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TECHNICAL MEMORANDUM

DATE: April 7, 2017

TO: Himanshu Mehta, Managing Director
Indian River County Solid Waste Disposal District

FROM: Robin Mitchell, Project Manager

SUBJ: **Traditional Recycling Opportunities and Approaches**

PROJ #: 73-04.00; 73-05.00

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1. INTRODUCTION

The purpose of this memorandum is to identify traditional and demonstrated recycling approaches that will assist Indian River County (County) in striving to achieve the State recycling goal. Table 1 provides the various tiers of the State recycling goal and the County's reported recycling rate for each year. The County came close to meeting the 2012 State goal, but failed to achieve the 2014 or 2016 goals.

Table 1: Florida Recycling Goal and Indian River County Recycling Rate

Year	State Goal	County Recycling Rate
2012	40% by December 31, 2012	37%
2013	Same as above	37%
2014	50% by December 31, 2014	36%
2015	Same as above	34%
2016	60% by December 31, 2016	37%
2018	70% by December 31, 2018	TBD
2020	75% by December 31, 2020	TBD

In 2014, Kessler Consulting, Inc. (KCI) was part of a team that developed an update to the County's Solid Waste Management Plan. As part of that update, KCI developed three phases of recycling recommendations for the County to strive to achieve the State recycling goal. A summary of this phased approach is provided in Attachment 1 of this memorandum.

The Solid Waste Disposal District (SWDD) has implemented or initiated several of the Phase 1 recommendations, including hiring a recycling program coordinator, converting to carted single stream recycling, and expanding public outreach on recycling. These changes increased the quantity of residential recyclables by approximately 51%. Because residential waste represents only a portion of waste generated in the County, the impact on the countywide recycling rate was only about 2-3%.

The County also issued a Request for Information (RFI) on May 22, 2016 to explore the viability of processing technologies that achieve high material recovery rates. This was also a Phase 1 recommendation in the Management Plan Update. In July 2016, the County received 12 submittals in response to the RFI that offered a range of technologies, including mixed waste processing, gasification, pyrolysis, and biosolids and organics processing.

Following a briefing on the RFI results during a September 13, 2016 meeting, the SWDD Board of Directors decided not to proceed with a Request for Proposals (RFP), but instead requested SWDD staff to look at traditional recycling programs implemented in Florida counties with high recycling rates, including the costs and resources to implement such programs and associated waste diversion.

SWDD requested KCI's assistance in compiling this information and identifying traditional recycling options for consideration by the SWDD Board of Directors. The results of this work are summarized in this memorandum.

2. FLORIDA COUNTY DATA ANALYSIS AND RESEARCH

KCI analyzed Florida Department of Environmental Protection's (FDEP) 2015 recycling data by county.[1] Before discussing this data, we offer a word of caution. Solid waste professionals throughout the State acknowledge that the accuracy of this data is less than perfect. It is based on self-reporting by counties and facilities, the latter of which must make determinations regarding the county of origin for the materials it manages. Some counties also seek out existing reuse and recycling activities that are not reported to FDEP (non-certified recycling), especially for heavy materials such as concrete, in order to boost their recycling rates. While FDEP makes an effort to cross-check data, it is not a perfect system. It is, however, the current system used by FDEP to measure progress toward recycling goals.

In 2015, no county had a traditional recycling rate exceeding 60% and only nine counties had an overall recycling rate exceeding 60%.[2] Six of these nine counties have waste-to-energy facilities and the other three counties received recycling credits for landfill gas recovery or other renewable energy.

This discussion focuses on traditional recycling rates (not including energy recovery credits). In 2015, 20 counties had rates exceeding 40% and only 10 of those counties exceeded 50%. As noted in Table 2 (see next page), construction and demolition debris (C&D) contributed as much as 66% and an average of 36% of all materials recycled in the 20 counties with the highest traditional recycling rates. Other material streams contributing high percentages to the recycling rates were yard trash and process fuel.[3] Combined, these three material streams (C&D, yard trash, and process fuel) represented as much as 84% and an average of 57% of materials recycled in these counties. In fact, for three of the four counties reporting the highest recycling rates, these three material streams represented more than 75% of all tons recycled in 2015.

For comparison purposes, Table 2 also includes Indian River County. Yard trash and process fuel contributed 64% of the total tonnage of material recycled in 2015, but C&D recycling lagged far behind compared to most of the top 20 counties. While other material streams certainly contributed to the recycling rates in these counties, this analysis demonstrates the role of C&D, yard trash, and process fuel in achieving high recycling rates.

[1] FDEP had not yet published 2016 data at the time of report preparation.

[2] Traditional recycling rates do not include renewable energy recovery recycling credits; overall recycling rates do include these credits.

[3] FDEP defines process fuel as the use of yard trash, other clean wood waste, or paper waste to produce alternative clean-burning fuels such as ethanol or to convert these materials to clean-burning fuel for the production of energy for use at facilities other than a waste-to-energy facility.

Table 2: Florida Counties with Highest Traditional Recycling Rates in 2015

County	Traditional Recycling Rate	C&D as % of Tons Recycled	Yard Trash as % of Tons Recycled	Process Fuel as % of Tons Recycled	C&D, Yard Trash & Process Fuel as % of Tons Recycled
Charlotte	59%	58%	24%	0%	82%
Sarasota	59%	65%	12%	0%	77%
Brevard	58%	31%	36%	17%	84%
Martin	58%	14%	3%	36%	52%
Collier	56%	34%	38%	0%	72%
St. Lucie	54%	23%	21%	5%	49%
Orange	52%	50%	6%	0%	55%
Pinellas	52%	53%	18%	0%	71%
Citrus	51%	10%	16%	0%	25%
Leon	51%	64%	2%	6%	71%
Hillsborough	49%	44%	8%	0%	52%
Alachua	48%	39%	27%	0%	66%
Duval	47%	36%	13%	12%	61%
Manatee	47%	22%	19%	32%	73%
Marion	47%	28%	14%	0%	42%
Lee	46%	38%	20%	0%	58%
Broward	43%	66%	2%	0%	68%
Madison	43%	1%	2%	0%	3%
Palm Beach	42%	43%	5%	16%	64%
Putnam	42%	0%	21%	0%	21%
Average	**50%**	**36%**	**15%**	**6%**	**57%**
Indian River	33%	6%	30%	27%	64%

Note: Indian River County's overall recycling rate was 34%, but the traditional recycling rate (not including energy recovery credits) was 33%.

