Evaluation Criteria Results

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As part of Phase 3 of the Garbage and Recycling System Facilities Plan project, four scenarios were developed to show different ways that the system gaps identified in Phase 2 and 3 of the project could be addressed. The four scenarios include a baseline scenario and three different future scenarios. The scenarios developed are:

- Baseline (formerly Scenario A) – Metro does not build any new facilities. Instead, Metro keeps existing facilities and makes necessary improvements.
- Full-Service (formerly Scenario D) – Metro builds modern, full-service transfer stations and reuse and recycling facilities across three counties to recover more materials for reuse, recycling and composting and reduce the demand for garbage over the next 20 years.
- Distributed (formerly Scenario C) – Metro builds a network of accessible, distributed, mid-sized facilities across three counties to expand the recovery of materials for reuse, recycling and composting, and reduce the demand for disposal over the next 20 years.
- No-Build (formerly Scenario B) – Metro does not purchase new sites or build new facilities. Instead, Metro addresses facility gaps in the region by increasing requirements on local governments and private facilities, by investing in the expansion of services at private and non-profit facilities, and by renovating its existing facilities.

Draft scenarios were shared with stakeholder groups in July and can be reviewed by viewing the July 20, 2023 RWAC meeting. Additional details on the scenarios will be included in the materials shared for the September 2023 workshop.

The four scenarios were assessed using the evaluation criteria that were developed in Phase 2 of the project. This draft technical memorandum summarizes the results from that analysis. The planning horizon for this evaluation goes through the year 2040.

The following six different categories of evaluation criteria were developed:

- Environment
- Access
- Jobs
- Cost
- Environmental Justice
- Resilience

Each of the criterion has one or more sub-criterion as further described in the sections that follow. These criteria were based on the values and outcomes that were developed in Phase 1 of the project and are explained in more detail in this summary flyer.

The evaluation criteria were applied to the four different scenarios and the results for each are shown below, organized by criteria category. Additional details on the general methodology for each criterion is included in Attachment 1.

Environment

The Environment criteria consists of three sub-criterion:

- Expected quantity of greenhouse gas emissions reduced by quantity of materials diverted for reuse and repair under each scenario
- Expected quantity of greenhouse gas emissions reduced by quantity of materials recovered for recycling and composting under each scenario
- Potential of each scenario to reduce greenhouse gas emissions from travel to/from facilities

The first sub-criterion (Criterion 1) represents the expected quantity of greenhouse gas (GHG) emissions reduced by the quantity of materials diverted for reuse and repair under each scenario. The second sub-criterion (Criterion 2) represents the expected quantity of greenhouse gas emissions reduced by quantity of materials recovered for recycling and composting under each scenario. The final sub-criterion (Criteri 3) represents the potential for each scenario to reduce greenhouse gas emissions from travel to/from facilities and onsite. GHG emissions are outputs of the Environmental Protection Agency (EPA) Waste Reduction Model (WARM).

As shown in Table 1, the three sub-criterion have been added together to show one overall total GHG reduction from increased reuse, repair, recycling, composting and travel emissions. In this instance, the baseline receives a zero and the larger the reductions (or larger the negative value) the better.

Table 1. Evaluation Criteria Results for Environment Criteria

Environment Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
1. Expected quantity of greenhouse gas emissions reduced by quantity of materials diverted for reuse and repair under each scenario	0	-81,500	-72,700	-289,000
2. Expected quantity of greenhouse gas emissions reduced by quantity of materials recovered for recycling and composting under each scenario	0	-1,851,600	-1,637,400	-888,400
3. Potential of each scenario to reduce greenhouse gas emissions from travel to/from facilities	0	-8,500	-15,100	3,800
Overall Total GHG Reductions (tons CO2 eq)	0	-1,941,600	-1,725,100	-1,173,600

Environment Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
Overall Environmental Score	**1.00**	**5.00**	**4.50**	**3.50**

The overall total GHG reductions were used to calculate the overall score for the Environment criterion. The final result is a 1 - 5 ranking of each scenario based on overall improvement from the Baseline and the best possible scenario scoring a 5. For this, the Baseline was given a 1. The Full-Service scenario scores best, followed by Distributed, then No-Build. Based on these results, the GHG emissions reductions resulting in increased reuse, repair, composting, recycling, and changes in travel distance, are greatest for the Full-Service scenario. This shows that the increased reuse, repair, composting, and recycling achieved by adding four large transfer stations and two new reuse facilities in the Full-Service scenario are greater than those achieved with the Distributed scenario (which includes three medium-sized transfer stations and four reuse facilities) or through the investment in private facilities and organizations in No-Build. GHG emissions associated with travel to and from facilities increase in the No-Build scenario due to increases in materials accepted for reuse and repair, recycling, and composting without improving access to facilities which accept these items. The reduction in GHG travel emissions due to the increase in the number of materials collected through curbside programs and other policies to reduce the demand for self-haul facilities was small when compared to the overall increase in trips to facilities. Improving access to facilities as done in distributed scenario is the best way to reduce GHG emissions associated with travel to and from facilities.

Access

These criteria quantify access to solid waste management facilities within the Portland Metro region. The evaluation was separated into two sub-criterion:

- Percentage of the population within 20 minutes of the nearest self-haul facility under each scenario (referred to as general public [GP] access in supporting files)
- Percentage of the region's area within 20 minutes of the nearest commercial hauler facility under each scenario commercial (referred to as private hauler [CH] access in supporting files)

Calculations were performed to determine the percent of population (for GP access, Criterion 4) or percent of region's area (for CH access, Criterion 5) within 20 minutes to the nearest solid waste management facility for each material sector. Gap assessment results from Phase 2 were utilized to weight each material sector result. Material sectors that were assigned a high gap had more weight than those with a medium or low gap. Material sector results were then rolled up into a total for each sub-criterion. Access to solid waste management facilities is related to providing excellent service and equitable system access.

Table 2 summarizes the evaluation criteria results for the Access criterion. The final result is a 1 - 5 ranking of each scenario based on overall improvement from the Baseline and the best possible scenario scoring a 5.

