

April 16, 2020
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MEMORANDUM

TO: Rob Hilton, Philip Mainolfi – HFH Consultants

FROM: Tracie Bills

SUBJECT: Merced County Regional Waste Management Authority
Estimated Organics Disposal and Capacity Study

TASK 3: PROVIDE ESTIMATES TO ACHIEVE COMPLIANCE

SCS Engineers (SCS) conducted an analysis of the existing and future organics generation and processing capacity for Merced County. The Merced County Regional Waste Management Authority (MCRWMA) will use the information to establish the County's organics baseline and to identify compliance options to meet the requirements of SB 1383. This technical memo provides details of the estimated types and quantities of organic materials in the MCRWMA waste stream, and the current and future capacity of organics processing facilities.

Existing Organic Materials Generation

A modeling exercise was performed to estimate the quantity of organic material in the waste stream for the MCRWMA service area. SCS used data on the annual tons of waste disposed, recycled and composted, and applied to this the 2014 CalRecycle waste characterization data to estimate the quantity of organic materials in the disposed waste stream. It is typically preferred to utilize separate commercial and residential tonnage records when modelling waste quantities, however the available data was not assigned by sector, and therefore an overall waste stream characterization is presented.

In 2018, the MCRWMA managed 276,898 tons of material. Of this:

- 241,719 tons (87 percent) was disposed,
- 11,311 tons (four percent) was recycled, and
- 23,868 tons (nine percent) was composted.

MCRWMA received waste from the unincorporated areas of Merced County and six incorporated cities, which included Atwater, Dos Palos, Gustine, Livingston, Los Banos and Merced. **Table 1** presents the data for each member agency, including the types and quantity of materials disposed, recycled, and composted.

Table 1. Waste Managed by MCRWMA by Origin and Material Classification (CY2018)

Material	Livingston	Atwater	Los Banos	Gustine	Dos Palos	Merced (City)	Merced County	Total	
Trash	General Refuse	13,228	23,197	31,289	75	3,918	80,494	70,221	222,423
	Extra Handling	63	58	76	0	45	480	1,363	2,086
	Green - Rejected	0	260	45	0	36	630	1,043	2,013
	LF Brush	0	0	932	1	3	52	238	1,225
	LF Grass	0	0	881	0	0	3	29	914
	LF Greenwaste	0	719	4,517	0	731	1,983	1,882	9,832
	LF Tire Shreds	0	0	17	0	0	0	285	302
	LF Wood	24	150	69	0	0	982	571	1,796
	Mattress/ Box Spring	0	0	0	0	0	0	0	0
Special Burial	466	13	62	0	0	473	115	1,129	
Recyclables	Cardboard - Clean	0	14	5	0	0	81	93	192
	Commercial Rej. Recy	0	0	0	0	0	2	8	9
	Mattress (Business)	0	1	9	0	1	29	9	49
	Mattress (Residents)	2	18	86	0	0	222	20	348
	Recyclbls-Clean (Comm)	0	0	3,704	0	0	4,248	2,174	10,126
	Recyclables-W (Priv)	0	237	19	0	0	18	81	355
Rejt'd Recycled	0	0	0	0	0	22	210	231	
Organics	Grass/Leaf	0	172	1	0	0	486	27	686
	Green - Clean	0	2,302	109	0	0	6,007	5,983	14,401
	Brush/Prune-W	29	433	121	0	7	5,761	924	7,274
	Soil-Received	0	12	411	0	0	212	872	1,507
Total	13,812	27,584	42,351	77	4,742	102,185	86,147	276,898	

Using the data provided in Table 1, SCS estimated the quantity of organics disposed using the 2014 CalRecycle statewide solid waste characterization study data. Because the original data was not separated out for residential and commercial sectors, the overall disposed waste characterization data was used for this analysis. This information is combined with the actual tonnage for source separated organics (e.g. Separated Organics) and organic material currently landfilled (e.g. Separated Organics Disposed) in the MCRWMA service area, and is shown in **Table 2**. Organic materials defined as disposed in MCRWMA records include brush, grass, greenwaste, and wood. Other organic materials are disposed by homeowners and are not separately quantified (e.g. food, compostable paper). As indicated, the estimated annual organic waste in the MCRWMA service area is 128,341 tons

