



Memorandum

MONTEREY REGIONAL WASTE MANAGEMENT DISTRICT

Reviewed by:  Date: 2/12/21
General Manager

DATE: February 12, 2021
TO: General Manager
FROM: Director of Operations
SUBJECT: Report Out on Residential Single Stream Fiber & Residual Recovery Retrofit

BACKGROUND

The District's recycling operation at the Materials Recovery Facility (MRF) has been in operation for approximately three (3) years and has expanded the incoming flow of Single Stream Recyclable materials (SSR) from an initially projected volume of approximately 15,000 tons per year, to over 63,000 tons in 2020.

With the implementation of the Chinese National Sword initiative by the government of China in early 2018, the value of post-processed recyclable commodities had declined by approximately 50% below what was anticipated for the MRF when the facility was designed. Additionally, the National Sword initiative has reset quality standards for marketed materials not only in China but in markets across the globe. This has required that additional sorting staff be added to the processing lines to achieve those new standards, increasing labor costs above the original operating proforma that was established during the 2014 facility design. The MRF SSR system was initially designed primarily to process Municipal Solid Waste (MSW) materials with the intention of meeting future California diversion goals. It was not singularly designed to most efficiently and effectively process single stream recyclables in the larger volumes currently being received.

The Residential Single Stream Fiber and Recovery Retrofit that the Board approved in January 2020 was intended to begin to address the long-term needs of the District for processing SSR materials in a way that meets the changing marketplace requirements, while improving the economic performance of the facility. At the December 2019 Board of Directors meeting staff presented that the MRF was going to miss the budgeted FY 19/20 revenues for the facility by approximately \$1.4 million. The Retrofit was estimated to improve the financial performance of the MRF by approximately \$1 million per year through a projected increase in sales revenue of \$750,000 and a decrease in labor expense of roughly \$315,000. The balance of the revenue shortfall was projected to be made up through the phased-in implementation of the SSR processing fee charged to GreenWaste which provides another \$500,000 in the FY 20/21 budget.

DISCUSSION

Implemented Investments Approved by MRWMD Board in January 2020

The full effect of the Board of Director's approved investment of approximately \$3.5 million is beginning to be realized. The specific projected benefits were as follows:

1. The first piece of equipment installed in July was a Cardboard Separation Screen which was expected to improve the recovery of Cardboard (Old Corrugated Containers, aka OCC), while eliminating four (4) sorting labor positions that was estimated to provide approximately \$250,000/yr in savings.
2. The second piece of equipment installed in early August was the Optical Sorter for residual line clean-up and recovery of California Redemption Value (CRV) materials. Originally this was going to include robotics for separation, but during detailed design it was determined that an optical sorter that included metal detection and

3. camera technology would allow for greater efficiency and effectiveness. In the Fall of 2019 staff worked with the SCS Consultants to sample various source-points to the residual line to assess the potential loss of CRV materials, and based on their findings staff estimated that \$421,000 a year in revenue was being lost due to CRV containers being missed by either equipment and/or sorters. This investment was expected to increase CRV recovery by capturing over 70% of the materials on the residual lines in addition to reducing one sorter position for a combined net benefit of \$350,000/yr.
4. The third system installed in late August was the Optical Fiber Sorter to enhance the separation and recovery of OCC out of the mixed paper stream and combine it with the other separated cardboard that is being separated by the new OCC screen. Due to the increased value of the recovered OCC as compared to the Mixed Paper, and with a better value for the Mixed Paper reduced "brown grades" in it, staff anticipated an increase in revenue sales for our Fiber streams by approximately \$450,000/yr.

Table 1 below summarizes the total system cost and financial impacts as project by staff at the time of approval for the invest in January 2020

Table 1

Combined System Financial Impact			
	Cost	\$	3,500,000.00
	Annual Additional Revenue	\$	730,647.81
	Annual Savings in Labor	\$	316,064.43
	Projected Annual Additional Maintenance Expense	\$	87,500.00
	Payback of Investment - Years		3.65

Staff committed to the MRWMD's Board of Directors' approval of the capital improvement to provide to the Board a report of the financial and operational performance of the equipment and how actual financial performance compared to the initial projections provided to the Board in January, 2020.

FINANCIAL IMPACT

First Quarter Operational Results of Retrofitted MRF

At the time of approval staff anticipated that the system installation would occur in September/October of 2020 and be fully operational by November. Bulk Handling Systems (BHS) was able to move up the equipment manufacturing timeline, resulting in the installation in late July and completion of the third phase in late August. The District started to see immediate results in the recovery of OCC on July 29th, an increase in the recovery of CRV materials on August 9th, and the additional increased recovery of OCC from the Mixed Paper on August 23rd.

