

Organics Resource Recovery Technologies (ORRT) Feasibility Study

Presentation - Council Report PW 2023-42
Oxford County Council Meeting, October 25, 2023

ORRT Study - Purpose

- Evaluate and identify preferred waste diversion concept(s) for residential and other organic material sources
- To position the County to meet compliance with upcoming legislative requirements and policy changes
- To support the Strategic Plan Pillars and Goals:
 - Promoting community vitality
 - Enhancing environmental sustainability
 - Fostering progressive government

County Organics Program Management

- Backyard Composters and Green Cone Digesters¹
- 11 County-wide brush, leaf and yard waste drop-off depots and processing facility (compost) at OCWMF
- Wastewater biosolids storage at OCWMF for agricultural land application/soil amendment
- Residential FOG² Cup program and OCWMF Drop-off for third party vendor collection
- ICI FOG/Sludge Co-digestion pilot project at Ingersoll WWTP
- ICI FOG/Organics – Third party vendor collection/processing

1. 75% cost of backyard composter and 60% cost of Green Cone digester subsidized by County

2. FOG = fats, oil, and grease used in cooking

ORRT Study - Findings

Estimated Quantity of Residential Organic Material Landfilled at the OCWMF in 2021

Residential	12,093 tpy	% of Total
Avoidable and unavoidable food waste	7,714 tpy	64%
Pet waste	3,018 tpy	25%
Tissue and paper towels	930 tpy	8%
Leaf and yard waste	432 tpy	4%

Organic waste generation rate:

- 5,200 – 9,500 tonnes per year (tpy)
- Assume 45% to 60% capture rates (County-wide SSO program)

* Extends Landfill life up to 10 yrs

Estimated Quantity of ICI Organic Material Landfilled at the OCWMF in 2021

ICI	7,259 tpy	% of Total
Food waste	6,388 tpy	88%
Leaf and yard waste	871 tpy	12%

Potential additional organics capture opportunities

Provincial Food and Organic Waste Policy Statement

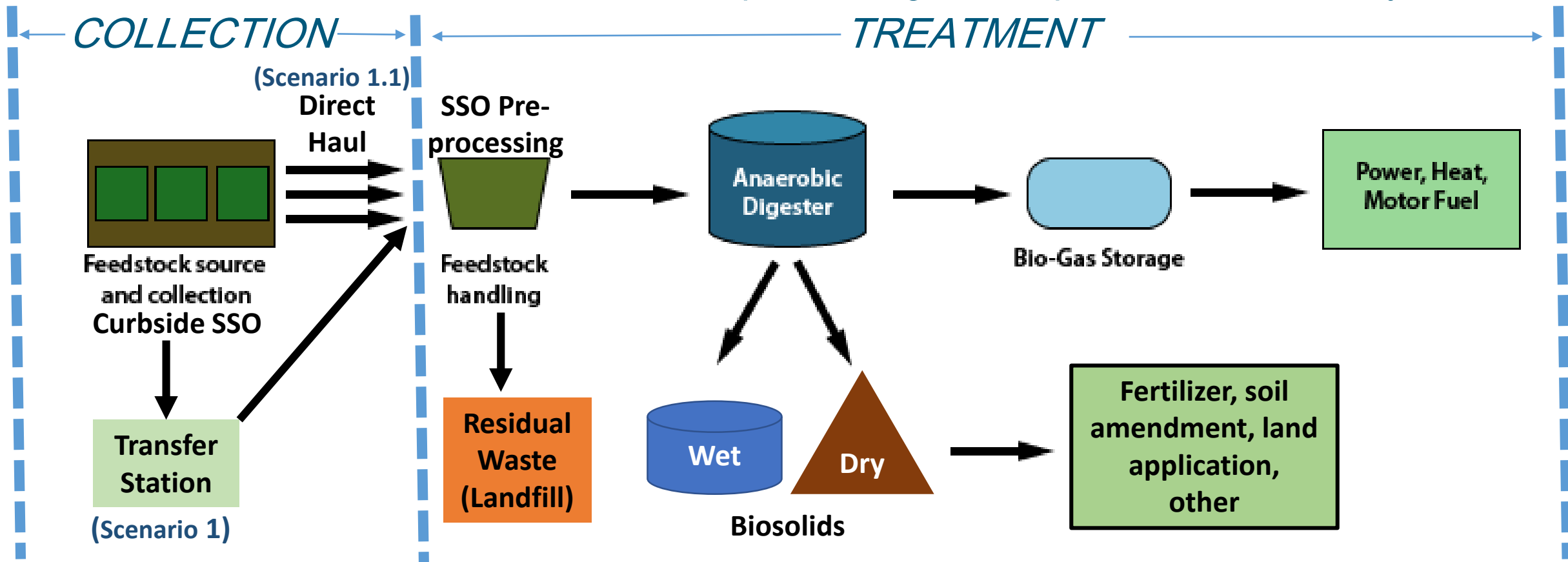
Oxford County Implementation of the Policy Statement by 2025, specifically:

- City of Woodstock and Town of Tillsonburg will meet population thresholds by 2025 **requiring** implementation of a curbside SSO program
- Where collection of *food and organic waste* is not required municipalities shall:
 - Provide for the *resource recovery* of *food and organic waste* through means such as home composting, community composting and local event days
- Municipal compliance to Policy Statement subject to MECP Director Orders

OTHER: POTENTIAL FEDERAL BAN OF ORGANICS LANDFILLING - 2030

ORRT Concepts

- **Scenario 1: Third-Party Wet Anaerobic Digestion (AD)**
 - Collection to County Transfer Station / Transport to Out of County Processor
- **Scenario 1.1: Third-Party (Direct Haul) Wet Anaerobic Digestion (AD)**
 - Direct Haul to Local Pre-processing / Transport to Out of County Processor



ORRT Approaches

- **Scenario 1: Third-Party Wet Anaerobic Digestion (AD)**

- Collection to County Transfer Station / Transport to Out of County Processor

- **Scenario 1.1: Third-Party (Direct Haul) Wet Anaerobic Digestion (AD)**

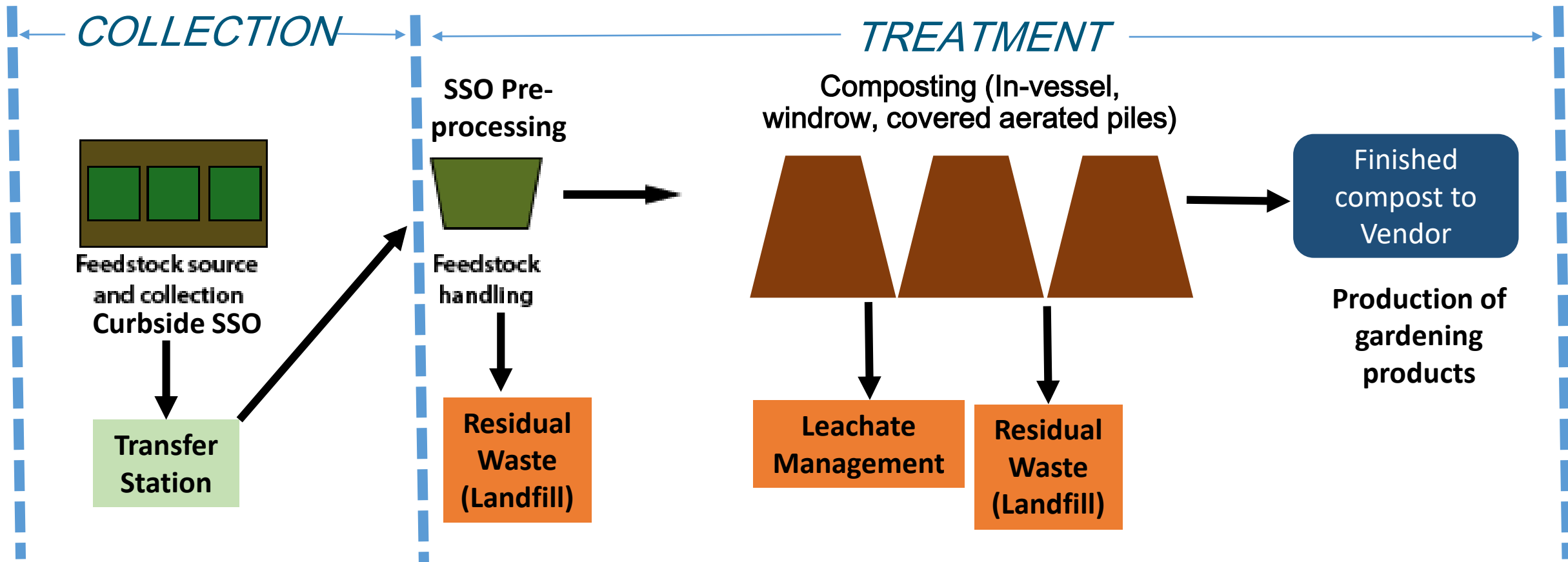
- Direct Haul to Local Pre-processing / Transport to Out of County Processor