KCI surveyed five of the top 20 counties to identify the programs and policies that contributed to the recycling rate in each. This included the two counties reporting the highest traditional recycling rates in 2015 (Charlotte and Sarasota), St. Lucie County because of its proximity to Indian Rivers County, and two counties selected by KCI based on their note-worthy programs (Alachua and Lee). Table 3 provides a summary of the key findings of this survey.

Additional information regarding specific programs and policies are included as case studies in appropriate sections of this report. All case study information provided in this report is based on information provided by the respective government personnel or obtained by reviewing contracts or other available information.

Table 3: Key Recycling Programs in Select Florida Counties

County	Traditional Recycling Rate	2015 Population	Key Recycling Programs	Annual Budget	Solid Waste Staff
Alachua	48%	254,893	• Mandatory commercial and multi-family recycling – source-separation of at least 3 recyclables; inspect all businesses (~1,000) annually; educate noncompliant businesses; repeat offenders brought to enforcement board; $125 fine allowed but has never been levied • Mandatory separate yard trash collection • Pay-as-you-throw (PAYT) residential collection – 18% decrease in solid waste and 25% increase in recycling in first year implemented (1994) • Education and outreach; Tools for Schools	Total SW: Personnel - $3.9M Operations - $17.4M Recycling: MRF - $2.3M Waste Alternatives: Enforcement - $75,000 E&O - $325,000 Admin - $375,000	66 - FTE Total (TS, MRF, etc.) 10 FTE - MRF 5 FTE - Waste Alternatives
Charlotte	59%	167,141	• Concrete recycled for road projects – County sought non-certified recycling tonnage and identified 126,000 tons of concrete and other materials recycled in road projects with no County involvement (represents nearly half of all recycled material in 2015) • Conversion to carted single stream recycling • Education and outreach	Total SW: Sanitation - $14.5M Landfill - $27.1M Recycling: Collection - $3.2M E&O - $20,000	31 – FTE Total 1.7 FTE - Recycling
Lee	46%	665,845	• Mandatory C&D recycling – Materials Management Plan required prior to work; diversion fees must be paid if 50% diversion not achieved before CO will be issued; C&D recycling facilities must meet minimum 50% diversion (C&D represents 38% of recycled material) • Mandatory commercial recycling – must recycle at least 1 recyclable making up largest portion of waste stream; compliance inspections (~1,200/year); Advance Disposal Fee (ADF) of $100-500 may be levied for non-compliance but has never been used; 98% compliance • Mandatory multi-family recycling – requires onsite recycling program for recyclable paper and containers, white goods, and electronics; inspections; fines of up to $500 allowed but never levied; 100% compliance	Total SW - $83.8M Estimated Recycling - $2.6M (includes MRF capital & operating expenses)	96 - FTE Total (WTE, LF, etc.) 1 FTE - MRF 6 FTE - C&D 8 FTE - compost 2 FTE – recycling E&O 5 PTE - inspections

			• Conversion to carted single stream recycling – 22% increase in residential recyclables after conversion; >90% participation • County owned and operated C&D recycling facility – 45% recycled; represented <10% of total C&D recycled (remainder by private companies) • Education and outreach		
Sarasota	59%	392,090	• Mandatory C&D recycling – requires all mixed C&D dispensed within unincorporated county be delivered to any C&D recycling facility (C&D represents 65% of recycled material) • Mandatory residential recycling – estimates 66% of residential waste is recycled; includes all multi-family properties • Mandatory commercial recycling – estimates 90% of unincorporated county businesses in compliance; compliance inspections (~1,100/year); educate businesses not in compliance and re-inspect; never issued a fine, but occasionally code enforcement inspects • C&D recycling contractor at County facility – 38% recycled; represented <5% of total C&D recycled (remainder by private companies) • Education and outreach – delivers E&O materials to multi-family property manager to distribute to tenants • Green Business Partnership certification program – county does not believe this program had a significant impact	Total SW: Personnel - $2.3M Operations - $34.3M Estimated Recycling: Personnel - $211,035 Operations - $175,600	34 - FTE Total (LF, etc.) 2.5 FTE - Recycling
St. Lucie	54%	287,749	• C&D recycling contractor at county facility • Education and outreach – recycling challenge in 2014 periodically awarded $100 to residents recycling right; distributed ~$5,000/month	Total SW: Personnel - $4.5M Operations - $13.1M Recycling: NA	72 - FTE Total (LF, MRF, etc.) 22 FTE - MRF 2 FTE – Recycling E&O

Note: Information provided in this table is based on information provided by county staff or found on county websites.

Key:
E&O = Education and Outreach
LF = Landfill
NA = Not Available
SW = Solid Waste
WTE = Waste-to-Energy
FTE = Full-Time Equivalents
MRF = Material Recovery Facility
PTE = Part-Time Employee
TS = Transfer Station