Table 2. Evaluation Criteria Results for Access Criteria

Access Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
4. Percentage of the population within 20 minutes of the nearest self-haul facility under each scenario	78.73%	93.81%	98.66%	87.52%

Access Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
5. Percentage of the region's area within 20 minutes of the nearest commercial hauler facility under each scenario	79.81%	91.39%	88.69%	88.51%
Overall Access Score	**1.00**	**4.50**	**5.00**	**3.25**

As shown in Table 2, the Distributed scenario has the best score, followed by Full-Service, and then No-Build. Distributed is the scenario that has the greatest distribution of new facilities and this is reflected in the results. Based on the number, type, and location of new facilities associated with the Distributed scenarios, general public access to HHW facilities, self-haul mixed garbage, self-haul dry waste, recycling depots, and mattress reuse locations is improved (material sectors that had minimal change are not listed). Commercial hauler access to mixed garbage, commercial hauler residential organics, and food waste facilities also improved. The Full-Service scenario came in as a close second and this is due to the additional new facilities associated with that scenario.

Jobs

The Jobs criteria consists of two sub-criterion:

- Estimated number of new jobs created under each scenario.
- Potential employment and workforce development opportunities for historically marginalized communities under each scenario

The first (Criterion 6) provides an estimate for the total number of new jobs created under each scenario, including jobs within the recycling and compost industry and new positions within Metro needed to staff new facilities. Criterion 6 evaluates the estimated change in jobs associated with reuse/repair, recycling, and composting additional materials in each scenario. Job increases consist of end-of-life material management jobs in the reuse/repair, recycling, and composting sectors in addition to jobs required for staffing new solid waste management facilities in the Metro region. Reduction in landfill jobs based on estimated landfill diversion was also considered. Assumptions were made based EPA's 2020 Recycling Economic Information Report and existing public solid waste management facilities to estimate job growth in each scenario. Full-Time-Equivalent (FTE) units were used to evaluate potential job growth.

The second (Criterion 7) represents the potential employment and workforce development opportunities for historically marginalized communities under each scenario. Criterion 7 reviews job opportunities created within Metro in each scenario that would be subject to the Construction Careers Pathways Policy Framework and 2030 Regional Waste Plan good jobs and workforce diversity goals, which would result in training and workforce development opportunities with growth and equitable pay opportunities.

An equal weighting was applied to each sub-criterion to calculate the overall score for the Jobs criteria. The final result is a 1 - 5 ranking of each scenario based on overall improvement from the Baseline and the best possible scenario scoring a 5.

Table 3. Evaluation Criteria Results for Jobs Criteria

Jobs Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
6. Estimated number of new jobs created under each scenario	1.00	5.00	3.96	3.85

Jobs Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
7. **Potential employment and workforce development opportunities for historically marginalized communities under each scenario**	1.00	5.00	4.54	1.00
Overall Jobs Score	**1.00**	**5.00**	**4.25**	**2.50**

As shown in Table 3, the Full-Service scenario scores best, followed by Distributed, No-Build, and Baseline. Full-Service has more jobs than Distributed because more tons are estimated to be diverted from landfill based on the construction of new facilities. Both have the same number of new facilities (7) but Full-Service facilities receive more tons compared to Distributed. The No-Build scenario has the fewest changes to facilities aside from Baseline and therefore scores lower than Full-Service and Distributed.

Cost

The cost criteria has the following four sub-criterion, which are 4 ways to view costs associated with these scenarios:

- Estimated increase from 2023 to 2040 to the regional system fee to construct and operate each scenario (with inflation)
- Estimated increase from 2023 to 2040 to the average curbside rate for garbage and recycling collection service at single family homes to construct and operate each scenario (with inflation)
- Estimated increase from 2023 to 2040 to tonnage charges at Metro facilities to construct and operate each scenario (with inflation)
- Estimated percentage of monthly median income that is associated with an increase in curbside rate for single family homes

Capital and operating costs have been estimated using high-level assumptions. These costs have been input into a cost model which provides rough order of magnitude estimates for the four sub-criterion (Criterion 8, 9, 10, and 11) displayed in table 4.

After preparing the results for the 4 cost sub-criterion, the team also prepared a series of supplementary information included in the Cost Summary Memo Attachment 2. Per-ton fees are relatively high in the No Build scenario because fewer tons are managed at Metro Transfer Stations. A different perspective is shown by the cost of each Scenario (See Table 5, required revenue from tonnage fee and regional system fee). Ultimately, this item was used to prepare the overall cost score (1 to 5). Using this evaluation, Baseline scored best, followed by Distributed, then No-Build and then Full-Service.

Table 4. Evaluation Criteria Results for Cost Criteria

Cost Criteria	Today	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
8. **Estimated 2040 regional system fee to construct and operate each scenario in 2023$**	$31.41	$37.43	$63.04	$55.08	$46.30

Cost Criteria	Today	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
9. Estimated 2040 average monthly household garbage and recycling collection bill to construct and operate each scenario in 2023$	$37.71	$39.01	$41.84	$40.72	$49.36
10. Estimated 2040 "Blended" Tipping Fee (total cost and fees / total tons) to construct and operate each scenario in 2023$	$137.30	$140.69	$184.36	$167.05	$184.54
11. Estimated percentage of monthly median income that is associated with an increase in curbside rate for single family homes	0.51%	0.53%	0.56%	0.55%	0.67%

Table 5. Additional Cost Criteria Results & Overall Cost Score

Additional Cost Results	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
Change in Metro's annual increase in required revenue from tonnage fees and the regional system fee, with inflation (i.e., 2040 annual minus 2024 annual) in Millions$	$84	$199	$152	$86
Estimated annual cost paid by households for new curbside programs in 2040, with inflation (mid-point estimate) in Millions$	$0	$0	$0	$105
Cost of each Scenario in Millions$	**$84**	**$199**	**$152**	**$191**
Overall Low Cost Score	**5.00**	**1.00**	**2.75**	**1.25**

Environmental Justice

The Environmental Justice criteria has two sub-criterion:

- Potential facility burdens on communities of color and with low incomes under each scenario
- Potential facility benefits for communities of color and with low incomes under each scenario

The burdens sub-criterion (Criterion 12) analysis reviews burdens to communities within the Metro boundary based on construction of new facilities and their respective location to residential areas, households, and community organizations. The benefits sub-criterion (Criterion 13) analysis reviews benefits to communities within the Metro boundary based on improvements to communities through increasing access to solid waste facilities and increases in community funding through the Community

Enhancement Grants (CEG). Baseline is considered the baseline with no additional benefits received. The other scenarios are then scored in relation to the baseline.

