



North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

December 17, 2014

Ms. Audrey D. Oxendine
Mr. Dan Messier
2175 Reilly Road
Fort Bragg, NC 28310

Solid Waste Compost Demonstration Approval (SWCD-26-14)

Dear Ms. Oxendine and Mr. Messier:

The Division of Waste Management, Solid Waste Section, has reviewed your request for approval of a Solid Waste Composting Demonstration Approval (SWCD-26-14) located at the Lamont Landfill, Bldg. O-3454, Lamont Road, Fort Bragg, 28310. Your request is considered approved in accordance with the N.C. Solid Waste Management Rules, 15A NCAC 13B .1409 and subject to the following conditions:

- (1) The approval period is from receipt of this letter to December 17, 2015. If an extension is needed it must be requested by September 17, 2015 with a justification for the extension.
- (2) A full Solid Waste Compost facility permit will not be issued for this facility without approval from the appropriate local zoning officials or a letter indicating that the property is not zoned. Any local zoning approvals necessary for the demonstration approval are the responsibility of the applicant.
- (3) Composting at this site shall be limited to the materials specified in the application.
- (4) The site shall be prepared to control run-off and run-on. Best management practices shall be utilized for this purpose. All run-off from the site and any leachate generated shall be managed to prevent any impact to ground or surface waters. A full Solid Waste Compost facility permit will not be issued for this facility until storm water and leachate from the site are managed according to the Division of Water Resources standards.
- (5) This approval is subject to immediate revocation if activities on site result in a direct or potential threat to the public health or the environment or if significant odor problems are created. The Division of Waste Management reserves the right to apply any other requirements of 15A NCAC 13B Section .1400 as the Division deems necessary during the above approval period.
- (6) Operation of the facility and compost monitoring activities shall be in accordance with the approved application and Section .1406 of the Solid Waste Management Rules. Records of temperatures shall be maintained to show pathogen reduction and vector attraction reduction requirements have been met and shall be available to representatives of the Section upon request.

- (7) Compost testing, frequency of testing, and reporting of test results shall be in accordance with the approved application and Section .1408 of the Solid Waste Management Rules. Classification and distribution of compost shall be in accordance with Section .1407 of the Solid Waste Management Rules.
- (8) **All compost shall be tested and the results approved by the Solid Waste Section prior to being used at the facility or removed from the facility for any use.**
- (9) Any changes or additions to this facility, subsequent to receipt of this letter shall be approved prior to the start of the operation.
- (10) This approval is not transferable.
- (11) A pre-operational inspection is required to confirm the site's setbacks in accordance with NC Solid Waste Composting Rule 15A NCAC 13B .1404 **prior** to accepting feedstock's for composting.
- (14) Drew Hammonds, Environmental Senior Specialist, will be responsible for oversight and inspection of the facility and related activities. Mr. Hammonds can be contacted at (910)433-3350.

If you have questions concerning this approval please contact me at (919) 707-8280.

Sincerely,



Martin A. Gallagher, Environmental Supervisor
Composting & Land Application Branch

Cc: Drew Hammonds, Environmental Senior Specialist
Dennis Shakelford, Eastern District Supervisor

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Request for Compost Demonstration Project



Fort Bragg recently acquired in-vessel composting equipment. Previous efforts to compost material on Fort Bragg have been limited to yard waste due to the manpower required to compost using windrows and inadequate nitrogen sources. Composting using the in-vessel system will automate many of the processes that usually require manpower. It will also allow the composting of food waste which may have caused a leachate and vector problem if composted in windrows. This demonstration project will be used to determine if composting with this equipment is cost effective by evaluating the manpower requirements, amount of food waste diverted and the overall value of the compost produced based on its use.

Facility Information

Fort Bragg proposes a compost demonstration project to be operated by the Directorate of Public Works. The facility owner is Fort Bragg United States Army Garrison.

Fort Bragg
Directorate of Public Works
2175 Reilly Road
Fort Bragg, NC 28310
Operator – Audrey D. Oxendine/Dan Messier
Phone: 910-907-3214

Location

Composting will take place at the Lamont Landfill on Fort Bragg. Lamont Landfill is a permitted Construction and Demolition Landfill. Composting equipment, consisting of 3 – 40yd stainless steel container vessels, will be placed in the transfer station since it is no longer utilized for solid waste transfer. The Lamont Landfill is located on the western boundary of Fort Bragg. From the intersection of Gruber Road and Longstreet Road, follow Longstreet Road west. Before exiting the installation through the Longstreet Access Control Point (ACP), turn right onto Cooly Conch Road. The Lamont Landfill is at the end of Cooly Conch Road. See Attachment 1.

