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March 25, 2014

Ms. Donna J. Wilson
Environmental Engineer
Composting and Land Application Branch
NCDENR - Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Craven Ag Services Compost Facility
Comment Responses
MacConnell & Associates, P.C. Project No.: A45201.00

Dear Ms. Wilson:

In response to your email dated January 27, 2014, describing additional information needs for Craven Ag Services, the following additional information and responses are provided. The items listed are addressed herein or on the appropriate document attached. Thank you for your efforts on this project. We all appreciate your thorough and comprehensive review. One hard copy and one electronic copy of the revised information is provided for your review to the address above.

1. Please provide analytical data for the DAF skimmings from Maola and another sample of the coal ash that is to be incorporated into the pads, to ensure consistency of the analysis.

   Response: Samples of the waste from Maola and the ash material were analyzed and the results forwarded to you. The Maola waste will be valuable as a nutrient source for the compost. The BOD (organic carbon), N and P will be used to satisfy nutritional needs of the microorganisms involved in the compost operation. The compacted ash will serve as a good base on which to work when properly mixed, blended, and compacted with other fines and existing soil.

2. Ash Memo:

   a. It should be stated that the ash and compost application will be incorporated to all three areas, the 3 acre site, the 4.7 acre site, and the 1.8 acre site. It is required at the 3 acre site because it is used for curing and for feedstock storage (Rule 1404 (a)(10)(B)).

Response: Ash and compost fines will be placed in each of the areas designated for composting and curing. These are areas 1, 2, and 3 as you specified in the e-mail.

b. The memo describes the placement of 1 to 2 inches of compost fines and 2 inches of ash for incorporation in the compost areas. These numbers are not consistent with the description on Drawing C102, which states that 2 to 3 inches of compost fines and 2 to 3 inches of ash will be incorporated.

Response: The ash loading and the compost fines loadings are consistent between the memo and the plans. The rate of addition is intended to remain flexible since the fines should modify soil texture with very small addition. The texture classifications are based on relative percentages of fine materials and coarser materials. Based on previous analysis, the volume of materials required should be less than the 4 inches of fines proposed for addition.

c. It should be stated that the Rule requires the soil texture to be finer than loamy sand, instead of fine sand.

Response: The addition of the compost fines and the ash fines should increase the level of fines to classify the soil materials as finer than loamy sand. These texture classifications are based on the soil textural triangle and the difference between loamy sand and loamy fine sand is very slight. Similarly, the difference between loamy sand and sandy loam is very slight. The incorporation of 2 inches of each of the fine fractions specified will add 33% by volume to the control layer where texture is determined. This will be adequate to reclassify the material as finer than loamy sand.

d. The lifetime loading for nickel should be 18 lb/acre.

Response: The Nickel load is 420 mg/kg as stated in your January e-mail. Clearly the cumulative metal load is not a significant issue in the development of the pads. No metal is to be applied at the cumulative metal limits imposed through 40 CFR 503 and incorporated into NC Rule.

e. Please add units to the metal loading table – monthly average mg/kg, Lifetime, mg/ kg, lb/acre.

Response: The memo has been modified as requested to list the cumulative loadings consistent with rule.

f. After incorporation of the ash, soil texture sampling and testing should include at least one lab sample for each area (3 areas). Confirmation sampling should also include field tests for soil texture, as described at these websites, at least ten per acre:
https://www.osha.gov/doc/outreachtraining/htmlfiles/soiltex.html
http://www.ndhealth.gov/wq/sw/z1_nps/pdf_files/soil_texture_feel_test.pdf
For the field tests, provide field documentation, including a sketch of sampling locations and a table listing the soil texture results. What will be the procedure if a field sample fails or a lab sample fails? Ultimately, we are asking for certification (soil scientist) that the three areas were constructed in accordance with the plan and state rules.

Response: The soil texture will be determined in each of the areas where the materials were added. The testing will include both hand texturing and soil texture analysis in the laboratory. The hand texturing will be accomplished at the 10 per acre level as described. These locations will be random at approximately 4,000 square foot areas per sample. The laboratory analysis will be as determined by NCSU Soil Science Department, Soil Test Laboratory or a certified soils laboratory qualified to perform texture analysis. One composite soil sample from each of the areas will be collected to generate three (3) separate texture analyses for the area. The soil scientist (either Mr. Tom Hinson or Mr. Scott Frederick) will certify these areas meet the requirement in rule.

3. Drawings C101 and C102 – Please re-number the groundwater monitoring wells as 1, 2, and 3 (instead of 1, 3, and 4).

Response: Drawings C-101 and C-102 have been modified to reflect well numbers correctly. These conform with those from the CPEC report.

4. Drawing D102 – Please remove the groundwater well schematic drawing because it is not consistent with the groundwater schematic drawing in the water quality monitoring plan.

Response: Monitoring well detail is removed from Drawing Sheet D-102 and a note added to Sheet C-101 that monitoring wells shall be installed in accordance with the CPEC report.

5. Please provide an update to the revised water quality monitoring plan.

Response: The CPEC monitoring plan developed for this project has been updated and forwarded to Ms. Ritter and you. The plan recommendations have been incorporated into this plan and the wells have been renumbered, the well detail is in accord with Mr. Hinson's recommendations.

Thank you again for your comprehensive review. If you have any questions please call me or Zachary L. Fuller, PE at (919) 467-1239. Thank you for your assistance.

Sincerely,

Gary S. MacConnell, PE
President

A. R. Rubin

Enclosures

cc: J. W. (Billy) Dunham – Craven Ag Services

Memo from: A. R. Rubin

Subject: CAS permit requests from Donna Wilson

To: Zach Fuller and Billy Dunham

Ms. Wilson requested additional information to complete the permit. I have included a table listing the characteristic of the ash and the metal load with a 2 inch lift of the ash applied per acre. I have also described the procedure to follow with the ash and fine compost incorporation to achieve the "finer than loamy sand" designation required. Lastly, I have made required changes to the operations manual.

Coal ash and associated metal loading Criteria:

The coal ash collected on the site was tested to determine the levels of regulated metal and the TCLP metal levels as required. The total regulated metal levels are higher than the TCLP metal levels simply because the rigor of the test is greater for a total metal analysis than for a TCLP extraction. For purposes of creating a layer of material "finer than loamy sand" a layer of ash approximately 2 inches thick and a layer of fine compost between 1 and 2 inches thick will be added to the compost windrow areas designated in the application.

For purposes of this application, the weight of the ash is assumed as 80 pounds per cubic foot. The ash load required to apply a lift 2 inches in dept to an acre of pad area is calculated as:

a. Each cubic yard of ash applied to achieve a 2 inch lift will cover an area of –
    1. Each cubic foot of ash applied as a 2 inch lift will cover 6 square feet
    2. Each cubic yard of ash will cover 27 ft cu/yd x 6 ft sq/ft cu = 162 square ft/yd
    3. Each acre of pad area will require 43560 sq ft/ac/162 ft sq/yd = 269 yds cu/ac or 295 tons/ac at a density of 80 lb/ft cu.
b. Testing indicates the metal concentrations are low. Based on the MicroBac test results utilized previously the metal loading in a 295 ton/ac application is provided in the table below.

Coal Ash Metal testing and Loading if applied at 295 T/Ac– Craven Ag

Metal	EPA Clean	EPA Load (lb/ac)	Coal Ash Level (mg/kg)	Mass (as lb)/T	Cumulative Metal load @ 295 T/A*
As	41	37	2.1	0.004	1.24
Cd	39	35	0.2	0.0004	0.12
Cr	1200	2678	2.2	0.004	1.30
Cu	1500	1339	7.4	0.015	4.37
Pb	300	268	2.1	0.004	1.24
Hg	17	15	0.04	0.0001	0.02
Ni	420	375	6	0.012	3.54
Se	36	89	0.96	0.002	0.59
Zn	2800	2500	2.9	0.006	1.71

Clearly all metal loadings are well below the cumulative metal loading allowed in the EPA Rules and in NC DWM Rule. Metal loadings are not a limitation in the design of the pad system required to create a soil texture finer than fine sand. The cumulative loading is for this single event. No additional ash is assumed as necessary and the cumulative load is the annual load.

Incorporation of compost fines and coal ash

Areas requiring addition of coal ash fines and compost fines are:

1. The site to be used as the compost feedstock pad is listed as a portion of the 1.8 acre area intended to store incoming feedstock and potentially serve as an initial compost production area and the mix pad.

2. The large 4.7 acre area intended to support the bulk of the compost activity constitutes that portion of the overall site on which windrows will be constructed and managed to achieve the PFRP and VAR designation required in rule.

3. The large area at the front of the site along River Road containing approximately 3.5 acrea will serve as final curing and product storage.

These areas have been tested previously and were found to contain soil characterized as fine sand; rule requires soil material classified as finer than fine sand. To achieve that both compost fines and coal ash will be added to the site in accord with the following procedure:

a. Compost fines will be applied to the site in a lift of 1 to 2 inches and these compost fines will be incorporated into the topsoil to a depth of approximately 4 inches using standard implements – disk, plow, roto-tiller. The areas may be covered with a nursery cloth if the site owner deems this is necessary to facilitate operation.
b. Once the compost fines are incorporated to the recommended depth, layers or lifts of the coal ash will be placed on the soil surface and incorporated into the soil to a depth of 6 inches using standard implements-disk, plow, roto-tiller. The lift proposed in a series of two operations, each applying and incorporating a 1 inch lift.
c. Once these fine materials are incorporated, soil material will be assessed by sampling the soil to a depth of 12 inches and determining soil texture using ASTM procedure (D 422.63). A series of 20 sub-samples will be collected from each acre prepared to serve as a compost pad. Each subsample will be collected randomly from the site with a minimum distance between samples of 25 feet. Sub-samples will be composited and tested at the Soil Science Department at NCSU or an approved laboratory.

Background and Introduction: Materials Contained herein are derived from North Carolina Administrative Code (NCAC) and the compost requirements contained in 15 A NCAC 13B 1400 et seq. and are intended to support the application to permit and operate a Compost Production facility in Craven County, NC.

The operation proposed involves expanding the approved 3.005 acre demonstration site to include a 4.7 acre and 1.8 acre site for a total of 9.505 acres. The expansion will create a new mix/blend area and windrow area, expand the finish product and blending area, and develop a more permanent and sustainable compost operation utilizing the entire area specified as the CAS compost operation. Site 1 is the 1.8 acre site to the south containing Area 1, Site 2 is the large 4.7 acre site to the southwest containing Area 2, and Site 3 is the existing 3.005 acre demonstration site containing Area 3 as shown on plan Sheet C-102. The operation will take place on the three portions of the site listed in the permit application. Areas with jurisdictional wetland and areas in flood prone portions of the large acreage tract are not intended for coverage under this permit.

The effort is intended to allow Craven Ag Service (CAS) to remain in operation while the activities necessary for expansion onto the larger proposed site occur. The operations on the existing site have demonstrated to CAS and NCDWM the viability of a compost operation. The existing demonstration site has capacity to function satisfactorily for approximately 18 additional months while the expansion areas are developed. The intent is to permit the entire facility as a permanent compost operation.

This application is intended to support requirements in the .1400 rule to permit a septage/FOG/MSW compost facility.

