Mifflin County Clean Wood Diversion Program

Mifflin County Solid Waste Authority
87 Landfill Road
Lewistown, PA 17044


SCS ENGINEERS

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ACKNOWLEDGEMENTS

SCS Engineers acknowledges the following organizations and individual for supporting this project.

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Sustainable Resources Consulting (SRC)
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1 PROJECT DESCRIPTION

The Mifflin County Solid Waste Authority (MCSWA) operates a waste and recyclable materials transfer station that provides solid waste management services to approximately 46,000 county residents. These services include waste transfer, collection of hard-to-recycle items such as electronics, tires, white goods, and collection of traditional recyclable materials. MCSWA also maintains and collects public recycling containers at drop-off sites located throughout the County. The MCSWA also provides organics diversion through its compost site and clean wood diversion located on the transfer station property.

In 2017, the MCSWA obtained a state-issued wood processing permit for the purpose of diverting clean, untreated wood from landfill disposal while benefitting County recycling efforts. The MCSWA is interested in supporting local or regional markets and consumers (e.g., landscapers and homeowners) by providing processed clean wood while at the same time generating revenue through the sale of processed wood that will in turn sustain and grow the successful clean wood diversion program. The MCSWA has struggled to secure long term, economically viable outlets for processed clean wood. The MCSWA requested recycling technical assistance to research and identify economically viable markets for processed clean wood.

2 SUMMARY OF WORK

This section summarizes the work activities performed as part of this recycling technical assistance project by key task.

Task 1 – Data Request and Site Visit

The project team requested and reviewed operational information/data characterizing the MCSWA's yard waste composting and clean wood diversion programs. This information was supplemented with a site visit that included discussions with MCSWA staff and organics equipment operators.

Task 2 – Research Clean Wood End Markets

The project team researched prospective markets for clean wood products. As preferred markets were identified, the project team followed up with markets using phone surveys to obtain more detailed information to help evaluate the feasibility of diverting clean wood to each market. The objective of this task included identifying primary and secondary markets potentially available to MCSWA.

Task 3 – Recommend Program Modifications

Based on the research and market information identified as part of Task 2, the project team developed recommendations regarding the clean wood program.

Task 4 – Final Report

This report provides the results of the research and the recommendations pertaining to the MCSWA's clean wood recovery program, including potential markets and program modifications.

3 CURRENT PROGRAM

SUMMARY

The MCSWA operates a yard waste composting site and clean wood processing area adjacent to its waste and recyclables transfer station located at 87 landfill Road in Lewistown, Pennsylvania. The

clean wood processing area is approximately one-acre. Wood diversion and processing reduces landfill fees and turns the wood into a beneficial product. The wood processing area is permitted by the State under General Permit No. WMGM044SC003. In accordance with the permit, the wood-based materials listed below are eligible for processing. Materials like brick and concrete are listed in the permit but not shown because they are not applicable to the project or to wood processing activities.

- Unpainted/untreated wood
- Pallets
- Skids
- Saw dust

In accordance with the permit, the following wood-based products or end uses are eligible:

- Mulch
- Wood chips
- Soil conditioner/amendment
- Alternative fuel
- Wholesale

OPERATIONS

Based on staffing and equipment availability, MCSWA staff remove clean wood arriving at the transfer station so it can be processed into wood shreds and marketed, rather than transferred to a landfill or other processor. MCSWA staff separate clean wood (mostly skids/pallets) from other materials manually and with a front-end loader. The clean wood is placed in roll-off containers for temporary storage prior to grinding. When sufficient clean wood is accumulated and staff are available, the clean wood is shredded in the designated processing area using a Morbark Wood Hog 2600 horizontal grinder (**Figure 1**). According to MCSWA recycling reports approximately 270 tons of clean wood was diverted from disposal from 2015 through 2019.

Currently, no identified market with capacity and demand to accept bulk loads of clean wood shreds exists. MCSWA requires a market to generate enough revenue to offset MCSWA's processing and transportation costs with a goal to expand clean wood diversion. With no market, the MCSWA periodically ships loads of processed clean wood 50 miles (one-way) to the Clinton County Solid Waste Authority at a cost of $300 per load. The Clinton County Solid Waste Authority incorporates the wood into their composting operation.