An equal weighting was applied to the two sub-criterion to calculate the overall score for these criteria with the worst scenario receiving a 1.00 and best scenario receiving a 5.00.

Table 7. Evaluation Criteria Results for Environmental Justice Criteria

Environmental Justice Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
12. **Potential facility burdens on communities of color and with low incomes under each scenario**	5.00	1.00	2.19	5.00
13. **Potential facility benefits for communities of color and with low incomes under each scenario**	1.00	4.37	5.00	1.73
Overall Environmental Justice Score	**1.50**	**1.00**	**5.00**	**3.25**

As shown in Table 7, some scenarios score high for burdens and low for benefits or vice versa. For the burdens sub-criteron, the Baseline scenario and No-Build scenario had the best scores due to the fact that these two scenarios do not have new construction and therefore don't have new burdens, whereas Distributed and Full-Service result in significant construction associated with the many new facilities. For the benefits sub-criterion, Distributed includes new facility construction improving community access to facilities for reuse and recycling results in added community benefits. Distributed has increases in CEG funds for Gresham, Clackamas, and Cornelius. When the two sub-criterion were combined, the final scores indicate Distributed scoring the best overall, followed by No-Build, Baseline, and then Full-Service.

Resilience

The resilience criteria has two sub-criterion:

- The extent to which Metro's existing garbage and recycling facilities (sites) will be improved to be better equipped to sustain extreme weather events under each scenario
- The potential to provide redundant infrastructure, equipment, services to prepare for the volume and type of materials resulting from inclement weather events, social disruption, extreme weather events, under each scenario

The first sub-criterion (Criterion 14) evaluates the safety of Metro solid waste facilities based on potential natural hazards like flooding and earthquakes. Facilities were scored based on their proximity to hazardous areas like floodplains, existing landslide areas, and high liquefaction zones. If a facility receives upgrades in a particular scenario the score is increased to reflect upgrades to combat natural hazards. If facility is in an existing landslide area no increases were granted based on upgrades (i.e. Metro Central).

The second sub-criterion (Criterion 15) evaluates the redundancy of the Metro region's solid waste infrastructure for disposal of various materials. Evaluation was based on the potential for a facility to remain in operation in the event of natural hazard (i.e. major flood or earthquake). A binary scoring approach was used in this evaluation. Facilities were considered to remain operational if it is greater than 500 feet away from existing landslide area, 500 feet away from a high liquefaction zone, and the property is outside of the floodplain.

The overall resilience score for each scenario is based on an 20% weighting for Criterion 14 and a 80% weighting for criterion 15.

Table 8. Evaluation Criteria Results for Resilience Criteria

Resilience Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
14. The extent to which Metro's existing garbage and recycling facilities (sites) will be improved to be better equipped to sustain extreme weather events under each scenario	1.83	2.86	2.93	2.00
15. The potential to provide redundant infrastructure, equipment, services to prepare for the volume and type of materials resulting from inclement weather events, social disruption, extreme weather events, under each scenario	2.24	3.00	3.43	2.71
Overall Resilience Score	**2.25**	**3.00**	**3.25**	**2.50**

As shown in Table 8, the Distributed scenario scores the best, followed by Full-Service, then No-Build, and lastly Baseline. Distributed has significant improvements to extreme weather resilience due to the rework of Metro South and the new facilities with more resistant infrastructure. Distributed also has significant improvements in redundancy for commercial wet waste as new Cornelius and new Clackamas are located in areas less prone to severe damage from an earthquake or flood. Distributed also has self-haul redundancy improvements due to construction of distributed self-haul reuse and recycling centers.

Summary of Overall Evaluation Criteria

Table 9 provides a comparative summary of the six main evaluation criteria.

Table 9. Summary of Overall Evaluation Criteria Results

Evaluation Criteria	Baseline (formerly Scenario A)	Full-Service (formerly Scenario D)	Distributed (formerly Scenario C)	No-Build (formerly Scenario B)
Benefits				
Environment	1.00	5.00	4.50	3.50
Access	1.00	4.50	5.00	3.25
Jobs	1.00	5.00	4.25	2.50
Environmental Justice	1.50	1.00	5.00	3.25
Resilience	2.25	3.00	3.25	2.50
Low Cost	5.00	1.00	2.75	1.25

As shown in Table 9, the Baseline scenario is less expensive but does not provide progress toward meeting Metro's goals as it scores low in all other criteria besides cost. The Distributed scenario outperforms the No-Build scenario as it scores higher in all criteria. The Distributed Scenario also provides more benefit in every criterion except environment, and jobs compared to the Full-Service scenario. The Distributed scenario consistently scored best or second best and appears to provide the most value at a relatively low cost compared to other scenarios.

Additional Parameters

Additional parameters include high-level public facing statistics from various evaluation criteria comparing the modeled futures for each scenario. Attachment 3 provides more details of these additional parameters. Metrics within the public statistics summary include: Material End of Life, GHG emissions, access to solid waste facilities open to the public, jobs created within Metro Organizations, expenditures, and construction emissions.

Material End of Life Summary
Material End of Life is focused on the estimated recovery rate and disposal rate of the total waste materials generated in the Metro region. This statistic is expressed using 2040 as the evaluation year once all construction and policies are complete in each respective scenario. Full-Service performs best with a 52.35% recovery rate due to increases in commercial organics composting investments at Metro owned transfer stations. Distributed performs the second next best at a 50.13% recovery rate due to the significant increases in recyclable material recovery at distributed Metro facilities. No-Build has an estimated 49.40% recovery rate due to moderate increases in recycling and composting and strong increases in reuse and repair. Baseline has a 45.76% recovery rate.

GHG Emissions Summary
GHG emissions reviews the total cumulative reductions in GHG emissions from 2024 – 2040 for each scenario. This summary does not include construction emissions which are estimated separately below. GHG emissions are then expressed in other metrics such equivalent of passenger vehicles removed, reductions in gallons of gasoline consumed, and percentage of the U.S. electricity sector.

Access to Solid Waste Facilities Open to the Public Summary
Access to solid waste facilities open to the public focuses on material sectors which directly affect the average resident with the Portland Metro region. The estimated average travel time to specific type of solid waste facility for a Portland Metro region resident is used to compare each scenario.

Jobs Created Within Metro Organizations Summary
Jobs created within Portland Metro organizations is estimated and expressed in full-time equivalent for each scenario.