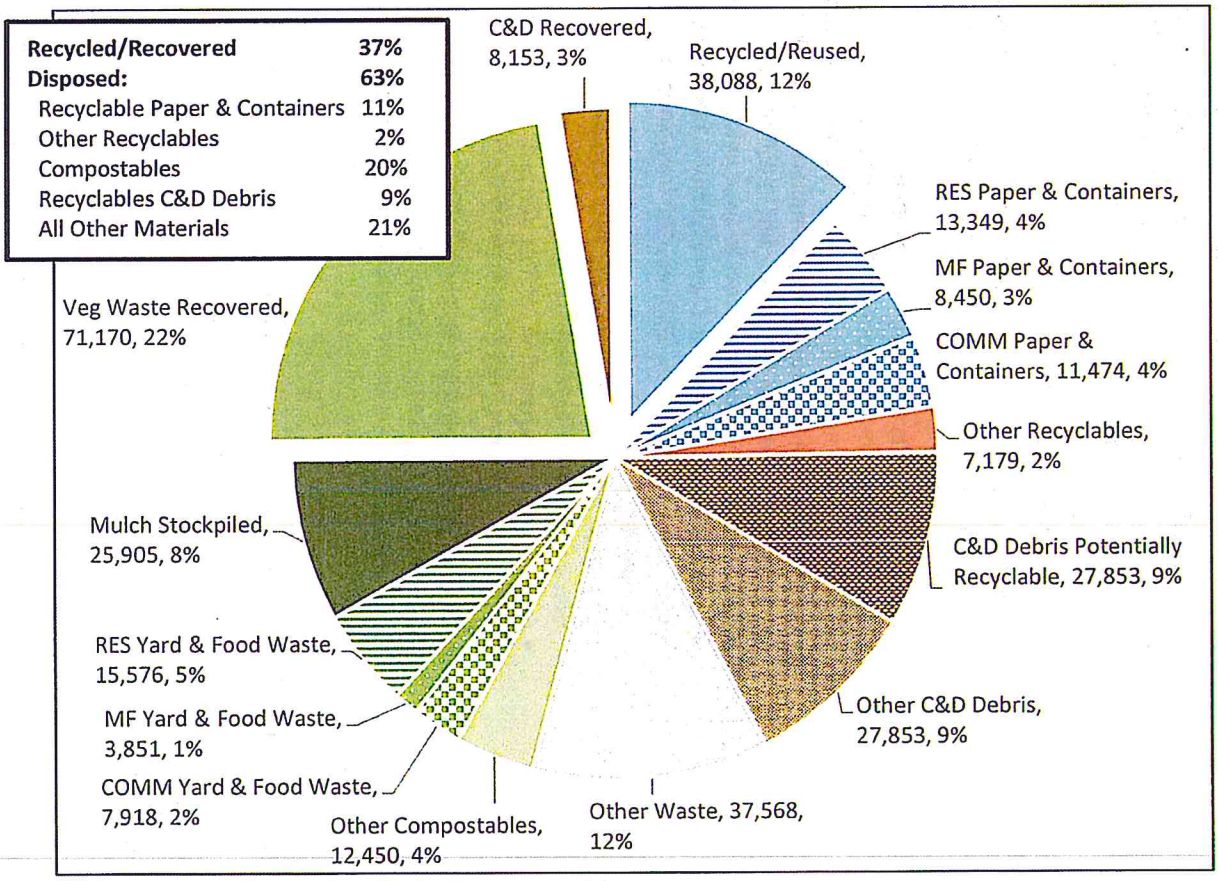
Table 3 also provides budget and staffing information for each county. Because of the range of services included and differences in the types of facilities each county owns and/or operates, caution should be used when making comparisons. SWDD's FY 2017 budget is $13.1 million, with $6.7 million earmarked for convenience centers and recycling activities. Of this, approximately $240,000 is for recycling education and outreach. SWDD employs 10 FTE, one of which focuses on recycling efforts.

3. INDIAN RIVER COUNTY RECYCLING OPPORTUNITIES

To identify the greatest recycling opportunities in Indian River County, KCI used SWDD's 2016 facility tonnage data, 2016 data reported to FDEP, and results of the 2014 waste composition study. By opportunities, we mean where the largest quantities (tons) of potentially recyclable materials exist that might be feasible to recover.

Figure 1 depicts the 37% of materials that were recycled in 2016 and also provides a breakdown of the types and sources of materials that were landfilled. The quantities and types of waste generated can vary greatly year over year; therefore, this figure is provided merely as a planning tool. It depicts the estimated composition of waste generated within the County at a given point in time.

Figure 1: Materials Management in Indian River County, 2016 (% by weight)



RES = Residential MF = Multi-family COMM = Commercial

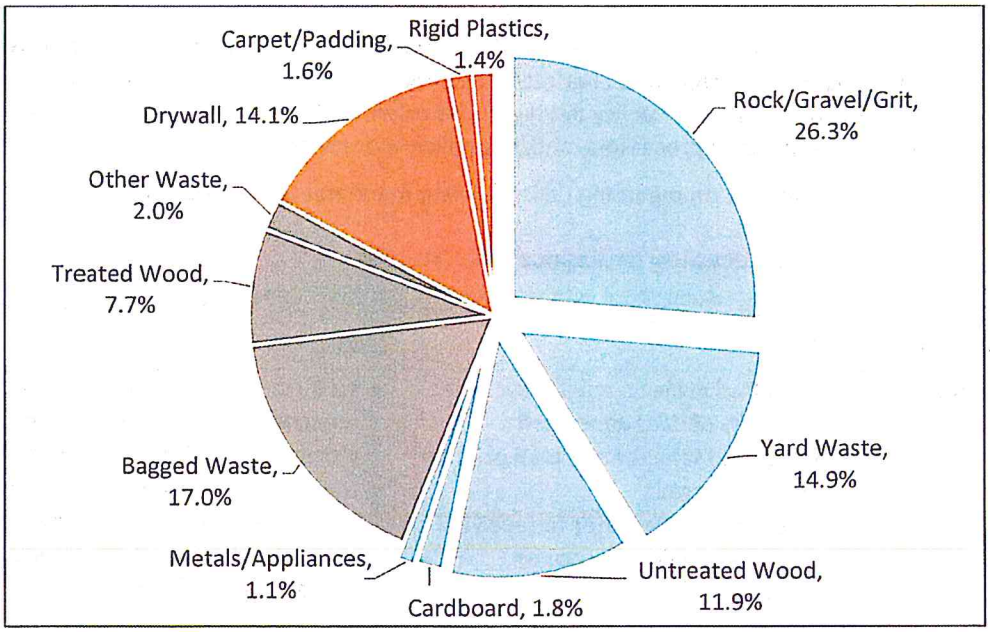
Source: This figure was developed based on data compiled by SWDD and provided by FDEP. The breakdown by source and material type was based on results of a 2014 waste composition study conducted by KCI for SWDD and adjusted to account for implementation of single stream recycling.

Other Recyclables includes electronics, polystyrene, ferrous and nonferrous metals, and white goods.

Based on Figure 1, an estimated 42% of the waste generated consisted of potentially recyclable or compostable materials that were disposed. The County does not have the programs and infrastructure in place to recover and process all of these material types, and even if it did, it is not realistic to assume that they would all be recovered. However, the greatest opportunities to increase recycling include the following:

- C&D – On a tonnage basis, C&D offers one of the greatest opportunities to increase the recycling rate. In 2016, SWDD received nearly 45,000 tons of mixed C&D and approximately 14,000 tons of clean concrete. An estimated 3,300 tons of this material was recycled at the SWDD facility as road base. SWDD appears to receive most of the C&D generated within the County, although IRC Recyclers, a C&D processor located near the landfill, recycled nearly 5,000 tons of C&D in 2016. Based on a visual audit of bulky waste conducted by KCI for the County in 2014 (see Figure 2), at least 50% of the C&D received at the landfill consisted of potentially recyclable materials (rock/gravel/grit, yard waste, untreated wood, cardboard, metals, and appliances).