Figure 1 – Morbark Wood Hog 2600

CONSIDERATIONS FOR PROGRAM EXPANSION

Based on the observed **inbound** quantities of clean wood, the MCSWA could increase the amount of clean wood diverted from its tip floor. Conceptually, the MCSWA could offer a reduced tipping fee as an incentive for larger clean wood generators to separate clean wood from other materials prior to delivery. Accepting screened loads from wood generators to reduce contamination and sorting would streamline wood handling by MCSWA. MCSWA reports there are about four-to-six customers that regularly tip loads containing divertible quantities of wood. Since the MCSWA incurs operating and maintenance costs for the clean wood separation, storage, processing, and transportation - **it is imperative the MCSWA identify an economically viable market prior to expanding the clean wood diversion program**.

SITE VISIT

The project team visited MCSWA's clean wood processing area and compost facility on September 30th, 2020. **Figure 2** shows the current locations of the clean wood processing area, transfer station, and yard waste compost site.

Figure 2 - MCSWA Wood Processing and Compost Areas (Aerial)

OBSERVATIONS

The following observations were made during the September 2020 site visit:

- **Clean Site and Material** - The clean wood processing site and the processed wood shreds were very clean. No debris, litter or other contamination was observed in shredded material or in the processing area. The wood processing area working surface is compacted dirt/gravel.

  The yard waste drop-off, pickup, and compost site was clean and well organized. The areas for finished product pick up, leaf drop-off, and brush drop-off were distinct and separated the public from the grinding area.

- **Staff and Equipment Limitations** - Based on discussions with the grinder operator, if all recoverable clean wood is diverted on a weekly basis, it would require one staff person approximately one (1) full day to grind all the clean wood. The MCSWA is not currently diverting all clean wood from the tipping floor because staffing and equipment are currently limited (MCSWA expects to hire a staff person and to purchase a front-end loader in 2021). MCSWA has one front-end loader and its allocation to transfer station operations takes precedent over use at the compost facility and wood processing area.

A new loader that has been purchased by MCSWA will be delivered in early 2021 – This should provide more operational flexibility to manage clean wood and yard waste grinding during normal business hours.

- **Clean Wood Product Description** - The clean wood shreds were coarse to very coarse 1-inch to 8-inches in length and about 3-inches wide. This differs from most landscaping mulches, which are finer, homogenous, and darker in color.

- **Grinder Mobilization and Setup** - Since the designated areas for grinding yard waste and grinding clean wood are different, the grinder is mobilized and set up for grinding at each location.

- **Roll-off Storage** - Several 30 yard open top roll-offs are staged near the processing area to temporarily hold clean wood until there is enough to warrant processing.

4 MARKET RESEARCH AND ASSESSMENT

The project team researched potential outlets for clean ground wood shreds generated by the MCSWA. Broadly, the possible consumers or end uses for processed wood shreds includes the following:

- Biomass thermal fuel including pellets (kilns, heating furnaces, electricity generation)
- Compost bulking agent (added to leaf compost to promote airflow and decomposition)
- Landscaping mulch (weed suppression and moisture retention)
- Wastewater treatment process bulking agent
- Mushroom farm substrate
- Pulp/Paper mills
- Lumber yards (serving as consolidation/transfer to established bulk consumers)
- Ecologic restoration/construction (e.g., rivers/creeks repair and erosion control)
- Bioreactors for denitrification
- Compost site leachate and stormwater management
- Livestock bedding
- Playground cover

SRC initially conducted a desktop analysis to identify markets for processed clean wood produced by MCSWA. A list of potential markets located within 100 miles of Lewistown (PA) was generated from the preliminary screening that included over 50 facilities (**Appendix A – Clean Wood Market Summary**). These potential outlets included the following core business types:

- Wastewater treatment plants
- Compost facilities
- Paper mills
- Biomass Fuel Facilities
- Landscapers

SRC worked with the MCSWA to screen the initial list of facilities and to select several preferred markets with a primary factor being logistics, including the hauling distance to market and the capacity of the end user to offer hauling service to the MCSWA for loads of processed wood. The preferred potential outlets/companies listed were contacted by phone to assess their interest and capacity to accept MCSWA's clean processed wood shreds. Only one company, Metzler Forest

Products, expressed possible interest in MCSWA's processed wood but was not willing to discuss financial arrangements at this time. Conclusions from the market interviews included:

- **Metzler Forest Products (Reedsville, PA):** Metzler is a large and growing producer of landscaping products that accepts yard waste and materials collected as part of timber operations.