Ingredients

Fort Bragg will compost using two feed stocks. The nitrogen source will be food waste from the dining facilities and commissaries. The carbon source will be yard waste/wood waste brought to the landfill from various base operations. Assuming the carbon to nitrogen ratios for food waste and yard waste are assumed to be 20 and 200, respectively, an estimated 594 tons of food waste and 54 tons of yard waste will be utilized during the 1 year trial period.

Schedule

Fort Bragg requests a one year time period to perfect feed stock ratios and logistics. The compost process for this system is estimated to be 14-25 days.

Methodology

Feed stocks will be composted “in-vessel” using equipment designed by Engineered Compost Systems. <http://www.compostsystems.com/systems/cv-composter> System is comprised of 3 – 40yd³ steel containers. Feed stock is loaded in the containers via a vessel loading conveyor which is fed from a compost mixer. Once full, vessels are connected to the aeration system for composting. Composting time will vary between 14-25 days. Fully loaded vessels weigh approximately 45,000lbs. Vessels can be moved and unloaded by roll-off truck.

Aeration

Aeration is provided via pump and piping system to each container. The system is computer operated and monitored. This allows fans to automatically adjust to set parameters and the system to log data for record keeping. The system will maintain conditions to keep compost at ≥ 131 °F for 3 consecutive days, ≥ 104 °F for 14 days or longer with an average temperature > 113 °F. System will automatically record data.

With airflow in, there is also airflow out which is piped to a bio-filter made of clean wood chips approximately 2 inches in diameter from de-barked trees. The bio-filter is approximately 4 foot deep. The designer estimates they filter should last approximately 1-2 years. Once the filter starts to deteriorate, the filter material will be replaced with clean wood chips with the same specifications.

After pathogen reduction requirements have been met, compost will be unloaded and shaped into windrows for curing. Compost will be turned as often as needed to maintain oxygen and moisture requirements.

Blending

Compost will be blended via compost mixer (vertical auger) using 11 parts food waste to 1 part yard waste. To achieve a compost mix at 35:1 carbon to nitrogen (C:N) ratio, the ratios for food waste and yard waste are assumed to be 20 and 200, respectively. Waste analysis will be conducted once the project starts to confirm actual C:N ratios. Wastes will be transferred from the mixer, via conveyor, to the vessel through the loading hatch. Mixing/loading will take place under a covered shed on a concrete pad. All wet materials will be contained on the concrete pad. Any leachate remaining on the pad after mixing will be drained into a leachate holding tank.

Monitoring

Temperature probes set in different zones will monitor the temperature on a routine basis and log the data. Moisture will be measured when loading feed stocks into the vessel. Because the vessel is contained and insulated, we do not anticipate adding moisture to the system once the process starts. The floor of each bin is perforated sheet metal. Air flow through the bin will be driven by an 18" direct drive radial fan capable of air flow rates of 1539 – 802 cubic feet per minute. The exhaust fan is a 15" direct drive backward curved fan with air flow rates of 2786 – 1887 cubic feet per minute. Specification sheets for fans are attached.

Leachate

All leachate is collected in the vessel and transferred to a leachate tank. The tank will be emptied as needed and properly disposed by septic hauler.

On Site Storage

Food waste will be placed in 64 gallon sealed containers. They will be collected and processed daily Monday – Friday. Yard waste will be stored in the recycling area of the Lamont Landfill. Food waste containers will be rinsed on the concrete pad each time they are emptied. All rinsate will be emptied via drain into a 5,000 gallon rinsate collection tank. The tank is pumped and disposed of periodically at the Harnett County Waste Water Treatment Plant.

Product Testing

The final product will be used only on the installation. It will not be sold or made available for any other use outside of Fort Bragg. Initial tests to determine waste analysis and heavy metals will be conducted by the North Carolina Department of Agriculture. Pathogens and foreign matter will be determined by a private lab. Additional tests of the same parameters will be

conducted every 6 months. As the vessel is unloaded, grab samples will be taken from the front, middle, and back sections to ensure a representative sample.

Curing Area and Product Storage

Once the compost has meet the pathogen reduction requirements, the vessel will be emptied at the storage site (see attached map) and placed in windrows for curing. Windrow equipment pulled by a tractor is available on site to turn the rows for final curing which will take approximately 30-60 days.

Record Keeping

Daily operational records will be maintained at the site. This will include the weight of food waste received daily, weight of yard waste added to the mix, and temperature data for the entire compost cycle. In addition, all analytical results, final weights for each compost batch and weights of all compost utilized on the installation will be maintained on site. Man hours of all employees involved in the composting operation will be tracked to determine cost effectiveness.

Product Use

Final product will be used in several ways. It will be mixed with soil and used for landscaping, daily landfill cover, range maintenance, and erosion control stabilization. All compost produced under this demonstration project will be utilized by the installation.

