

SECTION 1.0 GENERAL FACILITY OPERATIONS

1.1 OVERVIEW

This Operations Manual was prepared for the Flowers LCID Recycling Center located off of Motorcycle Road near Flowers, North Carolina (see **Figure 1**). The proposed use for the site includes remediation of an un-permitted Land Clearing and Inert Debris (LCID) landfill owned by the late Mr. Billy Flowers¹. The site is currently under a Notice of Violation by the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Waste Management². The planned use of the site will provide for the remediation of the site through excavation and processing of the existing landfill under 15A NCAC 13B 0.300. The final development of the property will include returning the site to its original condition (prior to LCID placement).

The information contained herein was prepared to provide facility personnel with a clear understanding of how the Design Engineer assumed that the completed facility would be operated. While deviations from the operations outlined here may be acceptable, they should be reviewed and approved by the Design Engineer.

1.1.1 Processing Overview

The proposed processing at the site generally involves mining of the existing LCID, receipt of additional LCID, gross sorting of materials, grinding of land clearing debris materials, and screening of the material into three (3) products as follows:

- Mulch
- Mulch and Soil Combination (Amended Soil)
- Soil

Land clearing debris is defined as *solid waste which is generated solely from land clearing activities such as stumps, trees, limbs, brush, grass, and other naturally occurring vegetative matter.*

1.2 CONTACT INFORMATION

All correspondence and questions concerning the operation of the Flowers LCID Recycling Center should be directed to the appropriate contact personnel, Engineer, and State personnel listed below. For fire or police emergencies dial 911.

¹ Correspondence dated February 10, 2004 from Mr. Ben Barnes, NCDENR to Mr. Billy R. Flowers, Flowers LCID regarding Notice of Violation issued July 18, 2003.

² Notice of Violation dated July 18, 2003 from Mr. Ben Barnes, NCDENR to Mr. Billy R. Flowers, Flowers LCID.

1.2.1 Contact Person

Mr. Gary K. Lynch
P.O. Box 20012
Raleigh NC 27619
Phone: (919) 553-3187
Fax: (919) 553-9910
email: ccraftsmen@myway.com

1.2.2 Engineer

Richardson Smith Gardner & Associates, Inc.
Attn: Stacey A. Smith, P.E.
14 N. Boylan Avenue
Raleigh NC 27603
Phone: (919) 828-0577
Fax: (919) 828-3899
email: stacey@rsgengineers.com

1.2.3 North Carolina Department of Environment and Natural Resources

North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, NC 27605
Phone: (919) 508-8400
Fax: (919) 733-4810

Division of Waste Management (DWM) - Solid Waste Section:

Environmental Engineer II: Toni Wyche, E.I.
Branch Head: Ed Mussler, III, P.E.

Division of Land Resources - Land Quality Section:

Raleigh Office: 3800 Barrett Drive, P.O. Box 27687
Raleigh, NC 27611
Phone: (919) 571-4700

Regional Engineer: John Holley, P.E.

1.2.4 Emergency Response

Archer Lodge Fire Department
6483 Covered Bridge Road
Clayton, NC 27520
Phone: (919) 550-4136
www.archerlodgedfd.org

1.3 ACCESS CONTROL

Limiting access to the Flowers LCID Recycling Center is important for the following reasons:

- Unauthorized and illegal dumping of waste materials is prevented.
- Trespassing, and injury resulting therefrom, is discouraged.
- The risk of vandalism is greatly reduced.

The facility attendant will be on duty at all times when the facility is open for public use to enforce access restrictions.

1.3.1 Physical Restraints

The site will be accessed by Motorcycle Road. A guard house is provided at the entrance. Access to the recycling center includes an all-weather access road as well as a 25 foot clear buffer for access in the event of fire around the perimeter of the facility. The entrance off of Motorcycle Road will be securely locked during non-operating hours.

1.3.2 Security

Frequent inspections of gates and fences will be performed by facility personnel. Evidence of trespassing, vandalism, or illegal operation will be reported to the Owner.

