Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

LETTER OF TRANSMITTAL

TO: NCDENR, Division of Waste Management	DATE: June 26, 2013
Geof Little NCDENR DWM SWS 217 West Jones Street Raleigh, NC 27699	PROJECT NO: 03 / TASK NO: 001C
	Re: Site Suitability Update & Permit to Construct Application Anderson Creek LF C&D Phase III Expansion SWS # 43-03
	TRANSMITTAL NO: 1 / PAGE 1 OF 1

WE ARE SENDING: ☐ Originals ☐ Prints ☐ Shop Drawings ☐ Samples
☐ Specifications ☐ Calculations ☒ Other: See Below

Quantity	Drawing No.	Rev.	Description	Status
2			Hard Copy of the Site Suitability Update & Permit to Construct Application for the ACLF Phase III Expansion	F,G
2			Hard Copy of the Groundwater Monitoring Plan for the ACLF Phase III Expansion	F,G
1			Digital Copy of Site Suitability Update & Permit to Construct Application for the ACLF Phase III Expansion	F,G
1			Digital Copy of Groundwater Monitoring Plan for the ACLF Phase III Expansion	F,G

Issue Status Code: A. Preliminary B. Fabrication Only C. For Information D. Bid
E. Construction F. For Review & Comments G. For Approval H. See Remarks

REMARKS:

Elizabeth,

Attached you will find two copies each of the Site Suitability Update & Permit to Construct Application package and the associated Groundwater Monitoring Plan for the Anderson Creek Landfill Phase III Expansion.

Please feel free to call with any questions or comments.

46 W Washington St., COATS, NC 27521 PHONE:910 897-7070 FAX: 910 897-6767

Signed C. Tyrus Clayton, Jr., PE

P:\003 Harnett County\03001C ACLF C&D Phase 3\ACLF SITING APPLICATION 2013\LOT 13 0626 Werner- Phase III Application Submittal - CTC Jr PN03001C.docx

Anderson Creek Landfill Facility
Construction and Demolition Landfill - Phase III

SITE SUITABILITY UPDATE
&
PERMIT TO CONSTRUCT APPLICATION

NC SWS Permit # 43-03
Harnett County, NC

June 2013

Prepared by:

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Harnett County

North Carolina

Anderson Creek Landfill Facility
Construction and Demolition Landfill - Phase III

SITE SUITABILITY UPDATE
&
PERMIT TO CONSTRUCT APPLICATION

NC SWS Permit # 43-03

June 2013

NORTH CAROLINA PROFESSIONAL SEAL 026909 ENGINEER C. TYRUS CLAYTON, JR.

6-25-2013

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1.0 *INTRODUCTION*

Harnett County wishes to complete a lateral expansion of the existing Construction & Demolition (C&D) landfill at Anderson Creek Landfill, NCSWS permit number 43-03. As defined in 15A NCAC 13B.0101(5) a C&D landfill is a sanitary landfill. Therefore, this report has been prepared for Harnett County in accordance within the application requirements for sanitary landfills as listed in 15A NCAC 13B.0503, 13B.0504, and 13B.0505. The information provided in this report with the attached drawings constitutes the Site Application requirements as listed in 15A NCAC 13B.0535 for a Construction and Demolition (C&D) landfill at the existing Anderson Creek Landfill facility.

The Anderson Creek Landfill facility is located approximately 15 miles southwest of Lillington, North Carolina. This facility contains an active C&D landfill, a MSW Transfer Station, two closed municipal solid waste (MSW) landfill units, a closed land clearing and inert debris landfill (LCID), and a yard waste storage area. The two MSW landfills stopped receiving waste prior to October 9, 1993. The area of the LCID is the location of the existing C&D landfill.

Exhibit 1 – Vicinity Map

1.1 Report & Application Format

This report is organized in a format consistent with the application requirements specified in 15A NCAC 13B.0535 through 13B.0543. Below is a summary of the main components and where the information is presented.

Application	**Prepared in accordance with**
Section 2 - Site Suitability Update	.0535, .0536
Section 3 – Facility Plan	.0537
Section 4 – Engineering Plan	.0539
Section 5- Construction Quality Assurance Plan	.0541
Section 6 – Operation Plan	.0542
Section 7 – Closure/Post Closure	0.543

In order for the permit application to be complete, there are two other components that are required, the Hydrogeological Report and the Groundwater Monitoring Plan. These documents are not included in the report/application that follows and are stand alone related documents.