  Materials Accepted for Processing:
  - Yard waste

  Products Generated:
  - Mulch
  - Soil blend
  - Compost
  - Certified playground material
  - Erosion control (mulch/compost blend)

  Services Potentially Available to MCSWA:
  - Yard waste/green waste processing (delivered)
  - Removal of bulk loads of processed wood shreds

- **Energex (Mifflintown, PA):** Energex is a pellet fuel manufacturer that derives most hard wood feedstocks for making pellet fuel from the lumber/timber industry. Materials are debarked to generate less than one percent ash content and must meet inspections and testing requirements in accordance with the Pellet Fuels Institute (PFI). This requirement relates to the combustion of materials inside occupied dwellings and potential air quality risks and associated health hazards.

  Materials Accepted for Processing:
  - 95 percent clean hardwoods, 5 percent softwoods.

  Products Generated:
  - Pellet fuel

  Services Potentially Available to MCSWA:
  - None.

- **Marlette Homes, Inc. (Lewistown, PA):** Marlette Homes is not an outlet for wood shreds, but is a large custom home building and relatively large local generator of wood debris. They were contacted to confirm their arrangements for transporting and offsite processing of wood. Wood scraps are primarily soft woods including wood cutoffs and miscellaneous scrap. Wood is consolidated in roll-off containers and hauled offsite three-to-four times per week by a private hauler for disposal. The cost is $300 per load, or about $6,000 per month.

  Materials Accepted for Processing/Transportation
  - None

  Products Generated
  - Homes

  Services Potentially Available to MCSWA

- None. Marlette is seeking more affordable transportation and processing for wood discards.

5 FINDINGS

The key findings from the market assesment, site visit, and project evaluation include:

- **Clean Organic Materials and Products** - MCSWA conducts thorough visual screenings of inbound materials to select clean, untreated wood for diversion to the clean wood recovery program. The finished yard waste mulch, leaf compost and wood shreds were visibly very clean. The grinder has a magnetic separator that removes nails, screws and other ferrous metals from processed materials. MCSWA staff separate and reuse skids that are stamped, painted and treated as part of MCSWA's recycling programs (e.g., for use in storing and transporting electronics).

- **Estimated Wood Shred Quantities** - Based on inbound load observations, it would take approximatly one day per week to grind all the clean wood that could potentially be removed (primarily skids). Assuming active grinding was five hours per grinding, at a production rate of 50 cubic yards of wood shreds per hour as expected from the Morbark Wood Hog 2600, the MCSWA could produce roughly 250 cubic yards per processing day (equivalent to a weeks-worth of clean wood diverted). This is about 35 tons of clean wood shreds per week using a conversion factor of 250 to 300 pounds per cubic yard for wood shreds.

- **Wood Shred Product Composition** - Visually, the processed wood shreds are a clean, light colored material. Per MCSWA, about 90 percent of the diverted wood and wood shreds are skids/pallets that are primarily softwoods like pine. After grinding, the wood fragments range from about one inch to eight inches in length, with a width of three inches or less. The coarse wood shred product results from using three inch upper and lower screens in the Morbark Wood Hog 2600. Coarse, non-uniform wood shreds produced from three inch screens is a low-grade mulch. The wood shreds produced by MCSWA are not the industry standard for landscaping mulches.

