disposal services are provided. Fewer contracts will likely result in smaller equity impact.	Provides some ability to affect promotion of equity in how transportation and disposal services are provided. Having more contracts provides an opportunity to have a larger impact on a larger worker population or within more host communities, increasing equity.
7. Minimize cost to Metro customers	Separate contracts for transportation and disposal from each station would result in the highest administrative costs for Metro, the lowest economies of scale, and would result in tip fees influenced by most favored customer clauses.	One contract for all transportation and disposal would provide the best economies of scale and the potential for bypassing most favored customer disposal rates (by obscuring the tip fee in a joint transportation and disposal price).

In preparation for an evaluation workshop held on December 20, 2016, CH2M and WIH Resource Group (WIH) used the evaluation criteria and measurement scales from the first workshop and began assigning scores to the scenarios. However, as we proceeded through this exercise, it became apparent that without knowing the details about actual proposals, it was difficult to complete the scoring exercise, and

there was considerable uncertainty about how to score some of the criteria in the absence of specific proposals. For example, there are a series of details related to the specifics of a proposal that could have a dramatic effect on the quantity of greenhouse gas and other emissions associated with a scenario (e.g., location of intermodal yards, unit train versus merchant service, locomotive and tug engines in use, container payloads).

Additionally, it was impossible to assign a meaningful score to the Menu Approach relative to the other scenarios. This is because the Menu Approach can be configured in such a way that maximizes the benefit of any one particular criterion, however, there are trade-offs between some of the criteria (e.g., operational ease versus equity) so that there is no single configuration that can be the best for all criteria.

In response, the team decided that a revised methodology would be better suited for this stage of the analysis, and that a more formal MODA evaluation would be better suited for evaluating actual proposals later in the process. During the December 20 workshop, the participants discussed the advantages and disadvantages of each scenario, and concluded that further outreach with other Metro staff would be useful for deciding on the best procurement strategy.

3.2 Recommended Procurement Strategy

After further discussion, the group collectively agreed upon a two-step solicitation: issuing a request for qualifications (RFQ) for disposal and then issuing separate requests for proposals (RFPs) for transportation and disposal. The procurement will proceed as follows:

1. Step 1 – Metro will release a Request for Qualifications for disposal that will include certain essential performance specifications Metro will require (e.g., capacity, landfill gas to energy, operating hours). The purpose for this step is mainly to narrow the number of disposal locations transporters will use as the basis for costing transportation options in the transportation RFP (Step 2).
2. Step 2 – Using the list of qualified landfills obtained in Step 1, Metro will release an RFP for transportation and an RFP for disposal. Only landfills that are pre-qualified in Step 1 will be eligible to be considered in Step 2 for the transportation and disposal RFPs.

Each RFP will include three service levels: proposers may submit a proposal for one, two, or three service levels. The service levels are as follows:

Service Levels

a. Transportation

1. Metro Central Station to each approved landfill the proposer is interested in serving.
2. Metro South Station to each approved landfill the proposer is interested in serving.
3. Both Metro stations.

b. Disposal

1. From Metro Central Station.
2. From Metro South Station.
3. Both Metro stations.

When evaluating proposals, Metro will first score transportation and disposal proposals separately. The high scoring proposal for each service level will be calculated, with the cost of each proposal calculated to include the total transportation system cost (TTS cost). The TTS cost includes any added cost at transfer stations above the current baseline plus the transportation cost from a station to a landfill.

Next, Metro will calculate the highest scoring disposal proposal for each service level. The cost of disposal will include costs proposed by the landfill and the TTS cost of the highest ranked transportation proposer from the particular Metro station(s) to that landfill.

Finally, Metro will evaluate various transportation and disposal combinations and select the highest-scoring combination. That combination will be the basis for the award that identifies the recommended preferred proposer(s).

3.3 Basis for the Preferred Procurement Strategy

There are several reasons why this strategy is preferred by the group:

1. The RFQ for disposal provides an early opportunity for Metro to state the issues of most importance for a landfill service provider, and will provide definitive destinations for transport firms to calculate costs.
2. This approach is preferred over bundling transportation and disposal together for the following reasons:
 - a. Rate and operations transparency. This is important in supporting the public value of these contracts.
 - b. It allows Metro to advance its Diversity, Equity, and Inclusion goals in a manner that has the greatest impacts. For example, the large landfills all have preferred transport companies. Unbundling allows the possibility for smaller trucking firms to bid.
 - c. Depending on the mode of transportation, this preserves the option for Metro to continue its fuel savings by purchasing fuel directly.
3. Allows all transportation modes (barge, rail, truck) to participate on an equal basis.
4. Ensures that Metro gets the best combination of non-monetary value and cost for the Metro region by making all service combinations transparent.
5. Fosters innovation from bidders and allows the private sector to be creative.
6. Promotes competition to Metro's benefit.
7. Provides the opportunity for smaller firms to participate, and promotes opportunities for improving diversity, equity, and inclusion.
8. Releasing the disposal RFQ first, will help to identify the potential host communities for Metro's solid waste, which will in turn help inform communication plans and stakeholder engagement efforts.

