

# MONTGOMERY COUNTY MARYLAND

## Aiming for Zero Waste

Task 8: Review of Existing Processing Facilities

Technical Memorandum #4 – Summary Report



Prepared for the Department of Environmental Protection  
Montgomery County, Maryland

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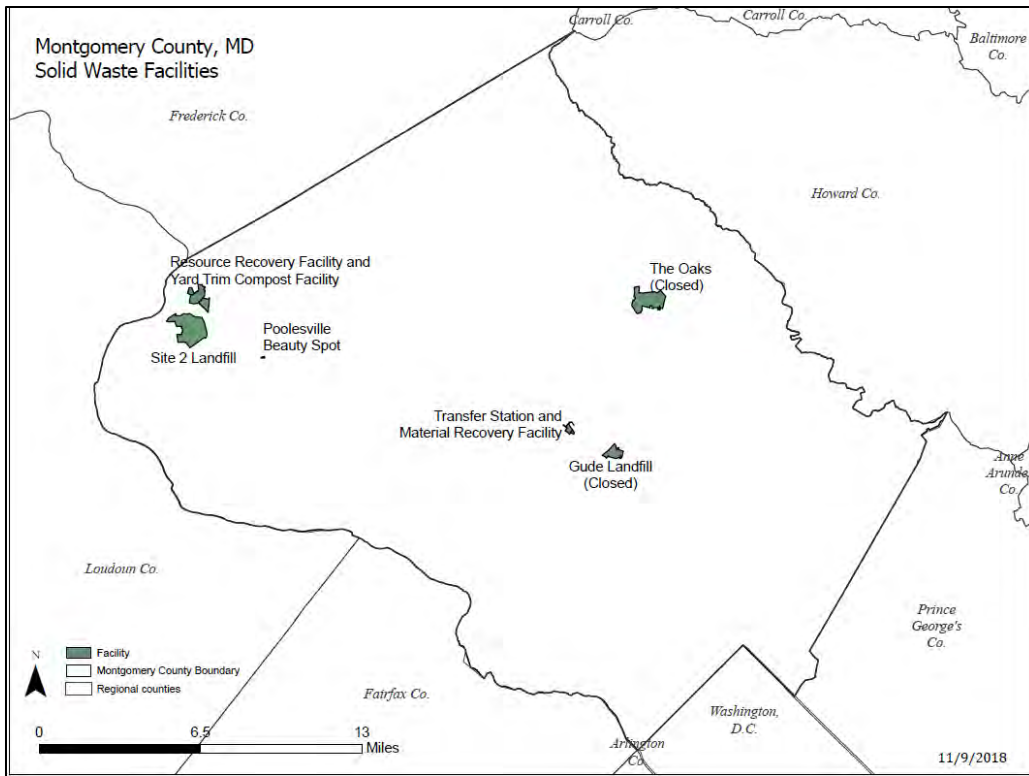
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# 1 Background and Purpose

This Facility Assessment Technical Memorandum (Memo), developed as part of Task 8 in Montgomery County’s “Aiming for Zero Waste” Master Plan, is the fourth of a series of reports developed in support of the project. The purpose of this report is to assess the existing physical and operating condition of each of Montgomery County’s four primary solid waste Processing Facilities, as well as the County’s Yard Trim Grinding Operation, and prepare a list of repair and replacement needs. The facilities assessed as part of this Memo are the Materials Recovery Facility (MRF), the Shady Grove Processing Facility and Transfer Station, the Resource Recovery Facility (RRF), the Montgomery County Yard Trim and Composting Facility (MCYTCF) and the County’s Yard Trim Grinding Operation. A map of the County’s facilities can be seen in Figure 1-1. Also, the Memo includes recommendations for operations and maintenance improvements and best practices to operate the Processing Facilities through 2025, 2030, 2035, and 2040.

Figure 1-1: Montgomery County Solid Waste Facilities



## 2 Materials Recovery Facility

The Materials Recovery Facility (MRF), also known as the Recycling Center, is located in Derwood Maryland adjacent to the Shady Grove Processing Facility and Transfer Station. The MRF is owned by the County and operated under an Inter-Governmental Agreement (IGA) by Maryland Environmental Service (MES). MES is also responsible for marketing the recovered materials. The MRF processes the two streams of recyclables: mixed commingled materials, which consist of glass, 1-7 plastics, aluminum, ferrous, bi-metal cans, and aluminum foil, and fiber materials, which consist of mixed paper and old corrugated cardboard (OCC). The MRF processes materials from single-family and multi-family residences, as well as some commercial sources.