The installation of the equipment went relatively smoothly with a limited impact on the District's operating schedule. Originally the schedule anticipated only two (2) days of operations being delayed. Ultimately the installation impacted the District's ability to process materials on four (4) days in late July. Staff was able to stockpile materials onsite and not incur any additional costs by having another entity transport and process materials on our behalf. It took until the end of September for staff to process all the backlog of materials.

Impacts on Staffing and Cost Reductions

As stated previously, staff anticipated that these new pieces of equipment would reduce our staffing needs by five (5) sorting positions in total. Those reductions in the locations on the sort-line that were anticipated were achieved, four (4) on the OCC presort line positively pulling off cardboard and one (1) on the residual line recovering CRV materials. However, due to the volumes of materials being recovered from both the new Optical Sorters on the Residual line and the Mixed Paper line, we have had to reposition two (2) of those staff positions into other places on the post-sort line to do quality control sorting on the OCC line and the Container processing line. Table 2 below shows the financial summary of the circumstance. Residential Single Stream Fiber & Recovery Retrofit impacts of that change in staffing needs from the original projections:

Table 2

Labor Savings from Retrofit

Anticipated Savings from Staffing Changes		
Vacated 5 sorting positions on the line - (4 OCC Pre-sort, 1 Residual line Recovery)	\$	316,064
Actual Annualized Savings from Staffing Changes		
Vacated 3 sorting positions on the line - (reduced 3 OCC Line)	\$	189,639
Difference	\$	(126,426)

Impacts on Revenue

The additions of the various pieces of equipment have had a significant increase in our revenues, although in slightly different ways than we had projected upon approval in January. In Table 3 below, we have annualized the impacts that we are experiencing in the first three (3) months of operation with the new OCC separation equipment:

Table 3

**OCC Recovery and Mixed Paper (MP) Value Increases
After installation of New Equipment**

**Projected
Impact
(01/2020)**

<u>Mixed Paper Avg \$/Ton</u>	<u>Mixed Paper Avg \$/Ton</u>		<u>Value per Ton</u>	<u>Annualized Inc/(Dec) in MP Value/yr</u>	<u>Projected Annual Paper Value Increase (01/20)</u>	
<u>Jan - July</u>	<u>Aug - Oct</u>	<u>Total MP Tons Post Retrofit</u>	<u>Actual Change in \$/ton</u>		<u>Projected MP Tons/Yr Post Retrofit</u>	<u>Projected Change in \$/ton</u>
\$ (16.14)	\$ 4.33	9,460.04	\$ 20.48	\$ 193,705.58	7,607.11	\$ 25.00
<u>Mixed Paper Tons/Mo</u>	<u>Mixed Paper Tons/Mo</u>	<u>Reduction in MP Tons</u>	<u>Current \$/ton</u>		<u>Projected Annual MP Inc/(Dec) in Value (01/20)</u>	\$ 190,177.65
<u>Jan - July</u>	<u>Aug - Oct</u>				<u>Projected Increase in OCC Tons/Yr.</u>	<u>Projected OCC Change \$/ton</u>
959.66	788.34	(171.33)			4096.13	\$ 60.00
	<u>Annualized</u>	(2,055.93)	\$ 4.33	\$ (8,909.04)		
<u>OCC Tons/Mo</u>	<u>OCC Tons/Mo</u>	<u>Increase in OCC Tons</u>	<u>Current \$/ton</u>		<u>Projected Annual OCC Increase</u>	<u>Projected Impact (01/20)</u>
<u>Jan - July</u>	<u>Aug - Oct</u>					\$ 245,768.04
1,400.03	1,725.55	325.52				
	<u>Annualized</u>	3,906.22	\$ 85.67	\$ 334,632.60		\$ 435,945.69
			<u>Net Impact</u>	\$ 519,429.15		

As Table 3 indicates, if the first three months of operations and differential pricing remains consistent, we can expect to be receiving \$520,000 a year of additional revenue from the increased recovery of OCC and the improved quality of the remaining Mixed Paper. Staff estimates that we are currently recovering about 60% of the OCC that was previously commingled with the Mixed Paper. We will continue to look at how to further improve the separation of OCC from the Mixed Paper through the fine tuning of the equipment and other process improvements as there could be an additional \$250,000/yr. of value still available for the District to recover.