3.4 Next Steps and Schedule

During a May 2, 2017 Council Work Session, the Metro Council gave staff direction to proceed with the procurement process with separate proposals for transportation and disposal. Metro staff will now commence drafting the RFP and RFQ/P and initiate the procurement process. A high-level milestone schedule for the procurement follows.

High-Level Procurement Schedule

May 2, 2017 *	Overview of transport and disposal procurement.
Summer 2017 *	Evaluation criteria weighting.
Summer 2017	Qualify eligible landfills, and release draft RFPs for comment.
Fall 2017	Release RFPs.
Spring 2018	Announce highest ranked firms.
Summer 2018	Negotiate final contracts.
Fall 2018 *	Approve contract signing.
January 1, 2020	New transport and disposal contracts begin.

** Asterisk denotes Council Work Session*

Attachment

ATTACHMENT

Industry Site Visits and Interviews

Several site visits and other industry interviews were conducted during the course of this study. A summary of the information gathered during these activities is included below. Contacts are shown alphabetically.

Burlington Northern Santa Fe Railway

Date of Interview – November 17, 2016

Contact: Clinton Watkis, Manager of Sales for Industrial Products

Bob Wallace and Will Elder met with Clinton Watkis, Manager of Sales for Industrial Products from Burlington Northern Santa Fe Railway (BSNF) and Don Tibbets, General Manager of Washington State Post Collections for Republic Services. Republic provided the introduction and also participated in the meeting with the BNSF. Mr. Watkis was very clear that they will only be focused on bidding any transportation portion of Metro's RFP in partnership with Republic Services. Clinton also stated that the BNSF is not interested in a long-term agreement as they have done in the past with customers. He went on to state that he was not completely sure how competitive the railroad could be in such a short line haul from Portland to Roosevelt, Washington. He stated that any rates they would offer Metro directly would be the same as what they would quote Republic Services so they favor working directly with Republic Services. He also expanded that any annual rate increase adjustment would not be tied to any regional CPI index, rather it would be an index that would be more accurately tied to their true cost increases.

Coffin Butte Landfill, Republic Services

Date of Interview/Tour – February 14, 2017

Contacts: Jason Jordan, General Manager; Jennifer Stuber, Division Manager; Julie Jackson, Municipal Relations Manager; Cindy Dolezel, Municipal Relations Manager; Ian Macnab Environmental Manager.

Metro staff met with Republic Services staff and toured the landfill.

- Coffin Butte started in the 1940'S as part of Camp Adair then became Valley Landfill.
- 740 total acres with 184 permitted. 99 acres have been filled.
- Gas to energy is through a co-op called PNGC. There are 5 engines that generate 5.6 megawatts. They are also flaring excess gas. Gas production is 2,400 FCSM.
- The current life of the landfill was stated to be about 40 years with it receiving about 2,000 tons a day or about 0.5 million tons a year (current annual flow). Adding the Metro-area/Riverbend tonnage of 260K tons/year for two years would reduce the capacity by an additional year.
- The permitted height is 630'.
- The landfill has 7.5 million gallons of leachate storage with two ponds. Currently leachate is being trucked to Corvallis and Salem for disposal. They are looking at developing a partnership with the town of Adair Village to develop a treatment plant where Republic would be a customer.
- The site receives about 44" of rain annually.

- There is currently only one tipper in operation but a second has been purchased and is on site. Normally they have a 15-18 min tip time but lately it's been 30-35 min with some being as long as 45 min.
- Most of their waste comes from 20 miles or closer. They will be accepting waste from a swap with WM. Jurisdictions/haulers being diverted currently from Riverbend will be Newberg, Canby and Pride Disposal. Forest Grove will also shift tons to Coffin Butte by April 1. This waste shift will be complete by in April.
- Benton Co receives a \$2.37 host fee. There is no additional charge for the use of the tippers but they also charge an environmental fee. This is a corporate imposed fee. This varies by contract and the fee goes directly to Republic.
- Republic staff emphasized the partnership with the County and any move to bid on Metro's disposal contract would need to be discussed with them.
- Their current contracts range from 3-7 years in length and many are on an annual renewal basis.
- They would prefer to see transport and disposal bundled.
- Trucking is the only transportation option to Coffin Butte.