A. Site Location (.1405 (b)(1))

The Craven Ag Service, Inc. Compost Facility is currently operating through a demonstration permit. The site is located on River Road in Craven County, NC. The site is located between River Road and the Neuse River. The property contains 89.34 acres, but only those portions of the large acreage tract located on the higher elevations will be utilized in the compost operation. The specific location of the compost facility is shown on a site map and aerial photographic maps included in Attachment 1. The Craven Ag Service, Inc. Compost Site is located so as to meet or exceed all the applicable buffers for a Large Type 3 composting facility posed in NC Rule. The buffer distances between existing residences and active compost production is over 500 feet. No product will be stored within 500 feet of existing off-site residences, however finished product storage, haul roads, ingress and egress to storage is within the 500 foot buffer. The 500 foot buffer to Area 3 (Curing) and composting area boundaries will be field delineated with markers. These markers will show the location of the 100 year flood plain. The applicable buffers are shown on the site map provided in Attachment 1.

The proposed compost site is currently permitted as a septage receiver site. Land application of septage will be halted in areas permitted for composting activities. The entire area was investigated previously by Mr. Fred Smith. His site and soils report were submitted as a portion of the permitting package submitted to obtain the septage land application permit and are included as an attachment to this report. This previously submitted report contains the relevant site and soil information required to obtain a land application permit and similar information is required for the compost operation. This site and soil report is in the record for the CAS site and is considered as representative of the current underlying soil features.

The application for the compost site permit does include feedstocks from the ongoing CAS septage and grease trap dewatering operation currently permitted at the Highway 55 facility. In addition to these regulated wastes, bulking materials and feedstocks will be as listed in Section D, Part 1 of this document.

B. Letter from Craven County Planning (1405(a)(2))

The Craven County Zoning letter, 12 May, 2011 is attached as appendix A.

C. Compliance: (.1405(b)(3) and .1404 (a)

(1) The Craven Ag site is located on a terrace landscape position adjacent to the Neuse River in Craven County, NC. Portions of the property are in designated 100 year flood elevation areas and designated as AE in the FEMA flood maps (FIRM Map, Map Number 37205544001, 2 July, 2004). The areas designated as Zone AE or the AE floodway are not intended to host compost operations.
(2) The site map attached identifies property boundaries and demonstrates compliance with mandated buffer requirements (NO active compost operations will take place within 500 feet of off-site residences).
(3) The site map attached indicates adequate buffer between site operations and adjacent residences or dwellings.
(4) The site map attached indicates adequate buffer between site operations and wells.
(5) The site map attached indicates adequate buffer between compost operations and waterways.
(6) There is no direct discharge of pollutants from the site. An assessment by Ken Pickle, NCDENR - DWQ indicates no direct runoff. Water quality standards apply to discharge systems; non-point sources of discharge have been addressed through the operations plan.
(7) No portion of the operation is located over a closed solid waste operation.
(8) No portion of the operation is located within 25 feet of a berm or swale.
(9) No discharge of pollutants will impact section 404 waters or areas or violate water quality standards.
(10) Site assessments confirm no groundwater within 24 inches of soil surface.

Compliance: 1404(b)

1. Not applicable

Compliance: .1404(c)

1. Access to the site is controlled at locked gate along River Road
2. Effective sediment control practices are in place and practiced
3. Air emissions are controlled by turning appropriately and maintaining required buffers
4. Odor emissions are controlled by managing compost turning operations and feedstock management

D. Operational Details:

1. Waste types: See Table 3-1 (Section G, Part 3 - Raw Materials, Proposed Feedstock Volumes and Protocol For Compost).

2. Site assessment: The soil evaluations indicate seasonal groundwater elevations at a depth of well over 24 inches. Soil evaluation indicated the predominant soil texture in the western portion of the site proposed as the windrow area as loamy sand. The soil materials in this area will be modified by addition and subsequent incorporation of coal dust/ash/compost fines to introduce fine particles and modify soil texture in the control zone as described. This will be accomplished with a disk. The current demonstration area has been modified over the last two (2) years through continued use as a compost production facility and the natural and planned addition of compost fines and coal combustion dust to the site. The soil texture in the existing compost manufacturing area currently serving as the demonstration site is fine sandy loam as determined by hand-texture method and to be confirmed by laboratory analysis. This meets requirements contained in DWM Rule NCAC.1404 10 b. This texture has been modified over the original texture by the years of operation during which fine textured soil particles were deposited on the site. These materials consist of: fine textured ash, organic materials such as fine organics and fine soil particles from yard and leaf waste, and compost produced on the site. This is listed as area 3 on the plans. Areas 1 and 2 will be modified through addition of fine materials to render the texture finer than loamy sand as necessary. This will be confirmed by hand texturing at 10 sites per acre and through laboratory analysis.

   The site had been investigated previously to obtain the permit to operate a septage land application site. This report was submitted by Mr. Fred Smith, CPSS. Mr. Smith indicated that the report was on file at DWM and if additional site/soil work were required, he would be willing to accommodate DWM needs, but that the initial investigation did provide information relevant to the subsurface soil conditions along the western side of the site.

The area proposed as the mix/blend area will contain a concrete pad and push wall to serve as a mixing and blending. Site 1 (1.8 acre site) will contain a concrete pad to serve as a receiving area for all putrescible material (see plan Sheet C-102). Site will also be the area (Area 1) used to store bulking material for the composting operation. When the putrescible material arrives on the concrete pad, a Kuhn/Knight Mixer will be used to mix and blend this material with the bulking material. Once the mixing is done it will be hauled in the mixer to the composting site and windrowed (Site 2/Area 2).

The area proposed as an active compost windrow area will be developed for active compost production operations using a compacted ash base with incorporation of the coal ash using a disk (TCLP Attached) to provide a working surface, to reduced soil permeability and to provide an area compliant with the texture requirement in rule. The ash material contains a mix of particle sizes and when compacted, the variation in particle size results in reduced permeability. The permeability will be confirmed by the project team (Mr. MacConnell and Mr. Rubin and Mr. Scott Frederick, CPSS or Mr. Tom Hinson, CPSS will confirm soil texture) and reported to DWM.

Groundwater monitoring wells are proposed as indicated in the attached report by Cpec Environmental, Inc. A single up-gradient well is proposed to establish and benchmark background levels of groundwater quality. Two down gradient wells are proposed. The approximate well locations are provided on site plans

E. Site Plan: Site plan is attached, see attachment 1

The site plan indicates that NO potable water-supply wells are located on the site and no surface water storage facilities are on the site nor will they be proposed. Drinking water for operators is provided as bottled water and supplements process water required for compost operations is provided by the wet waste accepted at the facility.

The plan indicates that no residences are located within 500 feet of the active compost production sites or storage areas, however haul roads are located within 500 feet of existing off-site residences. Markers will be maintained marking the 500 foot setback along the northern edge of Area 3 (Curing).

Portions of the large acreage site do contain areas that are clearly wetlands, BUT NO area proposed for the compost production or storage are located in jurisdictional wetland areas. Markers will be installed and maintained delineating composting areas. Portions of the tract located between the Neuse River and the western portion of the site are wetlands; these areas are unsuited for any of the operations proposed, they are untrafficable and are NOT proposed as a part of the compost operation. The site had been investigated previously by Fred Smith and those areas designated as suited for land application are NOT wetlands. The flood hazard map attached demonstrates flood plain issues do not influence the site selected to host the compost operations. Portions of the site had been previously permitted as septage receivers, portions of the permitted septage receiver areas are proposed to host the compost production and storage. Those areas

currently permitted as septage receivers will be excluded from land application as the compost operation expands.

F. Compost Facility Permittee and general operation guide

1. Mr. J. W. (Billy) Dunham is the Permittee for this facility. The Craven Ag operation is a family business. Personnel involved in the compost operation are:

    a. J. W. (Billy) Dunham, Operator in responsible charge
    b. Mack Dunham, Assistant Facility Operator
    c. John Dunham, Assistant Facility Operator
    d. Maintenance crew
    e. Equipment crew
    f. Transportation crew (over-the-road crew)

2. Operations Schedule: The Craven Ag compost operation may be open between 7:00 A.M. through 7:00 P.M. Monday through Saturday depending on the need to process and move compost. These operating hours will accommodate inflow, outflow of finish product and required compost production operations. Hours of operation may be less than reported here. Upon completion of a typical work day, the compost windrows will be checked to assure proper cover is in-place and the gate will be closed and locked as staff exit the site.

3. HHW - Household Hazardous Wastes are not composted at the site. If these materials are ever received on the site, they will be removed and handled through approved HHW operations.

4. Special precautions: During inclement weather (excessive rain, severe winds, snow, ice, or weather warning associated with tornado or hurricane), the facility will not actively mix or blend incoming feedstock materials. Compost windrow turning may proceed if site and soil conditions permit access to the site and the operation can be conducted safely without generating runoff or endangering staff.

5. Vector and nuisance conditions will be addressed by maintaining proper cover over windrows to prevent vector attraction. Noise associated with equipment operations will be controlled by operating only during posted hours of operation, no Sunday morning operation, and by controlling vehicle speed along River Road. Dust control if needed will be achieved by wetting roadways and other surfaces generating dust.

6. Finished compost will be utilized as a component of bioretention mix in stormwater systems, as a medium for plant growth, as a landscape material and for agricultural, horticultural, and silvicultural operations and as substrate for plant growth. All compost materials will be certified as PFRP and representative samples of the material will be tested as accomplished by NCDA for organic matter, nutrient, regulated metals, and salt levels as required in rule.

7. An operations and maintenance manual is provided. The Operations manual lists activities of individuals involved, operational requirements during normal operations and adverse weather, turning frequencies, temperature monitoring requirements, product quality testing and disposition for the compost, groundwater monitoring, safety, and other operational issues.

G. Compost Facility Design

1. The current Craven Ag, Inc. Compost Facility consists of a series of compacted marl gravel, compost and compacted soil/ash pads each of varying size. The compost site proposed contains several distinct areas to be developed using the coal ash as a soil amendment to develop suitable soil texture in the compost operations or a concrete pad in the mix/blend area. These are identified on the site map attached:

   Area 1 – Receiving Area - material receiving and mix pit
   Area 2 – Active Composting Area - material composting/processing area to assure PFRP and VAR compliance,
   Area 3 – Storage/Curing Area/Finished product storage Area - screening and material curing, as well as areas suited for storing finished compost or dry feedstock materials and for short term storage while materials are held waiting distribution and marketing.

   In addition to these defined areas, the site may also contain temporary tank trucks for storage and treatment of the raw materials to be processed and composted. These consist of above ground portable tanks ranging from 1,500 to 6,500 gallons capacity. The proposed area involves development of a concrete mixing/blending pad (Area 1).

   The design team will certify to DWM that Sites 1, 2, and 3 are developed as permitted with the ash materials to reduce permeability and prepare a stable working surface. Ash and compost fines will be applied over the site as described in the plans with a loader, spread evenly, and disked into all three sites. This will provide a 9 to 12 inch thick slowly permeable pad suitable for this type facility. Groundwater wells are proposed as indicated in the attached report by Cpec Environmental. The Groundwater monitoring plan is included in the O and M manual.