1.4 SIGNAGE

A prominent sign containing the information required by the DWM will be placed just inside the main gate. This sign will provide information on facility name, operating hours and facility contact information. Service and maintenance roads for use by operations personnel will be clearly marked and barriers (e.g., traffic cones, barrels, etc.) will be provided as required.

1.5 COMMUNICATIONS

Due to the close proximity of the processing area and the guard house, communication will be maintained between the guard house and the processing areas verbally. The guard house will have a telephone (land or cell) in case of emergency and for the conduct of day-to-day business. Emergency telephone numbers are displayed in the guard house.

1.6 FIRE SAFETY

The possibility of fire at the recycling center must be anticipated in the daily operation of the facility. Potential fire hazards include both surface conditions and subsurface conditions. Surface conditions include equipment operations and visible stockpiles of processed materials. Subsurface conditions include underground fires caused by decomposition of the existing land clearing and inert debris materials previously landfilled.

1.6.1 Fire Triangle

The “triangle” illustrates the rule that in order to ignite and burn, a fire requires three (3) elements: heat, fuel, and oxygen. A fire is prevented or extinguished by “removing” any one of them. A fire naturally occurs when the elements are combined in the right mixture (e.g., more heat needed for igniting some fuels, unless there is concentrated oxygen). These principles are integral in the prevention and management of potential fire situations.



1.6.2 Equipment Safety

A combination of factory installed fire suppression systems and/or portable fire extinguishers will be operational on all pieces of heavy equipment at all times. Potential fire hazards at the recycling center are created from the build-up of fine, dry dust particles on and around operational motors and control panels. The presence of these build-ups can cause overheating and potential fire if periodic equipment cleaning and maintenance are not practiced. Portable fire extinguishers should be maintained in a state of readiness at the screen location and on each piece of moving equipment and equipment should be cleaned periodically.

1.6.3 Processing Material Management

As a part of the recycling operations, stockpiles of mulch and/or mulch-soil mixes (fuel) will exist around the site. In organic materials, spontaneous combustion occurs when heat produced through biological degradation is not allowed to dissipate thus raising the temperature of the material. The stockpiles will be monitored for height and temperature (heat). Exothermic oxidation of wood occurs around 200 °F (National Fire Protection Association). Therefore, the pile temperature will be controlled and limited so as not to exceed 150 °F, by either reducing pile height or simply dividing the pile into smaller piles. A 25 foot clear perimeter will be maintained around the processing area and between storage piles to allow access for monitoring by personnel and to allow potential heat dissipation.

1.6.4 Landfill Mining Management

Operations include mining of the existing landfill which can introduce air (oxygen) into the existing waste mass. Management of the excavation activities should be limited to a maximum of one (1) acre open at any one time. A stockpile of soil should be maintained to immediately cover any areas that may ignite at a minimum of two (2) feet thick. For larger or more serious outbreaks, the local fire department will respond. An additional 1,000 feet of fire hose should be maintained at the site to aid in potential fire department access to site and to control surface fires coupled with cover operations.

1.6.5 Fire Management Strategies

Each fire situation is site specific, however, general strategies for active fire management include the following (in no particular order):

- Accelerated high temperature combustion (displacing fuel);
- Covering of the landfill burn area with soil (reduce oxygen);
- Covering of the burn area with foams (reduce oxygen);
- Flooding the burn area with water (reduce heat);
- Injecting an inert gas such as CO₂ (reduce oxygen); and
- Excavating the burning material (displacing fuel) and then extinguishing it in small controlled areas.

1.6.6 Coordination

The facility is located in the Archer Lodge Fire District. A copy of the site Operations Plan will be filed with the local fire department including all contact information for the facility.

1.7 EQUIPMENT REQUIREMENTS

The facility will maintain on-site equipment required to perform the necessary mining, processing and screening activities. Periodic maintenance of all facility equipment, and minor and major repair work will be performed at designated maintenance zones on-site. Refer to equipment specific O&M Manuals for recommended equipment maintenance schedules.