Table 2. Organic Materials Managed by MCRWMA

Material	Proportion	Annual Tons
Organics in Disposed General Refuse		
Other Miscellaneous Paper - Compostable	0.2%	400
Remainder/Composite Paper - Compostable	6.6%	14,700
Food	18.1%	40,300
Leaves and Grass	3.8%	8,500
Prunings and Trimmings	3.1%	6,900
Branches and Stumps	1.7%	3,800
Clean Dimensional Lumber	3.2%	7,100
Clean Engineered Wood	1.7%	3,800
Clean Pallets & Crates	2.1%	4,700
Subtotal	40.5%	90,200
Separated Organics		
Grass/Leaf		686
Green - Clean		14,401
Brush/Prune-W		7,274
Subtotal		22,361
Separated Organics Disposed		
Green - Rejected		2,013
LF Brush		1,225
LF Grass		914
LF Greenwaste		9,832
LF Wood		1,796
Subtotal		15,780
Total		128,341

Note: Proportion of organic materials in general refuse estimated from 2014 CalRecycle Statewide Waste Characterization Study of Overall Disposed Waste

Projected Organic Materials Generation

As the population grows in Merced County, so will the quantity of waste generation. In order to project the increase in organic materials generated, SCS accessed the population growth rate data from the State of California Department of Finance¹, selected “Total Population by County” and downloaded a spreadsheet with population projections for Merced County. **Table 3** presents projected population growth, and waste and organics generation and diversion projections through the year 2025. The current amount of organics diversion is 22,361 tons per year, or 17% of the total organic materials that are generated. By 2025, the 75% diversion requirement for organic materials will total 106,000 tons per year. The current amount of material composted is 22,360 tons per year; therefore, MCRWMA will need to find capacity for an additional 83,640 tons annually.

Table 3. Projected Growth in Organics Generation

Year	Population Growth	Waste Managed (Tons)	Organics Generated (Tons)	Organics Diverted (Tons)	Proportion Organics Diverted
2018	1.1%	276,898	128,341	22,361	17%
2019	1.4%	280,800	130,200	45,600	35%
2020	1.4%	284,800	132,000	66,000	50%
2021	1.4%	288,800	133,800	73,600	55%
2022	1.4%	292,800	135,600	81,400	60%
2023	1.4%	296,900	137,500	89,400	65%
2024	1.4%	301,100	139,400	97,600	70%
2025	1.4%	305,200	141,300	106,000	75%

Available Processing Capacity for Organics Material

SCS researched organics processing facilities located within a 120-mile radius of the MCRWMA service area to provide information on the available capacity for processing green waste, food scraps, and compostable paper. SCS assembled a list of organics processing facilities, reviewed CalRecycle permitting records, and researched current incoming quantities at targeted organics processing facilities. The initial target list included composting operations, in-vessel and anaerobic digestion facilities, and land application.

SCS identified the organics processing facilities using the CalRecycle Solid Waste Information System (SWIS) database², which includes the contact information, permitted volumes, annual throughput capacity, and estimated incoming volumes of material. Information summarizing the

¹ <http://www.dof.ca.gov/Forecasting/Demographics/Projections/>

² <https://www2.calrecycle.ca.gov/SWFacilities/Directory/>

types and number of facilities by County is included in **Table 4. Attachment A** lists each facility along with the type of facility, materials received, location, business name, distance to MCRWMA offices, permitted and estimated throughput volumes, and notes regarding remaining capacity and facility status.

Table 4. Summary of Organic Processing Facilities by Type and Location

Summary of Open or Planned Facility Type by County											
Facility Type	Alameda	Fresno	Madera	Mariposa	Merced	Monterey	San Benito	San Joaquin	Santa Clara	Stanislaus	Tuolumne
Anaerobic Digestion	1	1							1		
Composting Facility (Agricultural)		1	1		7	4	4	3	6	16	1
Composting Facility (Green Waste)	2	1			4	3	1	5	2	4	1
Composting Facility (Mixed) - A facility that composts sewage sludge, animal material, or green material, in addition to mixed solid waste	1	2		1		3		2	2	3	
Composting Facility (other)					1	2					
Chipping and Grinding Activity Facility/Operations	3	2					1	1	2		
Land Application	1	1									
TOTAL = 97	8	8	1	1	12	12	6	11	13	23	2

A total of 97 organics material processing facilities are located within a 120-mile radius of the MCRWMA offices. Our team reviewed the list and removed chip and grind operations, land application facilities, and organic facilities that have minimal permitted organics capacity with low probability of expanding their current operations. A list of 40 sites across 11 counties were then targeted to interview to gather the following information:

- Quantity of Material Used as Alternative Daily Cover (ADC)
- Accepted Materials
- Current Quantities Received
- Sectors Material is Received from (Residential, Commercial, Industrial, Institutional)
- Estimated Available Capacity
- Plans to Increase/Decrease the Types of Materials Accepted
- Does Facility Accept Animal Waste, Manure, Compostable Diapers, or Farm Waste?
- Facility Outlook Regarding Future Organics Market Changes 5 Years From Now
- Perceived Barriers to Increased Organics Diversion
- Facility Issues with Material Quality or Contamination
- Facility Tipping Fees

Table 5 summarizes the number of organics facilities targeted in each county for further information. Of the 40 facilities contacted, we received 33 responses.

Table 5. Summary of Facilities Contacted

County	Total Number of Organic Facilities	Number of Facilities Contacted	Number of Responses Received
Alameda	8	1	1
Fresno	8	3	2
Madera	1	1	1
Mariposa	1	1	0
Merced	12	4	3
Monterey	12	4	4
San Benito	6	0	0
San Joaquin	11	4	1
Santa Clara	13	4	4
Stanislaus	23	18	17
Tuolumne	2	0	0
Total	97	40	33

Of the original 97 organic facilities listed, removing 11 chip and grind operations and land application facilities, for the remaining 86 facilities we calculated the permitted capacity, estimated in-use capacity, available and future or planned capacity. These calculations excluded most facilities in Alameda and Santa Clara Counties, with the exception of a few facilities requested to be targeted by MCRWMA. Based on the research, it is estimated there is approximately 3,844,684 tons per year of permitted capacity and 414,435 tons per year of available capacity. **Table 6** provides the estimated capacity information by County.

Table 6. Estimated Organics Processing Capacity by County

County	Permitted Capacity (Tons/Year)	In-Use Capacity (Tons/Year)	Available Capacity (Tons/Year)	Planned / Future Capacity (Tons/Year)
Alameda	443,950	443,950	0	160,000
Fresno	419,231	Unknown	Unknown	0
Madera	364,000	364,000	0	0
Mariposa	20,000	Unknown	Unknown	0
Merced	176,451	128,319	48,132	0
Monterey	198,975	179,225	19,750	100,000
San Benito	36,040	Unknown	Unknown	0
San Joaquin	481,419	Unknown	Unknown	0
Santa Clara	590,680	585,056	5,624	260,000

County	Permitted Capacity (Tons/Year)	In-Use Capacity (Tons/Year)	Available Capacity Tons/Year	Planned / Future Capacity Tons/Year
Stanislaus	1,074,919	732,990	341,929	0
Tuolumne	6,250	6,250	0	0
Subtotal (without Alameda and Santa Clara County)	2,810,054	1,411,784	408,811	100,000
Total	3,844,684	2,440,790	414,435	520,000

In order to understand the in-use and available capacity for the targeted facilities, we assumed the smaller facilities (with capacities less than 20,000 tons/year) did not have any available capacity. For those facilities with larger permitted capacity but without exact tonnage data that either provided percentages of incoming material or the permit value (cubic yards per year instead of tons per year), we used a conversion factor to estimate the amount of material currently accepted at the facility. It is important to note that some facility operators are reluctant to provide available capacity information, as they consider this confidential information affecting their pricing and contractual arrangements.

Facilities that did not respond to our inquiry, and therefore we were unable to estimate capacity for are indicated as “unknown” in Table 6. Those facilities include the following:

- **Fresno County** – No response was received from Mid Valley Disposal, which has 290,000 tons per year of permitted capacity. We can continue to reach out, but may need assistance from MCRWMA.
- **Mariposa County** – No response was received from Mariposa Composting, which has 20,000 tons per year of permitted capacity. Because of its limited operation, no further phone calls were made.
- **San Benito County** – The six facilities in this county have relatively small individual permitted capacities, with a combined total of 36,040 tons per year. SCS did not reach out to these facilities to confirm their available capacity.
- **San Joaquin County** – Forward Resource Recovery has 260,000 tons per year of permitted capacity. SCS is waiting for a response from the contact at this facility. Valley Landscaping and Element Landscaping Materials have been contacted however no response has been received and no permitted capacity information is available online.

POTENTIAL PROCESSING CAPACITY FOR ORGANIC MATERIALS

The following facilities have the potential to accept MCRWMA organic materials. We recommend contacting these facilities to discuss the viability of accepting materials from MCRWMA.