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Fort Bragg In-Vessel Composting System

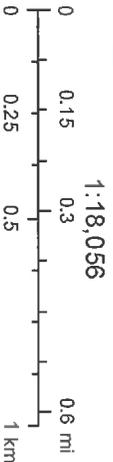
Cumberland County GIS Data Viewer



February 14, 2014

 Municipal Boundaries

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Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Cumberland County GIS Data Viewer

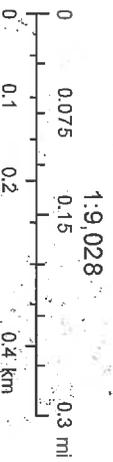


February 14, 2014

Municipal Boundaries

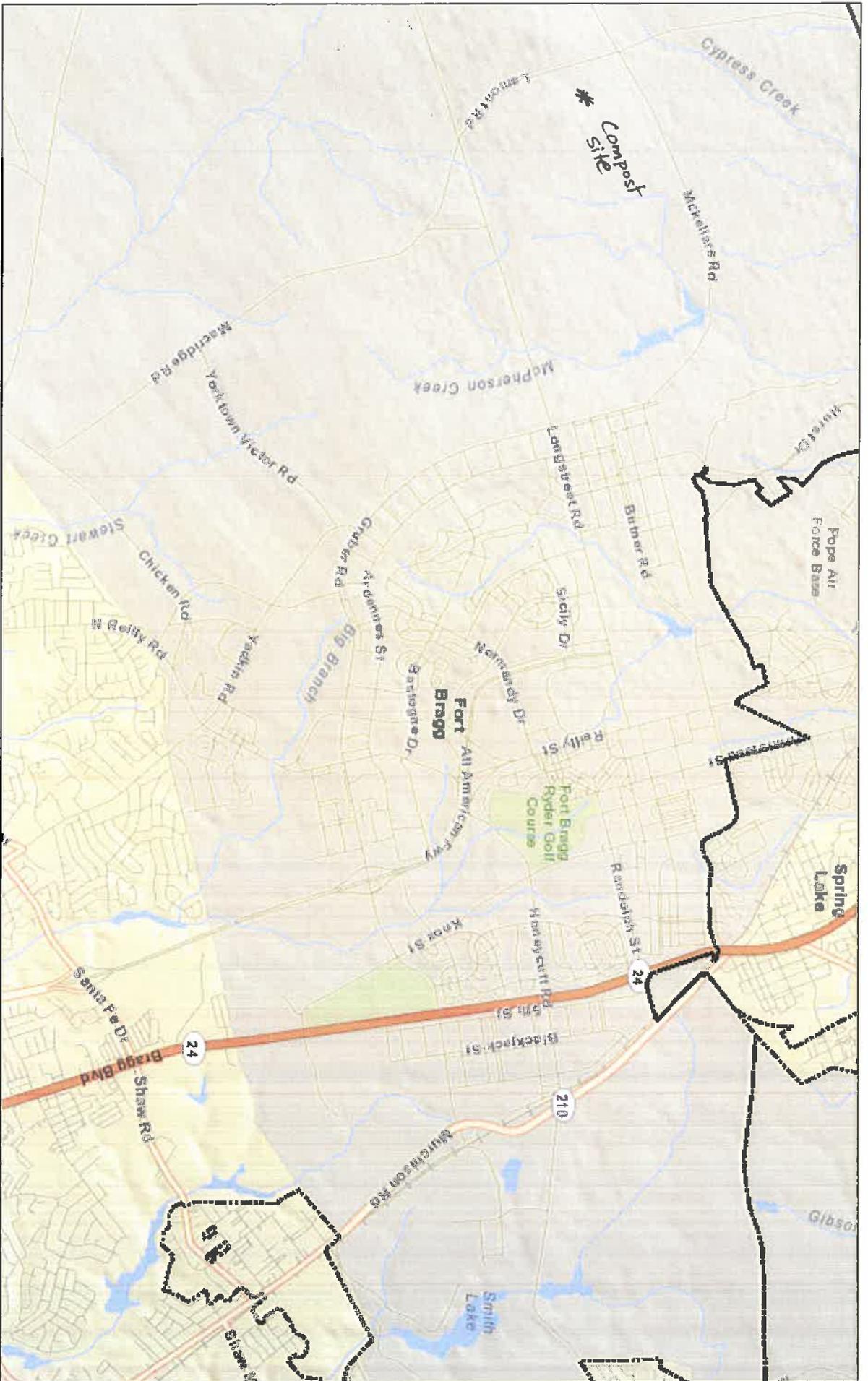
Addresses

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Source: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, U.S.G.S., AEX, Geomatics, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

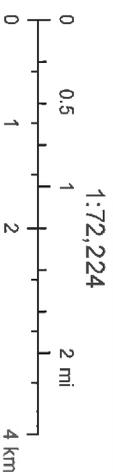
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Municipal Boundaries

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Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013