Challenges	Opportunities	Acceptable Materials
<ul style="list-style-type: none"> • Requires dewatering and process wastewater treatment • Requires residual waste management • Out of County Processing subject to tipping fees • Non-local organic waste management solution • Local transfer station required (Scenario 1) • Third party vendor capacity 	<ul style="list-style-type: none"> • Direct haul to in County pre-processing facility (Scenario 1.1) • Energy recovery through biogas generation • Ability to accept both residential and ICI SSO • Biosolids management is responsibility of third party vendor 	<ul style="list-style-type: none"> • Residential SSO • ICI SSO, including FOG • Wastewater Sludge

ORRT Concepts

- Scenario 2: Third-Party Aerobic Composting

- Collection to County Transfer Station / Transport to Out of County Processor



ORRT Approaches

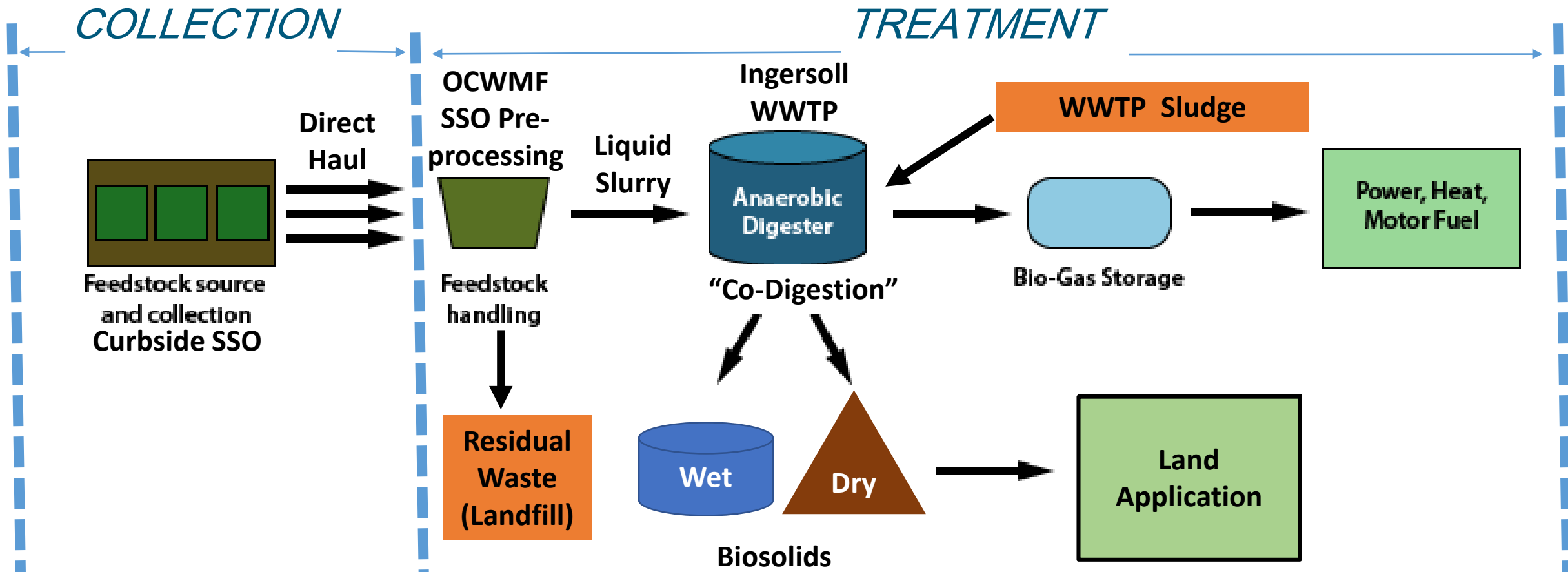
Scenario 2: Third-Party Aerobic Composting