Site observations

- The landfill has a self-haul area where customers can separate and recycle material by bin. The "floor" is elevated so the customer dumps right into a trailer that can be tipped in the landfill when full. They sell compost and receive yard debris on site to be processed by PRI.
- Republic is considering developing a public MRF, salvage and reuse area on another part of the site where they may also consider creating a HHW collection site. They hope to separate the public customers from the landfill's commercial customers. There is a public road that intersects the site with one private lot still held in the middle.
- The excavation material observed indicated a very rocky base material. This is being used onsite.
- They are using ash and screening fines for ADC but mainly use a tarp system as they are short on dirt – although they maintain large on-site stockpiles of excavated materials.
- Liner is 45mil. They indicated there were no streams or other groundwater issues that were being mitigated through landfill engineering.

Columbia Ridge Landfill, Waste Management

Date of Interview/Tour – November 16, 2016

Contacts: Alan Anderson, District Manager; Dean Kampfer, Municipal Marketing; Kip Eagles, District Manager; and Paul F. Burns, Director of Disposal Operations

Metro staff and the CH2M/WIH consulting team met with Waste Management and toured the Columbia Ridge Landfill. The following items were during that visit.

- Walsh has been a good partner in the Metro operation. They're doing about 80-86 loads per day.
- Intermodal railyard in Portland doesn't work so well versus the cost of truck haul: Metro is right on the cusp of what's competitive to move by rail.
- In the future, a lack of drivers is likely to result in cost increasing faster than they have in recent years.

- They move some waste in using BN from east to Pasco area. Currently move 6 unit trains/week, used to be 7. Typical train is 7,000 ft+ with 80-100 cars, and they turnaround one train a day. Trains from Seattle come in between 6 am and 1 pm each day: that variability is not a problem because they have plenty of other loading and unloading to do each day. The Kitsap train is very irregular because of the short-line railroad (Puget Sound).
- The two landfills (municipal solid waste [MSW] and hazardous waste) employ about 130 people, with 70 to 75 at the MSW site. Of those employees, 70 percent live in the county.
- Metro is 25 to 30 percent of incoming volumes: About 60 percent comes from Seattle or other rail business along the I-5 corridor. Gondola work is growing.
- Recently, Waste Management received approval to add another 6,000' of track at their rail intermodal yard. Operations on the new track will start Jan 1, 2017, and will be paving next spring. They added capacity will make them much more efficient.
- 40' containers last a bit longer than the 48' open tops, which handle construction and demolition (C&D).
- From what they've been hearing, moving garbage up the Gorge is not much of an issue anymore: oil trains are the big issue.
- Host fee is \$2.25/ton plus a 3-5 cent per ton road fee. Host fee escalates with inflation (CPI).
- Landfill gas to energy:
 - 64 wells with two flare facilities
 - 12 MW from 12 engines
 - Run at 6,500 cubic feet per minute (cfm)
 - Four engine (6 MW) expansion in past year
 - Landfill does leachate recirculation and some supplemental liquids to enhance decomposition.
 - Didn't notice any change in relative gas quantities after Seattle banned food waste
 - Landfill gets 8 inches of rain per year
- Capacity = 121 years at current fill rate of 2.6-2.7 million tons per year: historically it's been 2.2 to 2.3 million tons per year. Landfill has 760 permitted acres and they own 12,000 acres. WM also has 93 windmills on site (not in the landfill area), and contract out wheat and cattle operations.
- The plasma arc plant needs an injection of capital to move to next phase.
- Procurement preference:
 - No strong preference. Might prefer the control that results from bundling transportation with disposal.
 - Term: longer is better.

Cowlitz County

Date of Interview/Tour – November 21, 2016 and December 19, 2016

Contact: Don Olsen, Solid Waste Manager

Bob Wallace spoke with Don Olson of Cowlitz County regarding the Cowlitz County Headquarters Landfill on November 21, 2016. Don provided an overview of this landfill which is owned and operated by the

County and is located approximately 53 miles from the Oregon border in southwestern Washington State. The physical address of the landfill is 3434 South Silver Lake Road, Castle Rock, Washington 98611, off Exit 46 on I-5 and 7 miles to the East.

Metro staff and the CH2M/WIH consulting team toured the Cowlitz County Headquarters landfill site on December 19, 2016. Notable observations made during these two engagements follow:

- The Headquarters Landfill was permitted in 1992 by Weyerhaeuser Company
- Cowlitz County purchased the landfill from the Weyerhaeuser Company and began operations on March 13, 2014. The purchase included an agreement to dispose Weyerhaeuser's industrial waste from mill operations in Southwestern Washington of approximately 125,000 tons per year.
- The County does not want to re-open the Army Corps of Engineers (Corps) wetlands permit. The site already had extensive mitigated wetlands.
- The Headquarters landfill is a limited purpose landfill regulated under [WAC 173-350](#). This landfill takes industrial waste as well as construction and demolition waste, commercial waste and some MSW.
- It is a fully lined Subtitle D landfill and complies with all current Washington State and Federal landfill permit requirements
- This year, the County anticipates they will accept about 550,000 cubic yards, and the landfill is permitted to accept 1 million cubic yards per year (for planning purposes the County assumes that industrial waste converts from cubic yards to tons at a rate of about 1:1, and less for MSW). At the rate of ½ million tons per year, the landfill has a forecast life of 106 years.
- Approximately 250,000 tons annually are received from customers along the I-5 corridor
- Currently, the landfill receives about 60 trucks per day. The environmental impact statement (EIS) dictates that truck traffic must come up Headquarters road.
- They have not had any trouble with neighbors for many years (when landfill was first built, there was some opposition, but that was long ago).
- 80 percent of the current waste volume is considered industrial and the remaining 20 percent is MSW
- The current posted tip fee is \$25.00 per ton, but Mr. Olson recognized that a lower rate could be offered to Metro through an Interlocal Governmental Agreement
- The current permit allows for disposal of 1 million tons annually
- The County estimates that the landfill has 44 years of remaining capacity at its maximum permitted 1 million ton per year fill rate.
- The landfill has a total of 22 cells permitted and is currently in cell 7 of the engineered design
- The site has 52 million cubic yards of airspace remaining
- The County recently invested \$10MM into a pipeline to the nearest waste water treatment facility for proper management of the landfill's leachate
- The landfill receives considerable rainfall (about 60 inches this year). It has been constructed with extensive underground groundwater conveyance to pipe groundwater beneath the landfill to maintain natural flows.
- The landfill has a legacy waste issue with hydrogen sulfide. It used to take Weyerhaeuser's clarifier solids when their boiler was down for maintenance (typically they were burned in the boiler).

Clarifier solids are no longer brought to this landfill (currently, they are shipped to eastern Washington). However, the landfill has a landfill gas treatment facility that will operate as long as hydrogen sulfite levels are high.

- They do not pay a host fee and the landfill operates as a utility.
- In the 3 years that the County has owned the landfill, the most significant weather event occurred last Thursday. They remained open through that: Headquarters Road is a high priority for the County emergency and snowplow crews.
- Landfill leachate is piped to a municipal wastewater treatment plant using a dedicated line (300 gallon per minute capacity).
- Closed and opened portions of the landfill are both run with County employees, same union as Metro (AFSCME), with 12 employees, 8 equipment operators (2 women).
- The County has contracts with Weyerhaeuser, Capstone Fiber, counties and cities (Cowlitz, Pacific County, and a few others).
- Waste Control is a local franchised hauler that provides solid waste collection services throughout the County under contract and franchise. It has held the WUTC collection certificate in the area since 1949.
- The site has two trailer tipplers. The landfill tipplers (used to remove waste from trailers) are owned and operated by Waste Control. The County charges its customers \$1/ton for each tip.
- The county has standard indemnification language that they like to use. They will send us the contract terms they've used with other local governments.
- Weyerhaeuser used to bring waste to the facility by rail. There is a rail transfer facility on the site. The Union Pacific main line feeds this short line (10 miles to main line) that is now owned by Patriot. Patriot is talking to the County Commissioners next month (potentially about a rails to trails project).
- The landfill currently produces 700 cfm of 48 percent methane that is flared off in enclosed ground flare. The County is interested in pursuing the use of landfill gas to generate electricity, but further study would be necessary before it could commit to energy recovery.
- The site is about four miles from the main gas line and is at the end of the electric distribution network: converting gas to beneficial use will be relatively expensive.
- A Designated Facility Agreement exists between Cowlitz County and Metro (METRO CONTRACT NO. 93350)
- Cowlitz County is interested in receiving solid waste from Metro. They believe they have capacity to take the waste from one of Metro's two stations.
- At this time, it appears that the County Commissioners would be open to receiving Portland waste.
- The County would rather proceed by executing an interlocal agreement (IGA), however, they might submit a proposal if that was Metro's preference.

For additional information, visit the County's webpage for the Headquarters Landfill:

<http://www.co.cowlitz.wa.us/index.aspx?NID=1603>

Finley Buttes Landfill, Waste Connections

Date of Interview/Tour – November 16, 2016

Contacts: Eric Merrill, VP – Governmental Affairs; Jason Hudson, Division VP; Dean Large, Sales Manager, Waste Connections; Kevin Green, Assistant District Manager; Jerry Friesen, Gas to Energy Engineer

The following information was collected during this visit; attended by Metro Staff and the CH2M/WIH consulting team.