1. **Agromin-Bowles Compost Facility** – 13000 Carlucci Rd., Dos Palos (Merced County)
 - 21,000 tons per year additional permitted capacity available

2. **Billy Wright Composting** – 17173 Billy Wright Rd., Los Banos (Merced County)
 - 23,500 tons per year additional permitted capacity available
3. **California Soils** – 3401 Gaffery Rd., Vernalis (Stanislaus County)
 - 20,000 tons per year additional permitted capacity available
4. **Gilton Resource Recovery Composting Facility** - 800 South McClure, Modesto (Merced County)
 - Have not received a response, but have estimated 122,000 tons per year additional permitted capacity available.
5. **Hwy 59 Composting Facility** – 7040 North Highway 59, Merced (Merced County)
 - 1,300 tons per year additional permitted capacity available
6. **John Brichetto Compost Sites A-O (13 permits)** – 26 Mile Road, Oakdale (Stanislaus County)
 - It is estimated that each site will have 7,400 tons per year, or 96,200 tons per year additional permitted capacity available. Each site is vertically integrated.
7. **Keith Day Company (3 sites)** – Marina, Moss Landing, Gonzales (Monterey County)
 - Has an additional 50,000 tons per year permitted capacity available between the following three facilities:
 - Gabilan Ag Services – 14201 Del Monte Blvd, Marina, CA
 - Gabilan Fertilizer Moonglow Dairy – 375 Dolan Road, Moss Landing, CA
 - Gonzales Compost Operations – Short Road, Gonzales, CA

POTENTIAL ORGANICS PROCESSING EXPANSION

Six facilities stated they are planning to expand their permitted capacity. Two facilities anticipate available capacity, however only Keith Day facilities (increased permit among all three sites) will have a significant amount of available capacity that may benefit MCRWMA. Four facilities are expanding their organics permit; however, all of the extra capacity has been accounted for.

Potential Expansion of Processing Capabilities with Available Facility Capacity

1. **Keith Day Company** – Marina, Moss Landing, Gonzales (Monterey County)
 - Starting to permit for an additional 100,000 tons per year between the following three facilities:
 - Gabilan Ag Services – 14201 Del Monte Blvd, Marina, CA
 - Gabilan Fertilizer Moonglow Dairy – 375 Dolan Road, Moss Landing, CA
 - Gonzales Compost Operations – Short Road, Gonzales, CA
2. **Newby Island Resource Recovery Park** – 1601 Dixon Landing Rd., Milpitas, CA 95035 (Santa Clara County)
 - In 2019, Republic added 60,000 additional tons per year to their permit, however extra capacity has already accounted for. They have 50 tons per day available (5,600 tons per year).

Potential Expansion of Processing Capabilities with No Available Facility Capacity

1. **Altamont Composting Facility** - 10840 Altamont Pass Road, Livermore, CA (Alameda County)
 - o In 2019, WM added 160,000 additional tons per year to their permit, however extra capacity has already accounted for.
2. **Davis Street Transfer Station** – 2615 Davis St., San Leandro, CA (Alameda County)
 - o This facility recently changed their permit to include on-site composting; however, no new capacity was added and are only using material currently accepted.
3. **Z-Best Composting** – 980 State Hwy. 25, Gilroy, CA (Santa Clara County)
 - o Looking to add 200,000 tons per year, however extra capacity has already accounted for.
4. **Zero Waste Energy Development Company** – 685 Los Esteros Rd. San Jose, CA (Santa Clara County)
 - o Owners were looking into expanding their facility; however, that plan has been put on hold.

Facility Interviews with Potential Organics Processing Options

MCRWMA requested SCS contact three companies to discuss the potential to manage some of the Authority's organic materials. The following information was gathered from these conversations.

Agromin

SCS spoke with Agromin representatives Bill Camarillo and Kimberly Cook on March 17, 2020 to discuss how Agromin could provide organics capacity in the MCRWMA service area. Agromin manages a compost facility at Bowles Farming Company, located at 13000 Carlucci Road in Dos Palos. The facility is permitted for 200 tons per day (62,000 tons per year), and accepts agriculture and green material. Due to low landfill tipping fees, they have had challenges obtaining material, and they currently process only 41,000 tons per year. They are actively seeking an additional 21,000 tons per year of new material.