1.8 PERSONNEL REQUIREMENTS

At least one (1) member of the supervisory staff will be trained in the processing equipment operations. Each facility employee will go through an annual training course (led by supervisory staff).

1.9 HEALTH AND SAFETY

All aspects of the recycling center operations were developed with the health and safety of the operating staff, customers, and neighbors in mind. Prior to commencement of operations of the facility, a member of the operating staff will be designated site safety officer. This individual, together with the facility's management will modify the site safety and emergency response program to remain consistent with National Solid Waste Management Association and Occupational Safety and Health Administration (OSHA) guidance.

Safety equipment provided includes equipment rollover protective cabs, seat belts, audible reverse warning devices, hard hats, safety shoes, and first aid kits. Facility personnel will be encouraged to complete the American Red Cross Basic First Aid Course. Other safety requirements as designated by the Owner will also be implemented.

Each facility employee will go through annual training course in health and safety (led by

supervisory staff). All training shall be documented and attested to by signatures of the trainer and trainee. The following are some general recommendations for the health and safety of workers at the Flowers LCID Recycling Center.

1.9.1 Personal Hygiene

The following items are recommended as a minimum of practice:

- Wash hands before eating, drinking, or smoking.
- Wear personal protective equipment as described in **Section 1.9.2.**
- Wash, disinfect, and bandage ANY cut, no matter how small it is. Any break in the skin can become a source of infection.
- Keep fingernails closely trimmed and clean (dirty nails can harbor pathogens).

1.9.2 Personal Protective Equipment

Personal Protective Equipment (PPE) must be evaluated as to the level of protection necessary for particular operating conditions and then made available to facility employees. The list below includes the PPE typically used and/or required in a compost facility workplace.

- Safety shoes with steel toes.
- Noise reduction protection should be used in areas where extended exposure to continuous high decibel levels are expected.
- Disposable rubber latex or chemical resistant gloves for handling and/or sampling of waste materials.
- Dust filter masks

Following use, PPE's should be disposed of or adequately cleaned, dried, or readied for reuse.

1.9.3 Mechanical Equipment Hazard Prevention

The loaders and other equipment should be operated with care and caution. All safety equipment such as horns, backup alarms, and lights should be functional. A Lockout-Tagout program shall be used to identify equipment in need or under repair and insure that operation is "off-limits" prior to maintenance or repair. All operators shall be trained in the proper operation of equipment.

1.9.4 Employee Health and Safety

Some general safety rules are:

- Consider safety first when planning and conducting activities.
- Review the equipment O&M Manual prior to attempting repairs/changes.
- Remember the buddy system in case of repair of mechanical equipment
- Post emergency contact phone numbers.

- Provide easy and visible access to the Right to Know materials.
- Provide easy and visible access to the first aid kit and fire extinguishers.

1.9.5 Physical Exposure

Facility personnel may come in contact with the fluids, solids, and airborne constituents found at recycling center. Routine training should be conducted regarding the individual and collective materials used in the recycling process and their associated hazards. Training concerning safe work practices around these potential exposures should use equipment and proper disposal procedures.

1.9.6 Material Safety Data Sheets

Material Safety Data Sheets (MSDS) shall be collected on every waste (if available) that enters the facility. Information shall also be made available for all chemicals stored on site for use by the County. MSDS sheets shall be stored in a location with all other Right to Know information for the site.

1.10 UTILITIES

Electrical power, water, telephone, and portable restrooms will be provided at the guard house.

1.11 RECORD KEEPING PROGRAM

The facility shall maintain documents in an operating record at the facility in accordance with **Section 4.0** of this document. The operating record will be kept up to date by the Site Manager or his designee. It will be presented upon request to DWM for inspection. A copy of this Operations Manual will be kept at the facility and will be available for use at all times.

SECTION 2.0 PROCESSING OPERATIONS

2.1 OVERVIEW

This section describes the processing operations for the Flowers LCID Recycling Center.