– Collection to County Transfer Station / Transport to Out of County Processor

Challenges	Opportunities	Acceptable Materials
<ul style="list-style-type: none">• Potential for noise/odour/dust emissions• Out of County Processing subject to tipping fees• Non-local organic waste management solution• Local transfer station required• Third party vendor capacity	<ul style="list-style-type: none">• Highly stable and dry product (Self-pasteurizing and self-drying)• Environmental compliance and end product marketing is responsibility of third party vendor	<ul style="list-style-type: none">• Residential SSO• ICI SSO, no FOG• Brush, Leaf & Yard Waste

ORRT Concepts

- Scenario 3: Anaerobic Co-Digestion at Ingersoll WWTP
 - Direct Haul to County Pre-processing Facility (OCWMF) / Slurry Transfer to WWTP



ORRT Concepts

- **Scenario 3: Anaerobic Co-Digestion at Ingersoll WWTP**

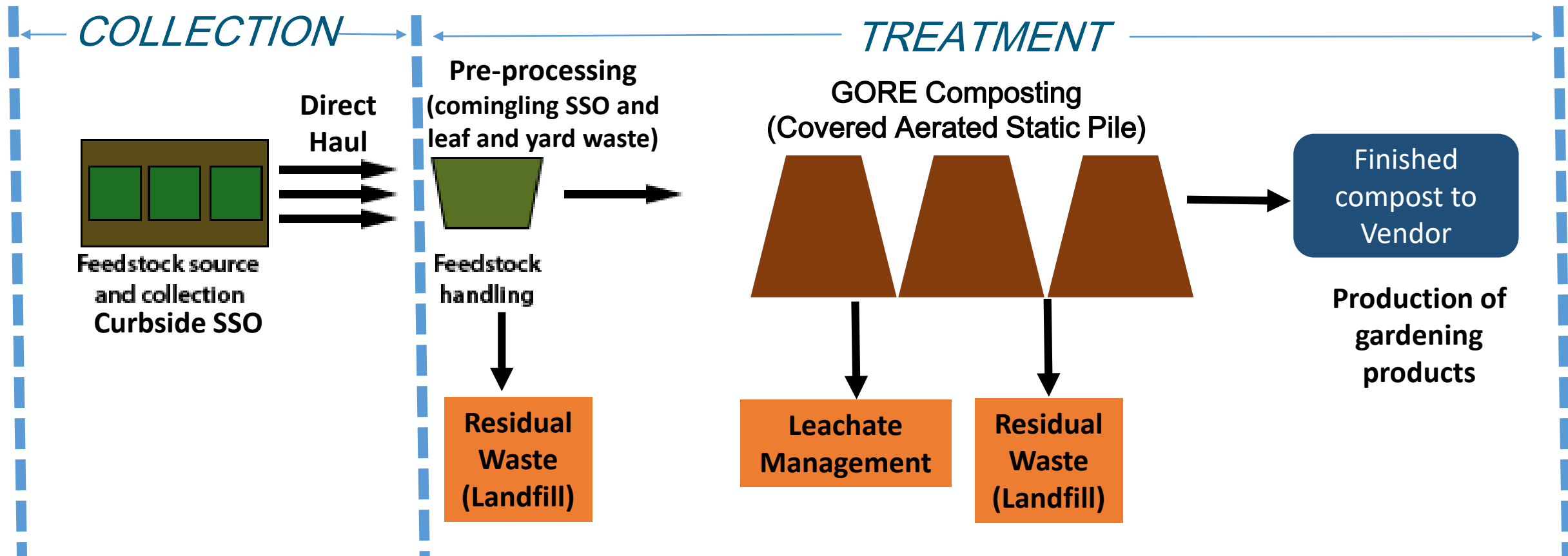
- Direct Haul to County Pre-processing Facility (OCWMF) / Slurry Transfer to WWTP

