

RECYCLING FEASIBILITY STUDY

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APPENDIX A

Additional Resources

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APPENDIX A – ADDITIONAL RESOURCES

More detailed research and analyses about how these factors may impact Charleston could be performed but was beyond the scope of this engagement. Readers are encouraged to review the following sources for more information on industry trends.


- ◆ **West Virginia Solid Waste Management Board (SWMB):**
<https://www.state.wv.us/swmb/default.html>
- ◆ **West Virginia Department of Environmental Protection (WVDEP):**
<https://dep.wv.gov/WWE/Pages/default.aspx>
- ◆ **U.S. Environmental Protection Agency** at <https://www.epa.gov/americanrecycles>
- ◆ **Recycling Coalition of West Virginia** at <http://www.wvrecycles.com/home.html>
- ◆ **The Northeast Recycling Council (NERC)** at <https://nerc.org/>
- ◆ **Southeast Recycling Development Council (SERDC)** at <https://www.serdc.org/>
- ◆ **The Solid Waste Association of North America (SWANA)** at <https://swana.org/>
- ◆ **The Institute of Scrap Recycling Industries (ISRI)** at <https://www.isri.org/>
- ◆ **The National Waste and Recycling Association (NWRA)** at <https://wasterecycling.org/>
- ◆ **The Recycling Partnership** at <https://recyclingpartnership.org/>
- ◆ **Closed Loop Partners, LLC** at <https://www.closedlooppartners.com/>

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APPENDIX B
City Council Briefing
10/07/2020

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Recycling Program Feasibility Study




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INTRODUCTION & PROJECT OVERVIEW

CHARLESTON CITY COUNCIL
ENVIRONMENT AND RECYCLING COMMITTEE

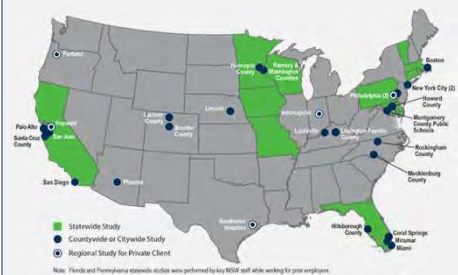
OCTOBER 7, 2020



About MSW Consultants




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- Florida-based management consultant specializing in the municipal waste sector
 - Offices in Maryland and Pennsylvania
- Experienced in solid waste master planning, waste & recycling composition studies, rate studies, procurement support
- Engaged by City in August 2020 to perform recycling optimization study.

State of Recycling in West Virginia




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- West Virginia Recycling Act created in 1989
- Goal of 50% reduction per capita disposal by 2010 (1991 base year)
- Curbside recycling required for municipalities of 10,000 or more
- Key challenges (per SWMB):
 - Low population density
 - Low materials volumes/high unit costs for many centers
 - Access to end markets
 - Low material values
- 2018 to present: Export market restrictions and disruptions



Recycling in Charleston



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- 2015 study showed recycling participation rate of just 19.5%
- Low curbside recycling tonnages:
 - ~670 tons per year
 - ~75 lbs. per household
- Curb-sort program until 2014 (with KCSWA)
- Single-stream with RCSWA 2014-2020
- City-provided clear bags, eliminated 2019
 - \$400,000 annual savings
- High recyclables processing & transportation costs
 - RCSWA request for relief/per-ton processing fee
- Recycling suspended April 2020 due to COVID-19 related closure at RCSWA
- Recycling resumed September 28th
 - \$175 per ton processing fee

Project Phases & Key Tasks

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Phase 1 – Initiation & Info. Gathering	Phase 2 – ID and Evaluate Alternatives	Phase 3 - Reporting	Phase 4 (optional)
<ul style="list-style-type: none"> • Kickoff & info request • Operations assessment • CoS estimate • Contracts review • Educational review • Ordinance review • Benchmarking • Working meeting 	<ul style="list-style-type: none"> • Analyze collection system and alternatives • Analyze recyclables processing • Recycling education & public outreach 	<ul style="list-style-type: none"> • Draft report • Final report • Presentation 	<ul style="list-style-type: none"> • <i>Customer Survey</i>