Expenditures Summary
Includes overall capital and operational and maintenance expenditures in each scenario from 2024 – 2040 with and without inflation for comparison. For more information and details on estimated costs per scenario see the Cost Summary Memo in Attachment 2.

Construction GHG Emissions Summary
Estimates the GHG emissions associated with the construction projects proposed in each scenario. These construction estimates are based on square feet of new construction.

Attachment 1. Summary of Evaluation Methodology

Attachment 1. General Methodology

The general methodology that was utilized to complete the evaluation criteria analysis is summarized below for each of the criterion.

Environment

Criteria	General Methodology
1. Expected quantity of greenhouse gas emissions reduced by quantity of materials diverted for reuse and repair under each scenario	Reuse and repair tonnage increases from the baseline are assumed to have composition of 35%-dimensional lumber, 25% mixed metals, 15% wood flooring, 10% carpet, 10% vinyl flooring, and 5% medium-density-fiber board. This compositional breakdown is based on existing reuse and repair tonnages and material input categories for US EPA Waste Reduction Model (WARM). Increases in reuse and repair from the baseline in "No-Build" formerly scenario B are based on investments made to the reuse and repair sector. Increases in reuse and repair tonnage were assumed based on existing Portland Metro Investment and Innovation grants yielding a relationship between dollars invested and tonnages reused. Grants involving food waste were omitted to determine this factor ($1,350/ton). A conservative assumption was made that no private funding is contributed in addition to the annual $5 Million investments from Portland Metro. Increases to reuse and repair tons from grants are observed in the first three years following the grant allocation and then reuse and repair tonnages are diminished by 50%. Increases to reuse and repair from the baseline in "Full-Service" formerly scenario D and "Distributed" formerly scenario C were based on construction of new facilities. Reuse and repair tons were calculated based on tons/sf factor (0.054 tons/sf) determined from similar types of facilities including The ReBuilding Center, Community Warehouse – Gresham, and UrbanOre Berkeley. Thes estimated increases to reuse and repair tonnages were then input into US EPA WARM model to determine reductions in green house gas emissions. The baseline scenario was assumed to have no additional reuse and repair tonnages and these materials were disposed of in a landfill.
2. Expected quantity of greenhouse gas emissions reduced by quantity of materials recovered for recycling and composting under each scenario	Additional tonnages recovered for recycling and composting in each scenario were estimated based on construction of new facilities or upgrades to existing facilities. New facility construction increases material handling capacity and allows for additional processing of materials. Materials recovered for recycling were assumed to have composition of 35% mixed recycling, 25% plastic, 15% cardboard/kraft paper, 10% aluminium, 10% glass, and 5% electronics. Materials recovered for composting were assumed to have composition of 70% food waste, 20% wood waste, and 10% yard debris. Additional material recovered compositions are based on existing landfilled rates for each material category and the potential for each material to be recovered. Increases in materials recovered for recycling and composting in each scenario were estimated using tons/sf processing factors based on existing similar facilities. Additional materials recovered were input into EPA WARM model to determine reductions in green house gas emissions. The baseline scenario was assumed to have no additional materials recovered for recycling and composting and these materials were disposed of in a landfill.

3. Potential of each scenario to reduce greenhouse gas emissions from travel to/from facilities	A future tonnage forecast of all 14 types of materials reviewed in the gap assessment for Metro facilities and private facilities was created for each scenario based current disposal rates at each facility and projected future disposal rates. New facilities scheduled for construction in each scenario were given a general location within the proposed project vicinity for modelling purposes. Driving distance to each facility was calculated based on existing transportation analysis zones (TAZs) and converted to greenhouse gas equivalents based on commercial vehicle or general public passenger car factors from US EPA. Materials associated with General public were assumed to drive to the nearest facility. Materials associated with commercial haulers were assumed to follow the tonnage forecast for each material type based on affiliated hauler rates, facility capacity, facility proximity, and price of disposal.

Access

Criteria	General Methodology
4. Percentage of the population within 20 minutes of the nearest self-haul facility under each scenario	The percentage of the population with travel time less than 20 minutes was calculated for the 8 General Public material sectors. Then the average population weighted travel time was estimated. Populations within TAZs are evenly distributed within each representative TAZ. For TAZs located on the border of a district or of Metro's jurisdiction, only the population within the border is counted. Travel times are based on the travel time from centroid of one TAZ to the centroid of another TAZ. Travel times represent once all facilities are constructed in a scenario.
5. Percentage of the region's area within 20 minutes of the nearest commercial hauler facility under each scenario	The percentage of the population with travel time less than 20 minutes was calculated for the 7 Commercial Hauler material sectors. Then the average population weighted travel time was estimated. Populations within TAZs are evenly distributed within each representative TAZ. For TAZs located on the border of a district or of Metro's jurisdiction, only the population within the border is counted. Travel times are based on the travel time from centroid of one TAZ to the centroid of another TAZ. Travel times represent once all facilities are constructed in a scenario.

Jobs

Criteria	General Methodology
6. Estimated number of new jobs created under each scenario	For each scenario, between 2027 and 2040, tonnages were estimated for reuse and repair, recyclable material, organic material, other material/dry waste, and total tons diverted from landfill. Then potential jobs to manage that material were estimated using assumptions included in the following resources: https://www.tellus.org/pub/More%20Jobs,%20Less%20Pollution%20-%20Growing%20the%20Recycling%20Economy%20in%20the%20US.pdf https://ilsr.org/composting-sense-tables/

7. Potential employment and workforce development opportunities for historically marginalized communities under each scenario	Metro staff utilized GIS data to determine the percentage of people of color, limited English proficiency, and limited income within a 3-mile radius of the new facilities associated with each scenario. A total percentage was calculated. This was called the Environmental Social Justice (ESJ) weighting. Then, using data obtained from Metro operations, Metro Large Item Reuse Study, and Region of Peel, a full-time-equivalent (FTE) was assumed for each type of new Metro-owned facility. Those assumptions were applied to each scenario to estimate the total number of additional Metro jobs (represented as FTEs). The ESJ weight was applied to the total additional jobs and then ESJ weighted jobs were calculated for each scenario.

Cost

See Cost Summary Memo (Attachment 2 of Evaluation Criteria Results) for detailed methodology and description of cost criteria calculations.