- Clark County is about 1/3 of the material to the landfill, the remainder from Pendleton, Pasco, and Hermiston. Landfill accepts about 80 percent MSW and 20 percent special wastes.
- Wasco County Landfill: At the edge of being required to recover landfill gas. The Metro procurement would give them a reason to install a state-of-the-art system.
 - Truck haul to Wasco County Landfill.
 - 100 years of capacity at approx. 700,000 tons per year.
 - During lock closure, they'll truck Clark County waste to Wasco County Landfill.
 - Putting substantial capital into the facility this year: adding scale and scalehouse. The toe of the landfill has been buttressed to stop sliding.
 - Historically, most waste accepted has been special wastes, not MSW.
 - Two tippers at the landfill.
 - Same \$3/ton host fee as Finley Buttes Landfill.
- Landfill Gas to Energy: Plant online in 2007. Have 56 vertical wells and 52 horizontal.
 - Use CAT 3520 engines (same as those at Columbia Ridge)
 - Facility has heat recovery from engine and from exhaust which is piped to an onion dehydrating facility next door. With heat recovery, the system is 70-75 percent efficient.
 - 4.8 MW capacity, running at about 3.6 MW – 3 engines at 1.6 MW each.
 - They do some leachate recirculation and have evaporation ponds.
 - Noted that it costs \$2m per MW for landfill gas vs. \$6m per MW for energy from organics from a typical AD facility.
- Landfill takes some leachate from Marion County ash monofill. This operation has been ongoing for about 10 years: recently signed a new 5-year contract.
- Host fee to Morrow County is \$3 per ton and they maintain the road to the landfill. The landfill operation is the 2nd largest tax contributor in the county.
- Procurement preference:
 - Transportation bundled with disposal is preferred.
 - Wasco County Landfill would be a good solution for Metro South Station.
 - If transportation and landfill are separate, they'd be placed in an awkward position of having to consider rail haul to Columbia Ridge Landfill (CRLF) through Northwest Container Services (NWCS), which would be a challenge since CRLF is owned by Waste Management and NWCS is owned by Waste Connections, two leading waste industry competitors.

- Minimum term for them would be seven years: 10-20-year contract would be better.
- Waste Connections prefers to partner with communities and doesn't necessarily bid aggressively on all contracts. Contract terms are important: need to be balanced with liquidated damages that are reasonable.

Foss Maritime

Date of Interview/Tour – November 17, 2016

Contact: Tim Beyer, Director of Business Development – US West Coast; Captain Paul Hendriks – Regional Operations Manager; and Bo McCall, Commercial Manager

Bob Wallace and Will Elder met with Tim Beyer, Director of Business Development – US West Coast, Captain Paul Hendriks – Regional Operations Manager and Bo McCall, Commercial Manager. While they are interested in Metro's business, they were invited and did not bid the transportation contract last time it was released citing that issues with long shore labor with available public and private dock spaces was a serious cost issues that they thought would prevent them from being competitive. Further, they thought the only option that would make sense for them to potentially bid on would be the waste from Metro Central due the vicinity to the river/waterfront for transloading and barging containers. Metro South they think poses challenges for any maritime/barging transportation alternative due to its inland location. Also, while they have purchased newer EPA compliant barges, they are mainly ocean-going, not small enough for the inland river waterways and anticipate they would need to purchase newer barges to be compliant with any EPA Tier engines to meet Metro's potential emissions reductions requirements. Foss also said that the Cal Air Resource Board, aka CARB, is a great resource for understanding emission regulations and tiering with barge engines. They cited that neither Washington nor Oregon is currently mandating air emissions requirements for the maritime industry, unlike California.

Lynden Transport Inc.

Date of Interview/Tour – November 17, 2016

Contacts: Al Hartgraves, Business Development Manager and Chae Matt, Regional Operations Manager

Bob Wallace and Will Elder met with Al Hartgraves, Business Development Manager and Chae Matt, Regional Operations Manager for Lynden Transport Inc. Al and Chae are interested in trucking the waste for Metro to the selected landfill for the next procurement cycle. They cited competitive concerns about the advantage that Walsh has as the incumbent. We talked at length about the labor issues related to driver shortages and that they see this as a continuing and ongoing concern in the industry. They stated that turnover is high in the industry and hourly compensation for truck drivers continues to be an issue to remain competitive.

Northwest Container Services

Date of Interview/Tour – November 14, 2016

Contact: Gary Cardwell, Divisional VP

Northwest Container Services provided a handout with information about their terminal. The following notes are from our discussions.

- Northwest Container Services noted the "penalty" in the last RFP for trucking waste across St. John's Bridge (this refers to the evaluation criterion for neighborhood impacts and air quality).