   The compost is to be manufactured from ingredients listed in Table 3-1 (Section G, Part 3 - Raw Materials, Proposed Feedstock Volumes and Protocol For Compost) of this document. New feedstock sources will be tested to determine levels of nutrients, regulated metals, organic carbon and salt prior to receipt and these new feedstocks will be submitted to DWM as needed for approval. No new feedstock will be allowed if regulated metal levels exceed the Table 1 values listed in 40 CFR Part 503 or if excluded by TCLP or as a toxic or hazardous waste.

All of the putrescible material is mixed and blended with a suitable substrate on the concrete pad on the day of arrival to prevent nuisance problems. On day of arrival, the non-putrescible materials are stored in the raw material storage areas for subsequent use as needed for staging purposes. A mixer with a feed auger is used to combine the blended raw materials, which are then placed into the windrow compost production area. The windrow compost process continues in these open windrows for approximately 60 days from placement to product. At the end of the composting process, the PFRP/VAR compliant compost is moved by loader onto the compacted finished compost storage pad for curing. The finished compost is to be stored for a period of not less than 120 days and not to exceed 270 days for curing. A maturity test will be used to assess the stage of maturity of the compost. The finished compost may be sold in bulk as a soil amendment, blended with topsoil or sand marketed as finish compost, topsoil or bio-retention blend.

The facility is intended to accommodate up to 50,000 tons per year of compostable materials. These materials will be received on a varying schedule and daily receipts may exceed 100 tons, while annual processing will not exceed 50,000 tons. This schedule supports 300 days of active operation per year. Compost mixes or blends will be developed each day based on incoming feedstocks and ultimate market opportunity. Coarse materials will be used to produce silvicultural product while the finer textured materials will be mixed and blended for the horticulture and bioretention blend markets.

2. Compost Recipes

The exact blends and mixtures are developed based on proprietary mixes and blends developed by Craven Ag Service, Inc., for specific end uses or general compost production. The characteristics of a portion of the raw materials used for compost mixture calculations are described in the Operations and Maintenance Manual.

The composting operation serves primarily to receive feedstocks and bulking materials listed in Table 3-1 (Section G, Part 3 - Raw Materials, Proposed Feedstock Volumes and Protocol For Compost) of this document. Composting septage and dewatered grease trap wastes will allow an increase in the hydraulic loads onto the land treatment operation permitted for Craven Ag Service and to provide an outlet for solids produced in dewatering operations operated by CAS. The mixtures of substrate and waste should result in an initial C:N ratio of ~30:1 and a moisture content of ~75%.

3. Raw Materials, Proposed Feedstock Volumes and Protocol For Compost

The maximum waste production and processing assumptions for the compost operation are:

a. 50,000 gallons grease trap waste processed 5 days per week (10 to 20 dry tons/day after dewatering)
b. 50,000 gallons of septage processed 5 days per week (10 to 20 dry tons per day after dewatering)
c. 5,000 gallons of portable toilet waste processed 5 days/week (0.5 DT/D)
d. 20,000 pounds (10 tons) of vegetative waste per day received
e. 100,000 pounds (50 tons) per day feedstock from municipal, commercial, agricultural/agribusiness, and industrial sources.

These volumes will vary seasonally, but total production from all sources will not exceed 50,000 dry tons annually.

The solids portion of the processed liquid waste is to be composted. The liquid will be accommodated through land application, transported to a separate and properly permitted land treatment facility or to a permitted POTW (such as Kinston POTW). In addition to the nitrogen sources available from the septage and dewatered grease trap waste, several sources of carbonaceous bulking materials are readily available for utilization in the composting process. These materials are listed below and the estimated quantity received per week is estimated in Table 3-1 Please note that quantities received vary depending on market conditions and are subject to change:

Table 3-1

Compost Feedstocks

Feedstock	Estimated Quantity (Tons)
hardwood and softwood sawdust from local manufacturing plants	15
wood shavings	15
mixed wood chips and sawdust from ground pallets (nail free)	15
animal litter or transport bedding materials from livestock operations	15
DAF skimmings (from Maola)	6
scraped animal manure	3
straw bedding material from the on-site free-stall dairy, horse, or cattle barns	12
poultry litter from local poultry growers	15
untreated wallboard from home/mobile home construction/manufacture	6
pre and post consumer food waste	12
hay/straw harvested from the land	15

application fields	
ground corn cobs	3
ground and un-ground yard waste	15
dewatered septage	30-60
dewatered grease trap wastes	30-60
field crop residue	6
construction debris (clean wood scrap from construction operations)	6
vegetative agricultural/agribusiness wastes (wet indigestible hay or forage, corn stover, cotton gin trash, peanut hulls, tobacco scraps/spoilage, tobacco dust)	12
land clearing debris material	6
seafood processing wastes (crab scrap, fish processing wastes)	3

Items Incorporated with Finished Product

Feedstock	Estimated Quantity (Tons)
lime mud from water treatment operations	3
non-toxic/non-hazardous combustion dust and ash	6

Prohibited Materials

Municipal sludge
Hazardous waste
Infectious waste

Entrance signage and property boundary marking will be accomplished listing the type of facility, the permit number, and appropriate contact information.

4. Flow Diagram

The composting process at the Craven Ag Service Compost Facility is depicted on the site plan showing the processing area, mixing pad, the compost production windrows, the curing area and the screening/mixing area and may described as follows: dry raw materials are received and stored prior to use in the "dry material" storage areas. These materials are combined with a daily delivery of wet raw materials and the dewatered materials generated off-site at the Craven Ag dewatering facility. The dry materials are placed directly onto the pad and the dewatered or processed septage/grease trap materials are placed over the top of the material, these materials are mixed and blended using a

loader in an approximate 50/50 ratio. These raw feedstock materials are loaded via loader into the bulk mixer (Knight Mixer - RC 200 Series, see Attachment 5). The proper ratio of material introduced onto the mixing pad is determined by the number of "buckets" of material placed by the loader. The bulk mixing operation thoroughly combines the raw material and "mixed" raw materials are transferred to the compost production area. Windrows are turned with a windrow turner as required to achieve the 5 turnings in 15 days for PFRP compliance and VAR compliance. After initial treatment in the compost windrows for PFRP and VAR compliance, the compost is removed to the initial storage or curing area, where it is allowed to complete the compost curing process. A **Solvita** test will be used to assess the maturity of the compost.

A process flow diagram, showing the equipment and flow of materials through the composting system is included in Attachment 2. The critical flow duration in the active windrow is 15 days at required temperature with 5 consecutive turnings as required in rule. Typical time in an active windrow will be 4 to 6 weeks to allow for temperature rise from ambient to thermophilic and required mixing. Mixing and blending will be accomplished in a single day. Composting will require an estimated 21 days. Curing may require between 2 and 3 months depending on end use and Solvita test results. Storage can be accomplished following a Solvita test indication that the material is stable. Storage will be dependent on end use and may require op to 9 months depending on users.

5. Leachate Collection and Recycle System

The concrete mixing pad will collect leachate for transport to the compost for use in the process or to a permitted wastewater receiver site. Leachate is removed as needed or as required and incorporated back into compost batch as a liquid and nitrogen source or allowed to evaporate. Any addition of leachate back to the windrow is carried out in the primary loading of the windrow and results in an additional full processing and heat cycle which results in the Process to Further Reduce Pathogens (PFRP) to be repeated. In very wet conditions or in an emergency, such as a sustained power outage or equipment breakdown, the collected leachate will be transferred to the nearby permitted wastewater treatment facility in Kinston, NC.

6. Preliminary Compost Analysis/Quality

Detailed compost characterizations have been performed previously by NCDA on several samples of the finished compost. All units in the analysis are measured on a dry weight basis (mg/kg). Attachment 3 shows a summary of the results from NCDA sampling. The finished compost does not exhibit high concentration of regulated or heavy metals. The raw material sources are primarily agricultural in nature and do not have significant heavy metal concentrations.

7. Pathogen Reduction Verification

Pathogens are to be reduced as required in the NC Solid Waste Compost Rules, Section .1406. The CAS Facility shall maintain the compost process at a temperature above 55 degrees C (131 degrees F) for 15 days with the required 5 turning events and the material may be retained longer on the active compost portion of the site following the PFRP compliance. This satisfies both the VAR and PFRP requirement.

The completed compost from the CAS Compost Facility will have a fecal coliform density of less than 1,000 colonies Most Probable Number (MPN) per gram of dry solids. The materials will demonstrate pathogen reduction requirements by process monitoring (time and temperature).

8. Protocol For Compost Which does not Meet Pathogen Reduction Level

All finished compost which does not meet the time temperature requirements listed in rule (131 degrees F for 15 days) or tested fecal coliform level of 1,000 colonies per gram of dry material are to be returned to the windrow and subjected to an additional, high heat cycle (131 degrees Fahrenheit for 15 or more days with required turnings). Product may be re-sampled if readings are believed to be a "false positive." Temperature probes will be calibrated annually to assure reliable measures. In the event that this process does not reduce the fecal coliform count or the manager/operator decides that the additional composting is of no value, then the material will be land applied to an appropriate, permitted off-site disposal area (permitted for class B material through NCDWQ or NCDWM) or transported to a permitted landfill.

9. Contingency Plans for the Operation

An operating manual detailing the composting facility operations and procedures, including recipes, equipment, monitoring, maintenance, and record keeping is included as Attachment 4.

Contingency plans for operation in the event of equipment breakdown or temporary power failure or inclement weather essential operations will be accomplished with alternative equipment; for example, if turning is required and the turner is inoperable, turning will be accomplished with front end loader.

Problems with operation of the composting facility during extreme weather conditions such as heavy rain or high winds will be minimized because of limited ingress to the site. Essential operations will be accomplished as required with equipment available.

In freezing conditions, it may be necessary to modify the compost cycle to assure temperatures are maintained adequately. This may require turning during late morning and early afternoon hours to take advantage of warmer day-time temperatures. This practice should allow the temperature to reach and maintain the desired level in excess of 131 degrees Fahrenheit for at least 15 days with the required turnings to meet the PFRP requirements. Special caution will need to be taken with the operation of skid loader equipment in any areas where the small amount of leachate could freeze and present a slippage hazard. Operators will be trained in proper operation of all equipment to assure a safe and sound operation.

10. Compost Equipment: The equipment proposed for the compost operation is described in the Operations and Maintenance Manual, attached. The equipment is identical to that currently utilized in the ongoing compost demonstration.

11. Vector Reduction

On day of arrival, putrescible materials will be mixed, blended and prepared for composting, then placed into the compost windrow on that same day to reduce nuisance vectors. These materials will be covered with 3 to 6 inches of finished compost, 3 to 6 inches of a carbon rich material such as sawdust or a layer of plastic as described in the operation and maintenance manual to prevent escape of odor. Other dry stock component materials may be stored for longer periods. The VAR requirements established in rule shall be met through the windrow composting method (minimum temperatures of 131 degrees with 5 turnings) for PFRP compliance.

12. Traffic Flow

Based on the maximum throughput production of the compost operation a maximum of two tractor trailer loads of compost per day would leave the facility on average. The over the road tractor trailers are anticipated to move on the gravel access road leading from the facility to River Road, thence to NC Highways and roads for ultimate distribution in the area. Given the existing truck traffic from the facility, the additional effect on local traffic of a maximum of two trucks of finish compost per day, 4 to 5 loads of dry feedstock materials, and 2 to 3 loads of dewatered material on average will be negligible.