Project Activities To-Date

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- Project kick-off meeting (August 31)
- Data gathering
- Collection route observations
- KCSWA and RCSWA site visits
- Council member briefings
- Report draft in-progress
 - Early November project report





Keys to Success

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- Sufficient Management & Administration Resources
- Efficient, Full Service Curbside Collection Program
- Convenient Processing at Proper Scale
- Fair, Transparent and Sustainable Funding

Questions and Thank You

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MSW CONSULTANTS

APPENDIX C
Working Meeting
11/6/2020

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Recycling Program Feasibility Study




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WORKING MEETING #1

CITY OF CHARLESTON, WV

NOVEMBER 6, 2020



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Working Meeting Objectives

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- Update Charleston Team on Progress
- Review Existing System Evaluation
- Discuss Potential System Improvements

2

Project Scope & Status

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Phase	Task	Description	Status?
1 – System Baseline	1.1	Information Request	☑
	1.2	Kick-off Meeting	☑
	1.2.1	Council Briefings (3)	☑
	1.3	Facility/Assets Review	☑
	1.4	Collection Observations	☑
	1.5	Cost-of-Service Estimate	☑
	1.6	Contracts Review	☑
	1.7	Education Program Review	☑
	1.8	Ordinance Review	<i>In-progress</i>
	1.9	Benchmarking	<i>In-progress</i>
1.10	Working Meeting	November 6, 2020	
2 – ID Alternatives			
3 – Reporting			

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Collection System Overview

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Service	Truck Type	Days of Week	Crew Size	Routes Per Day
Residential Trash	Rear-load	T-W-Th-F	3	10
Residential Recycling	Rear-load	T-W-Th-F	3	2/3
Bulky	Stake bed/rear-load	T-W-Th-F	2	5
Tires	Stake bed	T-W-Th-F	2	2
C/I Dumpsters	Rear-load	M-S	3	
Total				

4

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- ❑ Tuesday = East End, Westmoreland, Capitol Hill
- ❑ Wednesday = Kanawha City, Oakridge Drive area
- ❑ Thursday = South Hills, Corridor G
- ❑ Friday = West Side, North Charleston, Route 21
- ❑ Bulky, tires, etc. also collected T-F
- ❑ Dumpster crew S/M



RECYCLING & TRASH 39 ROUTES

DAYS	ROUTES
TUESDAY	11 THRU 20
WEDNESDAY	21 THRU 30
THURSDAY	31 THRU 39

Trash & Recycling Collection Routes

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Charleston MSW Collections (2019)

- Households Served: 18,000

Material	Tons	Gen/HH/Yr. (lbs.)
Trash*	24,129	2,681
Recyclables	631	70
Yard waste	1,841	205
White goods	125	14
Tires	37	4
Totals:	26,763	2,974

* = Less estimated 562 tons of trash collected from dumpster routes

- City collects from residential properties with 12 or less dwelling units
- Provides dumpster service to 67 facilities & properties
 - 3 cy, rear-loader collection
- Yard wastes no longer processed into mulch

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Recycling Collections

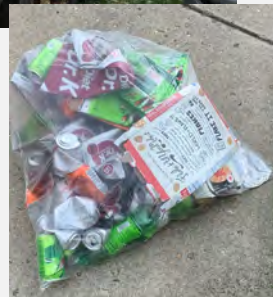
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Recycling in Charleston (Recent History)

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- Curb-sort program until 2014 (with KCSWA)
- Single-stream with RCSWA 2014-2020
- **City-provided clear bags, eliminated 2019**
 - *\$400,000 annual savings*
- Recycling suspended April 2020 due to COVID-19 related closure at RCSWA
- Recycling resumed September 28th



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Curbside Recycling Service Levels



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Photo credit: Kanawha County Solid Waste Authority