Challenges	Opportunities	Acceptable Materials
<ul style="list-style-type: none">• Requires dewatering and process wastewater treatment• Requires residual waste management• Biosolids management subject to land availability• Capital intensive	<ul style="list-style-type: none">• Direct haul to OCWMF• Energy recovery through biogas generation• Ability to include raw wastewater sludge• Ability to accept both residential and ICI SSO• Local organic waste management solution	<ul style="list-style-type: none">• Residential SSO• ICI SSO, including FOG• Wastewater Sludge

ORRT Concepts

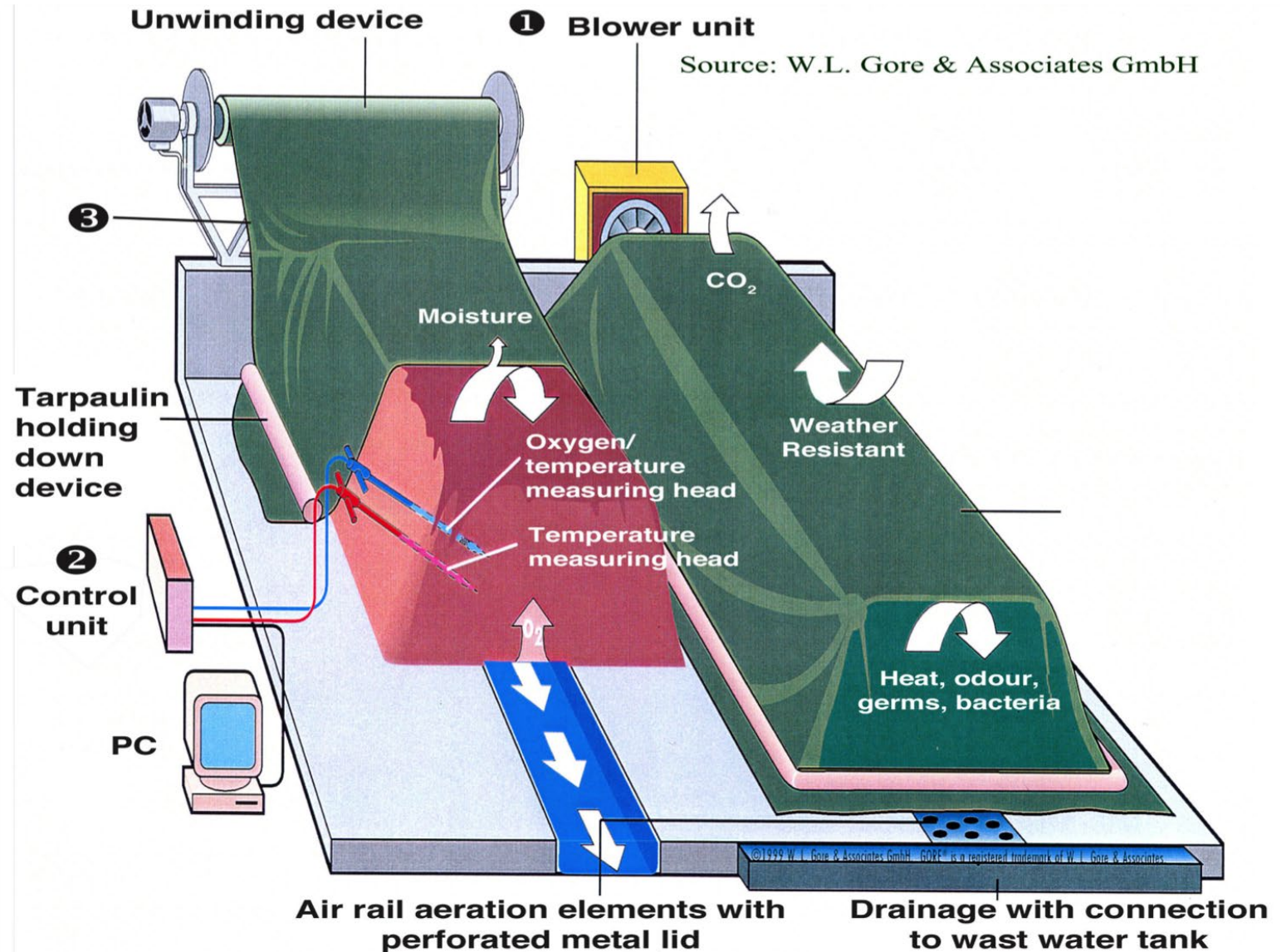
Scenario 4: Covered Aerated Static Pile Composting at OCWMF