H. Marketing Plan and Materials

A portion of the finished compost has normally been sold by bulk to local buyers. At present, CAS Compost Facility has established a strong working relationship and goodwill with growers and producers in the area to continue with expansion of markets for soil amendment, compost and bioretention area soil mixes. A comprehensive set of

information sheets will be provided to end users depending on the use. Information sheets will be provided for horticultural, agricultural and silvicultural uses. Samples are contained in the O and M Manual.

Copies of the previous communication from the NC Division of Solid Waste regarding the Compost Facility are included as Attachment 9.

I. SUBMITTAL

Gary MacConnell and Zach Fuller with MacConnell and Associates and I appreciate the opportunity to compile this permit application for the CAS Compost Facility. Initial development and final review of these materials was provided by Billy Dunham, Gary MacConnell, Zach Fuller and A. R. Rubin. If either you or the NC DENR DWM representatives/reviewers have any questions regarding this report, please contact us directly.

Sincerely,

Gary MacConnell, P.E. A. R. Rubin

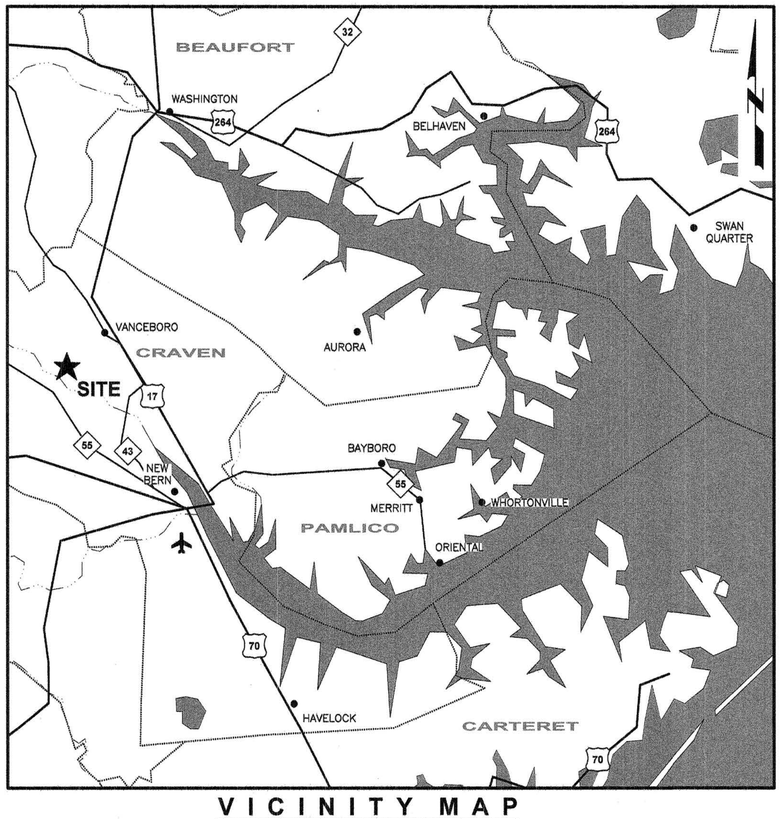
attachments

CRAVEN AG SERVICES, INC.

COMPOST FACILITY

CRAVEN COUNTY, NC

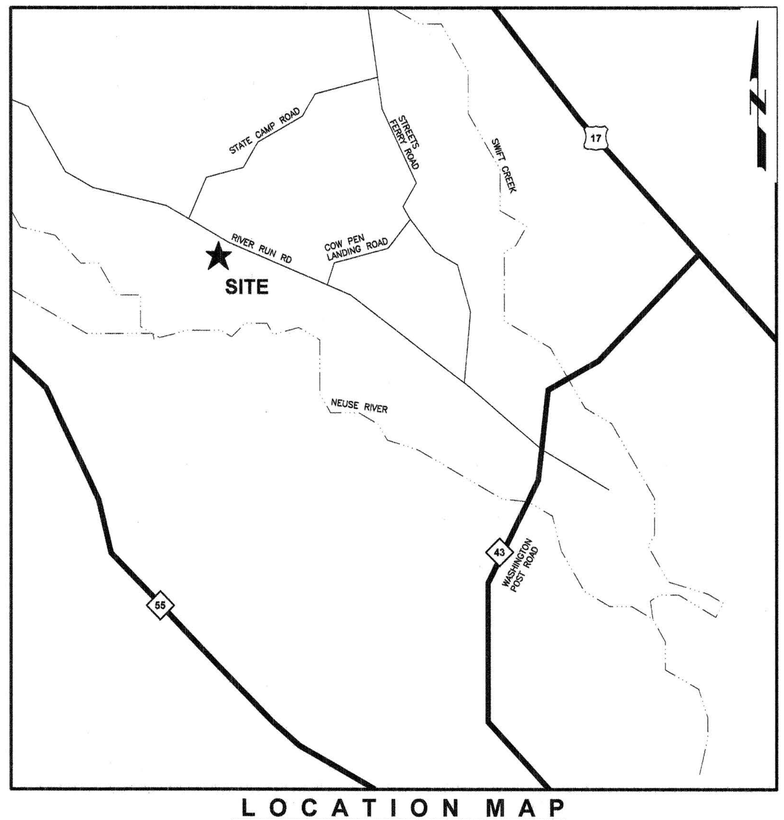
PROJECT No. A45201.00



VICINITY MAP

SCHEDULE OF DRAWINGS:

	COVER SHEET
C-101	SITE PLAN
C-102	SITE LAYOUT
C-103	STORMWATER/SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 1 OF 2
C-104	STORMWATER/SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 2 OF 2
D-101	DETAILS
D-102	MIXING PAD DETAILS



LOCATION MAP

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

192 fearrington post
pittsboro, nc, 27312

919 545 3066
919 270 0344

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL 3/28/14

PROJECT MANAGEMENT

MacCONNELL & Associates, P. C.
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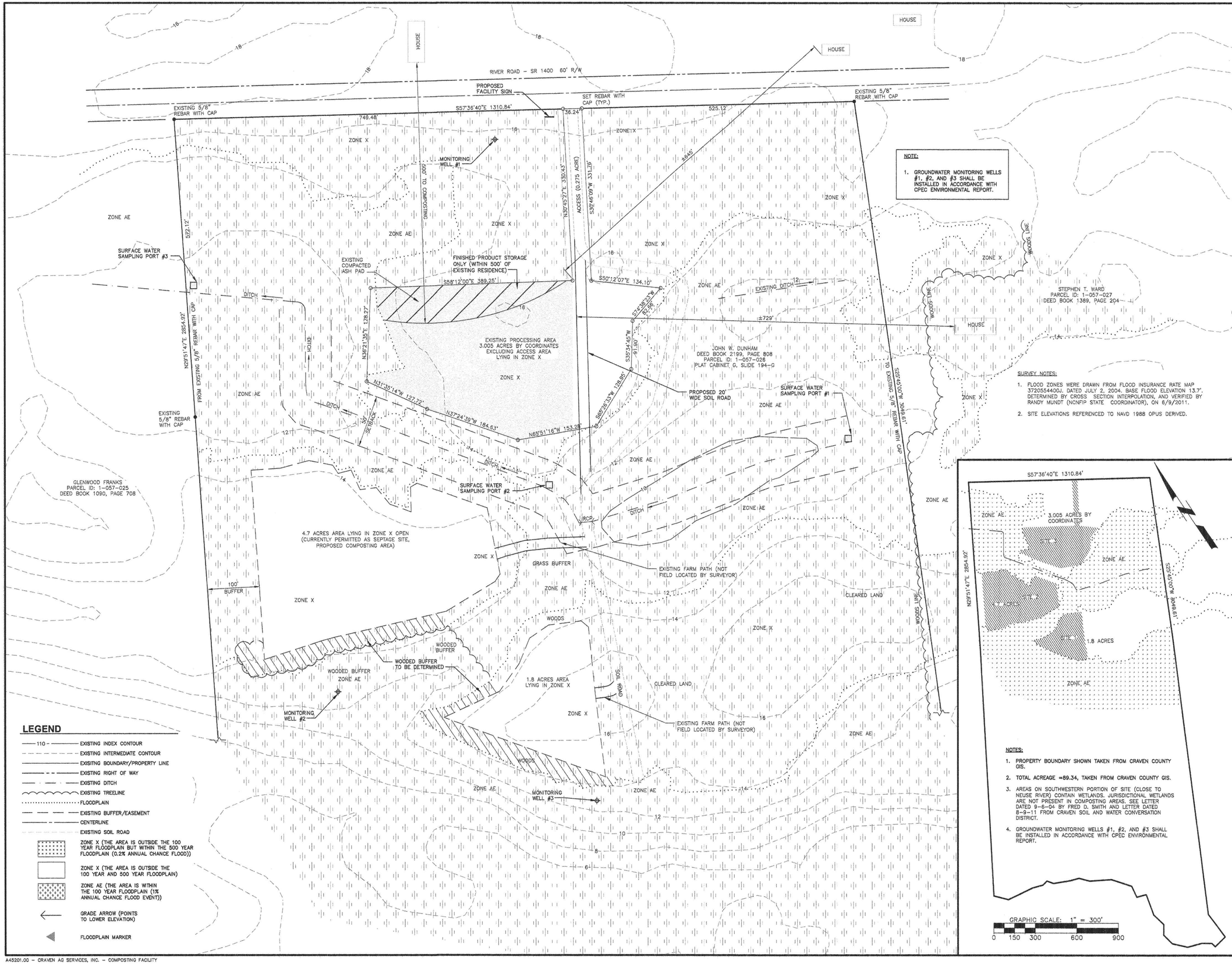
CARY, NC 27513
P. O. BOX 129
MORRISVILLE, NC 27560
TEL: (919) 467-1239 FAX: (919) 319-6510

JUNE 28, 2011

REVISIONS			
NO.	DATE	DESCRIPTION	SHEET
1	08/08/11	REV. PER LQS	ALL
2	02/29/12	REV. PER SWS	ALL
3	12/03/12	REV. PER SWS	ALL
4	08/14/13	REV. PER LQS, SWS	C-101,2,3,4 D-101
5	11/21/13	REV. PER SWS	C-101,2,3,D-101
6	1/29/14	REV. PER SWS	C-101,2,4, D-102

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOST FACILITY



NOTES

1. SURVEY PROVIDED BY:
   MAYO & ASSOCIATES, P.A. LAND SURVEYING
   10121 US HWY 17 SOUTH
   VANCEBORO, NC 28586
   DATED: JUNE 17, 2011
2. TOPOGRAPHY TAKEN FROM NCDOT LIDAR.
3. MACCONNELL & ASSOCIATES UTILIZED THE DATA AND THE EQUIPMENT INFORMATION TO DESIGN SITE DETAILS FOR THIS FACILITY. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, AND UTILITIES BEFORE BEGINNING ANY CONSTRUCTION.
4. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SOIL EROSION AND SEDIMENTATION CONTROL REQUIREMENTS OF THE COUNTY AND STATE.
5. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OSHA AND SAFETY REQUIREMENTS OF THE COUNTY AND STATE.
6. ADJACENT RESIDENCE LOCATIONS ARE APPROXIMATE AND WERE LOCATED USING THE CRAVEN COUNTY GIS WEBSITE.