Environmental Justice

Criteria	General Methodology
8. Potential facility burdens on communities of color and with low incomes under each scenario	All existing Metro facilities and proposed Metro facilities are either within an EFA or within 0.5 miles of an EFA and are thus included in this assessment except for Pride Disposal in Sherwood. Burden scoring is based on construction of new facilities and how these facilities' positions are related to the number of households within 0.5 miles, nearest residential zone and nearest community organization. Assumed worst case scenario for non-existing facilities by comparing to population density maps for proposed construction area. Burdens are weighted using two factors (1) cumulative sum of the percent of low-income population, limited English speakers population, and people of color population; (2) type of facility. Reuse and recycling centers create less burdens compared to a commercial or full-service facility. Existing facilities burden scores create the baseline, and all other scenarios are scored in relationship to the baseline. In this evaluation the higher the number the more burdens that are created. The total count is then translated into a 1 through 5 rank where a 5 is best case scenario and 1 is worst case scenario. For facilities that do not exist yet and are proposed in various scenarios, the worst-case siting scenario was assumed based on the population density. (i.e. New East in Gresham has relatively high population density and a burden score of 10 out of 12 was assigned). Burdens associated with reductions in funds from CEF and CIF due to reduced tonnages accepted at facilities in different scenarios are not included in this evaluation.
13. Potential facility benefits for communities of color and with low incomes under each scenario	All existing Metro facilities and proposed Metro facilities are either within an EFA or within 0.5 miles of an EFA and are thus included in this assessment except for Pride Disposal in Sherwood.

	Benefits were quantified based on construction of new facilities and how these facilities' positions are related to the number of households within a 3-mile radius but greater than a 0.5 miles radius. For non-existing facilities, the worst case scenario (least populated area) was assumed based on population density maps for the proposed project vicinity. Benefits associated with new construction were weighted using two factors (1) cumulative sum of the percent of low-income population, limited English speakers' population, and people of color population; (2) type of facility. Reuse and recycling centres create more benefits compared to a commercial or full-service facility. Benefits were also quantified associated with increases to Community Enhancement Fund increase for a specific community based on projected tonnages received by facilities. Existing facilities benefits scores create the baseline, and all other scenarios are scored in relationship to the baseline. The total benefit score for each scenario is ranked from 1 – 5 scale with 5 representing the best scoring scenario.

Resilience

Criteria	General Methodology
14. The extent to which Metro's existing garbage and recycling facilities (sites) will be improved to be better equipped to sustain extreme weather events under each scenario	Facilities were scored based on their proximity to hazardous areas like floodplains, existing landslide areas, and high liquefaction zones. Based on these hazard areas there are three possible points to receive for the earthquake score and three possible points to receive for the floodplain score. Six possible points to receive total with six points being the best most favourable. Earthquake score based on: +1 for greater than 1/4 mile from high liquefaction area, +1 for greater than 1/2 mile from high liquefaction, and +1 for greater than 1/2 mile from landslide hazard. Earthquake score for a facility can increase by 1 point if it is not vulnerable to landslide hazards and receives a full earthquake retrofit, 0.5 point for partial retrofit. Floodplain score based on: +1 for greater than 500 feet from floodplain, +1 for greater than 1000 feet from floodplain, and +1 for greater than 1/2 mile from flood plain. Floodplain score for a facility can increase if the facility is located in the floodplain. 1.0 point for full retrofit and 0.5 point for partial retrofit. For facilities that do not currently exist and are proposed for future construction, the worst-case scenario is assumed based on existing earthquake, landslide, and floodplain data. If a facility receives upgrades in a particular scenario the score is increased to reflect upgrades to combat natural hazards. If facility is in an existing landslide area no increases were granted based on upgrades (i.e. Metro Central).
15. The potential to provide redundant infrastructure,	Evaluates the redundancy of the Portland Metro region's solid waste infrastructure for disposal of the 14 material categories reviewed in the gap

Criteria	General Methodology
equipment, services to prepare for the volume and type of materials resulting from inclement weather events, social disruption, extreme weather events, under each scenario	assessment. Evaluation was based on the potential for a facility to remain operational in the event of natural hazard (i.e. major flood or earthquake). A binary scoring approach was used in this evaluation based on if a facility meets the following criteria: (1) greater than 500 feet from a landslide zone, (2) greater than 500 feet from a high liquefaction zone, (3) less than 50% of the facility property is outside of the flood plain. If all three of these criteria were met, then a facility was considered to remain operational in the event of a natural hazard. Non-existing facilities were assumed to be located in the worst-case locations based on proposed construction areas and surrounding liquefaction, landslide, and flooding potential. Scenarios were evaluated on a county level and the number of facilities considered to remain operational in the event of a natural hazard was quantified per county for each of the 14 material categories. Material categories were scored based on if zero (no points), one (one point), or more than one (two points) facility was considered to remain operational in the event of a natural hazard. The total possible points for each material category was six, if each county had more than one facility which was considered to remain operational in the event of a natural hazard. Counties with more than one type of facility scored higher than those with one or zero. The 14 material categories were averaged to obtain an overall redundancy score for each scenario which was rated from 1 – 5 based on the lowest possible score (zero) and highest possible score (six).

Attachment 2. Cost Summary Memo

Attachment 2. Cost Criterion Summary Memo

Introduction

The cost criterion was evaluated using a modified version of the Portland Metro Fiscal Year 2024 adopted Rate Model (Rate Model). The Rate Model was used to establish a baseline condition for annual system operating expenses including transfer station and other operations and maintenance expenses, transfer station contract costs, assumed escalation rates, Metro administration and overhead expenses, and baseline repair and replacement assumptions. That baseline was used to develop a Scenario Cost Model where changes in annual capital and operating expenditures were estimated for each scenario. Rates calculated in the Scenario Cost Model represent the required unit costs to finance all capital and operating expenditures based on the assumptions and inputs used in this assessment.

Scenario Cost Model Inputs and Assumptions

Expenditures for each scenario are itemized in Appendix A along with the assumed implementation and construction years. The asset replacement schedule plus proposed new equipment and material costs were used as a reference for ongoing maintenance at the Metro Central and Metro South Transfer Stations.

The Scenario Cost Model incorporates the results of a tonnage forecast prepared for each scenario that includes projected tons arriving at each facility (private and publicly owned) based on facility location, existing disposal rates, and disposal capacity.