- **Skids/Pallet Characteristics** - Skids/pallets have unique characteristics that in some cases negatively impact marketability. However, many public and private composting and landscaping operations in Pennsylvania and nationally process untreated skids/pallets for use as mulch and other products. Notable characteristics of skid/pallet wood include:

    - Contains nails, staples and other metals (removed by magnet)
    - Potential contamination by chemicals (e.g., paints, preservatives, dyes, adhesives)
    - Potential contamination by shrinkwrap or other non-wood components
    - Kiln dried preservation (to kill insects prior to transport)
    - Skids made of softwoods are not desireable for some markets

- **Metzler Forest Products (Metzler) Potential Opportunities** - Metzler is a local landscaping company, and was the only company that expressed potential interest in MCSWA's wood shreds in bulk volume. Metzler is open to discussions relating to marketing and transporting MCSWA's clean wood and may be wiling to work with MCSWA provided mutually agreeable pricing and beneficial operational arrangements are identified.

- **Pellet Fuel Manufacturers Not A Viable Market -** Pellet fuel manufacturers do not accept skid/pallet wood due to strict chemical requirements relating to combustion in occupied

dwellings. Further, debarked hardwoods are used for pellet fuel and most skids are made of pine or other softwoods.

- **Local Waste Water Treatment Plants (WWTP) Not a Viable Outlet -** Although organics like leaves and processed wood can be incorporated as a bulking agent for certain waste water treatment processes, the local WWTP's primarily use sludge drying beds and do not have capability or demand for MCSWA's wood shreds.

- **Laboratory Testing –** MCSWA produced wood shreds, yard waste mulch and leaf compost have not been laboratory tested. Based on discussions with potential markets, laboratory data confirming material cleanliness and clarifying material specifications of the final product could benefit MCSWA in negotiating potential market arrangements.

- **The Primary End-use in the Lewistown Area is Landscaping Mulch** - Considering limited bulk consumer demand and potentially high transportation cost to bulk markets, the end-use with the most versatility, economic feasibility and potential demand is application as a landscaping mulch. Since many landscaping companies produce higher quality mulch using two-inch screens, it can be assumed MCSWA wood shreds would yield a lower value than landscaping mulches sold in the region. MCSWA's wood shreds would have applications as a mulch ground cover with the following benefits:

    - Weed prevention
    - Moisture retention
    - Topsoil protection (retaining topsoil nutrients for the intended plants)
    - Soil temperature moderation
    - Yard/landscape aethetics
    - Protecting vulnerable plants, trees, and shrubs from damage (e.g., mower)

- **Two Primary Marketing Structures for Organic Products -** The two marketing structures include: distribution off-site to bulk consumers or distribution onsite to low-volume consumers. MCSWA has not secured reliable bulk consumers and it is a best practice to have at least two bulk markets available for the purposes of negotiating competive pricing and outlet redundancy. Thus, only onsite distribution to low-volume consumers is currently feasible.

    It is SRC's opinion that the feasible marketing structure for MCSWA's organics products, including those generated from clean wood, is the distribution to low-volume consumers that purchase wood shreds by the scoop directly from MCSWA. This is MCSWA's current marketing strategy and it effeciently and cost-effectively places the cost of final product transportion on the consumer. Under this marketing and distribution structure the MCSWA may not be in a position to significantly "expand" the clean wood program. However, the MCSWA could continue the recovery of clean wood to the extent staffing, equipment, and economics allow. This approach could be complimented by adapting a broader market strategy to gradually improve the quality of all its organics products and increase and diversify local distribution (refer to Recommendations).

    1. **Low-Volume Onsite Distribution to Consumers** - Includes smaller landscapers and individuals, typically purchasing quantities of finished mulch products 10 cubic yards or less. Transportation and costs are typically borne by the end-user because they travel to pick-up the finished product from the place it is generated. MCSWA has this market structure in place and sells mulch and compost products to customers on site for $10 - $20 per scoop.