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

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pittsboro, nc, 27312
919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 80'
0 40 80 160 240

REVISIONS		
NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS
3	12/03/12	PER SWS
4	08/14/13	PER LQS, SWS
5	11/21/13	PER SWS
6	01/29/14	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY:	CHECKED BY:
MAE	GSM

DATE:
JUNE 28, 2011

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 17069 MARY S. MacCONNELL
3/6/14

MacCONNELL & Associates, P. C.
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CRAVEN AG SERVICES, INC.

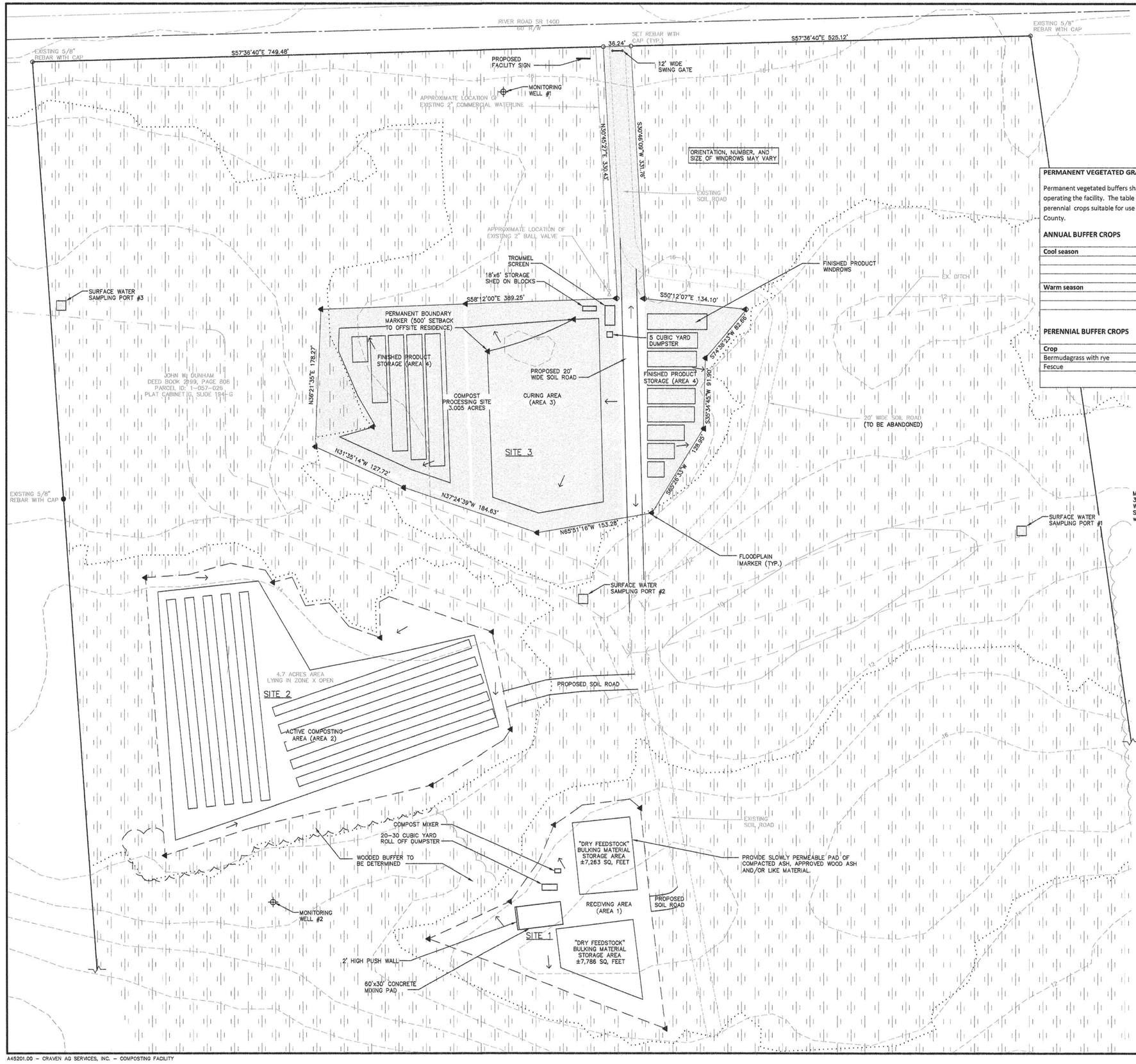
COMPOSTING FACILITY

CRAVEN COUNTY, NC

SITE PLAN

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-101

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY



NOTES

1. SEE C-101 FOR GENERAL NOTES.
2. DISTURBED AREAS NOT COVERED BY SLOWLY PERMEABLE PAD OR CONCRETE SHALL BE SEEDED WITH COASTAL BERMUDA, RYE GRASS, OR NATURAL GRASS.
3. FACILITY SIGN SHALL BE A MINIMUM 2'x3' AND INCLUDE THE PERMIT NUMBER, PROHIBITED MATERIALS, AND EMERGENCY CONTACT INFORMATION.
4. BLEND A MIN. 1"–2" OF COMPOST FINES, MIN. 2" OF ASH, WITH NATIVE SOIL FOR AN ADDITIONAL THICKNESS OF 3"–4" WITHIN THE ENTIRE BOUNDARIES OF SITES 1, 2, AND 3. MODIFIED SOIL TEXTURE SHALL BE FINER THAN LOAMY SAND IN ACCORDANCE WITH RULE .1404 (a) (10) (B).
5. COMPOST WINDROWS WILL BE ORIENTED TO PROVIDE SHEET FLOW TO RUNOFF PER FINAL GRADING WITH ASH MIXTURE.
6. FLOODPLAIN AND BOUNDARY MARKERS SHALL BE MAINTAINED AT SITE.
7. PROVIDE 50' MINIMUM VEGETATED BUFFER (WOODLAND OR CROPS) AROUND PERIMETER OF SITES 1, 2, AND 3.

PERMANENT VEGETATED GRASS BUFFERS

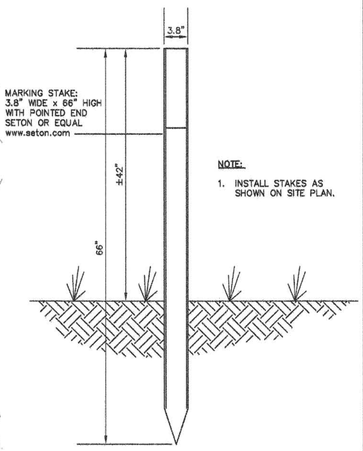
Permanent vegetated buffers shall be established downslope of the compost production site prior to operating the facility. The table below lists a variety of cool season and warm season annual and perennial crops suitable for use in the buffer areas and the recommended seeding rate for Craven County.

ANNUAL BUFFER CROPS

Cool season	Crop	Seeding Recommendation
	Annual rye	Broadcast @ 20 lb/ac, drill @10 lb/ac
	Wheat	40 lb/ac
	Oats	Broadcast@ 110 lb/ac, drill @ 80 lb/ac
Warm season		
	Sudan/sorghum	30 lb/ac
	Millet	Broadcast @20 lb/ac, drill @ 10 lb/ac

PERENNIAL BUFFER CROPS

Crop	Seeding Recommendation
Bermudagrass with rye	Bermuda broadcast @ 8 lb/ac, drill @ 5 lb/ac, rye as above
Fescue	Broadcast @ 15 lb/ac, drill @ 10 lb/ac



NOTE:
1. INSTALL STAKES AS SHOWN ON SITE PLAN.

FLOODPLAIN AND BOUNDARY MARKER
1 / C-102 SCALE: NTS

LEGEND

- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISITNG BOUNDARY/PROPERTY LINE
- EXISTING RIGHT OF WAY
- EXISTING DITCH
- EXISTING TREELINE
- FLOODPLAIN
- EXISTING BUFFER/EASEMENT
- CENTERLINE
- EXISTING SOIL ROAD
- ZONE X (THE AREA IS OUTSIDE THE 100 YEAR FLOODPLAIN BUT WITHIN THE 500 YEAR FLOODPLAIN (0.2% ANNUAL CHANCE FLOOD))
- ZONE X (THE AREA IS OUTSIDE THE 100 YEAR AND 500 YEAR FLOODPLAIN)
- ZONE AE (THE AREA IS WITHIN THE 100 YEAR FLOODPLAIN (1% ANNUAL CHANCE FLOOD EVENT))
- GRADE ARROW (POINTS TO LOWER ELEVATION)
- FLOODPLAIN MARKER

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

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919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 60'
0 30 60 120 180

REVISIONS		
NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS
3	12/03/12	PER SWS
4	08/14/13	PER LQS, SWS
5	11/21/13	PER SWS
6	01/29/14	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY:	CHECKED BY:
MAE	GSM

DATE:
JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL
5/14/14

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CRAVEN AG SERVICES, INC.