Figure 2: Visual Audit of Bulky Waste and C&D Debris (% by weight)



- Organics – In 2016, nearly 26,000 tons of ground vegetative waste appears to have been stockpiled for future use as alternative daily cover (ADC). This material cannot be considered recycled. In addition, an estimated 27,000 tons of yard trash and food waste (approximately 8% of all waste generated in 2016) were disposed as part of the mixed residential and commercial waste streams.
- Traditional recyclable materials – An estimated 33,000 tons of recyclable paper and containers (approximately 11% of all waste generated in 2016) were also disposed as part of the mixed residential and commercial waste streams. This figure is estimated to have dropped by more than 4,000 tons in 2016 following implementation of residential single stream recycling.

In the following sections, each of these material streams is discussed in greater detail. The potential diversion opportunity is reiterated and any applicable Florida laws regarding the material stream or generator sector is provided. This is followed by case studies of how other jurisdictions have increased recycling of each particular stream and approaches for consideration by the County. All cost estimates are based on other similar programs and are very preliminary in nature. They are subject to change based on more detailed implementation plans for any selected approaches.

4. C&D DEBRIS

Opportunity: The quantity of C&D generated can fluctuate widely year to year. In 2016, nearly 45,000 tons of C&D were disposed at the SWDD landfill and nearly 11,000 tons of concrete and dirt/sod were stockpiled. Based on a 2014 visual audit, at least half of the C&D received by SWDD consisted of potentially recyclable materials. Applying this to the 2016 C&D tonnage, C&D recycling has the **potential to increase the County's overall recycling rate by an estimated 9%.**

Florida Law: Florida law requires each county to implement a program to recycle C&D (Section 403.706(2)(b), F.S.). It further requires that, to the extent economically feasible, all C&D debris must be processed prior to disposal, either at a permitted MRF or permitted disposal facility (Section 403.707(9)(g), F.S.).

Case Studies: KCI surveyed five Florida counties to identify initiatives that helped achieve a high level of C&D recycling. In two counties (Alachua and Charlotte), C&D recycling was conducted by private recyclers with no county involvement or policy driving it. The other three counties (Lee, Martin, and Sarasota) use mandates, contracted processors, and/or publicly owned facilities.

Table 4 provides relevant information regarding C&D recycling mandates in Lee and Sarasota counties.

Table 4: Mandatory C&D Recycling Ordinance Case Studies

	Lee County, FL	Sarasota County FL
Year established	2008	2003
Requirements	• Permitted projects must recycle at least 50% of C&D generated • Materials Management Plan prior to receiving permit • Proof of recycling prior to receiving Certificate of Compliance or Certificate of Occupancy • C&D facilities must recycle at least 50% of materials received	• All mixed C&D dispensed within unincorporated county must be delivered to a C&D recycling facility • County attorney gave opinion that ordinance does not apply to C&D generated in Sarasota County but disposed out-of-county
Enforcement	• If 50% recycling not achieved, diversion fees imposed • Diversion fees range from $110-$5,00 based on project type/size	• Written warning for first offense • Penalties starting at $200 for 2nd offense up to $500 for 4th offense • Not actively enforced
Compliance	Reports 90% compliance	Not actively enforced
Diversion	Reported 53% of C&D recycled in 2015 (229,172 tons)	Reported 76% of C&D recycled in 2015 (338,309 tons)
Staffing	1 FTE	Not actively enforced

Currently, Sarasota County does not actively enforce its ordinance. Lee County has a more structured program and actively works to enforce its ordinance. They estimate that 90% of C&D projects comply and 53% of C&D was reportedly recycled in 2015.

Martin and Sarasota counties contract for processing mixed C&D received at their facilities. Table 5 provides relevant information regarding these programs. Material recovery rates at the two facilities are similar (42% and 38%). The Martin County representative indicated that if they had it to do over again, they would construct the C&D processing facility themselves and contract for operation.

Table 5: C&D Recycling Contractor Case Studies

	Martin County, FL	Sarasota County FL
Contractor	R3 Recycling	WCA
Location	County facility	County facility
Requirements	• R3 provides equipment and labor • Recycle at least 65% of C&D received • No penalty specified for not achieving recovery rate	• WCA provides equipment and labor • Recycle at least 50% of C&D received • $2,500 penalty for each percentage point below 50%, calculated semi-annually
Throughput	26,337 tons (2015)	48,597 tons (2015)
Materials recovery	11,185 tons (2015)	18,686 tons (2015)
Recovery rate	42% (represents 70% of total C&D recycled in county)	38% (represents 5% of total C&D recycled in county)
Staffing	0.2 County FTE	0.1 County FTE 6 WCA FTE & 2 temp. labor
County tip fees	• $42.00/ton • $8.00/cubic yard (cy) • $21.00/ton for concrete	• $48.96/ton • $16.32/cy
Contractor fees	• $32.50/ton • $8.00/cy • $18.00/ton for concrete • Contractor pays tip fee for C&D landfilled	• Same as tip fees (pass-through to WCA) • Tiered rebate to county of $1.00-2.00/ton for tonnage exceeding 2,000 TPM • County pays $2.34/ton for recovered screen material (RSM) • WCA pays tip fee for C&D landfilled
Comments	If county had it to do over again, would construct the facility and contract for operation	Most C&D generated in county is delivered to private facilities

County-owned and -operated C&D processing facilities are not common in Florida; therefore, Table 6 provides relevant information about one facility in Lee County, Florida, as well as a publicly owned and operated facility in Horry County, South Carolina.

