Improving Oregon Recycling Systems Infrastructure Research

Initial Alternative Scenario Selection (Phase 2 Task 5)

February 24, 2020

Draft Alternative Recycling Infrastructure Scenario Definitions

Based on research on customer engagement, collection, and processing, the Cascadia Consulting Group team (Cascadia) has developed four initial alternative recycling infrastructure scenarios to analyze in Phase 2 Task 5. These scenarios represent a range of infrastructure system alternatives, focusing mainly on variations in the collection and processing infrastructure and to some extent on the accepted materials lists by groupings provided by DEQ — Metro Area; Willamette Valley, etc.; Other Areas with Curbside: and Areas Without Curbside[1]. Cascadia limited variations in other system parts so the varying effects of collection and processing elements could be compared more directly. The more elements are changed in a scenario, the more difficult it is to determine the effects of individual changes.

- **Scenario A: Single-Stream with Modern MRFs —** Single-stream/glass on side — same list as current and modernized MRFs in Metro Area (paper/containers)
- **Scenario B: Single-Stream with CRF —** Single-stream/glass on side — expanded list and modernized MRFs in Metro Area plus out-of-state CRF
- **Scenario C: Dual-Stream Statewide —** Dual-stream/glass on side everywhere — expanded list, modernize and create dual-stream fiber MRFs in Metro Area; add/upgrade one or two container lines in Metro Area, modernize fiber MRF in Eugene-area
- **Scenario D: Dual-Stream Outside Metro Area —** Dual-stream/glass on the side outside Metro — expanded list, modernized MRFs in Metro Area (paper/containers), dual-stream fiber sorted in Eugene and Metro Area, dual-stream containers sorted in Metro Area

[1] Grouping descriptions can be found in the "FINAL Phase 2 Task 4 Research Plan" at www.oregon.gov/deq/recycling/Documents/BaseCaseModelingPlan.pdf.

The tables below use the following color-coding:

- **Gray**: no change from baseline.
- **Yellow**: change, but the same across scenarios.
- **Red**: change and different across scenarios.

A description of commodity bale grades and typical materials by marketability are presented on page 11.

Scenario Summaries

Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
No changes — base-case	**On-route material list:** no change.	**On-route material list:** expand to "emerging" except in Other Areas with Curbside grouping.	**On-route material list:** expand to "emerging."	**On-route material list:** expand to "emerging."
	On-route collection method: no change.	**On-route collection method:** no change.	**On-route collection method:** switch all on-route collection to dual-stream with glass on side.	**On-route collection method:** switch non-Metro Area on-route single-family residential groupings to dual-stream. No change to Metro Area grouping.
	Depot list: expand to "emerging" in Metro Area grouping; expand to variable elsewhere.	**Depot list:** expand to "emerging" in Metro Area and Willamette Valley, etc. groupings.	**Depot list:** expand to "emerging" in Metro Area and Willamette Valley, etc. groupings.	**Depot list:** expand to "emerging" in Metro Area and Willamette Valley, etc. groupings.
	Depot type(s): no change.	**Depot type(s):** no change.	**Depot type(s):** no change.	**Depot type(s):** no change.
	Sortation: modernize MRF paper-lines and add/upgrade one or two container lines in Metro Area grouping.	**Sortation:** modernize paper-lines of MRFs in Metro Area grouping and send containers to CRF outside state**.**	**Sortation:** modernize paper-lines of MRFs to accept dual-stream paper and add/upgrade one or two container lines in Metro Area grouping. Sort all containers in Metro Area. For non-Metro dual-stream fiber: sort half in Eugene and the other half in Metro Area.	**Sortation:** Modernize paper-lines of MRFs for single-stream and add/upgrade one or two container lines in Metro Area grouping. Sort all containers in Metro Area. For non-Metro Area dual-stream fiber: sort half in Eugene and the other half in Metro Area.

Customer Engagement: Education and Compliance

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro Area	Varies	**Residential (RES) and commercial (COM) customers**: Direct feedback by haulers (with cameras on fully automated trucks and lid-flips on semi-automated trucks); refusal to collect.			
Willamette Valley, etc.	Varies				
Other Areas with Curbside	Varies	**RES and COM customers**: Direct feedback by haulers (with cameras on fully automated trucks and lid-flips on semi-automated trucks).			
Areas without curbside	Limited	No change			
At Transfer Station/MRF	None	**Haulers**: Spot-check QA with refusal/fines on incoming material. **MRFs**: Third-party bale-breaking and estimating quality on outgoing.			