2. **High-Volume Off-Site Distribution to Bulk Consumers** (e.g. 40 – 100 yards) - MCSWA assumes the transportation costs. Transportation can include self-haul, outsourcing to a hauler, or negotiating transportation with the bulk consumer (sometimes included in the price paid per cubic yard). Transporting bulk loads may include hauling distances over 20 miles one way. Markets accepting bulk loads are often the same place of sale for finished mulch (or similar) organic products. Based on SRC's experience with hauling models and review of transportation costs, bulk load transportation costs range from $200 - $400 per load. A bulk sales value of $2 - $4 per cubic yard for 100 yard trailers is needed to offset transportation cost. In Pennsylvania, most compost facilities are unable to sell bulk loads of coarse mulch and generate a profit. For example, many municipally-operated compost sites secure vendors to take material away for no charge or pay transportation fees that may be discounted with consideration of product value.

   Most bulk consumers (e.g., Metzler Forest Products) would be expected to incorporate MCSWA's wood shreds into their finished products to sell to their bulk consumers (e.g., mid-sized landscaping companies) and to their lower-volume consumers. MCSWA's coarse wood shreds likely require regrinding and other processing including colorization, mixing, and laboratory testing to create marketable products that meet product specifications to yield higher sale values for finished products. Since bulk consumers are expected to incur additional processing costs to refine MCSWA wood shreds, it is not expected that MCSWA could recover a high enough price per cubic yard or total bulk sale value to offset MCSWA's operation and maintenance costs for clean wood processing, transportation and other costs associated with a bulk consumer program.

- **County-Wide Recycling Efforts** - The MCSWA is designated by Mifflin County to implement its County Municipal Waste Management Plan in accordance with the Pennsylvania Waste Planning, Recycling, and Waste Reduction of 1988 (Act 101). MCSWA yard waste composting operation and wood recovery program are important elements of MCSWA's comprehensive recycling program and align with the County's role to advance recycling in Pennsylvania.

6 RECOMMENDATIONS

The following recommendations are provided for consideration by MCSWA pertaining to clean wood and other organics processing, operations, and marketing.

- **Do Not Expand Clean Wood Diversion Program at this Time** - It is not recommended the MCSWA expand or aggressively pursue increased diversion of clean wood, which may be reliant on bulk consumers removing large quantities of processed clean wood on a regular basis. The potential quantities that could be diverted may result in an overaccumulation of both unprocessed and processed clean wood material on site.

- **Target Low-Volume Consumers Via Onsite Distribution and Sales** - Improve marketing and distribution to low volume customers that pickup and purchase organic products directly from MCSWA. Using this marketing structure the MCSWA can 1) streamline clean wood and yard waste grinding, 2) continue to divert clean wood to beneficial use, 3) avoid the market risks, operating complexity, and additional costs associated with distribution to bulk consumers, 4) improve the quality, demand and sale value of organic products, and 5) be in the position to increase or decrease clean wood diversion based on MCSWA's operational capacity and program economics.

- **Continue Clean Wood and Yard Waste Processing Operations** – Continue grinding operations within designated areas (**Appendix B**) and incorporate best practices to enhance overall organics program performance. This requires the MCSWA and staff to test and troubleshoot different operational methods and strategies to fine tune its use of wood shreds, production of mulch and compost products, and distribution and marketing of finished products.

- **Improve the Quality of Organics Products and Potentially Increase the Types of Organics Sold** - With goals to improve the demand, value and revenue generated from its organic products, the MCSWA should enhance the qualify of its leaf compost and mulch products. Consider the following best practices:

  Material Quality:

  - **Leaf compost** - Construct parallel leaf windrows eight feet tall and 12' – 16' wide. Turn leaf windrows at least twice within the first month they are deposited to activate microbes and maximize natural decomposition. In the spring after windrows have reduced in size, combine two parallel windrows to form one larger windrow. After leaves have decomposed to compost over a four to six month period, place the compost in piles to cure for a period of one to two months prior to distribution.

  - **Clean Wood and Yard Waste -** Purchase two inch upper and lower screens for the Mobark 260 to create higher quality/landscape grade mulch products from clean wood and yard waste. Deacon Equipment (vendor of the Mobark grinder sold to MCSWA) recommends Model AR450, two inch hex screens at a cost of $968.78 each.

    Two inch screens may slow grinding rates slightly, most noticeably when grinding larger pieces of wood. MCSWA could limit the amount of large diameter wood processed with two inch screens (i.e. < eight inches) to maintain adequate processing rates, minimize maintenance, and extend the life of the screens and machine.