Table 6: Publicly Owned and Operated C&D Recycling Facility Case Studies

	Lee County, FL	Horry County Solid Waste Authority (HCSWA), SC
Owner & operator	County; constructed 2011	HCSWA; constructed 2012
Capacity	500 TPD	72,800 TPY
Throughput	~50,000 TPY 49,835 tons (2015)	14,049 tons (FY2014/15)
Materials recovered	22,669 tons (2015) Concrete, rubble, brick, roofing tile, wood, ferrous and non-ferrous metals, cardboard, and select plastics. May add asphalt shingles to recycle into pavement	10,092 tons (FY 2014/15) Clean wood, dirt, concrete, cardboard, scrap metal, carpet, scrap plastic, mattresses/pads, PET plastic, and aluminum
Recovery rate	45% (represents ~10% of total C&D recycled in county)	72%
Equipment	• Designed by Machinex • Finger screen, sorting line, magnetic separator, trommel screen, density separator	• Low-technology portable system that can be moved around the site. • Trommel screen, sorting line with magnetic separator, and baler
Staffing	Single shift 4-5 days/week 6 FTE (1 supervisor and 5 equipment operators) 13 temporary laborers (10 to sort and 3 for traffic control)	5-10 workers
Capital cost	$3.5M, including $1.8M for equipment	$1.0M, including rolling stock (trackhoe excavator, wheel loader, and skid steer)
Annual costs & revenues	Costs: $1.3-1.9M ($26-39/ton), Includes amortized equipment costs Revenue: $1.5M (~$30/ton)	Costs: $271,897 ($20.40/ton) Revenue: $273,017 ($20.48/ton)

Approaches: Some counties have boosted their recycling rates by identifying C&D recycling activities, especially concrete recycling, that are not reported to FDEP (non-certified recycling). While SWDD receives most of the C&D generated within Indian River County, it may be worth researching whether unreported concrete recycling is occurring.

Because SWDD receives the vast majority of C&D, establishing at least a basic recovery system at the SWDD facility would be key in recycling this material. SWDD could either contract for development and operation of a processing system, or construct a processing line and then operate or contract for operation. To ensure the long-term financial viability of this investment, the County should ensure that C&D will continue to be delivered to the SWDD facility in the future. This could be accomplished through a nonexclusive license or franchise system. If passed, recently proposed State legislation to add wood, asphalt, and concrete to the list of materials included in the legislative definition of recovered materials could limit the County's ability to direct these materials to the SWDD facility.

Table 7 summarizes C&D recovery approaches that have been demonstrated to be successful in other jurisdictions and could be implemented in Indian River County. If SWDD continues to receive the vast majority of C&D generated within the County and establishes a recovery system at the SWDD facility, then the last approach (mandate) would not be needed.

Table 7: C&D Recovery Approaches

Approach	Objective	Estimated Cost	Estimated Staffing	Diversion Potential	Level of Acceptance
Research Private Concrete & C&D Recyclers	To get credit for any non-certified recycling by private companies	None	Minimal	Unknown	High
Contract for C&D Recovery	To process 50,000-60,000 tons of C&D received at SWDD facility	No capital costs $25-35/ton	0.1 FTE	High if SWDD receives most of C&D Low-Moderate if C&D goes to private facilities	High unless tip fee is increased
Construct C&D Recovery Line	To process 50,000-60,000 tons of C&D received at SWDD facility	Capital cost - $1.0-1.5M Operations - $20-30/ton	3-5 equipment operators 5-10 sorters	High if SWDD receives most of C&D Low-Moderate if C&D goes to private facilities	High unless tip fee is increased
Mandatory C&D Recycling Ordinance	To require minimum recycling rate for C&D generated in County	No capital costs	1.0 FTE	High if enforced	Moderate public support Low-Moderate support by generators High support by recyclers

5. ORGANICS RECOVERY AND PROCESSING

Opportunity: In 2016, an estimated 26,000 tons of mulched vegetative waste was stockpiled for future use as ADC at the landfill. An estimated 27,000 tons of yard trash and food waste (~8% of all waste generated) were disposed at the SWDD landfill as part of the mixed residential and commercial waste streams, as well as about 12,000 tons of other potentially compostable materials (~4% of all waste generated) such as non-recyclable paper and clean wood waste (see Figure 1). Putting the stockpiled mulch to beneficial use would have increased the recycling rate by approximately 8%. Combining this with an expanded organics recovery and processing program has the **potential to increase the County's overall recycling rate by an estimated 10-12%**, depending on the program initiated.

Additionally, the County receives more than 8,000 tons of sludge annually, which is currently dewatered and landfilled. Although FDEP does not count sludge as solid waste for the purposes of calculating recycling rates, establishing an organics composting system would put these biosolids to beneficial use, preserve landfill space, and eliminate the special handling of this material required on the working face. In addition, co-composting biosolids and yard trash, with the possible addition of food waste, results in a high-quality, marketable end product.

Florida Law: Florida law bans disposal of yard trash in Class I landfills unless (1) the landfill has an active gas-collection system and the landfill gas is put to beneficial use or (2) the yard trash is mulched and used as landfill cover (403.708(12)(c), F.S.). In addition, counties are encouraged to consider plans for composting or mulching organic materials that would otherwise be disposed of in a landfill (403.706(2)(i), F.S.). Landfill gas from the SWDD landfill had been delivered to INEOS where it was used for energy recovery. Because the INEOS facility is currently not operational, landfill gas is now being flared. Therefore, other than de minimis amounts, yard trash should not knowingly be disposed in the SWDD landfill at this time.

Case Studies: Numerous Florida counties have separate collection of yard trash and have achieved compliance through education, making separate collection convenient through curbside service, and, in some cases, requiring separation. Food waste recycling is less common in Florida and has generally been initiated by the private sector – either by large food waste generators (e.g., Walmart, Publix, large venues) seeking to reduce their environmental footprint or by organics processors seeking feedstock for their facilities. This was confirmed by KCI's survey of four Florida counties that reported recycling relatively high quantities of food waste. None of these counties were directly involved in the food waste recycling occurring in their respective county (see Table 8).

Table 8: Food Waste Recycling Reported in Select Florida Counties, 2015

County	Food Waste Recycling (tons)	Reported Sources
Charlotte	2,900	Private entities reporting to DEP, food bank
Martin	14,496	Genuine Biofuels (11,500 tons of FOG); Viesel Fuel (used cooking oil); Walmart (food waste)
Orange	20,831	Walmart, Disney, Universal Studios, Convention Center, Griffin Industries (FOG), Organic Matters (processor)
Sarasota	4,435	Private entities reporting to DEP including Walmart, food banks

FOG = fats, oil, and grease

The vast majority of Florida counties simply mulch yard trash; however, a more robust processing system is needed for food waste and biosolids. Therefore, KCI focused on relatively low-cost systems capable of co-composting yard trash, biosolids, and food waste. Because few examples exist in Florida of publicly owned composting facilities, Table 9 provides information regarding one in-state facility and one out-of-state facility that are owned and operated by public sector entities. Both facilities use the Modified Static Aerobic Pile (MSAP) composting method. KCI has worked with both facilities, as well as other clients throughout the country, in piloting the MSAP method with exceptional results. The MSAP method, developed by Harvest Quest International, relies on a proprietary microbial inoculant that expedites the composting process and minimizes turning requirements, which translates into lower operating costs. Reducing the number of turnings also controls odor better than traditional windrow composting.