The MRF commenced operations in August 1991. The initial facility was designed to process 80 tons per day (TPD) or 10 tons per hour (TPH) of commingled recyclables but is currently receiving 130-170 TPD (or 16-21 TPH) of commingled recyclables per day resulting in the need to bypass a large percentage of incoming material. Mechanical and hand separation is used to sort and bale the commingled containers. These materials are then sold to various commodity brokers and end markets to be remanufactured into new materials. There are in total 52 workers working at the MRF daily, running one shift per day, five days a week depending on the volume of materials they receive.

The Paper Processing Facility (PPF) was built at a capital cost of approximately \$3.3 million and entered commercial operation in May 2017. The paper processing operation is designed to process up to 25 tons of mixed paper and cardboard (OCC) per hour but is currently receiving more than this design capacity; on the order of 175-230 TPD (or 22-29 TPH). The PPF is operated by MES staff and contractor laborers for a total of 9 employees. The PPF operations include separating and baling mixed paper and OCC to sell to commodity brokers for processing into the market or ultimate disposal. The mixed paper and OCC are baled and is sent to paper mills both domestically and exported internationally to be made into new products.

The MRF is 28 years old and was last retrofitted 17 years ago as part of upgrades that were performed system-wide. As a result, most of the main processing equipment has exceeded its useful life. In addition, the existing MRF needs to be able to process 170 TPD of commingled material and the PPF, up to 230 TPD of fiber material and neither the commingled MRF nor the PPF is large enough to handle this throughput requirement. To reliably process this quantity of material, a complete retrofit of the commingled processing equipment is required, along with other building and site improvements.

The following describes the recommended capital projects based on HDR's observations and our professional opinion will help improve operations at the existing MRF.

- **New Scale Systems:** Traffic routing through the site for incoming material delivery is inefficient as a result of the use of split collection vehicles. This issue can be mitigated by installing an additional inbound scale to weigh the remaining fiber material after the commingled material is unloaded. A third scale is warranted to alleviate truck congestion and improve cycle time efficiency. In addition, the existing pit scales are original and in poor condition and it is recommended they be replaced with longer (80 foot) above ground scales. The scale house appeared to be in functional condition but is approaching 25 years old and should be replaced and expanded as part of the scale replacement project.
- **Electrical Systems Upgrade:** The existing electrical system in the commingled building is insufficient to provide adequate power for the new processing equipment.
- **Sewer and Stormwater Upgrades:** Due to the topography of the site, the commingled MRF building is situated at a lower elevation than the sewer mains. There is a sewage sump pit and pump that pumps sewage to the main sewer lines. MES staff informed HDR that there have been issues with backups and flooding, predominantly around the scale house, which should be investigated and addressed. As a result of the new PPF being constructed at a slightly higher elevation than the surrounding paved areas, rainwater drains into the Paper Receiving Building

causing the unprocessed paper products to become wet which reduces processing speed and increases contamination rates. To mitigate this issue, HDR recommends installing a new 12' wide trench drain, drain piping, and catch basins to collect and divert water away from the Paper Receiving Building.

- Enlarge Paper Receiving Building: The County has stated that there is insufficient storage for incoming fiber material; therefore, HDR has included an estimate of probable cost to expand the footprint of the building.
- Processing Equipment Upgrades: A complete retrofit of the commingled processing equipment is required, and improvements to the paper processing are needed to reliably process the quantity of material the County intends to receive at the facilities.

### 3 Shady Grove Processing Facility and Transfer Station

The Shady Grove Processing Facility and Transfer Station is located at 16101 Frederick Road on a 45-acre plot of land in Derwood Maryland. As seen in Figure 3-1, it is located adjacent to the Recycling Center and receives trash and recyclables from permitted solid waste haulers and collectors as well as residents at the public drop-off area. The Transfer Station has been in operation since the spring of 1982. In 1995, a transportation system was set up to facilitate rail haul of processible (i.e., combustible) waste from the Transfer Station to the Montgomery County Resource Recovery Facility (RRF). In 2004, a fourth compactor was added. In 2008 the tipping floor area and building were expanded adding a second tipping floor for self-haulers. In addition, improvements were made to the site roads, additional scales installed, and the public drop-off center was expanded.