  - **Other Products/Soil Amendment** - Consider making a 50:50 soil-leaf compost blend and testing its marketability. Test marketability of different products like two inch single-grind clean wood, two inch double-grind natural mulch and other combinations to evaluate consumer demand and to set pricing levels for MCSWA orgranic products.

  - **Laboratory Testing** - Submit samples of compost and mulch products for laboratory testing at least each year to confirm the quality and composition of mulches and compost. This data can be made available to consumers as part of marketing efforts.

    Penn State Agriculture Analytics Services Laboratory (agsci.psu.edu/aasl) recommends its Compost Test 1C ($75.00, December 2020) which includes: percent solids, organic matter, pH, soluble salts, total nitrogen, total carbon, carbon : nitrogen ratio, ammonium nitrogen, phosphorus, potassium, aluminum, calcium, magnesium, manganese, sodium, copper, iron, sulfur and zinc.

Material Distribution

- **Diversify Distribution of Compost and Mulch Products** - Continually evaluate end-uses and local applications of compost and mulch products to confirm that distribution and demand are balanced and overaccumulation of organics does not become problematic. Recommended distribution and end-users include:

  - Homeowners
  - Landscaping companies
  - Municipalities for Public Use - Coordinate quantities of mulch or compost that may be picked up from MCSWA or delivered to designated locations in local municipalities. Municipalities can stage mulch and compost in parking lots and similar accessible areas for use by residents.
  - Municipalities – Distribute for use in parks, athletic fields, and municipal building landscape maintenance, construction projects, etc.
  - County Conservation District – Distribute for use in parks, recreation and trails landscaping maintenance.

- **Utilize Wood Shreds within Filter Berms for Stormwater and Leachate Management** – On the downgrade perimeter of the compost site and woody processing areas install berms constructed of wood shreds (and/or other mulch and compost) to manage stormwater and leachate onsite. Build the berm on the contour perpendicular to sheet flow with the ends turned upslope to prevent runoff from bypassing the berm. Construct the filter berm using a trapezoid shape: two inch height (minimum), five inch wide (recommended base width) with 2:1 side slopes. Due to clogging with silt and dirt and saturation, it is recommended that every one to two years the berm be deconstructed and reincorporated within onsite mulch piles, and replaced with filter berms constructed of fresh wood shreds and/or mulch.

- **Test Incorporating Wood Shreds within Natural Mulch** – It may be feasible for the MCSWA to add wood shreds to its natural mulch produced from yard waste. Clean wood shreds will add light-colored pieces to the mulch and so MCSWA should test this method and understand the proper mix ratios. It is recommended the MCSWA start with a 1:8 ratio of wood shreds to yard waste mulch. This mix should be allowed to cure and breakdown for several months. The mix should be periodically mixed so that the wood shreds stain brown and break down to create a homogenous mulch product. This process will be facilitated by mulch and wood shreds that are created with two inch screens.

- **Continue Market and Transportation Discussions with Metzler and Other Potential Bulk Consumers** - Invite staff from Metzler to visit MCSWA to review processed wood shreds and continue discussions relating to marketing and transportation of bulk quantities of MCSWA processed wood shreds. It is recommended MCSWA continue to evaluate opportunities with bulk consumers so that this option is considered for the future.

If distribution of bulk loads of compost or mulch become feasible, construction of a load ramp may be needed (**Appendix B**). Load ramps can be constructed cost effectively using dirt and/or dirt with a concrete retaining wall.

- **Mitigate Fires** – Wood and yard waste processing facilities are at increased risk of fires. Often fires can occur due to careless smoking when large piles of leaves or ground yard waste are ignited by discarded cigarettes. To reduce the chances of mulch fires, it is recommended MCSWA prohibit smoking in the mulch processing areas, maintain pile sizes less than than 12' high, and use a front end loader to thoroughly mix mulch piles, particulary large mulch or compost piles that have been on site more than six months.