Key assumptions included in the Scenario Cost Model follow.

- All operations and maintenance (O&M) and capital costs were inflated using assumptions from the Rate Model.
- Metro would incorporate up to $5 million per year of capital costs into its rates without debt financing.
- Capital costs above $5 million were debt financed assuming an interest rate of 5.0 percent, a term of 20 years, and issuance costs of 1.5 percent.
- New transfer station capital costs were using a representative $ per ton from recent similar transfer station construction projects.
- Capital costs for other new facilities were estimated using $ per square foot factors from recent similar facility development projects.
- All capital costs (new and Rehabilitation/Replacement and Metro Division Costs are recovered from the Regional System Fee (RSF).
- All O&M costs for existing and new facilities are recovered from the Tonnage fee.
- O&M costs for transfer stations were estimated based on Jacobs' economies of scale estimates and existing Metro per ton operational costs. O&M costs for upgraded or new facilities were adjusted to reflect operational efficiency improvements.
- O&M costs for other new facilities were estimated based on existing facilities offering similar services.
- Metro Direct Operations and Metro Overhead costs are recovered from the Tonnage fee.
- Most capital projects are spread out over 3 years with a 15%/70%/15% split; land purchases occur in one year (100%).

- The average weight of a residential curbside garbage can is 30 pounds.
- The existing parts asset replacement schedule is applied to the Baseline and No-Build scenarios, and that schedule is modified for the Distributed and Full-Service scenarios; when new facilities are completed the existing asset replacement schedule is modified to reflect the fewer replacements required for a new facility.
- Parts costs for existing asset replacement were multiplied by 5.0x to account for design, installation, testing, and other asset installation costs.
- When the Metro Central and South Transfer Stations are upgraded or rebuilt, revised operations and maintenance costs were assumed to begin during the year after completion of the upgrade or rebuild.

Scenario Cost Model Outputs and Results

The overall cost score as shown in the *Reuse, Recycling, and Garbage System Symposium Workshop Discussion Guide* is calculated based on results in Table 1. The overall cost score considers two metrics. First, the estimated increase in annual required revenue from tonnage fees and the Regional System Fee (RSF) to operate and maintain facilities and service debt for new construction in 2040 minus the same for 2024. Second, the annual cost paid by households for new curbside programs in 2040 (which is included as part of the No-Build scenario).

Combined, these two metrics include the cost of operation, capital investments, and curbside collection costs for each scenario. The Full-Service scenario is the most expensive because it includes multiple capital-intensive projects. The No-Build scenario is also relatively expensive due to the estimated annual cost of new curbside programs in 2040. Other than the Baseline scenario, the Distributed scenario is the lowest cost because it provides fewer capital-intensive projects and does not include any new curbside programs.

Table 1: Comparative Cost of Scenarios, Million$, and Overall Cost Score on 1-5 scale

Parameter	Baseline	Full-Service	Distributed	No-Build
*Estimated annual increase in required revenue from tonnage fees and the regional system fee, **with inflation** (i.e., 2040 annual minus 2024 annual, Million$)*	$84	$199	$152	$86
*Estimated annual cost paid by households for new curbside programs in 2040, **with inflation** (mid-point estimate, Million$)*	$0	$0	$0	$105
Total Metro Required Revenue and Curbside Costs (Million$)	**$84**	**$199**	**$152**	**$191**
Overall Cost Score,1–5 scale	**5.00**	**1.00**	**2.75**	**1.25**

Each scenario was also evaluated using the four cost criterion that were originally developed for this project (Criterion 8-11). Results for each of these criterion are discussed in the text that follow. Estimated costs for these other criteria (Criterion 8-11) used in the comparative assessment of scenarios are shown in Table 2.

Criterion 8: Estimated 2040 regional system fee to construct and operate each scenario in 2023$
Criteria 8 is the estimated expenditures funded by the RSF divided by RSF tonnages in each scenario. Capital intensive projects like new construction were assumed to be funded through the RSF. Other costs

funded through the RSF are Metro Divisional costs such as grant programs, and support services within Metro. The Full-Service and Distributed scenarios each include significant new infrastructure projects and would increase the RSF 68% and 47% above the Baseline scenario, respectively. The 2040 Baseline RSF would increase by approximately 19% from what it is today because of essential infrastructure improvements to Metro owned facilities.

Criterion 9 Estimated 2040 average monthly household garbage and recycling collection bill to construct and operate each scenario in 2023$

Criteria 9 presents the change in an estimated average monthly household garbage and recycling collection bill based on the implementation of the different scenarios. For this analysis, new Metro expenditures affect only the disposal component of the monthly collection bill. The household disposal component is the tipping fee ($/ton) converted to a typical 30-pound weekly single-family residential garbage can. In addition to the disposal component, the No-Build scenario provides for the collection of additional recyclables at the curb and those costs are included in the estimated monthly collection bill. As a result, the No-Build would increase the monthly curbside bill by approximately 27%. The Full-Service and Distributed scenarios would increase the monthly collection bill slightly by approximately 7% and 4% respectively because of increases in the disposal component of the rate resulting from the new Metro infrastructure and programs included in those scenarios.

Criterion 10: Estimated 2040 "Blended" Tipping Fee (total costs / total tons) [1] to construct and operate each scenario in 2023$

Criteria 10 is calculated based on the total operating and maintenance costs and debt service required for each scenario divided by the total tons received at Metro transfer stations. Tipping fees are estimated to increase the most (31% increase compared to the Baseline) in the No-Build scenario because tons accepted Metro facilities would decline significantly because of the assumed elimination of metro tonnage allocation requirements. Tipping fees in the Full-Service and Distributed scenarios increase by 31% and 19% respectively: the increase in costs in these scenarios compared to the baseline are counteracted somewhat by an increase in tons accepted at Metro facilities.

Criterion 11: Estimated percentage of monthly median income that is associated with an increase in curbside rate for single family homes

Criteria 11 is calculated based on the 2021 US Census monthly median income data for the tri-county area (Clackamas, Washington, and Multnomah Counties) converted to 2023$. This criterion is proportionate to Criteria 9 but provides another perspective for viewing the results.

Table 2: Unit costs compared to today for four cost sub-criteria.