1.1.1 Hydrogeological Information

Hydrogeologic monitoring has been ongoing from March 1996 until February 2013 to better understand the site geology and hydrology. Based on the results of previous investigations, monitoring well data and the permitted location of the existing C&D landfill, C.T Clayton Sr. P.E. Inc. (CTC), on behalf of Harnett County, has determined that a lateral (piggyback) expansion of the existing landfill could be possible to the north of the existing cells. Protection of the underlying groundwater can be maintained in the proposed expansion area identified on Drawing 3. The Site & Design Hydrogeology Study for the proposed expansion area was submitted previously in March 2013.

1.1.2 Groundwater Monitoring Plan

This plan was prepared in conjunction with this application and is being submitted at the same time for review and approval.

2.0 *SITE SUITABLITIY UPDATE*

A site suitability study was performed in 1996 and again in 2004 as part of the permitting of the currently active C&D landfill, on the facilities entire property. In addition to the information gathered during the site suitability studies of 1996 & 2004, additional work and information has been gathered in the preparation of this permit application to update and expand the information to assure that the proposed C&D Landfill Expansion site would be acceptable per state and local government guidelines.

The following information documents the criteria required for meeting the C&D Landfill site suitability guidelines. The site characterization study consists of the landfill facility and a 2,000 foot perimeter measured from the proposed boundary of the facility. The site consists of approximately 223 acres, of which, approximately 7 acres is currently permitted as the Phase I & II waste units. The proposed Phase III waste unit will be approximately 11 acres. The site location, property boundaries, topography, and characterization features (existing conditions) are identified on Drawing 1 and Drawing 12.

2.1 Local Government Approval

2.1.1 Local Government Approval

The proposed expansion will be located within the Anderson Creek Landfill Facility property. On June 29, 1989 a conditional use permit was issued (due to local government ordinances) to extend the Anderson Creek Landfill. In accordance with 15A NCAC 13B.0504(1)(e)(I), a copy of a letter issued by Harnett County (dated March 11, 2010), found in Appendix I, confirms that the conditional use permit is valid and therefore in compliance of the Harnett County zoning regulations as required by Rule 15A NCAC 13B.0504(1)(e)(ii).

On November 15, 2010 the Harnett County Board of Commissioners passed a resolution to grant prior approval for the issuance of a sanitary landfill permit by the Division of Waste Management to Harnett County Anderson Creek Landfill, as established by Permit 43-03. A copy of this resolution can be found in Appendix I.

2.1.2 Land Use & Zoning

The parcel which the landfill is located and operated in addition to the surrounding properties is zoned residential based upon the County zoning map and GIS system. Exhibit 2 below shows the landfill property and 2,000 ft surrounding area with zoning classification (Residential RA-20R). Although the area is zoned as residential the majority of the area surrounding the landfill is undeveloped and heavily forested. Refer to Exhibit 3 on the following page for aerial photo. The hatched areas in subsequent exhibits throughout the report represent the approximate location of the Phase III footprint.