Figure 3-1: Site Plan of Shady Grove Transfer Station and Processing Facility



Source: Google image, photograph was taken 04/2018

The Shady Grove Processing Facility and Transfer Station has a waste operating permit limit of 821,500 tons per year. On an annual basis, the Shady Grove Facility processes about 550,000 to 625,000 tons of processible (combustible) waste, 40,000 to 60,000 tons of non-processible waste, 60,000 of yard trimmings, 26,000 mulch, and about 10,000 tons of scrap metal, electronics, and other recyclables. In 2016, more than 668,000 tons of trash and recyclable material was received and processed at the facility.

The Facility averages approximately 2,100 TPD of MSW delivered via commercial and residential vehicles. Sixty-five percent of the vehicular traffic is made up of smaller (less than 3-ton payload) vehicles.

The Transfer Station utilizes two entrances, the Shady Grove truck entrance, and the Route 355 Public Unloading Facility (PUF) Entrance. The Shady Grove truck entrance receives over 1,000 collection trucks, pickup trucks, cube vans, etc. (e.g., vehicles carrying more than 500 pounds) per day and the PUF entrance receives about 1,000 to 2,000 smaller vehicles (e.g., cars, mini-vans that are carrying less than 500 pounds) per day. Seven radioactive waste detectors are located at several entrances to safeguard from unacceptable waste. These locations include the entrance to the main tipping floor, the entrance at the PUF area, the three inbound truck scales, the entrance at annex tipping floor, and the contractor's dedicated scale.

The four solid waste compactors can compress up to 26 to 27-ton loads of solid waste, which are mechanically discharged into 40-foot intermodal containers. Containers of compacted waste are driven to the rail yard for shipment to the RRF. Processible waste can also be bypassed directly to other permitted disposal sites if necessary. Inspectors also routinely check waste loads for other types of unacceptable materials.

Non-processible waste received at the Transfer Station is transported to landfills in the region with most of the material currently going to the Mountain View Reclamation Landfill near Greencastle, Pennsylvania.

The following outlines some of the recent and planned capital improvement projects and highlights several recommended capital projects that, based on HDR's observations and our professional opinion, will help improve operations at the existing transfer station and ensure it is capable of operating through the year 2040.

- Tipping Floor Repairs: A section of the tipping floor is replaced every 3 to 6 years, and in the past 12 months 45 percent of the floor has been replaced. This replacement schedule for the floor should continue through 2040.
- Roof Repairs: Roof repairs are performed as needed to the main Processing Building and Maintenance Building and therefore are not included in the capital cost estimates.
- New Scale Systems and Scalehouse Upgrades: The scalehouse is original to the facility and the scale management system needs to be upgraded to improve automated ticketing and the acceptance of credit cards. There are three inbound and two outbound scales and a sixth scale which is dedicated for Covanta vehicles. Only the number 3 scale is large enough to accommodate larger packer trucks. Only one inbound and one outbound lane has an RFID reader, which is not used, and there are some safety issues (tripping hazards) between each scale due to the curbing and the need for drivers to walk across the scales to reach the scale house. A tare system works on only some scales. Any entity delivering more than 20 tons per month may open an account. HDR recommends replacing the original scales with larger 30' above ground scales to provide additional length to accommodate larger vehicles. The scalehouse software should be upgraded to accept credit cards and include an automated ticketing system and tare system for all vehicle accounts.
- Compactors: There are four compactors at this transfer station. A major overhaul is performed on one compactor every year. Although routine maintenance work extends the life of the compactors, all four will need to be replaced in the next 5 years.
- HVAC Systems: Maintenance Building and Tipping Building HVAC systems will need to be replaced.
- Fire Protection Upgrades: The fire protection system in the Annex and Administrative areas is only 11 years old, but the rest of the system (including in the main Processing Area) is 37 years old. Some components such as the annunciator panel components are obsolete and need to be upgraded.

- Underground Piping: A cracked sewer water line was identified under the main transfer station building. This water main may be difficult to repair due to its location. The existing underground piping should have another 15-20 years of useful life left; however, the actual life of this piping can be shortened by various factors.
- Rolling Stock: HDR recommends the purchase of a larger side loader which is capable of lifting fully loaded containers in the railyard.
- Rail Containers: Based on the inventory list, approximately 135 containers will need to be replaced in the next five years, followed by another 135 in the next ten years, followed by another 146 in the next 15 years.
- Rail Cars: There are about 90 rail cars in operation, and two more are on order and will be delivered in FY 2019. None of the rail cars will reach the 50-year life prior to the year 2040; however, HDR has included costs to perform critical repairs to the rail cars assuming more significant repairs are identified during the 40-year-old inspection.