7 CONCLUSIONS

Expanding the clean wood diversion program is not feasible at this time because bulk consumers have not been identified. Based on market findings, it is not expected MCSWA could generate revenue through bulk sales of clean wood shreds; particularly when considering the costs of processing and transportation. However, clean wood diversion is still a significant and beneficial part of MCSWA operations and existing recycling efforts. The MCSWA could continue its current level of clean wood diversion while applying the best practices identified within this report to fine-tune its organics operation. An opportunity exists for MCSWA to implement a long-term marketing strategy to improve the quality of its organic products and incrementally increase demand and distribution to low-volume local consumers. Increasing demand and product values would benefit the overall operations and the sustainability of MCSWA's organics program.

Attachment A
Clean Wood Market Summary

Potential Markets for Processed Clean Wood from Mifflin County Solid Waste Authority

Type	Name	Phone	Miles from TS
WWTP	Mount Carmel Municipal Authority Wastewater Treatment Plant	5703390472	68
WWTP	Bloomsburg Waste Water Treatment Plant	5707844738	68
WWTP	Twin County Joint Municipal Authority Wastewater Treatment Pla	NA	87
WWTP	Gordon Wastewater Treatment Plant	5706228240	77
WWTP	North Heidelberg Wastewater Treatment Plant	NA	104
WWTP	Lititz Waste Water Treatment Plant	7176262172	98
WWTP	Hershey Wastewater Treatment Facility	NA	72
WWTP	E.Y.C.S.T. Wastewater Treatment Plant	7172522797	90
WWTP	York Wastewater Treatment Plant	7178452794	83
WWTP	Capital Region Water Advanced Wastewater Treatment Facility	8885100606	61
WWTP	Grantham Wastewater Treatment Plant	7176979548	77
WWTP	Mechanicsburg Wastewater Treatment Plant	7176913320	72
WWTP	Chambersburg Waste Water Treatment Plant	7172613237	74
WWTP	Smith Valley Waste Water Treatment Plant	8145430853	31
WWTP	The Indiana Borough Regional Wastewater Treatment Facility	7244799766	125
Compost Facilities	Buckhorn Recycling & Compost Facility	8149416675	81
Compost Facilities	Penn State University Composting Facility	NA	34
Compost Facilities	Chambersburg Green Yard Waste Recycling Center	7172613213	73
Compost Facilities	Carlisle Compost Facility	7172494422	60
Compost Facilities	Middlesex/North Middleton Joint Compost Facility	7177660178	57
Compost Facilities	Swatara Township Yard Waste Composting Facility	717564-2551	65
Compost Facilities	A & M Compost	7176642073	88
Paper Mills	American Eagle Paper Mills	8146841610	59
Paper Mills	Appvion	8142242131	86
Paper Mills	Nittany Paper	8882887907	4
Paper Mills	International Paper Co	5708223158	69
Paper Mills	International Paper Company	5703843251	98
Paper Mills	International Paper Company	5703391611	90
Paper Mills	Ahlstrom Filtration LLC	7174863438	60
Biomass Fuel	Chestnut Road Lumber and Dry Kiln	717423-5941	58
Biomass Fuel	Lehigh Cement Co	7178430811	86
Biomass Fuel	Carlisle Cement Products Company Incorporated	7172435323	54
Biomass Fuel	Lehigh Cement	8005418020	86
Biomass Fuel	Hanson Ready Mix	4124316001	37
Biomass Fuel	New Enterprise Stone & Lime Co., Inc. -- Winfield Quarry	8005433860	52
Biomass Fuel	Carmeuse Lime & Stone	7178674441	80
Biomass Fuel	Keenan Slab Works -- sawmill, live edge wood slabs, and vacuum	7178749720	90
Landscapers	Metzler	7176672924	14
Landscapers	Wray's Landscaping	717242-3300	5
Landscapers	Bargers Landscaping	7173483994	7
Landscapers	Bushmen Landscaping	7172483484	5
Landscapers	Kauffman Landscaping	7175433501	13

Attachment B
Conceptual Site Layout

Mifflin County Solid Waste Authority

Yard Waste & Clean Wood Processing (Conceptual)