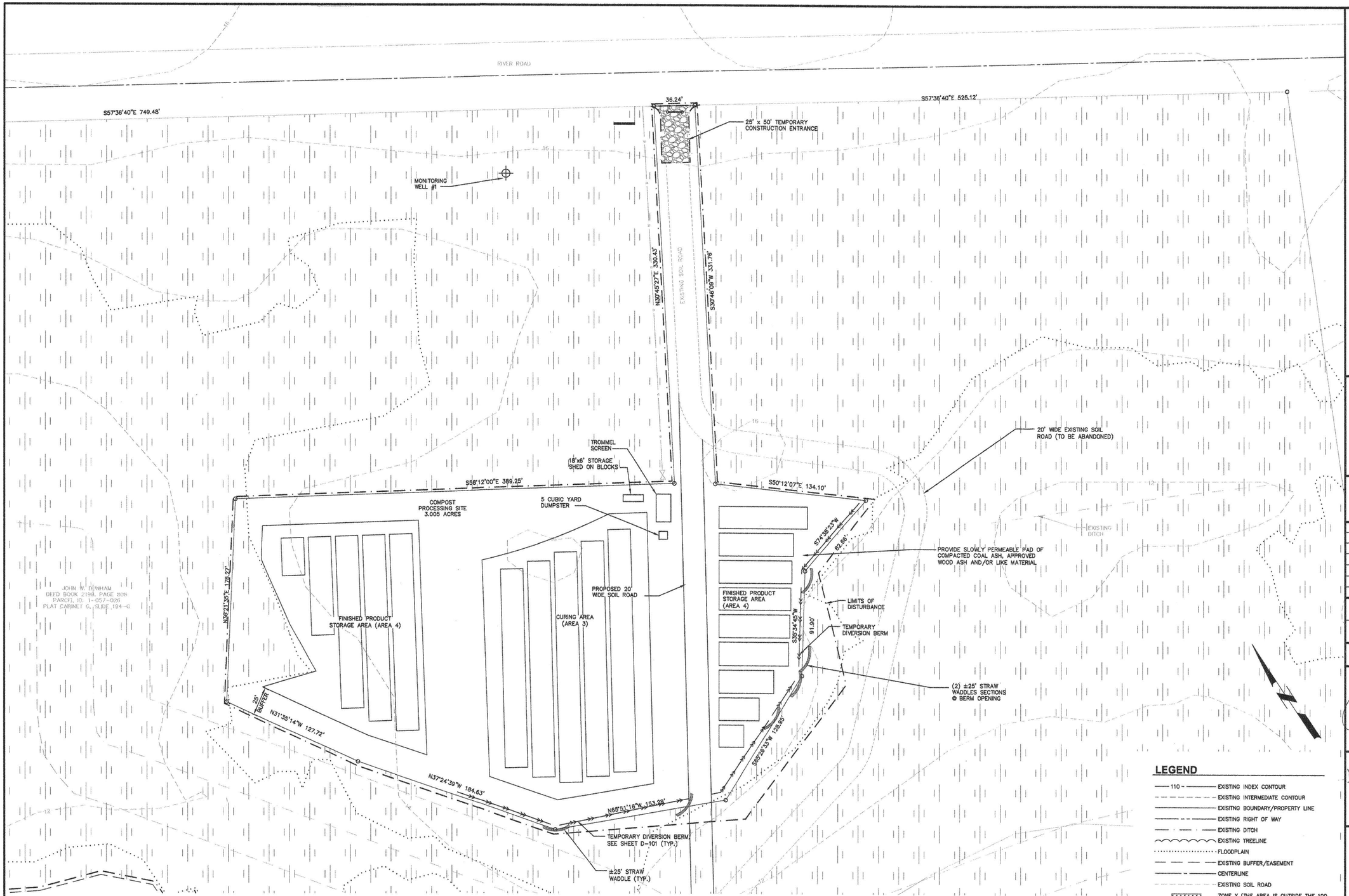
COMPOSTING FACILITY

CRAVEN COUNTY, NC

SITE LAYOUT

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-102

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY



NOTES

1. SEE C-101 FOR GENERAL NOTES.
2. ALL DISTURBED SOILS WILL BE USED FOR CONSTRUCTION OF DIVERSION BERMS AND GRADING OF COMPOST PAD.
3. HAY BALES (OPTIONAL) MAY BE PLACED DOWN SLOPE (OUTSIDE) OF STRAW WADDLES.
4. LOCATION OF STRAW WADDLE OUTLETS IN TEMPORARY DIVERSION BERM MAY BE ADJUSTED AS REQUIRED TO MEET SITE CONDITIONS.

S & EC LEGEND

- LIMITS OF GRADING/DISTURBANCE
- TEMPORARY DIVERSION BERM
- STRAW WADDLE
- CONSTRUCTION ENTRANCE/EXIT

LEGEND

- 110 – EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING BOUNDARY/PROPERTY LINE
- EXISTING RIGHT OF WAY
- EXISTING DITCH
- EXISTING TREELINE
- FLOODPLAIN
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- GRADE ARROW (POINTS TO LOWER ELEVATION)
- FLOODPLAIN MARKER

A. R. Rubin, Ed.D.
President

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919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 40'
0 20 40 80 120

REVISIONS

NO.	DATE	DESCRIPTION
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2	02/29/12	PER SWS
3	12/03/12	PER SWS
4	08/14/13	PER LQS, SWS
5	11/21/13	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY:	CHECKED BY:
MAE	GSM

DATE:
JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER DAVID S. MacCONNELL

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CRAVEN AG SERVICES, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

STORMWATER/ SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 1 OF 2

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-103

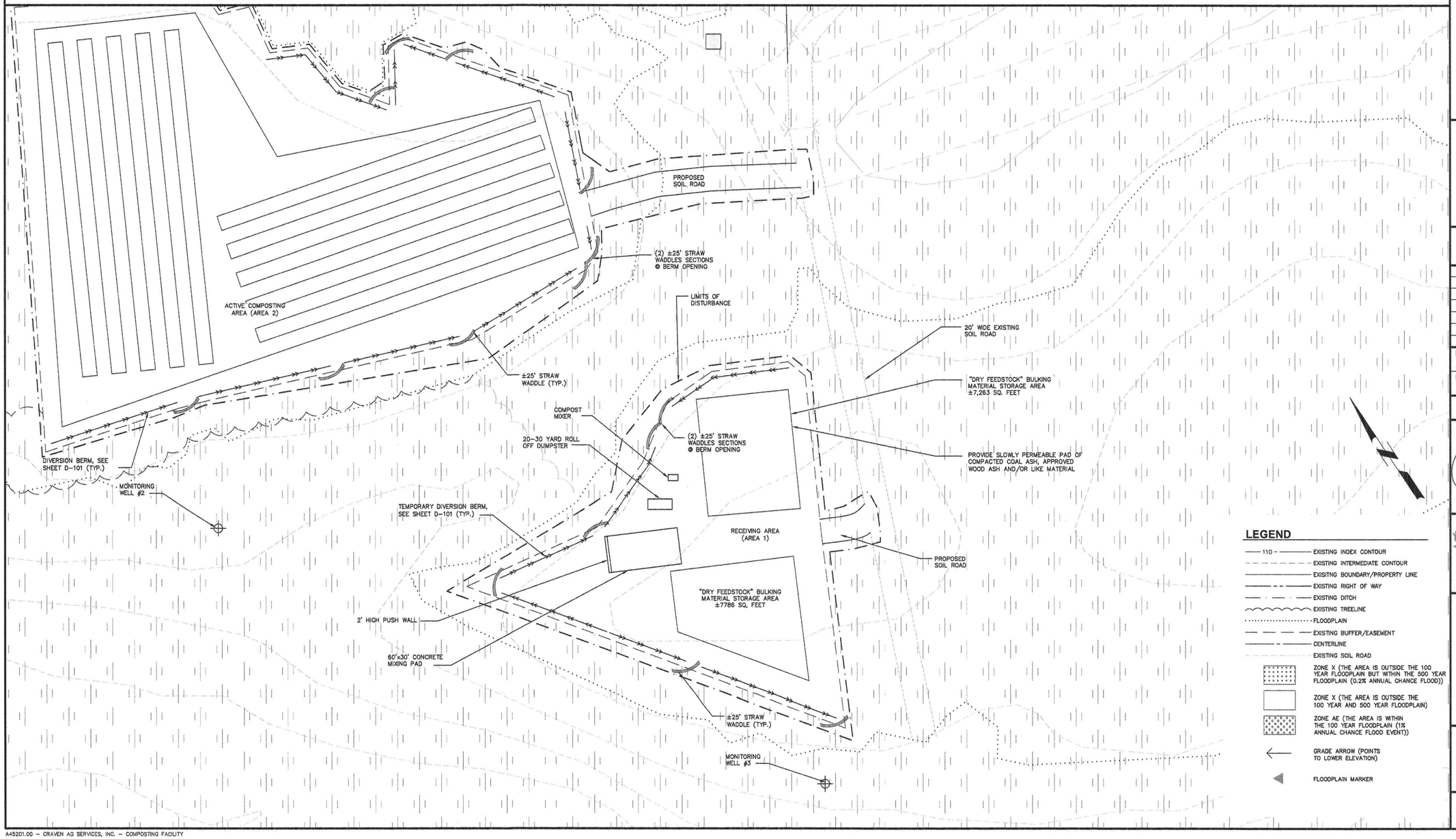
A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY

NOTES

1. SEE C-101 FOR GENERAL NOTES.
2. ALL DISTURBED SOILS WILL BE USED FOR CONSTRUCTION OF DIVERSION BERMS AND GRADING OF COMPOST PAD.
3. HAY BALES (OPTIONAL) MAY BE PLACED DOWN SLOPE (OUTSIDE) OF STRAW WADDLES.
4. LOCATION OF STRAW WADDLE OUTLETS IN TEMPORARY DIVERSION BERM MAY BE ADJUSTED AS REQUIRED TO MEET SITE CONDITIONS.

S & EC LEGEND

- LIMITS OF GRADING/DISTURBANCE
- TEMPORARY DIVERSION BERM
- STRAW WADDLE
- CONSTRUCTION ENTRANCE/EXIT



LEGEND

- 110 — EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING BOUNDARY/PROPERTY LINE
- EXISTING RIGHT OF WAY
- EXISTING DITCH
- EXISTING TREELINE
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- GRADE ARROW (POINTS TO LOWER ELEVATION)
- FLOODPLAIN MARKER

A. R. Rubin, Ed.D.
President

A. R. Rubin and Associates
sustainable environmental solutions

192 fearrington post
pittsboro, nc, 27312
919 545 3066
919 270 0344

GRAPHIC SCALE: 1" = 40'
0 20 40 80 120

REVISIONS		
NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS
3	12/03/12	PER SWS
4	08/14/13	PER LQS, SWS
6	01/29/14	PER SWS

PROJECT MANAGER: GSM	PROJECT ENGINEER: ZLF
DRAWN BY: MAE	CHECKED BY: GSM

DATE: JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17089 ENGINEER GARY S. MacCONNELL 3/25/14

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TEL: (919) 467-1239 FAX: (919) 319-8510

CRAVEN AG SERVICES, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

STORMWATER/ SEDIMENTATION & EROSION CONTROL PLAN LAYOUT 2 OF 2

PROJECT NUMBER	DRAWING NUMBER
A45201.00	C-104

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY

SEEDING SPECIFICATIONS

1. PERMANENT SEEDING: PERMANENT SEEDING IS REQUIRED FOR ALL AREAS DISTURBED BY CONSTRUCTION EXCEPT FOR AREAS COVERED BY STRUCTURES, PAVEMENTS, ETC.
2. TEMPORARY SEEDING: TEMPORARY SEEDING IS REQUIRED FOR THOSE AREAS DISTURBED BY CONSTRUCTION AND LEFT EXPOSED FOR PERIODS OF 15 DAYS OR MORE BEFORE BEING BROUGHT TO FINAL GRADE AND PERMANENTLY SEEDED. THE FORCE MAIN SHALL BE SEEDED AT THE END OF EACH WORKING DAY TO MINIMIZE CONSTRUCTION DISTURBANCE ACTIVITIES.

*PRODUCTS:

MATERIALS:

1. FERTILIZER: PROVIDE 10-10-10 COMMERCIAL FERTILIZER CONFORMING TO STATUTORY REQUIREMENTS AND ALL RULES AND REGULATIONS ADOPTED BY THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE.
2. LIMESTONE: PROVIDE LIMESTONE CONFORMING TO ALL STATUTORY REQUIREMENTS AND ALL RULES AND REGULATIONS ADOPTED BY THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE.
3. SEEDING: PROVIDE SEED CONFORMING TO ALL STATUTORY REQUIREMENTS AND ALL RULES AND REGULATIONS ADOPTED BY THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE. PROVIDE SEED MIXTURES AS TABULATED BELOW. DELIVER SEED TO THE SITE IN ORIGINAL CONTAINERS BEARING THE APPROPRIATE GUARANTEED MIXTURES. SEED SHALL SHOW A PURITY OF NOT LESS THAN 90 PERCENT AND GERMINATION QUALITY OF NOT LESS THAN 85 PERCENT.