Criterion	Today	Baseline	Full-Service	Distributed	No-Build
Criterion 8: *Estimated 2040 regional system fee required to construct and operate each scenario in 2023$*	$31.41	$37.43	$63.07	$55.08	$46.30
Criterion 9: *Estimated 2040 average monthly household garbage and recycling collection bill to construct and operate each scenario in 2023$*	$37.71	$39.01	$41.84	$40.72	$49.36

Criterion	Today	Baseline	Full-Service	Distributed	No-Build
Criterion 10: *Estimated 2040 "Blended" Tipping Fee (total cost and fees / total tons)* [1] *to construct and operate each scenario in 2023$*	$137.30	$140.69	$184.36	$167.05	$184.54
Criterion 11: *Estimated percentage of monthly median income that is associated with an increase in curbside rate for single family homes*	0.51%	0.53%	0.56%	0.55%	0.67%

[1] Blended Tipping Fee shown is total Metro costs divided by total tons at Metro transfer stations. Metro's posted tipping fees vary depending on the type of material delivered to a transfer station (e.g., wet waste is $137.30, yard debris is $56/ton).

Table 3 provides total capital and operations and maintenance costs for each scenario in millions of dollars with inflation. The Full-Service scenario remains the most expensive when comparing total capital and operations and maintenance expenditures from 2024 to 2040.

Table 3: Capital and O&M expenditures for each scenario from 2024 – 2040, $million with Inflation.

Parameter	Baseline	Full-Service	Distributed	No-Build
Capital Expenditures from 2024 – 2040 ***With Inflation***	$196	$952	$655	$350
O&M Expenditures from 2024 – 2040 ***With Inflation***	$2,640	$3,326	$2,905	$3,727
Total Expenditures from 2024 – 2040 With Inflation	**$2,836**	**$4,278**	**$3,560**	**$4,077**
Index, Low Cost = 100	**100**	**151**	**126**	**144**

Table 4 provides total capital and operations and maintenance costs for each scenario in millions of 2023 dollars, excluding the effects of inflation.

Table 4: Capital and O&M expenditure for each scenario from 2024 – 2040 in $million 2023 dollars (no inflation).

Parameter	Baseline	Full-Service	Distributed	No-Build
Capital Expenditures from 2024 – 2040 ***2023$, No Inflation***	$145	$811	$573	$281
O&M Expenditures from 2024 – 2040 ***2023$, No Inflation***	$2,061	$2,597	$2,238	$2,875

Parameter	Baseline	Full-Service	Distributed	No-Build
Total Expenditures from 2024 – 2040 2023$, No Inflation	**$2,206**	**$3,408**	**$2,811**	**$3,156**
Index, Low Cost = 100	**100**	**154**	**127**	**143**

In addition, an annual schedule of estimated capital costs for each new program is included in Appendix A (displayed in 2023$, excluding inflation).

Conclusion

The Full-Service scenario is overall the most expensive scenario due to multiple major capital construction projects. However, the No-Build scenario is also relatively expensive because of the cost of adding significant new materials to curbside collection programs throughout the region that would be paid by residents (see Table 3). Residents would likely see some increase in residential garbage and collection bills associated with all scenarios because of the increase in the disposal component of collection rates that would reflect the added cost to haulers for garbage deliveries to Metro transfer stations (see Criteria 9).

Other than the Baseline, the Distributed scenario would be the lowest cost scenario because Metro would invest less in its facilities, and it does not include any new materials in regional curbside recycling. In the Distributed scenario, commercial transfer stations and reuse and recycling centers are generally less expensive to operate than the full-service facilities provided in the Full-Service scenario. Thus, the Distributed scenario offers improved access, increased material recovery through composting and recycling, and operations resilience for relatively lower cost compared to other scenarios.

Appendix A – Capital Improvement Plan Schedule

Baseline

Facility	Total (2023 M$)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Metro Central	$64.1	$1.9	$4.5	$0.3	$0.8	$0.3	$0.1	$4.3	$0.5	$15.9	$10.1	$0.0	$2.6	$9.8	$10.0	$0.0	$0.4	$2.7
Metro South	$63.9	$0.3	$1.5	$0.3	$2.8	$1.0	$0.4	$5.6	$0.0	$22.6	$1.0	$1.6	$7.3	$1.5	$0.1	$2.6	$11.2	$4.1
Cornelius	($3.5)	($3.5)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Other	$20.7	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.7	$3.0	$14.0	$3.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total	$145.2	($1.4)	$6.0	$0.6	$3.7	$1.3	$0.5	$10.0	$1.2	$41.5	$25.1	$4.6	$9.9	$11.3	$10.0	$2.6	$11.6	$6.8

Full Service

Facility	Total (2023 M$)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Metro Central	$180.7	$1.9	$4.5	$0.3	$0.8	$0.3	$0.1	$29.5	$118.1	$25.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Metro South	$214.0	$0.3	$1.5	$0.3	$2.8	$1.0	$30.7	$147.0	$30.3	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New East	$157.0	$0.0	$0.0	$1.3	$28.5	$104.9	$22.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Cornelius	$141.0	$21.2	$98.7	$21.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Reuse Mall	$15.3	$7.8	$1.1	$5.3	$1.1	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Reuse Hub	$23.0	$13.0	$1.5	$7.0	$1.5	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New RID	$59.9	$9.0	$41.9	$9.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Other	$20.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$3.0	$14.0	$3.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total	$810.7	$53.1	$149.2	$44.3	$34.8	$106.2	$53.0	$176.6	$148.4	$28.2	$14.0	$3.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0

Distributed

Facility	Total (2023 M$)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Metro Central	$80.9	$3.4	$4.5	$0.3	$3.1	$10.8	$2.3	$4.3	$0.5	$15.9	$10.1	$0.0	$2.6	$9.8	$10.0	$0.0	$2.1	$1.3
Metro South	$69.9	$0.3	$1.5	$0.3	$11.5	$41.6	$9.1	$5.6	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New East	$28.8	$0.0	$0.0	$0.0	$2.8	$3.9	$18.2	$3.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Cornelius	$156.0	$23.4	$109.2	$23.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Southwest	$28.1	$0.0	$0.0	$0.0	$2.1	$3.9	$18.2	$3.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Clackamas	$166.0	$12.0	$23.1	$107.8	$23.1	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New RID	$12.4	$3.9	$1.3	$6.0	$1.3	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
New Paint	$11.0	$11.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Other	$20.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$3.0	$14.0	$3.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total	$573.0	$53.9	$139.5	$137.7	$43.9	$60.1	$47.8	$17.8	$0.5	$18.9	$24.1	$3.0	$2.6	$9.8	$10.0	$0.0	$2.1	$1.3