2.2 ACCEPTABLE WASTES

The proposed recycling center will only accept and process organic materials considered inert in nature. The materials acceptable for processing on the site include (at a minimum) reclaimed (mined) materials from the existing LCID landfill and additional delivered (public) materials as follows:

- Land clearing waste such as stumps, trees, limbs, brush, grass, and other naturally occurring vegetative materials;
- Site clearing debris;
- High carbon nitrogen (C:N) yard waste such as brush, tree limbs, and similar vegetative matter with C:N ratios greater than 75;
- Untreated and unpainted wood wastes that have not been glued, treated with preservatives, painted, stained, or varnished; and
- Other wastes as approved by the Division of Waste Management.

The recycling center will accept waste from the public as well as material will be excavated from the existing LCID landfill. As the site is reclaimed, only materials listed above will be processed. All other identified wastes will be removed and disposed in accordance with **Section 2.3**.

2.3 WASTE ACCEPTANCE

Although the site is considered a remedial measure, additional waste will be accepted at the site from the public for processing to support the remediation and provide enhanced vegetative soil amendments for distribution (sale). All material publicly received for processing will be monitored upon entrance to the site at the guard house. The Flowers LCID Recycling Center estimates it will mine (on average) about 150 cubic yards per day (~200 days per year) of wastes for processing and will receive an additional 500 cubic yards (raw) per day from off-site. The operating hours of the facility are anticipated to be from 7:00 a.m. to 6:00 p.m. Monday through Saturday. Thus, approximately 130,000 cubic yards (raw) per year (average) of wastes are anticipated for processing at the proposed facility. It is estimated that the site includes approximately 130,000 to 140,000 cubic yards¹ of waste and soil for processing to completely reclaim the site. The anticipated reclamation schedule is then estimated to be on the order of five (5) to seven (7) years with the limiting factor being mining of the existing landfill. Calculations

¹ This volume estimate is based on a comparison of the pre-developed USGS topography of the site with current conditions. Assuming all additional material was hauled in for disposal.

projecting these volumes are provided in **Appendix A**.

2.4 WASTE SCREENING

In order to assure that prohibited wastes are not processed, waste screening programs will be implemented. During reclamation of the landfill, a spotter will be used to monitor the mining activities and identify any non-acceptable wastes. If any non-acceptable wastes are identified, these wastes will be placed into a stockpile or container and removed from the site for disposal at a solid waste facility permitted to accept the particular waste. All records and receipts for this disposal shall be kept in the operating record for the site. It is anticipated that unacceptable wastes will either be generally classified as construction and demolition debris (C&D), white goods, or recyclable materials (i.e. plastic, steel, etc.) based on earlier correspondence regarding historical violations² at the site. The individual spotters and operators will be trained on identifying non-conforming/non-acceptable wastes.

2.5 PROCESSING OPERATIONS

The recycling process involves a flow through of excavated material from the existing LCID landfill and receipt of additional LCID materials publicly. Generally, the process includes excavation, sorting of the material into small and large fraction materials for grinding and screening. The ultimate product would include mulch products and soil products. This section provides discussion on the major components of the process. Please refer to **Figure 2** for a flowchart outlining the overall process.

2.5.1 Operating Capacity

The Operating Capacity for the Flowers LCID Recycling Center is estimated to be approximately 650 cubic yards (raw) of material undergoing processing per day. Based on the anticipated equipment (listed below), the site will be capable of processing as much as 1,500 cubic yards per day (limited by the grinding operation) providing an acceptable factor of safety.

2.5.2 Equipment Requirements

The anticipated equipment requirements for operation and maintenance of the site are listed in the following table.

Description	Primary Function (Allocation)
1) Excavator	LCID landfill mining and sorting
2) Front End Loader	loading and mixing

² Compliance Order with Administrative Penalty dated March 25, 1996 to Mr. Billy Flowers from Mr. William L. Meyer, Division of Solid Waste Management.

Description	Primary Function (Allocation)
3) Grinder (Bandit Beast)	grinding/shredding of bulky wastes, stumps, limbs, etc.
4) Screening Equipment (Extec)	processing material to uniform consistency and sorting of various gradations.
5) Dump Truck	hauling material around site.