3A. TEMPORARY MIXTURE:

A. FOR DECEMBER 1st THROUGH APRIL 15th, THE MIXTURE SHALL CONSIST OF 120 lbs./oc. RYE (GRAIN) AND 50 lbs./oc. KOBE.

B. FOR APRIL 15th THROUGH AUGUST 15th, THE MIXTURE SHALL CONSIST OF 40 lbs./oc. GERMAN MILLET.

C. FOR AUGUST 15th THROUGH DECEMBER 30th, THE MIXTURE SHALL CONSIST OF 120 lbs./oc. RYE (GRAIN).

3B. PERMANENT MIXTURE:

A. THE PERMANENT SEED MIXTURE FOR GENERAL AREAS SHALL CONSIST OF MINIMUM RATE OF 50 lbs./oc. PENSACOLA BAHIAGRASS, 30 lbs./oc. SERICEA LESPEDEZA, 10 lbs./oc. COMMON BERMUDA GRASS, AND 10 lbs./oc. GERMAN MILLET. THE BEST SEEDING DATES FOR THIS MIXTURE ARE FROM APRIL 1st TO JULY 15th.

B. OTHER MIXTURES: OTHER MIXTURES, AS APPROVED OR RECOMMENDED BY THE SOIL CONSERVATION SERVICE OR THE NORTH CAROLINA AGRICULTURAL EXTENSION OFFICE MAY BE USED.

4. MULCH: MULCH ALL SEEDED AREAS, EXCEPT WHERE JUTE MESH IS REQUIRED AND DURING PERMANENT SEEDING. USE UNDAMAGED, AIR-DRIED, THRESHED SMALL GRAIN STRAW FREE OF UNDESIRABLE WEED SEED. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, BY ROVING, OR THROUGH USE OF A MULCH ANCHORING TOOL.

*EXECUTION

1. FOLLOW PROCEDURES SET FORTH IN THE PUBLICATION "GUIDE FOR SEDIMENT CONTROL ON CONSTRUCTION SITES IN NORTH CAROLINA" BY THE SOIL CONSERVATION SERVICE OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, AND AS SPECIFIED HEREIN.
2. SPREAD A MINIMUM OF FOUR (4) INCHES OF TOP SOIL OVER ALL DISTURBED AREAS TO THE FINISHED GRADE.
3. REMOVE ALL GRASS AND WEEDS AND SHAPE THE OVERALL AREA TO EVEN OUT HIGH AND LOW SPOTS.
4. SCARIFY SOIL TO A DEPTH OF THREE (3) INCHES AND WORK INTO A SATISFACTORY SEED BED BY DISKING OR THROUGH THE USE OF CULTIPACKERS, HARROWS, DRAGS, OR OTHER APPROVED MEANS.
5. THE PREPARATION OUTLINED ABOVE SHALL NOT BE DONE WHEN THE SOIL IS FROZEN, WET, OR OTHERWISE IN AN UNFAVORABLE CONDITION.
6. BEGIN AND COMPLETE SEEDING OPERATIONS, AS OUTLINED BELOW, AS SOON AS POSSIBLE AFTER FINAL OR INTERMEDIATE GRADING IS COMPLETED.
7. DISTRIBUTE LIME AND FERTILIZER, AS REQUIRED, UNIFORMLY OVER THE SEED BED. HARROW RAKE OR OTHERWISE WORK THESE ADDITIONS INTO THE SEED BED.
8. DISTRIBUTE SEED UNIFORMLY OVER THE ESTABLISHED SEED BED. LIGHTLY RAKE THE SURFACE OF THE SEED BED IN ORDER TO COVER SEED TO A MAXIMUM DEPTH OF 0.25 INCH.
9. COMPACT THE SEED BED WITH AN APPROVED ROLL OR DRAG AFTER COVERING THE SEED.
10. NO LIME, FERTILIZER, OR SEED SHALL BE APPLIED DURING A STRONG WIND, WHEN THE SOIL IS WET, OR WHEN THE SOIL IS OTHERWISE UNWORKABLE. SHOULD RAIN FOLLOW SEEDING BEFORE ROLLING IS INITIATED, THE SEED BED SHALL NOT BE ROLLED.
11. NO RIP-RAP IS TO BE PLACED ALONG THE BANKS OF NEW FILL. MAINTAIN THE AREA AND REPAIR ANY EROSION DAMAGE UNTIL A PERMANENT GROUND COVER IS ESTABLISHED. USE MULCH OR MESH AS REQUIRED.

*APPLICATION

TEMPORARY SEEDING: FOR DECEMBER 1st THROUGH AUGUST 15th:

1. APPLY LIME ACCORDING TO THE SOIL TESTS OR AT A RATE OF 2000 lbs./oc. BEFORE SEEDING.
2. APPLY FERTILIZER ACCORDING TO THE SOIL TESTS OR AT A RATE OF 750 lbs./oc.
3. SEED THE SEED BED WITH THE SPECIFIED SEED MIXTURE AT THE SPECIFIED RATE FOR THE RECOMMENDED PLANTING SEASON.
4. APPLY GRAIN STRAW AT A RATE OF 4000 lbs./oc. OR PROVIDE EQUIVALENT COVER OF ANOTHER SUITABLE COVER. MULCH SHALL BE ANCHORED IN A SUITABLE WAY. WHERE JUTE MESH IS REQUIRED, APPLY THE PRODUCT ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND ANCHOR WITH STEEL HAIRPIN-SHAPED WIRE STAPLES.
5. REFERTILIZE SEED BED IF GROWTH IS NOT FULLY ADEQUATE, AS DETERMINED BY THE ENGINEER. RE-SEED, FERTILIZE, AND MULCH ALL DAMAGED, BARE, AND ERODED AREAS IMMEDIATELY AND UNTIL A SUITABLE COVER IS ESTABLISHED.

TEMPORARY SEEDING: FOR AUGUST 15th THROUGH DECEMBER 30th:

1. APPLY LIME ACCORDING TO THE SOIL TESTS OR AT A RATE OF 2000 lbs./oc. BEFORE SEEDING.
2. APPLY FERTILIZER ACCORDING TO THE SOIL TESTS OR AT A RATE OF 1000 lbs./oc.
3. SEED THE SEED BED WITH THE SPECIFIED SEED MIXTURE AT THE SPECIFIED RATE FOR THE RECOMMENDED PLANTING SEASON.
4. APPLY GRAIN STRAW AT A RATE OF 4000 lbs./oc. OR PROVIDE EQUIVALENT COVER OF ANOTHER SUITABLE COVER. MULCH SHALL BE SUITABLY ANCHORED. WHERE JUTE MESH IS REQUIRED, APPLY THE PRODUCT ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND ANCHOR WITH STEEL HAIRPIN-SHAPED WIRE STAPLES.
5. REFERTILIZE SEED BED IF GROWTH IS NOT FULLY ADEQUATE, AS DETERMINED BY THE ENGINEER. RE-SEED, FERTILIZE, AND MULCH ALL DAMAGED, BARE, AND ERODED AREAS IMMEDIATELY AND UNTIL A SUITABLE COVER IS ESTABLISHED.

PERMANENT SEEDING: APPLICATION OF LIME, FERTILIZER, SEED, AND MULCH:

1. WHERE A NEAT APPEARANCE IS DESIRED, OMIT SERICEA.
2. USE COMMON BERMUDAGRASS ONLY ON ISOLATED SITES WHERE IT CANNOT BECOME A PEST. BERMUDAGRASS MAY BE REPLACED WITH 5 lbs./oc. CENTIPEDEGRASS.
3. SOIL AMENDMENTS: APPLY LIME AND FERTILIZER ACCORDING TO SOIL TESTS, OR APPLY 3000 lbs./oc. GROUND AGRICULTURAL LIMESTONE AND 500 lbs./oc. 10-10-10 FERTILIZER.
4. SEED THE SEED BED WITH THE SPECIFIED SEED MIXTURE AT THE SPECIFIED RATE DURING RECOMMENDED PLANTING SEASONS. IF GRADING IS COMPLETED AT TIMES OTHER THAN THE RECOMMENDED SEASON, PROVIDE TEMPORARY SEEDING OR OTHER EROSION AND SEDIMENTATION PROTECTION APPROVED BY THE ENGINEER UNTIL THE APPROPRIATE PLANTING SEASON BEGINS.
5. MULCH: APPLY 4000 lbs./oc. GRAIN STRAW OR EQUIVALENT COVER OF ANOTHER SUITABLE MULCH. ANCHOR BY TACKING ASPHALT, ROVING, OR NETTING OR BY CRIMPING WITH A MULCH ANCHORING TOOL. A DISC WITH BLADES SET NEARLY STRAIGHT MAY BE USED AS A MULCH ANCHORING TOOL.
6. MAINTENANCE: REFERTILIZE THE FOLLOWING APRIL WITH 50 lbs./oc. NITROGEN. REPEAT AS GROWTH REQUIRES. MOW ONLY ONCE PER YEAR. WHERE A NEAT APPEARANCE IS DESIRED, OMIT SERICEA AND MOW AS OFTEN AS NEEDED.

CONSTRUCTION SCHEDULE

THE CONTRACTOR MUST COMPLY WITH THE REQUIREMENTS HEREIN:

1. INSTALL EROSION CONTROL MEASURES AS REQUIRED, SUCH AS THE CONSTRUCTION ENTRANCE, DIVERSION BERMS, AND STRAW WADDLES.
2. CLEAR AND GRUB ANY WOODED AREAS TO BE DEVELOPED WITHIN LIMITS OF DISTURBANCE. STOCKPILE TOPSOIL AND SUITABLE FILL MATERIAL IN AREAS DESIGNATED AS STOCKPILES.
3. BEGIN GRADING ACTIVITIES AFTER ALL REQUIRED EROSION CONTROL MEASURES HAVE BEEN INSTALLED AND CONSTRUCTED. SALVAGE ANY TOPSOIL THAT MAY BE USED AFTER CONSTRUCTION.
4. SEED TEMPORARY AREAS THAT HAVE BEEN LEFT DORMANT FOR LONGER THAN 15 DAYS.
5. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH HEAVY RUNOFF PRODUCING RAINFALL. NEEDED REPAIRS SHALL BE MADE IMMEDIATELY.
6. AFTER CONSTRUCTION REMOVE ALL TEMPORARY STRUCTURES AND ENSURE ALL SEEDING IS COMPLETED FOR AREAS DISTURBED.

MAINTENANCE PLAN

1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER EACH HEAVY STORMWATER-PRODUCING RAINFALL. ALL NEEDED REPAIRS SHALL BE MADE IMMEDIATELY TO PREVENT FURTHER DAMAGE AND EROSION. STRUCTURES THAT WILL BE MAINTAINED WILL INCLUDE:

   CONSTRUCTION ENTRANCE/EXIT: INSPECT CONSTRUCTION ROAD SURFACE REGULARLY, MAINTAIN IN A CONDITION TO PREVENT SEDIMENT FROM LEAVING THE SITE, AND TOP-DRESS WHEN NEEDED. SEDIMENT TRANSPORTED TO PUBLIC ROADS SHALL BE REMOVED DAILY.

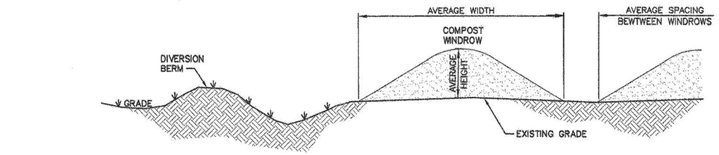
   STRAW WADDLE: CLEAN OUT SEDIMENT, STRAW, LIMBS, OR OTHER DEBRIS WHEN NEEDED. ANTICIPATE SUBMERGENCE AND DEPOSITION ABOVE THE STRAW WADDLE AND EROSION FROM HIGH FLOWS AROUND THE EDGES OF THE STRAW WADDLE. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN STRAW WADDLES, ADDITIONAL MEASURES CAN BE TAKEN SUCH AS, INSTALLING ADDITIONAL WADDLES AT BERM OUTLETS.