No Build

Facility	Total (2023 M$)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Metro Central	$89.8	$5.6	$21.9	$4.0	$0.8	$0.3	$0.1	$4.3	$0.5	$15.9	$10.6	$0.0	$2.6	$9.8	$10.0	$0.0	$2.1	$1.3
Metro South	$90.4	$0.3	$1.5	$4.4	$21.7	$5.1	$0.4	$5.6	$0.0	$22.6	$0.5	$5.1	$5.3	$0.0	$0.1	$2.6	$11.2	$4.1
Grants for NE Private	$17.8	$0.0	$0.0	$0.0	$0.0	$5.9	$5.9	$5.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Grants for SW Private	$35.6	$0.0	$0.0	$0.0	$11.9	$11.9	$11.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Grants for Reuse/Repair	$80.0	$0.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0	$5.0
Finance West WA Co Private	$30.0	$0.0	$0.0	$4.5	$21.0	$4.5	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Cornelius	($3.5)	($3.5)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Other	$20.7	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.1	$3.5	$14.1	$3.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total	$360.9	$2.4	$28.4	$17.9	$60.4	$32.7	$23.3	$20.9	$5.6	$47.0	$30.2	$13.1	$12.9	$14.8	$15.0	$7.6	$18.3	$10.4

All expenditures displayed in Millions$ without inflation in 2023$.

Attachment 3. Additional Parameters

Public Statistics Summary

Material End of Life Summary

Definitions	***Recovered***	Materials recycled or composted
	Disposed	Materials sent to landfill or incineration
	Generated	The total amount of end of life materials.
2040 Population		1,791,894

Material End of Life Category		**2040 Estimated Annual Statistics**			
		Baseline (Formerly Scenario A)	**Full-Service** (Formerly Scenario D)	**Distributed** (Formerly Scenario C)	**No Build** (Formerly Scenario B)
Annual Reused/ Repaired	*Total Tons*	41,900	44,600	44,600	54,200
	Lbs. Per Capita	46.8	49.8	49.8	60.5
Annual Recovered	*Total Tons*	1,086,600	1,241,800	1,189,100	1,167,000
	Lbs. Per Capita	1,212.8	1,386.0	1,327.2	1,302.5
Annual Recycled	*Total Tons*	705,600	753,700	746,400	734,700
	Lbs. Per Capita	787.5	841.2	833.1	820.0
Annual Composted	*Total Tons*	381,000	488,100	442,700	432,300
	Lbs. Per Capita	425.2	544.8	494.1	482.5
Disposed Tons	*Total Tons*	1,288,052	1,130,197	1,182,827	1,195,352
	Lbs. Per Capita	1,437.6	1,261.5	1,320.2	1,334.2
Generated Tons	*Total Tons*	2,374,652	2,371,997	2,371,927	2,362,352
	Lbs. Per Capita	2,650.4	2,647.5	2,647.4	2,636.7
Recovery Rate		45.76%	52.35%	50.13%	49.40%
Disposal Rate		54.24%	47.65%	49.87%	50.60%

GHG Emissions Summary

GHG Metric	**2024 - 2040 Cumulative Estimated Statistics**			
	Baseline (Formerly Scenario A)	**Full-Service** (Formerly Scenario D)	**Distributed** (Formerly Scenario C)	**No Build** (Formerly Scenario B)
Total Reductions in GHGs (Tons CO2e)	0	-1,941,600	-1,725,200	-1,173,600
Reduction Equivalent Comparisons				
Passenger Vehicles Removed	0	410,400	363,100	250,000
Reduction in Gallons of Gasoline Consumed	0	217,500,900	192,425,200	132,487,300
Reduction as Percentage of U.S. Electricity Sector	0.00%	0.107%	0.095%	0.065%

Access to Solid Waste Facilities Open to the Public Summary

Material Sector	***Estimated Average Travel Times to Facilities (minutes)***			
	Baseline (Formerly Scenario A)	**Full-Service** (Formerly Scenario D)	**Distributed** (Formerly Scenario C)	**No Build** (Formerly Scenario B)
Household Hazardous Waste	22.2	11.4	10.6	22.2
Self-Haul Trash	20.0	16.2	11.9	13.8
Self-Haul Construction Debris	13.7	13.0	10.2	11.8
Recycling Depot	13.4	8.9	9.0	11.0
Building Material Reuse	10.6	8.6	8.6	8.8
Mattress Reuse	14.1	9.6	9.4	11.7

Jobs Created Within Portland Metro Organizations

Job Metric	***Estimated number of jobs created (Full-Time Equivalent, FTE)***			
	Baseline (Formerly Scenario A)	**Full-Service** (Formerly Scenario D)	**Distributed** (Formerly Scenario C)	**No Build** (Formerly Scenario B)
Metro Organization Jobs	0	58	52	6

Expenditures Summary				
Parameter	***Estimated Expenditures in $Millions from 2024 - 2040***			
	Baseline (Formerly Scenario A)	**Full-Service** (Formerly Scenario D)	**Distributed** (Formerly Scenario C)	**No Build** (Formerly Scenario B)
Capital Expenditures from 2024 - 2040 ***With*** *Inflation*	196	952	655	350
O&M Expenditures from 2024 - 2040 ***With*** *Inflation*	2,640	3,326	2,905	3,727
Total Expenditures from 2024 - 2040 ***With*** *Inflation*	2,836	4,278	3,560	4,077
Capital Expenditures from 2024 - 2040 in 2023$ ***No*** *Inflation*	145	811	573	281
O&M Expenditures from 2024 - 2040 in 2023$ ***No*** *Inflation*	2,601	2,597	2,238	2,875
Total Expenditures from 2024 - 2040 in 2023$ ***No*** *Inflation*	2,206	3,408	2,811	3,156

Construction GHG Emission Summary				
Parameter	***Estimated GHG Emission from Construction Projects***			
	Baseline (Formerly Scenario A)	**Full-Service** (Formerly Scenario D)	**Distributed** (Formerly Scenario C)	**No Build** (Formerly Scenario B)
Construction GHG Emissions (Tons CO2e)	0	16,400	9,200	1,100