On-Route Accepted Materials List by Market Reliability

A description of commodity bale grades and typical materials by marketability presented on page 11.

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro Area	Varies, but includes "reliable", some "moderately reliable", and some "variable"	No change	"Reliable", "variable", and "emerging"		
Willamette Valley, etc.	Varies, but includes "reliable", some "moderately reliable", and some "variable"				
Other Areas with Curbside	Varies, but includes "reliable", some "moderately reliable", and some "variable"		"Reliable" and "variable"	"Reliable", "variable", and "emerging"	

On-Route, Single-Family Collection Method

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro area	Single-stream carts (mostly weekly), glass in tubs on the side.	No change	No change	Dual-stream in two carts with glass on side (effectively weekly by alternating collection of each cart), no change to glass.	No change
Willamette Valley, etc.	Single-stream mainly carts (mostly weekly), glass in tubs on the side.				Dual-stream in two carts with glass on side (effectively weekly by alternating collection of each cart), no change to glass.
Other Areas with Curbside	Single-stream mainly carts split every-other-week (EOW) & weekly, glass on the side.			Dual-stream in two carts with glass on side (effectively weekly by alternating collection of each cart), no change to glass. This increases service in areas currently using EOW cart collection.	Dual-stream in two carts plus glass on side (effectively weekly by alternating collection of each cart), no change to glass. This increases service in areas currently using EOW cart collection.

On-Route Multifamily and Commercial Collection Method

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro Area	Single-stream with glass on the side, frequency varies by customer needs.	No change	No change	Dual-stream in two receptacles, no change to glass.	No change
Willamette Valley, etc. and Other Areas with Curbside					Dual-stream in two receptacles, no change to glass.

Depot Accepted Materials List by Market Reliability

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro Area	Varies, but includes "reliable", some "moderately reliable", and some "variable."	Materials with "reliable", "variable", and "emerging" markets.			
Willamette Valley, etc.	Varies, but includes "reliable", some "moderately reliable", and some "variable."	Materials with "reliable" and "variable" markets.	"Reliable", "variable", and "emerging."		
Other Areas with Curbside	Varies, but includes "reliable", some "moderately reliable", and some "variable."	Materials with "reliable" and "variable" markets.			
Areas without curbside	Varies, but includes "reliable", some "moderately reliable", and some "variable."				

Depot Type(s)

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro Area	Staffed but passively monitored sites at transfer stations, mainly source-separated.	No change			
Willamette Valley, etc.	Staffed sites at transfer stations, mainly source-separated. Some unstaffed glass depots.	No change			
Other Areas with Curbside					
Areas without curbside	Staffed sites at transfer stations, mainly source-separated.	No change			

Consolidation and Transfer Methods

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Metro Area transfer facilities	Mostly direct delivery to MRFs.	Add transfer of containers from non-upgraded-container-line MRFs to MRFs with upgraded container lines.	Add transfer of containers from non-upgraded-container-line MRFs to out-of-state CRF.	No change in method (direct delivery) but send to dual-stream MRFs.	No change in method from hauler to MRF (direct delivery). Add transfer of containers from non-upgraded-container-line MRFs to MRFs with upgraded container lines.
Transfer facilities elsewhere	Consolidated for truck transport (mainly loose or compacted); existing facilities.			Truck transport half of fiber to Metro Area and half to Eugene area. Truck transport all containers to Metro Area.	

Sortation Methods

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
MRFs in Metro Area	Three Oregon-style MRFs for single-stream (Pioneer, Far West Portland, Far West Hillsboro) One commercial fiber facility expanding to single-stream (EFI) Two small MRFs (KB, WestRock).	Modernized paper side of main MRFs (screens and optical sorters) and modernize container side of one to two MRFs for single-stream residential and commercial in Metro Area.	Modernized paper side of main MRFs (screens and optical sorters) for single-stream residential and commercial in Metro Area; send containers to existing CRF outside Oregon for additional sorting.	Convert MRFs to dual-stream: modernized paper-line of main MRFs with optical sorters with separate in-feed for fiber. Modernized container side of one to two MRFs with separate in-feed for containers.	Modernized paper side of main MRFs with optical sorters with separate in-feeds for dual-stream fibers and containers from non-Metro Area and modernize container side of one to two MRFs for single-stream residential and commercial in Metro Area.
MRFs Outside Metro Area	One largely manual MRF (Garten) in Salem One fiber facility (International Paper) in Eugene.	No change		Garten continues operations as-is (modified in-feeds for dual-stream fiber and containers). One upgraded fiber MRF for residential fiber in Eugene area.	
Outside Oregon MRFs	West Vancouver, Idaho. or California MRFs (small portion of material from remote southern and eastern areas).	No change			