- Union Pacific Railroad is “hungrier” now than they were during the 2008 Metro procurement. They could have bid a price lower than truck but chose not to. Today, rates are very good. Much more E-W capacity now than in 2008.
- Union Pacific and BNSF Railroads designate unit trains as high priority (waste movements are all unit trains). Unit trains are usually 6,000-8,000 ft. in length, with 200-250 containers per train. Usually Monday, Wednesday and Saturday 8,000 ft. train from Seattle / Tacoma and Tuesday / Thursday 6,000 ft. train from Tacoma.
- Locomotive fleet may have a few low polluting engines, but not fleet-wide. Union Pacific has shunt engines that may be low polluting.
- Some of their yard equipment is retrofitted with diesel particulate filters (not all).
- Northwest Container Services yard is open from 5:30 a.m. to 3:30 p.m., but they continue loading and unloading railcars in the yard until 7:00 or 7:30 p.m. as needed.
- Top picks cost about \$500,000 new.
- Terminal does about 850 moves/day and 96,000 annually. Exports go north and imports go south. Some waste moves through their terminal to Finley Buttes landfill.

Port of Portland

Date of Interview/Tour – Ongoing discussions

Contact: Isaac Barrow, Business Development Manager

Initial discussions have taken place with the Port about properties that may be available for proposers. Discussions are ongoing and a meeting and site visit may take place in the near future.

Roosevelt Regional Landfill, Republic Services

Date of Interview/Tour – November 15, 2016

Contact: Don Tibbets, General Manager, Washington Post-Collections and Art Mains, Washington Environmental Manager

Metro staff and CH2M/WIH visited the Roosevelt Regional Landfill and collected the following information.

- Landfill opened November 1990. Landfill started in 1990 in response to RFP from Klickitat County. Name changed to Allied in 1998, and Republic in 2008. Permit is under Regional Disposal Company.
- 2,000-acre landfill for MSW and an ash monofill (from Spokane WTE facility). Landfill has 915 acres permitted and 350 acres developed. 245 million cy of capacity with about 50 million cy filled. 100 years of remaining life at 2.5 million tons per year. Currently 2.2-2.4m tons per year. Permitted for up to 5 million tons per year. 10 feet above grade is maximum because of visual aesthetic concerns.
- Material is about 60 percent MSW, 20 percent construction and demolition (C&D), and 20 percent special waste (e.g., soils and asbestos).
- Host fee is just under \$4/ton, and all County residents dump for free.
- Initially 2' clay and 80 mil liner (vs. required 60 mil or no synthetics if permitted under arid condition standards). Since 2003 using geo liner.
- Landfill cells typically about 18 months of capacity. Now working on new 20-acre cell that will go until 2018. Can build any time of year. Next cell will be in northwestern corner of landfill.

- They use dredge settlements that pass the paint filter test as Alternative Daily Cover.
- Transportation: They have a 40-year contract with BN that goes through 2030 (very near 10 years of service from new contract). They are BN's largest private customer west of the Mississippi.
 - 98 percent of their waste arrives by train by rail. They have 12 intermodal yards in the Pacific Northwest and Spokane area.
 - Typically, 2 6,000' trains daily and every other day a 3,500' train. Unit train is about 75 cars and 150 containers.
 - They have dedicated crews, with about a 4-hour turn.
 - Yes, they can ship waste via BN out of Portland.
 - They have barge loading capabilities for grain and have done rare barge unloading of waste.
- Gas to Energy: Klickitat County owns gas rights. Initially planned a bioreactor. Currently, they re-inject leachate. In 2003 installed 10.5 MW with Klickitat PUD. 2010 expansion to 26 MW with 2-10 MW turbines. Claimed they have the nation's largest gas to energy plant. Now at 20 MW.
 - Next expansion is probably renewable natural gas (RNG) because of energy markets.
 - They have 285 wells which is considerably more than the other large landfills nearby. (For example, 85 wells and 12 MW capacity at Columbia Ridge Landfill.)
 - Suggested one way to compare greenhouse gas emissions at landfills is homes powered per ton of waste per year (counting on MSW only). Consider also food waste programs of jurisdictions sending material to the landfill. About 15 percent or less of their MSW is from jurisdictions with food waste recovery programs.
 - Mentioned new clean air rule in Washington State.
 - Mentioned the Lundgren EPA model.
- Procurement preference: Prefer transport and disposal bundled, but looking at all modes of transport, with separate contracts for each transfer station. Barge and rail need transport and disposal bundled. They won't propose on a truck-only move.
 - Prefer a 10-year contract with an extension or a 10 with two 5-year extensions.
 - One year from award to start is acceptable.
 - Mentioned the recent Metro Vancouver RFP that had 3-year contract term with annual renewals, varying tons, and equipment clause (i.e., if default may take over some of contractor's equipment). They got no submittals.
- Containers are depreciated over 10 years, with major rebuild at year 7. They try to get 15 years' total from containers. Containers serving pre-load compactors.

Largest customer is Snohomish County at about 550K+ tons per year.