- Frequency = 1x/week
- Daily Routes:

Day of Week	T	W	T	F
No. Routes	2	3	3	2








- Rear-loader trucks
- Manual collections using 3-person crews
- Delivered to RCSWA MRF in Beckley (60+ mile one-way trip)

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Curbside Recyclables

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- Collection containers:
 - Resident-provided bins
 - Resident-provided container
 - See-through bags
- Set-outs must be:
 - 48-gallons or less
 - 40 lbs. or less
- No item limit

-  Aluminum Cans
-  Steel Cans
-  Mixed Paper
-  Cardboard
-  PET (#1) Plastics
-  HDPE (#2) Plastics
-  Glass Bottles & Jars

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Kanawha County Solid Waste Authority (KCSWA)



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- Residential and small business drop-off at Slack Street
- Also receives curbside recyclables from Belle & St. Albans
- Accepts source-separated recyclables
- Consolidation & baling operation at Eden's Ford



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Collections: Yard & Dispatch

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- MSW observations September 1st, 2nd & 3rd
- Crews report by 7 a.m.
 - COVID temp checks
 - Crews muster with route supervisors
- Truck pre-trips performed in lower lot



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Collections: Fleet

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- 32 Active vehicles
- 16 rear-load packers
 - All models 20-cubic yards
 - Average model year = 2016
 - Average miles = 51,552
- 10 stake-bed style trucks
 - All 1-ton capacity
 - Average model year = 2016
 - Average miles = 51,207
- 6 crew chief/supervisory
 - Average model year = 2014
 - Average miles = 53,552
- 2 compartmentalized recycling trucks





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Collection Observations: Recycling

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- Curbside recycling still officially suspended during MSW Consultants' visit
- Extremely light set-out (<10 set-outs during full day's route audit)
- Some residents likely storing materials until services resume




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Collection Observations: Recycling

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Crews instructed to dispose of OCC due to concerns over moisture.

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Collection Observations: Charleston Topography

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Narrow Roads



Steep Grades




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Key Recycling Metrics: (where we are vs. where we can go)

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Metric	Charleston	Optimized Program*
Lbs./HH/Yr.	70	458
Participation Rate	19.5%	85%
Processing Cost Per Ton	\$175	\$80-\$125



* Source: The Recycling Partnership; MSW Consultants

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MSW Consultants' Observations

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But first, a word about other curbside collection services:

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Collection Observations: Unlimited Set-outs

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Collection Observations: Yard Waste

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Collection Observations: Bulky & Scrap Metals

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Collection Observations: Multi-Family

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MSW Consultants' Observations

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- Recycling collection programs function most effectively when:
 - ☑ Large recycling bins or carts
 - ☑ Convenience
 - ☑ Consistent, clear and ongoing public education and outreach
 - ☑ Recycling collection provided as part of a utility rate structure
 - ☑ Recycling is incentivized
- Strong industry push towards automated collections


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Recyclables Processing

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Raleigh County Solid Waste Authority (RCSWA)



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- Recyclables processor since 2014
- Operates drop-off center network (including Raleigh County schools)
- **60 mile one-way trip**
- **\$0 processing fee until 2020 (subsidized by landfill tipping fees)**

- **\$175 processing fee 2020**
- **MRF processes ~2,600 tons per year (facility runs at ~20% capacity)**



RCSWA Material Recovery Facility

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RCSWA - MRF

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Infeed System & Sort Line

Paper Bunker





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RCSWA - MRF

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Bale Storage	Drop-off Bin
	

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RCSWA – Educational Center

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MSW Consultants' Observations: RCSWA

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Benefits	Drawbacks
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Availability <input checked="" type="checkbox"/> Single-stream system <input checked="" type="checkbox"/> Stability <input checked="" type="checkbox"/> Extra capacity 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> ~60 mile one-way trip <input checked="" type="checkbox"/> High processing price <input checked="" type="checkbox"/> Labor-intensive processing system