## 4 Montgomery County Resource Recovery Facility

HDR performed a physical assessment of the RRF as part of our review of the County's solid waste processing facilities. The objectives of this task were to (i) assess the general condition of the facility and major equipment and (ii) to identify major capital expenditures that may be required or advisable at the RRF to keep the facility operational considering the four different timeframes mentioned in section 1 of this report.

Built as part of Montgomery County's solid waste management strategy, the RRF began commercial operation in August 1995 and uses mass burn combustion technology to reduce solid waste volumes while generating electricity. The RRF is an energy from waste (EfW) facility operated by Covanta Montgomery, Inc. on behalf of the Northeast Maryland Waste Disposal Authority (NMWDA) and Montgomery County. The facility is located in Dickerson, (Montgomery County) Maryland and is comprised of three (3), 600 ton per day waterwall furnaces with Martin reverse reciprocating grates. Each boiler generates approximately 171,100 pounds per hour of steam at 865 pounds per square inch (psi) and 830°F. The steam is used to generate approximately 63 MW of electricity in a GE turbine.

HDR has reviewed the facility conditions, operating data, and related documentation to identify areas of performance shortfalls that might indicate additional refurbishment or replacement of the RRF equipment is needed to keep the facility running efficiently and reliably to 2026 and beyond if necessary. Based on the document review, discussions with key plant personnel, our review of the refurbishment projects undertaken between 2017 and 2019, and our notes taken during site visits, HDR has the following observations:

- The major equipment at the RRF appears to generally be in good condition. Exceptions include the condition of two of the three acid gas scrubber vessels, portions of the baghouse ducting systems in all three processing lines, and the high rates of ash spillage from the riddlings and bottom ash handling systems. Some sections of the boiler waterwalls in the first and second passes may also require additional maintenance.
- There are no concerns with the turbine rotor or blading that would result in significant capital expenditures through 2040. During a recent unscheduled turbine outage caused by a lubrication pump failure, a major overhaul was performed on the turbine. Based on the information provided to HDR during the turbine overhaul, the turbine is currently in good condition. The Generator reports and generator historical maintenance indicate the generator is also in good condition. HDR believes there will be some future major maintenance or upgrades necessary for the generator before 2040.
- The "Ash Systems" installed in 2012 on the boilers have resulted in significant housekeeping issues that have yet to be fully resolved.
- The refurbishment program performed FY2017 through FY2019 has helped to restore the boilers to historical availability and steam loads. Some additional capital for refurbishment work will be required to keep the RRF running reliably and efficiently through 2026.
- The Air Pollution Control (APC) Equipment currently installed at the facility is sufficient to consistently and continuously operate under the permitted emissions limits. There may be some significant capital improvements to some of the APC equipment, particularly the acid gas scrubbers that will be required to keep this equipment running effectively and reliably through 2026.

It is HDR's professional opinion that given proper levels of capital repairs/upgrades and a continuation of the currently improved operations and maintenance practices, it would be expected that the RRF should be capable of continuing to process waste and generate electricity at historical rates through the end of the current Service Agreement term (i.e., April 1, 2026) and beyond if necessary.

## 5 Montgomery County Yard Trim Composting Facility

In 1983, a 118-acre WSSC biosolids composting facility at the former "Matthews Farm" near Dickerson, Maryland was converted into a County- owned and managed Montgomery County Yard Trim Compost Facility (MCYTCF) operated by the Maryland Environmental Service (MES). . The MCYTCF is located at 21210 Martinsburg Road, Dickerson, MD 20842.

Leaves and grass are composted at the facility in an open-air turned windrow operation using windrow turners, loaders, and screening equipment. A process flow diagram is shown in Figure 5 1. Inbound raw materials are transported by truck and rail. To minimize truck traffic on MD Route 28 and other roads near the MCYTCF, there is a goal of transporting as much as possible by rail to the nearby Resource Recovery Facility.

Outbound compost is transported by truck either in bulk or as bagged product. The finished product is marketed under the brand name Leafgro® . Leafgro® is sold in bulk and bags and shipped by truck into the commercial bulk and bagged soil amendment market.