Tidewater Barge Lines

Date of Interview/Tour – November 14, 2016

Contact: Bob Curcio, President and CEO; Greg Zanavich, Business Development Manager, Grain and Project Cargo; Andy Stephens, VP Business Development; and Neil Maunu, Business Development Manager, Infrastructure

- During locks closure, Tidewater has an exemption to use the Wasco County Landfill.

- Tidewater is owned by Stonepeak Investment Partners, a firm that invests in infrastructure companies: they have about \$5.5b of capital, about \$2b of which is not yet invested. Purchased firm about four years ago.
- Tidewater growth is through expanded transload operations. Have terminal operations in Pacific Northwest, Alaska, Hawaii, and British Columbia.
- Tidewater works with a few unions including the IBU and ILWU (longshoremen). Will work with ILWU as required to serve customers. Terminal 1 (Portland) has historically been served by ILWU, therefore any new business there would require ILWU negotiation.
- Payloads: 30-31 tons in 40' containers.
- Fleet: 16 tugs, many recent major rebuilds (\$3m+). Have 6 EPA Tier 2 and one Tier 1. 3 new tugs are EPA Tier 3. All tugs use ultra-low Sulphur diesel (ULSD). New engines are 4,500hp CAT.
- Typically, they crew 8-11 tugs at a time and use the 9 clean engines most of the time.
- Four barges on each tow. Solid waste is not commingled with other commodities on a barge: typically 1-2 solid waste barges on a tow when transporting waste. Make 4 trips/wk of solid waste. Move about 250,000 tons per year.
- Tidewater has excess capacity to handle Metro's waste.
- Tidewater owns chassis and containers. At Boardman, Waste Connections hires a sub to truck from the Port to the landfill. About 13 miles, 1.25-hour round trip. 6 trucks that do 8-9 trips daily.
- Currently, about 225 containers 10 hours /day M-F and a short shift Saturday. Could add shifts. Have plenty of capabilities and about 300 containers.
- Typical cycle: Vancouver on Monday, Wednesday at Boardman, Vancouver on Friday. Usually 4.5 to 5 days, maximum is 7 days.
- Locks: March closure is 2-3 weeks each year. They truck from Vancouver to landfill. Usually use 3 firms, with a max of 8-9. Extended maintenance Dec 12 – Mar 20. Second in history with previous one 6 years ago. Likely they'd have another one in 2020-2030 contract term. For this closure, Tidewater's using only two firms. Each driver will make 2 trips daily to Wasco Landfill. During March closure a Boardman trucking firm makes two 7.5 hr round trips daily (not harvest time so capacity not huge issue).
- Tidewater is in discussions for a potential terminal in Portland – may team with another firm. However, a 10-year contract is not long enough (most likely) to develop a new terminal
- Prior transport procurement, Tidewater proposed trucking to Vancouver terminal from Metro Central at night to avoid traffic.
- Procurement preference: Clarity of evaluation is most important. One year to mobilize is fine.

Tidewater Terminal, Port of Morrow

Date of Interview/Tour – November 15, 2016

Contact: Greg Zanavich, Business Development Manager, Grain and Project Cargo

The Metro staff and CH2M Consulting team met with the above referenced senior management of Tidewater Barge Lines to conduct an interview and site tour of the facilities. Located in the Port of Morrow, Tidewater's Boardman Terminal houses a container facility equipped to handle both dry and refrigerated containers for import, export, and solid waste transport. The Port of Morrow contracts with Tidewater to operate the facility. The Boardman terminal annually handles approximately 9,500

containers to and from barge and truck and is the largest container terminal upriver of Portland, OR. The Metro staff and CH2M Consulting team took a quick tour of the Tidewater terminal. Facility has considerable excess capacity with two possible unloading docks. The facility has a gantry crane and mobile crane for unloading intermodal containers from and to barges in a dedicated inland cut-out barge slip. The facility is operated by a Supervisor who has been employed and managing the facility for over 20 years. This facility has been the recipient of Clark County WA's solid waste by barge since the early 1990s. The intent for the interview and tour by Metro staff is that it could be one transportation alternative for Waste Connections to use for Metro's waste via tugboat and barge for disposal and their Finely Buttes Landfill located approximately 11 miles away from the Terminal.