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Kanawha County Solid Waste Authority (KCSWA)

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- City's recyclables processor until 2014
- Recyclables processed (tons per year):

2010	2015	2017	2019
7,242	625	585	287

Source: KCSWA & WV SWMB

- Annual budget = ~\$100,000 (includes DEP REAP funds, materials sales)
- **Source-separated system**



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KCSWA – Slack Street

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Bales Awaiting Shipment
Covered Storage




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KCSWA – Eden’s Ford

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Baling Operation & Storage	Baler & Bobcat
	

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KCSWA – Eden’s Ford

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Baler & Bobcat	Push wall & Materials
	

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MSW Consultants' Observations: KCSWA	
35	
Benefits	Drawbacks
<ul style="list-style-type: none"><input checked="" type="checkbox"/> Local resource<input checked="" type="checkbox"/> ~1 mile to facility<input checked="" type="checkbox"/> High-quality materials<input checked="" type="checkbox"/> Sufficient parcel for facility development	<ul style="list-style-type: none"><input checked="" type="checkbox"/> Source-separated processing system<input checked="" type="checkbox"/> Scalability & cash flow<input checked="" type="checkbox"/> No existing structure

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Contracts Overview
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Recyclables Processing (RCSWA)

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- MOU between City & RCSWA effective September 28, 2020 – June 30, 2021
- Parties resolve to reassess pricing and work toward new agreement for FY 2022
- **\$175 per ton**

- MOU silent on key recyclables processing contract terms:
 - Recyclables market value
 - Revenue share
 - Materials composition
- **City not incentivized to deliver clean recyclables stream**

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Education & Outreach Overview

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Recycling Outreach Materials

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Downloadable Recycling Bin Decal
Recycling Guide






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Recycling Outreach Materials

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Recycling FAQ
Other



- Community Resource Guide
- Fire & Refuse Fees FAQ

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Recycling Outreach Materials: Social Media

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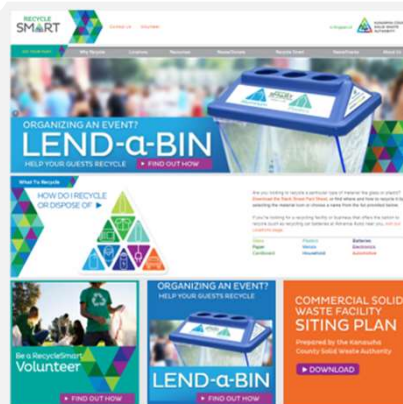
<https://www.facebook.com/CityCharlestonWV/photos/2717739008480885>

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Outreach Review: KCSWA Resources

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- <https://www.facebook.com/KanawhaCountySWA>



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MSW Consultants' Observations: Outreach

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- **Greater staffing and resources commitment is needed**
 - Recycling guide not impactful
 - Materials are difficult to locate on City's website
 - Information not routinely updated

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Benchmarking (in-progress)

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Benchmarking Cities

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City	State	Population	Households
Annapolis★	MD	39,223	15,664
Harrisburg★	PA	49,271	20,520
Huntington	WV	45,110	19,755
Morgantown	WV	30,549	10,522
Parkersburg	WV	29,306	13,152

★ = State capital

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Benchmarking Cities: System & Financials

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Residential Collection Systems		Financials		
City	Service Provider	City	Solid Waste Budget	Monthly Rate*
<i>Charleston</i>	<i>City</i>	<i>Charleston</i>	\$3.29 M	\$18.00
Annapolis	City	Annapolis	\$3.28 M	\$22.83
Harrisburg	City	Harrisburg		\$32.34
Huntington	City	Huntington	\$3.63 M	
Morgantown	Republic Services (exclusive franchise)	Morgantown	\$1.46 M	
Parkersburg	City	Parkersburg	\$2.58 M	\$16.00

* Rate for all solid waste services.