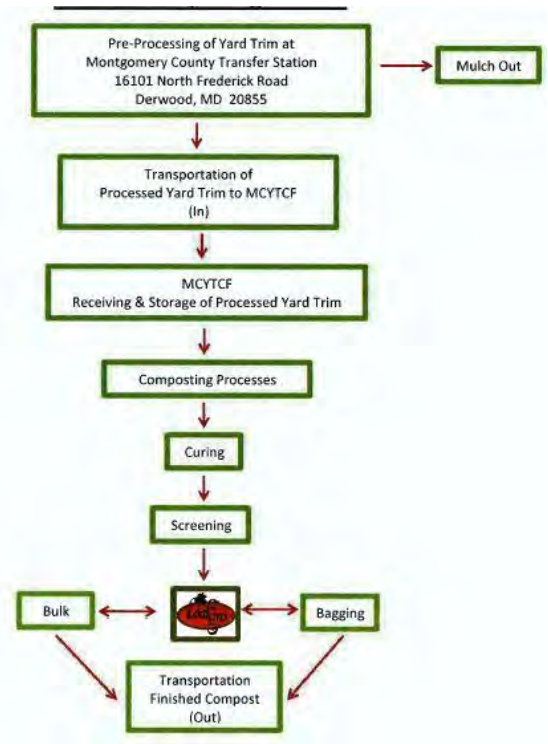
Most commingled yard trim is pre-processed at the Shady Grove Processing Facility and Transfer Station in Derwood before transporting it to the compost facility. Yard trim received from the County's vacuum leaf collection program is shipped from the County's Silver Spring Depot.

The MCYTCF operates within the County's agreement with the Sugarloaf Citizens Association The Agreement caps incoming tonnage yard trim accepted at the facility to 77,000 tons per fiscal year and caps production of bagged Leafgro® at 650,000 bags per fiscal year (as of FY18).

There are several areas where improvements would enhance the efficiency of the MCYTCF, thus reducing costs and improving environmental compliance:

- **Solids Separator:** The existing ponds have "forebays" (i.e., settling basins) that trap most of the solids; however, composting facilities elsewhere have begun adopting weir-type solids separators for more efficient solids removal and faster, less expensive cleaning.
- **Volume load scanning system:** Laser-based volumetric payload technologies that measure a loaded truck and compare it to the scanned volume of the truck before loading is recommended for this facility. This would save time from the current operating procedure of the loader operators having to monitor the weight of each bucket loaded onto a truck, keep track of the total, and verify the total by re-weighing the truck on the scales.
- **New equipment maintenance building:** The existing equipment maintenance building is not large enough to service some of the equipment inside the building.
- **Fiber-optic transmission line:** Extending a fiber-optic data transmission from the Dickerson Electric Generating Station would improve the ability of the MCYTCF staff to communicate with MES staff in Millersville, MD and the County staff in Rockville.
- **Replace scales:** while the scales are recalibrated and verified annually, these types of platform scales wear out over time and replacement every 10 years is suggested.

Figure 5-1: MCYTCF Process Flow Diagram  
Source: MES



- Replace lighting system: during a site visit in August 2018, it was noted that these lights do not work. While screening and bagging activities in the building are normally done during daylight hours, having operational lighting is an important safety consideration.
- Upgrade two USTs and ASTs: it is understood that the County is in the process of upgrading all its USTs to ASTs
- Repave Asphalt Pad: the annual asphalt patching contract has kept the asphalt working pad in good condition, but repaving the pad in the future is a prudent budgetary inclusion.

## 6 Montgomery County Grinding Operations

The Montgomery County Grinding Operations (MCGO) for yard trim is located at the Shady Grove Transfer Station and Processing Facility. The MCGO is operated by the MES. Unprocessed yard trim and landscaping debris are delivered to the Shady Grove Transfer Station by residential collection contractors, contractors, and residents. Yard trim is inspected, sorted and processed before transport to the MCYTCF. In FY2018, 57,900 tons of ground yard trim were shipped to the MCYTC, by rail, and by truck. Almost 27,00 tons of single grind wood-mulch were sold in the same fiscal year.

Residential collection and commercial vehicles containing solid waste or yard trim and natural wood materials enter the Transfer Station at the same commercial vehicle entrance on Shady Grove Road. During the calendar year 2018, there was an average of approximately 4,200 vehicles per month delivering yard trim. This number does not include trucks returning rail containers to the compactors, trucks picking up grounded yard trim material to be taken to the MCYTC, nor other vehicles that use the yard trim processing area as a traffic route when there are long queues to access the main tipping floor. The combined vehicle traffic can cause delays for both transfer station tipping floor and yard trim traffic.

Due to space limitation, in addition to the high traffic flow, the grinding operation loaders and grinders have to operate near all types of commercial and residential vehicles, creating safety risks. HDR recommends relocating the grinding operations.