2.5.3 Grinding/Chipping

Grinding and/or chipping will be conducted centrally on the site. The grinding/chipping operations will be conducted as needed to facilitate the recycling operations by using Bandit Beast Recycler Model 3680³ or equivalent unit (specifications provided in **Appendix B**). The facility intends to utilize a single grinder to process the collected material. The material excavated from the LCID landfill will be directed to the grinders as per the material size. It is anticipated that grinding and chipping will be conducted on a continual basis as materials are available. Grinders and chippers pose both maintenance and safety hazards. Therefore, please refer to the manufacturer’s safety and or maintenance literature prior to operating equipment at the site.

2.5.4 Screening

Screening will be conducted just beyond the grinding area centrally on the site. An Extec Model E7⁴ or equivalent screening machine will be used for this operation (specifications provided in **Appendix B**). The facility intends to utilize a single screening machine to process the ground materials. Screening is conducted after the grinding/chipping has been completed to provide a uniform material for distribution to the public. The screening process removes remaining large materials for a uniform product. The material is screened to achieve particle sizes of 5/8" to 2". The material not passing the screen, “overs” (>2"), are stored in the material storage area and re-ground or chipped for additional screening. The finished product is stored on site in a loading area until ready for delivery. Three (3) finished products are anticipated as follows:

- Mulch;
- Amended Mulch and Soil; and
- Soil/Topsoil.

The process is repeated for “overs” until a uniform blend is achieved. During the screening process additional non-conforming wastes may be identified. Once identified, these wastes will be removed and placed in the stockpiles or containers for disposal off-site. Screening machines pose both maintenance and safety hazards. Therefore, please

³ Additional information can be found at www.banditchippers.com

⁴ Additional information can be found at www.extecscreens.com

refer to the manufacturer's safety and or maintenance literature prior to operating equipment at the site.

2.5.5 Access and Roadways

The site has been designed to provide all-weather access to the processing area.

2.6 FINAL PRODUCT

Once the processing is completed to meet the specifications of this plan, on-site storage will be necessary until the product can be delivered. The area designated for the finished products will be accessible for both equipment involved in the storage as well as the equipment involved in loading the finished product off-site. The storage areas provide a buffer between processing operations and truck loading operations to maintain a safe controlled working environment.

Areas designated for storage will be protected against excessive runoff, soil loss or erosion by providing surface water diversions, silt fence, applying mulch products, or other best management practices (BMP's). The stockpiles shall not exceed heights beyond the limits of equipment available on-site or in such quantities as to provide a fire hazard due to decomposition (i.e. for the mulch product).

2.7 TROUBLESHOOTING

The final product must be maintained and monitored to prevent fire potential and to maintain an acceptable product. Typical problems and solutions have been provided in **Table 2.2**. This table may be updated from time to time to include additional information about the specific process at this site.

TABLE 2.2 TROUBLESHOOTING

Condition	Reason	Check	Remedy
PILE TEMPERATURE TOO HIGH (>150 °F)	INSUFFICIENT AERATION	IS PILE MOIST?	TURN PILE OR AERATE
	PILE IS TOO LARGE	HEIGHT > 8 FEET?	DECREASE PILE HEIGHT
EXTREMELY HIGH TEMPERATURE (>170 °F)	SPONTANEOUS COMBUSTION	LOW MOISTURE? BURNT SMELL?	DECREASE PILE SIZE, ADD WATER TO SMOLDERING SECTION, AND COMBINE WITH OTHER PILES
ODORS IN PILE	PILES ARE TOO LARGE	HEIGHT > 8 FEET OR WIDTH > 20 FEET ?	DECREASE PILE SIZE
NON-UNIFORM TEXTURE	POOR MIXING	ORIGINAL RAW MATERIALS DISCERNIBLE?	SCREEN PRODUCT & IMPROVE MIXING

2.8 MARKETS

The market for the proposed mulch and soil product will include the surrounding residential and commercial development in the area. The primary customers are assumed to be landscaping and grading companies through the remedial development period. All final product material will be delivered to the customer by Flowers LCID Recycling Center representatives.