In order to support MCRWMA and to fill the facility's permitted capacity, Agromin is looking to develop a demonstration site in Merced that would provide pre-processing at the landfill, then send clean organic material to the Agromin/Bowles Green Waste Composting Facility. Agromin currently has three different locations that perform preprocessing and have established a good process by using different technologies such as screens, the Scott Turbo Separator and manual labor. In order to accept food scraps and food soiled paper at the site, Agromin will add an Enforcement Agency Notification Research Project, then get a full permit during the two to four year research project. They could have a preprocessing system in place at the landfill by the start of 2022.

Agromin would look to be a contractor to MCRWMA, and are proposing to design, build, and finance the preprocessing at the landfill. In return, they would need a flow control agreement (10 years, or five year with five-year option) with minimum tonnage numbers of 40,000 to 50,000 tons annually.

Monterey Regional Waste Management Authority

SCS spoke with Tim Flanagan with the Monterey Regional Waste Management District (MRWMD) on February 28, 2020, to discuss the possibility of transferring their anaerobic digester to the MCRWMA Highway 59 landfill and compost facility. The anaerobic digester is owned and operated by Zero Waste Energy, LLC, and is located at 14201 Del Monte Blvd. Marina, California. The digester opened in 2013 and operated for five years under a pilot research compost project, accepting 5,000 tons per year of food scraps and green waste. It was closed in September 30, 2019.

The technology is a SmartFerm dry anaerobic digester, which features four steel fabricated and insulated digesters, each 12 feet in width, 12 feet in height and 40 feet in length. Each digester has a specially designed hatch that provides a gas-tight seal to ensure anaerobic conditions are properly maintained during processing. The base system contains a below-grade concrete percolate tank, a mechanical-electrical container, containerized combined heat and power system, package bio-filter, external biogas storage bladder and environmental control device. The SmartFerm system is a 21-day batch process that transforms organic waste into biogas and high quality digestate feedstock for windrow composting.

MRWMD will no longer be using this anaerobic digester, and is open to the removal of the facility from their property. The permit was not renewed because it was a pilot demonstration project; however, the technology is in good working condition. Any further discussion on the potential of moving the technology would need to be discussed with Zero Waste Energy.

To understand if the technology could be moved to MCRWMA land, SCS discussed with Todd Stewart, Senior Project Manager at SCS Engineers who worked on the MRWMD facility while working for Zero Waste Energy, LLC. According to Mr. Stewart, the technology could be moved to a new site. In order to move the technology, the following steps would need to take place:

1. Discuss with Zero Waste Energy LLC if they are interested in selling or providing the technology to MCRWMA, and if so, what the cost would be.
2. Talk with the local utility to see if MCRWMA could enter into a power purchasing agreement, and/or see if MCRWMA could use the energy onsite.
3. Perform further analysis on the technology, such as: what would need to be replaced if moved, what the cost would be for the transportation and other on-site infrastructure to support the technology.

Zanker Recycling

SCS spoke with Michael Gross with Zanker Recycling on March 26, 2020, to discuss Zanker could potentially help with organics capacity in the MCRWMA service area. Zanker has a number of sister companies (e.g. Green Waste Recovery, Z-best Composting, Zero Waste to Energy Development) that provide comprehensive solid waste programs and infrastructure to assist their clients with diversion goals. Their Z-best facility has clean OMRI certified compost, as well as mixed waste that is composted and used for landscaping.

Zanker currently is permitting two projects in Sacramento County that will manage 80,000 and 200,000 tons of organic material, and other projects in Bakersfield and San Jose. Zanker is working out the tip fee for each facility, however believes it will be between \$80 to \$100 per ton. They are looking to expand in the Central Valley if there is an opportunity to assist with SB 1383 compliance,

guaranteed volume of organic material, and a site that already has permits and space to place the processing equipment and composting windrows.

In order to determine whether this would be a viable solution with MCRWMA, Zanker would need a guarantee of a minimum of 80,000 tons of organic material. Zanker is targeting the organics fraction in the MSW, which has a lot of food scraps and food-soiled paper. They would consider placing a mixed material recycling facility to process the MSW, as well as any composting that may be needed. MCRWMA is looking to add composting at both Billy Wright and Highway 59; however, Zanker said that only one location would be needed and is preferred. Additionally, knowing that MCRWMA has been talking with Agromin, Zanker noted they have worked closely with Agromin on a number of projects, and would consider a joint effort and partnership moving forward. Zanker is willing to pay for all capital and operational costs for the infrastructure, and in return, MCRWMA would need to guarantee the material flow and tip fee.