– Direct Haul to OCWMF Processing Facility



Covered Aerated Static Pile Composting at OCWMF

- Residential and ICI SSO mixed with leaf and yard waste
- Enclosed space with odour control system for pre-processing and mixing
- Outdoor composting using covered aerated static pile system (GORE System)



Aerated Static Pile Composting Using GORE Technology



ORRT Concepts

- **Scenario 4: Covered Aerated Static Pile Composting at OCWMF**
 - Direct Haul to OCWMF Processing Facility

Challenges	Opportunities	Acceptable Materials
<ul style="list-style-type: none">• Potential for noise/odour/dust emissions• Reliability of end market demand	<ul style="list-style-type: none">• Direct haul to OCWMF• Highly stable and dry product (Self-pasteurizing and self-drying)• Lower capital and operating costs• Ability to integrate with existing LYW composting processes• Ability to accept both residential and ICI SSO• Local organic waste management solution	<ul style="list-style-type: none">• Residential SSO• ICI SSO, no FOG• Brush, Leaf & Yard Waste

Financial Analysis of ORRT Concepts

	Scenario 1: 3 rd party wet AD, out of County	Scenario 1.1: Direct haul, 3 rd party wet AD, out of County	Scenario 2: 3 rd party aerobic composting, out of County	Scenario 3: Co-digestion at Ingersoll WWTP	Scenario 4: Aerated static pile composting at OCWMF	Baseline Status quo landfilling organics at OCWMF
Upfront Capital Costs	\$2.8 - \$5.2 M	\$0	\$2.8 - \$5.2 M	\$33.9 - \$62.9 M	\$4.1 - \$5.6 M	\$0
Capital Costs over 20 years	\$7.6 M	\$7.6 M	\$7.6 M	\$7.6 M	\$12.9 M	\$0
Annual Operating Costs	\$1.7 M	\$1.3 M	\$1.4 M	\$700 K	\$830 K	\$625 K
Net Present Value	-\$28.4 M	-\$21.3 M	-\$26.3 M	-\$57.4 M	-\$26.3 M	N/A
Lifecycle Costs (2023 \$/tonne)	\$210	\$160	\$190	\$410	\$190	\$100