Table 9: Publicly Owned and Operated Composting Facilities

	Charleston County, SC	Emerald Coast Utilities Authority (ECUA), FL
Owner & operator	County	ECUA
Types and quantities of feedstocks	Yard waste ~75,000 tons/year Food waste ~5,000 tons/year	Yard waste ~20,000 tons/year Biosolids ~20,000 tons/year
Size of the facility (total & active composting area)	Total ~ 20 acres Compost & curing ~16 acres	Total ~16 acres Compost & curing ~9 acres
Composting method	MSAP	MSAP
Primary equipment utilized	Peterson horizontal grinder (6710D) 2 CAT loaders Scarab windrow turner (16) Doppstadt screen (726)	Morbark tub grinder 2 CAT loaders Backhus windrow turner (A55) Komptech multi-deck screen (L3) Doppstadt trommel screen (726)
Staffing	14 FTEs	3 FTEs
Capital cost	Total not available: active pad ~$480,000	$2.5 million
Operating costs & revenues	Annual cost: $2,504,000 Annual revenue: $234,000 Net annual cost: $2,270,000 Net cost/ton: $35/ton	Annual cost: $537,000 Annual revenue: $104,000 Net annual cost: $433,000 Net cost/ton: $11/ton

MSAP = Modified Static Aerobic Pile

Approaches: The County has programs in place for separate yard trash collection (subscription curbside collection and citizen convenience centers (CCCs)). Establishing universal collection in the Urban Service Area (USA) would make separate collection of yard waste more convenient to residents in the USA that do not currently subscribe for curbside service. In addition, the County could do more to educate residents and businesses that yard trash should be separated from other solid waste prior to collection or delivery to the CCCs.

To initiate a food waste recycling program, SWDD will need to establish both collection and processing infrastructure. The initial collection focus should be on large commercial food waste generators. SWDD should first work with its collection franchisee to establish a fee structure for collecting segregated commercial food waste, as allowed for in the franchise agreement (Section 11.2). If an acceptable fee structure cannot be negotiated, Section 11.2 further states that the agreement does not preclude other options for food waste diversion. The County could expand food waste collection to residents once the processing infrastructure and commercial program is established.

KCI understands that the County has initiated discussions with Alliance to process vegetative waste should the company purchase the property previously operated by INEOS. Based on our understanding, the technology they plan to use would not be conducive to processing food waste or biosolids. The County could potentially develop a system capable of processing yard trash, food waste, and biosolids at the SWDD facility or contract with a private vendor. Ground yard waste is needed as a bulking agent when composting these other organic materials. Table 10 summarizes organic materials recovery and processing approaches that are most likely to be successful in Indian River County.

Table 10: Organics Recovery and Processing Approaches

Approach	Objective	Estimated Cost	Est. Staffing	Diversion Potential	Level of Acceptance
Put stockpiled materials to beneficial use	To obtain recycling credit for stockpiled materials	Minimal	No extra staff needed	High	High
Universal collection in Urban Service Area (USA)	To provide all residents in USA with easy access to yard trash collection	Minimal	No extra staff needed	Moderate	Moderate
Require separate yard trash collection	To require separation of yard trash from solid waste	Low	0.2 FTE E&O; enforce	High if enforced	Moderate
Commercial food waste collection	To collect food waste from large commercial generators	Low	0.5 FTE	Moderate if voluntary	High if voluntary
Contract for composting services	To compost yard trash, food waste, and biosolids	No capital costs $25-40/ton	0.1 FTE	Depends on level of participation	High
Compost system at SWDD Facility	To compost yard trash, food waste, and biosolids	Capital costs: $2.5-3.5M Operations: $20-35/ton	3-5 FTE	Depends on level of participation	High

6. COMMERCIAL RECYCLING

Opportunity: In 2016, an estimated 11,000 tons of commercially generated recyclable paper and containers (~4% of all waste generated) were landfilled as part of the mixed waste stream (see Figure 1). Recycling even half of this material has the **potential to increase the County's overall recycling rate by an estimated 2%.**

Florida Law: According to Florida law, newly developed commercial property receiving a certificate of occupancy, or its equivalent, must provide adequate space and adequate receptacles for recycling by tenants and owners of the property (403.706(2)(c), F.S.). This provision applies to counties, such as Indian River County, that have established residential and commercial recycling programs.

Case Studies: Table 11 provides relevant information regarding mandatory commercial recycling programs in Lee and Sarasota counties. Both counties report at least 90% compliance with the mandatory ordinance; however, neither was able to provide an accurate estimate of the increase in recycling tonnage or recycling rate resulting from the mandatory program. Lee County's program requires businesses to recycle at least one material, but they are considering expanding this to more materials to increase diversion.

Table 11: Mandatory Commercial Recycling Ordinance Case Studies

	Lee County, FL	Sarasota County FL
Year established	2007; implemented in 2008	1991
Requirements	• Businesses in unincorporated county must recycle at least one material (recyclable material comprising largest portion of waste stream) • Fixed service fees in collection contracts so recycling is cheaper than waste collection	• Commercial customers in unincorporated county must contract for pick up or deliver program recyclables to recycling facility • Franchised collector must offer commercial recycling service
Enforcement	• Compliance inspections (~1,200/year) • 1st offense – warning and technical assistance to set up program • Additional offenses – monthly advance disposal fee (ADF) ranging from $100-$500, depending on business classification; no ADFs assessed to date	• Compliance inspections (~1,100/year) • 1st offense – warning and assistance and education • Additional offenses – penalties ranging from $200-$500; no penalties assessed to date
Compliance	Reports 98% compliance	Reports 90% compliance
Diversion	• No measurement available • Considering expanding to more than one material to increase diversion	No measurement available
Staffing	2 FTE – outreach to businesses 6 PTE – compliance inspectors	Part of responsibilities of 2.5 recycling FTEs
Comments	Elected official and business groups were supportive of program	

Approaches: The County's existing collection franchise agreement includes provisions that ensure recycling collection service is available to all commercial businesses in the unincorporated county. Section 8.3 of the agreement requires the franchisee to encourage commercial customers to recycle and to collect recyclables at a cost less than the collection rate charged for servicing a solid waste container of equal size and frequency. The agreement also provides a system for SWDD to monitor participation in commercial recycling by requiring the franchisee to provide a list each month of commercial customers receiving recyclables collection service, including the customer name, address, container size, frequency of collection, billing rate, and types of materials collected (Section 12.2.2.c). According to the franchised hauler, as of March 2017, 283 of the 1,431 commercial businesses in the unincorporated county receiving garbage service also contracted for recycling service.