Staff has also seen a significant increase in revenues after the Residual Line Optical Sorting installation above the projected revenue from recovery of materials and CRV value mentioned earlier. Table 4 below shows the estimated quantities and values of the CRV materials that staff anticipated were available for projected recovery and that we could capture up to 70% of that value with this new equipment (\$350,00).

Table 4

	Total Tons Processed /Yr	CRV Value Available for Recovery			
		% of SSR Residual	Tons of CRV in Residual	Value of Lost CRV in Residual	% of Lost CRV Value
Alum	60000	0.06%	36.81	\$ 141,730.39	16.70%
PET	60000	0.18%	108.84	\$ 163,258.05	11.42%
HDPE	60000	0.26%	155.26	\$ 62,102.08	12.51%
PP	60000	0.18%	107.24	\$ 42,895.25	25.41%
Glass	60000	0.37%	220.35	\$ 11,017.25	26.86%
		1.05%	628.49	\$ 421,003.02	
		Lost Value Per Year		\$ 421,003.02	

We have experienced during the first three (3) months of operation a significantly higher increase in the value of materials recovered than anticipated. Table 5 below shows where that increased recovered value is coming from. The equipment is recovering significantly more Aluminum and PET than staff had projected, resulting in a projected increase of revenues of an additional \$285,000 a year.

Table 5

CRV/Container Value Recovery				
Material	Annual Inc/(Dec) in tons	\$ /Ton Value		Annual Inc/Dec in Value
ALUMINUM UBC	83.61	\$	3,960	\$ 331,101.26
HDPE COLOR	79.50	\$	296	\$ 23,504.02
HDPE NATURAL	4.76	\$	1,106	\$ 5,262.83
POLY PROP #5	(57.13)	\$	90	\$ (5,141.31)
STEEL CAN	(5.34)	\$	75	\$ (400.71)
THERMOFORM - Outbound from MRF	136.21	\$	130	\$ 17,706.74
PET	147.63	\$	1,789	\$ 264,093.76
				\$ 636,126.58

During the period of time that these improvements were made on the system, the District also saw increases in the overall amount of materials that we were receiving at the MRF. Some of these increases were seasonal, and others were through new sources of materials, e.g, Merced County. The MRF averaged approximately 164 tons more a month of inbound materials during August through October compared to the previous three months of May through July. We have included a deduction of against the increased revenues that we have seen in Table 6 below we have aggregated the annualized cost savings and revenue enhancements that we have experienced in the first three months of operations.

Table 6

Total System Improvements		Actual Annualized	Projected (01/20)
<i>Annualized Additional Revenues</i>		\$ 1,155,556	\$ 730,648
<i>Annualized Labor Savings</i>		\$ 189,639	\$ 316,064
<i>Increased Tons/Mo in Aug-Oct</i>	164		
<i>Avg \$ Ton sold</i>	\$116		
<i>Deduction for Tonnage Increase (per month/annualized)</i>	(\$19,024)	\$ (228,288)	
		\$ 1,116,906	\$ 1,046,712

Budget vs Actual Expenses for Project

The total cost for the project came in approximately 3% over the budgeted project expense when including the additional expenses for safety enhancements for fall and fire protection modifications that staff has included in this project. Even with these included into the project costs, with the increase in the overall revenues, the Payback of Investment dropped from the original projected 3.65 years to 3.5 years if the performance of the system continues at the levels of recovery and the differential values between Mixed Paper and Cardboard continue at current levels.

Project Budget	\$ 3,500,000
<u>Expenses</u>	
BHS Contract Amount	\$ 3,432,364
Fire Protection Modifications	\$ 94,212
<u>Fall Protection Estimate</u>	<u>\$ 68,288</u>
Total Actual Costs	\$ 3,594,864

CONCLUSIONS

Staff is very pleased with the initial performance of the system. BHS and their installation contractor, Titus MRF Services, have provided a system that significantly enhances the District's capabilities to recover value from the materials in the recycling stream through more refined separation of higher value commodities from lower value streams. Additionally, it appears to have increased the recovery of materials that had previously been heading out with the residual stream, both increasing the financial performance of the system, but also increasing the overall diversion of the recycling stream by an additional 1%. Although modest, it is important to note that this is occurring simultaneously with an increase in the overall contamination rate of the stream of inbound materials.

Staff will continue to assess the performance of these improvements and also explore other options that might yield the same type of financial and diversion opportunities for the District. Staff will follow up with a FY 20/21 year end report out of the system improvements to inform the Board if the initial performance trends continue throughout the year.



Tim Brownell
Director of Operations