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Benchmarking Cities: Recycling Collections

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City	Frequency	Container Types
<i>Charleston</i>	<i>Weekly</i>	<i>Personal containers & bags</i>
Annapolis	Weekly	Carts
Harrisburg	Weekly	Bins
Huntington	Weekly	N/A (drop-off program)
Morgantown	Weekly	Carts
Parkersburg	Weekly	Bins

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Benchmarking Cities: Performance & Services

Benchmarking to allow quantitative comparisons of tonnage, generation, recycling rates, etc.

Also will examine qualitative program features:

- Recycling container types
- Outreach & education programs

City	Trash	Recyc.	YW	Total MSW	Recyc. Rate
<i>Charleston</i>	<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>	<i>x</i>
Annapolis	x	x	x	x	x
Harrisburg	x	x	x	x	x
Huntington	x	x	x	x	x
Morgantown	x	x	x	x	x
Parkersburg	x	x	x	x	x

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MSW Consultants' Observations

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- Do benchmarking cities provide more comprehensive services?
- Do rates adequately cover costs of service?
- Best management practices among benchmarking cities?

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Cost of Service Estimate

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Recycling Direct Costs

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- Pro-Forma direct cost estimate:
 - Collection vehicle capital cost
 - Collection vehicle O&M cost
 - Labor and fringes
 - Recyclables processing costs
- Analysis does not allocate administrative & overhead costs
- Analysis excludes additional collection services
 - No attempt made to validate current rates

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**Cost of Service Estimate:
Truck Capital, O&M**

Truck Capital Costs	
Metrics	Current
Cost per Truck	\$142,000
Trucks Needed (w/ One Spare)	4
Total Capital Cost	\$568,000
Useful Life (Years)	7
Annualized Capital Cost	\$81,143
Truck O&M Costs	
Metrics	Current
Routes	3
O&M Cost/Route	\$33,540
Total O&M Cost	\$100,620

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Cost of Service Estimate:
Labor

Position	Avg Wage & Benefits	Current	
		Count	Annual Cost
Sanitation Crew Leader	\$61,550	1	\$61,550
Sanitation Driver	\$46,267	4	\$185,067
Sanitation Worker	\$42,089	8	\$336,713
Total		13	\$583,331

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Cost of Service Estimate:
Recyclables Processing

Processing Costs	
Parameter	Current
Recycling Tonnage	631
Processing Per Ton	\$175.00
Total Processing Cost	\$110,425

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Cost of Service
Estimate:
Total Pro-
Forma

Scenario Cost Summary	
Metric	Current
Set-Out Rate	25%
Number of Routes	3
Annualized Capital Cost	\$81,143
Vehicle O&M Cost	\$100,620
Labor Cost	\$583,331
Processing Cost	\$110,425
Total	\$875,519
Households	18,000
<i>Annual Cost per HH</i>	<i>\$48.64</i>
<i>Monthly Cost per HH</i>	<i>\$4.05</i>
Recycling Tonnage	631
Cost per Ton	\$1,388

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Optimized Recycling

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Achieving Regional Recycling Critical Mass

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Jurisdiction	Pop.	# HH	Est. Tons
City of Charleston	46,536	21,970	5,042
Kanawha County (less Charleston)	131,588	57,467	13,189
All others (9)	289,351	118,196	27,126
Totals:	467,475	197,633	45,357

- Potential recyclables generation sufficient to support expanded regional recyclables processing capacity
- Based on 459 lbs. per household per year (optimized program with glass)
- **Scale matters**

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High-Performing Recycling Programs Have:

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High-Performing Recycling in Charleston?

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<ul style="list-style-type: none">☑ Optimized curbside collection services☑ Standard recycling containers☑ Carts-based collections☑ Develop more cost-effective processing capacity☑ Clear and transparent fee and incentive to recycle	<ul style="list-style-type: none">☑ More dynamic program education and outreach<ul style="list-style-type: none">☑ Mobile apps☑ On-line presence☑ Coordination with KC School district☑ Dedicated recycling coordinator
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Next Steps

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