While a system for collecting and processing commercial recyclables is in place, the key is to increase recycling participation by businesses and institutions. Increasing participation can be accomplished through voluntary means or by mandates. Table 12 summarizes both voluntary and mandatory approaches.

Voluntary means should go beyond just education to hands-on technical assistance. A technical assistance program generally includes onsite waste audits, assistance in developing in-house collection logistics, a toolkit providing step-by-step instructions for setting up a recycling program, list of service providers, sample education and promotion materials, and assistance with employee training.

While technical assistance programs can be effective, they generally do not achieve the diversion rates of a mandatory program. However, an effective technical assistance program is usually in place prior to establishing a mandatory program. As demonstrated in the case studies above, a mandatory program can take different forms.

Table 12: Commercial Recycling Approaches

Approach	Objective	Est. Cost	Est. Staffing	Diversion Potential	Level of Acceptance
Building code amendment	To require new developments to provide recycling space and receptacles	Minimal	No additional staff	Depends on enforcement	Moderate
Commercial Technical Assistance Program	To encourage and assist businesses and institutions to recycle	$50-100k	0.5 FTE	Low-Moderate depending on assistance provided	High
Mandatory Commercial Recycling	To require and assist businesses and institutions to recycle	$100-200k	1 FTE	Moderate-High depending on assistance and enforcement	Moderate-High public support Low-Moderate support by businesses depending on cost and assistance provided

7. RESIDENTIAL RECYCLING

Opportunity: In 2016, an estimated 22,000 tons of residentially generated recyclable paper and containers (~7% of all waste generated) were landfilled as part of the mixed waste stream (see Figure 1). Recycling half of this material has the **potential to increase the County's overall recycling rate by an estimated 3-4%.**

Florida Law: As with commercial properties, Florida law requires newly developed multi-family residential property receiving a certificate of occupancy, or its equivalent, to provide adequate space and adequate receptacles for recycling by tenants and owners of the property (403.706(2)(c), F.S.).

Case Studies: Table 13 provides relevant information regarding mandatory residential recycling programs in Lee and Sarasota counties. Sarasota County's mandate applies to all residential customers in the unincorporated county. Lee County's mandate applies only to multi-family residential properties because the county estimated that more than 90% of single-family residential customers were already participating in recycling.

Table 13: Mandatory Residential Recycling Ordinance Case Studies

	Lee County, FL	Sarasota County FL
Year established	2007; implemented in 2008	2006
Requirements	• Multi-family residential properties must institute recycling programs for recyclable paper, containers, white goods, and electronic devices • Multi-family property responsible for educating tenants on recycling	• Residential customers in unincorporated county must contract for pick up or deliver program recyclables to recycling facility • Multi-family property owners or agents must post mandatory recycling notice in all units
Enforcement	• Compliance inspections • 1st offense – warning and technical assistance • Additional offenses – $300-$500 penalties allowed, but never assessed	• Compliance inspections • 1st offense – warning and technical assistance • Additional offenses – $200-$500 penalties, but never assessed
Compliance	Reports 100% compliance	Most complexes in compliance
Diversion	No measurement available	~370 pounds/unit/year
Staffing	Included as part of commercial staffing	Part of responsibilities of 2.5 recycling FTEs

KCI also considered looking at Pay-As-You-Throw (PAYT) as an option to incentivize residents to recycle by charging them for solid waste service based on the size of the cart they select. PAYT programs are not common in Florida; in fact, Alachua County is the only county that has implemented such a program. PAYT can be an effective incentive to reduce waste and increase recycling; however, it is more conducive to universal programs than the subscription system currently in place in Indian River County.

Approaches: Through its franchise collection agreement, SWDD provides recycling collection service to all County residents, including those living in single-family and multi-family dwellings. Residents pay for this service through the solid waste assessment. Based on information provided by the franchisee, monthly participation in the curbside program has been as high as 77% and has averaged 54%. Collected recyclables are received at the SWDD facility where they are transferred to a contracted recyclables processor for separation and marketing.

Therefore, a system for collecting and processing residential recyclables is in place. The key to capturing additional residential recyclables is encouraging participation in the program, both in terms of the number of residents who recycle as well as asking residents to recycle to the maximum extent (i.e., recycle all types of materials accepted in the program). As with commercial recycling, increasing participation in residential recycling can be accomplished through voluntary means or by mandates. Table 14 summarizes these approaches. If the County converts to universal collection in the future, a PAYT program might also be considered.

Numerous examples of comprehensive education and outreach programs exist. Key features of an effective program include consistent branding or messaging, use of multiple media (e.g., website, video, social media, audio, print), and frequent and ongoing communications. In addition, some communities are integrating community-based social marketing (e.g., pledges, peer-to-peer education, block leaders) into their programs to influence sustainable behavior change.

As with commercial recycling, an active technical assistance program is more effective for multi-family complexes then simply providing educational materials. Many of the same materials would be used, but targeted to property owners, managers, and tenants. Mandatory approaches can take different forms, and have been demonstrated by numerous studies to be more effective than voluntary approaches.

Table 14: Residential Recycling Approaches

Approach	Objective	Est. Cost	Est. Staffing	Diversion Potential	Level of Acceptance
Building code amendment	To require new multi-family developments to provide recycling space and receptacles	Minimal	No additional staff	Depends on enforcement	Moderate
Expanded Education and Outreach	To encourage residents to recycle and recycle right	Minimal	No additional staff	Low	High
Multi-Family Technical Assistance Program	To assist multi-family complexes in establishing effective recycling programs	$50-100k	0.5 FTE	Low-Moderate depending on assistance provided	High
Mandatory Residential Recycling	To require residents to recycle specified materials	$100-200k	1 FTE	Moderate-High depending on assistance and enforcement	Moderate-High public support Low-Moderate support by owners and managers

8. SUMMARY AND NEXT STEPS

This report identifies key opportunities, in terms of tonnage, for Indian River County to increase its recycling rate. Approaches for targeting these opportunities or sectors are detailed in various sections of this report and summarized in Table 15 below. These approaches include programs, policies, or facilities that have been successfully implemented elsewhere. They should not be considered exhaustive, but are those considered most applicable for Indian River County.