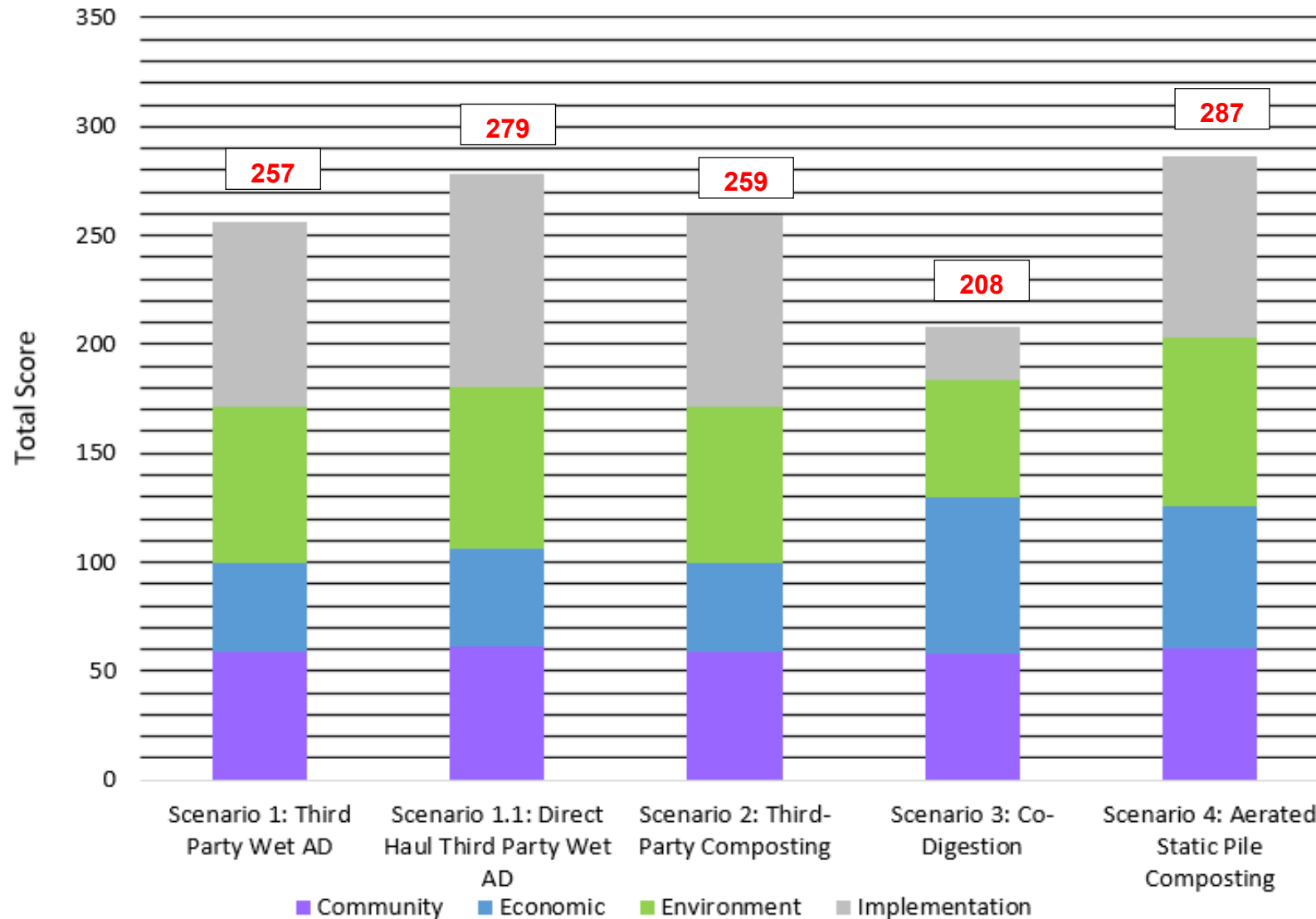
Note:
Scenarios 3 and 4 assume utilization of third-party processing for the first 4 yrs of SSO collection program as infrastructure not yet operational

SSO Curbside Collection Costs

Item	Cost
Initial Capital Costs for SSO Collection Carts (procurement and distribution)	\$2.7 M
Annual Cost For SSO Collection Carts (10%) (replacement and new)	\$270 K
Annual Operational SSO Curbside Collection Costs	Offset by Blue Box Program Savings