Bales and Marketing

Grouping	Oregon Baseline	Scenario A: Single-Stream with Modern MRFs	Scenario B: Single-Stream with CRF	Scenario C: Dual-Stream Statewide	Scenario D: Dual-Stream Outside Metro Area
Bale Specs (quality)	Bales meeting market allowances.	Bales meeting ISRI specs			
Bale grades produced (types)	Not specified by MRFs	TBD, based on incoming materials, but avoiding mixed paper and mixed plastics			
Market Locations	Not specified by MRFs	Domestic or markets with modern solid-waste infrastructure (OECD markets)			
End-Processing Methods	Not specified by MRFs	No change (mechanical only)	For mechanical recycling, chemical recycling, and/or energy recovery		

Materials/Bale Grades

The list below presents bale grades by anticipated ability to market materials. Bales may include items that Oregon facilities currently do not or cannot sort, such as PP #5 lids or small items.

Single-stream or dual-stream collection materials

Materials/bale grades with **reliable** markets:

- OCC (corrugated cardboard)
- Sorted office paper and sorted white ledger (commercial)
- Sorted clean newsprint (preferably depot; can be dual-stream or single-stream with advanced sorting)
- PET #1 (polyethylene terephthalate) bottles and jars
- HDPE #2 (high-density polyethylene) natural bottles
- HDPE #2 colored bottles
- HDPE #2 injection bulky rigid plastic, if source-separated (e.g., buckets at curbside; other items such as totes, crates, lawn furniture, carts, storage bins in depot)
- PP #5 (polypropylene) injection bulky rigid plastic, if source-separated
- HDPE #2 and PP #5 tubs and lids
- PP #5 bottles and jars (mostly deposit collection)
- PP #5 small rigid plastic (e.g., PP tubs and cups with tofu tubs, dishwasher-safe storage containers, hangers)
- Aluminum cans
- Steel cans
- Scrap metal, if source-separated

Materials/bale grades with **moderately reliable** markets:

- Sorted residential paper and news (e.g., newspaper, junk mail, magazines, printing and writing paper; no paperboard or brown grades)
- PE (polyethylene) clear film (commercial source-separated)
- Aluminum foil

Materials/bale grades with existing but **variable** markets:

- Aseptic and gable-top containers (though generated in small quantities)
- Paperboard/old boxboard alone (if not in a mixed paper bale, more marketable from dual-stream)
- Mixed paper (all paper and paperboard, more marketable from dual-stream)
- Mixed bulky rigid plastics (mainly PE and PP)
- PE colored film (commercial source-separated)
- PE retail mix film (commercial source-separated)
- Aluminum foil

Materials/bale grades with **emerging** markets:

- PET #1 thermoforms and tubs (PET packages not including bottles or jars)
- #3-7 bottles and small rigid plastics
- Densified MRF-grade foam PS #6 (food service and packaging)
- Polycoated paper (cups, food service papers)

Depot or source separated on-route collection materials

Materials/bale types with **reliable markets**:

- Foam PS #6 (polystyrene) in transport block and shape, if densified at the collection point
- Container glass

Materials/bale grades with existing but **variable** markets:

- Aseptic and gable-top containers (though generated in small quantities)
- Paperboard/old boxboard alone (if not in a mixed paper bale, more marketable from dual-stream)
- Mixed paper (all paper and paperboard, more marketable from dual-stream)
- Mixed bulky rigid plastics (mainly PE and PP)
- PE colored film (commercial source-separated)
- PE retail mix film (commercial source-separated)
- Aluminum foil

Materials/bale grades with **emerging** markets:

- PET #1 thermoforms and tubs (PET packages not including bottles or jars)
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