Table 15: Summary of Key Recycling Approaches

Target	Approaches	Potential Increase in Overall Recycling Rate	Relative Cost and Resources
C&D	• Research private concrete recyclers	• Unknown	• Low
	• C&D recovery at SWDD facility	• 9%	• Moderate - High
Organics	• Put stockpiled mulch to beneficial use	• 8%	• Low
	• Universal collection in USA	• 1%	• Low
	• Require separate yard trash collection	• 2%	• Low
	• Commercial food waste collection	• 1%	• Moderate, requires processing system
	• Composting system (at SWDD or contracted)	• Provide processing for above	• Moderate - High
Commercial Recyclables	• Building code amendment	• Unknown	• Low
	• Commercial technical assistance program	• 1-2%	• Low
	• Mandatory commercial recycling	• 2-3%	• Moderate
Residential Recyclables	• Building code amendment	• Unknown	• Low
	• Expanded education and outreach	• 1%	• Low
	• Multi-family technical assistance program	• 1%	• Low
	• Mandatory residential recycling	• 3-4%	• Moderate

Note: Potential Increase in Overall Recycling Rate and Relative Cost and Resources are preliminary estimates based on the County's 2016 tonnage data and similar programs implemented in other jurisdictions.

Education and outreach is a critical component of any recycling program, but has been demonstrated to be insufficient to achieve the recycling goal established by the State. Therefore, with the exception of residential recycling, education is not defined as a stand-alone approach but is an element of any program that is implemented.

Once the County decides which approaches to pursue, more detailed feasibility studies and/or implementation plans will need to be developed. As demonstrated by the case studies in this report,

programs and policies can be structured in various ways. These studies and plans will detail program specifics and more accurately estimate the costs and resources needed for implementation.

Indian River County is at a crossroads. The County is evolving in terms of growth from predominantly rural to a more urbanized community. It has valuable solid waste assets in its landfill and SWDD facility. It also receives the vast majority of waste generated within the County, giving it control over how that waste is managed. Closure of the INEOS facility provides the County with an opportunity to develop a more comprehensive organics program that could potentially include food waste and biosolids. The policies, programs, and infrastructure developed over the next few years will steer the course of future waste management and determine whether a concerted effort is made to achieve the State goal. Whatever course is chosen, periodic reassessment will be needed to evaluate progress, update information, and realign priorities to stay on track.

Attachment 1
Solid Waste Management Plan 2014 Update Recycling Recommendations
Phase 1 Recommendations to Target 50% Recycling

	RESIDENTIAL	COMMERCIAL	C&D DEBRIS
PHASE 1 - 50% Recycling Target Proposed Timeline – 2015-2016	• **Inter-Local Agreements** – work with the municipalities to update and execute ILAs that will commit all tonnage controlled by each entity to a countywide, integrated resource and waste management system • **RFI/RFP Process** – conduct an RFI/RFP process to explore the viability of processing technologies that achieve high material recovery rates		
	• **Renewable energy credit through INEOS** – audit INEOS and ensure County is receiving the appropriate energy credit for vegetative debris processed by INEOS • **Curbside collection changes** – convert to carted single stream recycling and weekly garbage collection as discussed in Table 6-1 (new collection agreement commences 10/1/2015) • **Multi-family program** – implement a comprehensive multi-family recycling program that includes technical assistance to property owners or managers • **Comprehensive public outreach** – implement a strategic, comprehensive public outreach campaign • **Recycling program manager** – designate a full-time position to implement program recommendations	• **Commercial recycling at not-to-exceed service fees** – in new franchise agreement, require franchisees to collect full range of commercial recyclables upon request at not-to-exceed service fees • **Monitor commercial recycling** – require franchisees to report on commercial recycling activity • **Green County Program** – lead by example by ensuring all County facilities and public schools have effective waste reduction and recycling programs • **County Ordinance** – amend to require new developments to provide for recycling as required by State law • Small Quantity Generator (SQG) hazardous waste center - provide a center to receive SQG waste	• **C&D debris recycling program** – implement a program to educate contractors of recycling opportunities and benefits, as required by State law
Target Increase in Countywide Recycling Rate	11%	1%	1%

Phase 2 Recommendations to Target 60% Recycling

	RESIDENTIAL	COMMERCIAL	C&D DEBRIS
PHASE 2 – 60% Recycling Target Proposed Timeline – 2017-2018	• **Processing technology implementation** – if the RFI/RFP process results in viable technologies, then initiate implementation, which might include public-private partnerships, updated ILAs, facility permitting/construction, etc. (current recyclables processing contract expires 9/11/2017; current landfill operating contract expires 12/30/2017)		
	The following actions may be taken to complement the selected technologies or in lieu of such technologies if none are deemed feasible: • **Residential recycling incentives** – if target recycling rates are not achieved, consider incorporating incentives, such as pay-as-you-throw or a rewards program • **Residential organics program** – once a viable composting infrastructure is established, pilot the collection and processing of other compostables (i.e., food waste and non-recyclable paper) along with yard trash	• **Commercial recycling program** – implement a comprehensive recycling program that includes a recycling toolkit with step-by-step instructions, hands-on technical assistance, and networking opportunities • **Commercial organics program** – initiate a commercial organics program, which will require establishing the collection and processing infrastructure	• **C&D debris recycling incentives** - establish policies and incentives to encourage C&D recycling, such as a diversion fee and rebate program
Target Increase in <u>Countywide</u> Recycling Rate	2%	3%	6%

Phase 3 Recommendations to Target 75% Recycling

	RESIDENTIAL	COMMERCIAL	C&D DEBRIS
PHASE 3 – 75% Recycling Target Proposed Timeline – 2019-2020	• **Processing technology start-up** – if processing technologies are implemented, initiate facility start-up and ongoing monitoring and fine-tuning to maximize recovery		
	The following actions may be taken to complement the selected technologies or in lieu of such technologies if none are deemed feasible: • **Comprehensive organics recovery program** – expand organics recovery, such as through universal collection of organics from residents and businesses • **Policies that drive recycling** – if recycling targets are not met, consider establishing and enforcing policies that incentivize or require recycling, such as disposal bans or recycling mandates		
Target Increase in <u>Countywide</u> Recycling Rate	15%		