   SEEDING, FERTILIZING, AND MULCHING: SEEDED AREAS SHALL BE INSPECTED FOR FAILURE AND NECESSARY REPAIRS SHALL BE MADE WITHIN THE SAME SEASON, IF POSSIBLE.

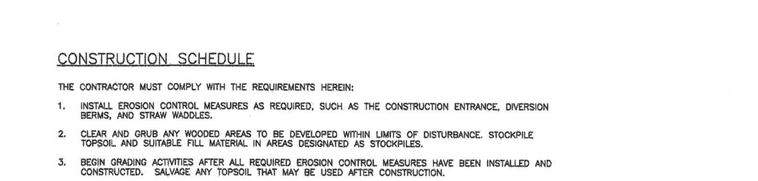
2. THE ANGLE FOR GRADED SLOPES AND FILLS SHALL BE NO GREATER THAN THE ANGLE THAT CAN BE RETAINED BY VEGETATIVE COVER OR OTHER ADEQUATE EROSION CONTROL DEVICES OR STRUCTURES. IN ANY EVENT, SLOPES LEFT EXPOSED WILL, WITHIN 21 CALENDAR DAYS OF COMPLETION OF ANY PHASE OF GRADING, BE PLANTED OR OTHERWISE PROVIDED WITH TEMPORARY GROUND COVER, DEVICES OR STRUCTURES SUFFICIENT TO RESTRAIN EROSION. PERMANENT GROUND COVER SHALL BE PROVIDED FOR ALL DISTURBED AREAS WITHIN 15 WORKING DAYS OR NO MORE THAN 90 CALENDAR DAYS.

TOTAL DISTURBED AREA: 7.95 AC.

WINDROW TYPE	AVERAGE HEIGHT	AVERAGE WIDTH	AVERAGE SPACING
ACTIVE	6'	10'	8'
CURING	15'	20'	6'-8'
FINISHED PRODUCT	30'	50' (MAX)	6'-8'

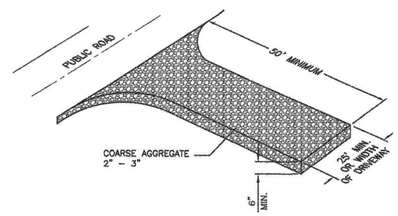


1 / D-101 **COMPOST WINDROW** NTS



NOTE:
1. COMPOST SOCKS MAY BE USED IN LIEU OF WADDLE.
2. INSTALL WOODEN STAKE ON EACH END OF WADDLE SEGMENT.
3. INSTALL WOODEN STAKES PERPENDICULAR TO SLOPE FACE.

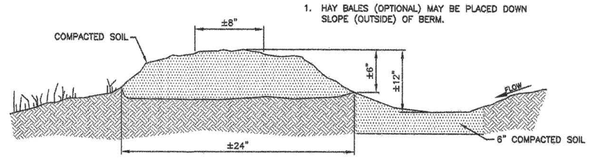
2 / D-101 **STRAW WADDLE DETAIL** NTS



NOTES:
1. GRAVEL PAD TO BE 25'-0" x 50'-0" AND 6" THICK MINIMUM
2. TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS IS TO BE PROVIDED.
3. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.
4. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE SHALL BE NECESSARY.
5. ANY MATERIAL DEPOSITED ONTO THE ROAD MUST BE CLEANED UP IMMEDIATELY.
6. APPLICABLE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS AND TIMELY MAINTENANCE OF THIS DEVICE MUST BE PROVIDED.

3 / D-101 **TEMPORARY CONSTRUCTION ENTRANCE** NTS

NOTE:
1. HAY BALES (OPTIONAL) MAY BE PLACED DOWN SLOPE (OUTSIDE) OF BERM.



4 / D-101 **DIVERSION BERM** NTS

NOTES

1. SEE C-101 FOR ALL GENERAL NOTES.

A. R. Rubin, Ed.D.
President

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919 545 3066
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REVISIONS		
NO.	DATE	DESCRIPTION
1	08/08/11	PER LQS
2	02/29/12	PER SWS
3	12/03/12	PER SWS
4	08/14/13	PER LWQ, SWS
5	11/21/13	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY:	CHECKED BY:
MAE	GSM

DATE:
JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17069 ENGINEER GARY S. MacCONNELL 11/21/13

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CRAVEN AG SERVICE, INC.

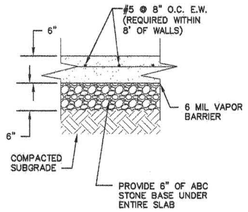
COMPOSTING FACILITY

CRAVEN COUNTY, NC

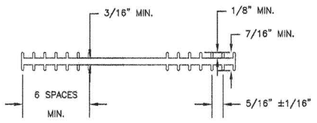
DETAILS

PROJECT NUMBER	DRAWING NUMBER
A45201.00	D-101

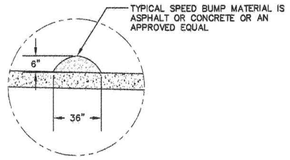
A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY



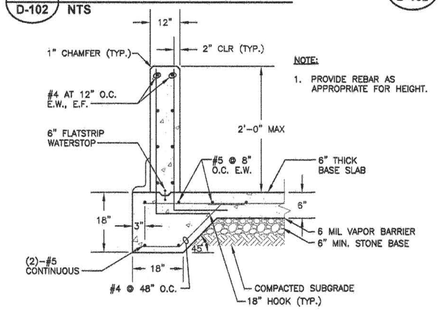
1 D-102 TYPICAL CONCRETE PAD DETAIL
NTS



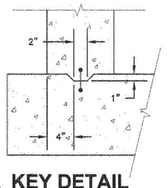
2 D-102 6" FLATSTRIP WATERSTOP
NTS



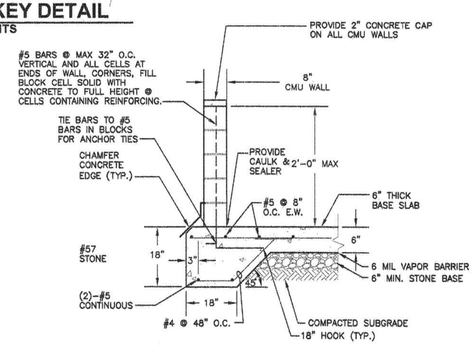
3 D-102 SPEED BUMP DETAIL
NTS



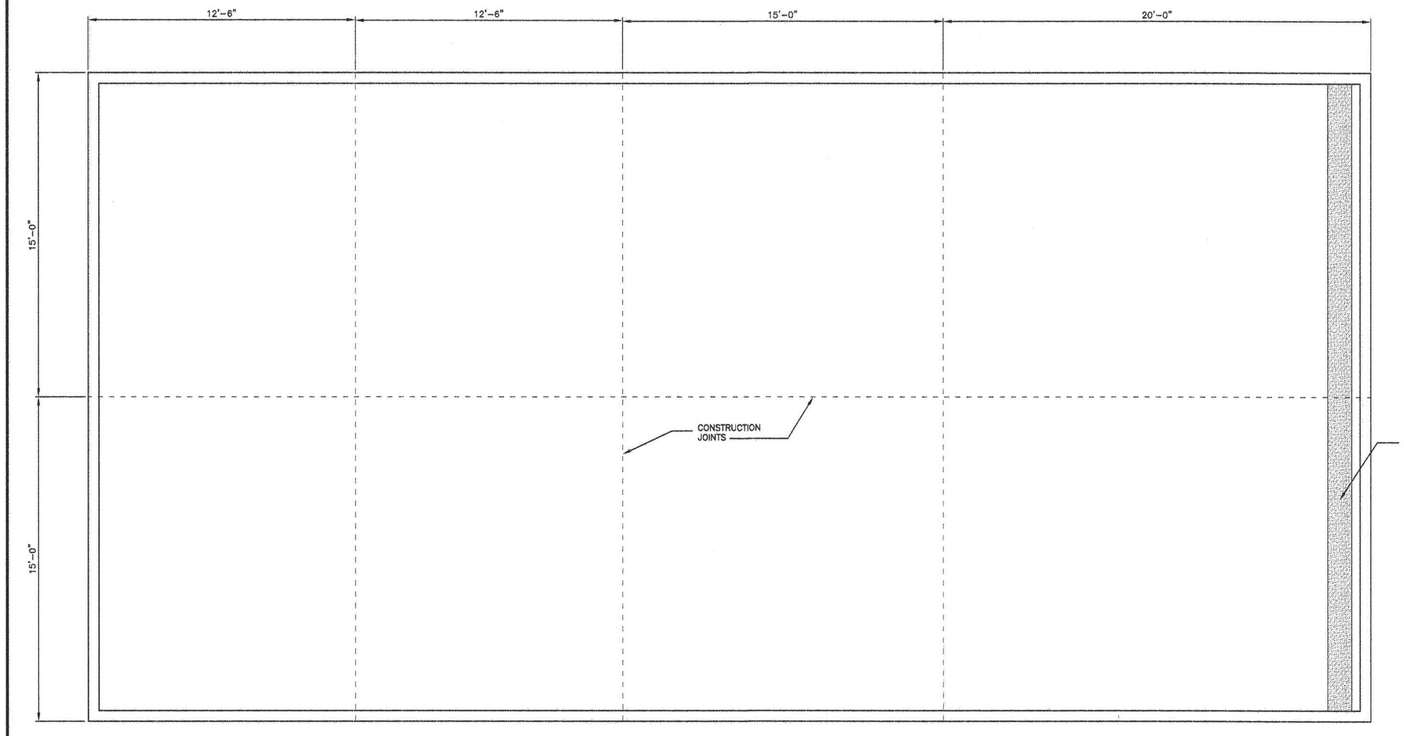
5 D-102 WALL POURED SECTION
NTS



4 D-102 KEY DETAIL
NTS



6 D-102 TYPICAL SLAB AND CMU WALL DETAIL
NTS



7 D-102 MIXING PAD DETAIL
NTS

NOTES

1. SEE C-101 FOR ALL GENERAL NOTES.

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President

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REVISIONS		
NO.	DATE	DESCRIPTION
2	02/29/12	PER SWS
3	12/03/12	PER SWS
6	01/29/14	PER SWS

PROJECT MANAGER:	PROJECT ENGINEER:
GSM	ZLF
DRAWN BY:	CHECKED BY:
MAE	GSM

DATE:
JUNE 28, 2011

NORTH CAROLINA PROFESSIONAL SEAL 17089 ENGINEER Z. L. MacCONNELL
3/21/14

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CRAVEN AG SERVICE, INC.

COMPOSTING FACILITY

CRAVEN COUNTY, NC

MIXING PAD DETAILS

PROJECT NUMBER	DRAWING NUMBER
A45201.00	D-102

A45201.00 – CRAVEN AG SERVICES, INC. – COMPOSTING FACILITY