*Common to all ORRT concepts, excludes transfer station where required

Multi-Criteria Assessment Results for Scenarios

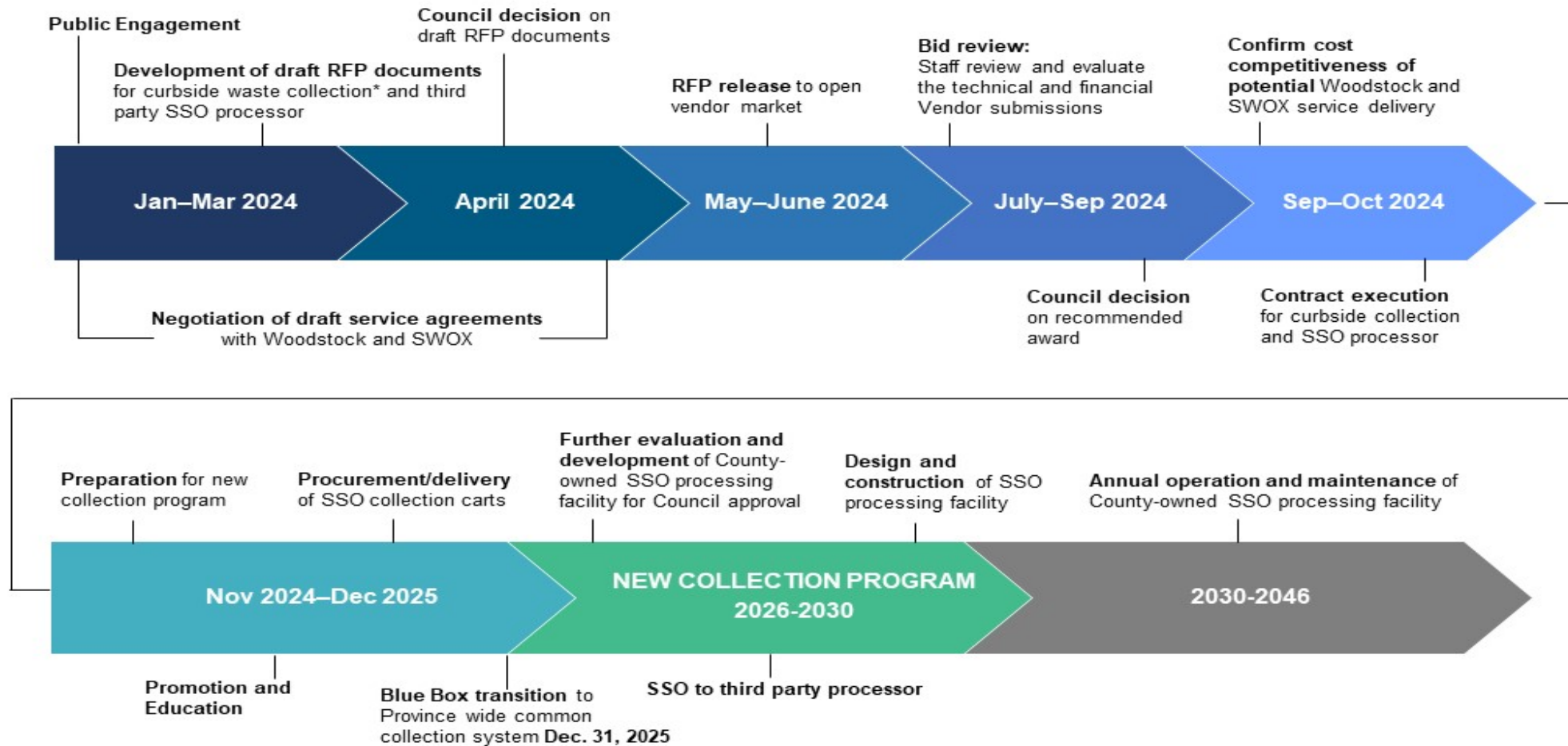


Preferred Organic Waste Diversion Concept

Scenario 4 – Covered aerated static pile compost technology at OCWMF

- Widely used throughout Ontario and North America
- May increase the landfill diversion rate by 6-8% and extend landfill life by approximately 10 years (based on anticipated County-wide residential tonnage and 45-60% capture rate)
- Potential for additional organic waste capture from ICI sources, including SSO
- Integration with County's existing composting facility
- Local control of organic waste management solution
- No out of County waste export
- Low upfront capital and annual operating costs
- Potential to receive up to \$30 per tonne for finished compost

SSO Implementation



*Garbage, SSO, large article, ineligible recycling sources