Union Pacific Railroad (UPRR)

Date of Interview/Tour – November 11, 2016

Contact: Melissa Maier, Senior Business Manager, Industrial Products

Dan Pitzler and Bob Wallace held a conference call with Melissa as she is based in Salt Lake City, Utah and was not able to meet in person in the Portland area. Dan and Bob briefed Melissa on the Metro procurement, outlining key details and timelines of it, as well as shared non-confidential information gathered from interested service providers that would utilize the UPRR railroad transportation network in an effort to verify the UPRR's position about the information, specifically how the UPRR would assist two of the potential proposers, Waste Management (WM) and Northwest Container Services (NWCS), in developing their respective railroad transportation components of their proposals. She responded by stating that the UPRR is neutral in providing the two companies railroad transportation rates and that the UPRR will provide the same rate levels to each client (WM or NWCS). She went on to express that the UPRR's desired term for any resulting contract would be 3-years and that a stretch would be a 5-year agreement for their services, with any customer. In terms of annual rate adjustments, she said the UPRR does not want a Consumer Price Index (CPI) Adjustment as they have gotten burnt in the past by that type of annual adjustment index. The UPRR will not provide stand-alone pricing to Metro and instead prefer to be part of a bundled solution with another company being the actual contracted entity with Metro. The primary reasons are that the UPRR does not want to get in the middle of competing with its existing customers who are very interested in being the prime contractor with Metro and offering bundled transport and disposal solutions and; the UPRR is not interested in acquiring chassis, intermodal containers and procuring trucking drayage services on both ends of the rail line to transport the containers to and from Metro's transfer stations, the rail intermodal yard in Portland and to and from a receiving intermodal yard near one of the rail served landfills in the Columbia River Gorge. When asked about the availability of EPA Tier 4 emissions compliant locomotives, she commented that they have them in their system, however getting ones in place to meet any emissions requirements for Metro's procurement could take some time to get them in place and some effort to keep the EPA compliant locomotives committed to serving just Metro's rail shipments of waste.

Walsh Trucking

Date of Interview/Tour – November 17, 2016 and December 21, 2016

Primary Contacts: Bob Walsh, VP – Senior Operations Management and Bernie Walsh, VP – Senior Operations Management

Bob Wallace and Will Elder met with Bob and Bernie Walsh, the senior management primarily responsible for the current day to day operations and interface for Metro's current waste truck transportation to the Columbia Ridge Landfill. They stated that they do have a large concern long term over the ongoing and current driver shortage in the trucking industry and that they are seeing significant driver turnover and recently hired three driver retention managers to interface with drivers on a regular

basis to stabilize and curtail driver turnover. The largest trend is the attrition of baby boomer age drivers that are retiring now and in the foreseeable future. They have a tracking and projection method for assessing and determining when their drivers will be retiring and have a recruiting truck and trailer that travels around to inspire younger generations to consider a career in trucking. The biggest concern going forward is that the newer generations (primarily Millennials) in the region are not even considering trucking as a career choice. Walsh is to be commended for their prior contract award and the re-engineering and design of the truck/trailer fleet combination that has allowed them and Metro to realize 34 ton payloads of waste. They also commented that they think another ton could be gained when Metro's preload compactors are updated.

On December 21, 2016, a second meeting / tour was provided by the Walsh senior management where they hosted the Metro staff and CH2M Consulting team at their corporate offices. The primary intent of this meeting was to include the rest of the Metro staff in a face to face meeting with Walsh management, tour their operations facilities, including the truck / trailer yard, visit the maintenance facilities and to meet the Walsh Senior management, Bob and Bernie Walsh. Many of the same items were discussed with Metro staff on this visit to that of the meeting and tour on November 17, 2016. The general outcomes were primarily a greater understanding and appreciation by Metro staff of Metro's current transportation service provider, Walsh Trucking.

Wasco County Landfill, Waste Connections

Date of Interview/Tour – December 21, 2016

Contact: Eric Merrill, VP – Governmental Affairs; Dean Large, Sales Manager, Waste Connections; Kevin Green, Assistant District Manager

The Metro staff and CH2M Consulting team met with the above referenced senior management of Waste Connections at the Wasco County Landfill and after a brief presentation and discussion, toured the landfill and observed site traffic and the active working face of the landfill. The key takeaways from the meeting / tour was that the landfill is a Subtitle D landfill with 12 full time employees, including the management, staff, operators, laborers and mechanics. The landfill is located on a permitted footprint of 175 acres with a total of 335 acres including buffer land. The site life expectancy is 80 years at current inbound waste volumes of an average of 2,200 tons per day or 580,000 tons annually. At present the landfill operates two trailer tippers for dumping of up to 53-foot long transfer trailers. Most of the landfill waste arrives by transfer truck for MSW and some by barge and dump truck for special wastes. The tipper turn-around times average 15-20 minutes per trailer being dumped. The landfill is currently undergoing a significant scale relocation project which eliminate queuing time for inbound and outbound trucks. The relocation project will expand the use of just one scale for all traffic (inbound and outbound) to two scales – one dedicated each to inbound and outbound truck traffic. This is expected to significantly reduce delays in and out of the landfill. The relocation of the scales and scalehouse is expected to be completed in Q1 of 2017. At present, the site does not generate enough landfill gas to warrant a collection and beneficial reuse of the gas being captured so it is being flared at present. The management stated that a future landfill gas collection system with a beneficial reuse program is expected to be in place by 2020.