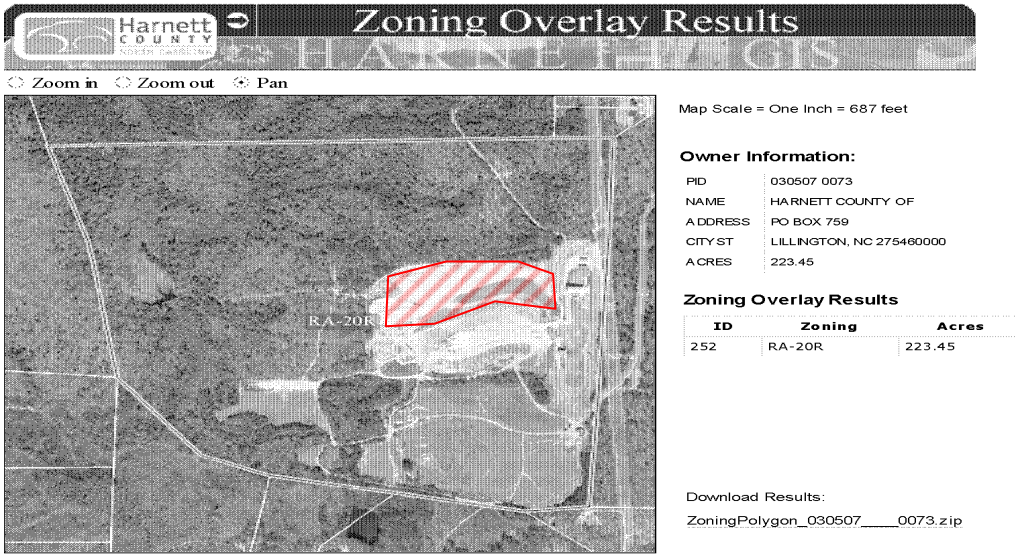


Exhibit 2 – Zoning Map

Exhibit 3 – Aerial Photo

(A more detailed 1” = 400’ scale image is shown on Drawing 12 attached)

2.2 Perimeter study of Landfill Facility

An aerial photograph of the proposed site including the 2,000 foot perimeter is shown on Drawing 12 in the Appendix. Characteristics of the property and the area within the 2,000 foot radius are also described below:

- An aerial photograph obtained from the Harnett County GIS Department website, dated 2010.
- This photograph shows the locations of all residences within the 2,000-ft site characterization perimeter. Currently there are 36 residences within the 2,000-ft facility perimeter of the facility.
- As shown by the aerial photograph, land use is primarily residential, managed forest, or vacant/heavily wooded.
- The nearest School, Western Harnett High School, is located approximately 4 miles north of the landfill facility off Hwy 27.
- The only buildings located inside this area are on the existing Anderson Creek landfill property. The only utilities existing in the study area are overhead electric transmission lines and telephone lines crossing the study area and a County, two-inch PVC, waterline serving the landfill. A dirt road system is in place for landfill operations; however, an asphalt road has been installed from the gate at Poplar Road to the newly constructed transfer station.
- Commercial construction is not allowed in the surrounding area due to zoning restrictions. Therefore no commercial properties are within the 2000-ft facility perimeter.
- Field investigations have verified that a majority of the residences within the 2,000-ft facility perimeter are served by the Harnett County water supply system and are not on private wells.

- There are six residences currently utilizing water supply wells within the 2,000-ft facility perimeter. These are located to the south east of the facility.

- Major water courses include McLeod Creek and Red Hill Branch located along the western portion of the property. There is a pond located to the east of the property; however, it is located beyond the study limits.

2.3 Public Participation

In accordance with 15A NCAC 13B .0536, a public meeting was held on October 8, 2010 for public comment on the proposed expansion at the Anderson Creek Landfill. Documentation of the meeting can be found in the Appendix IV.

2.4 State Nature and Historic Preserve

According to the NCDENR Division of Parks and Recreation, the only state park within Harnett County is Raven Rock State Park. The landfill is located twenty (20) miles southwest of Raven Rock State Park. Therefore, the proposed landfill would not impact any land designated as State Nature and/or Historic Preserve.

2.5 Cultural Resources

As stated in the original application, the North Carolina Department of Cultural Resources verified there are no structures of historical or archaeological importance which would be affected by the proposed project. Correspondence with the National Heritage and SHPO can be found in the Appendix V.

2.6 Endangered and Threatened Species

Based upon previous investigations and permitting, along with communication with the U.S. Fish and Wildlife Service, Ecological Services it appears that the project site does not contain suitable habitat for any federally listed endangered or threatened species known to occur in the area. A current list of federally designated endangered and/or threatened species along with correspondence is included in Appendix VI.

2.7 Site Buffers Requirements

The proposed site for the C&D landfill meets all buffer requirements for property lines, private dwellings, drinking wells and streams. The shortest distance between the proposed C&D landfill and property boundary is greater than 320 feet. There are neither private homes nor streams within 500 feet of the disposal area. The privately owned cemetery, located on the north east corner of the property will continue to have a 100 foot buffer around it. Refer to Drawing 1 and Drawing 12 for locations and buffers.

2.8 Wetlands

Wetland Solutions, LLC was contracted by CTC to perform a wetland delineation for the entire property of the ACLF. It was discovered that a total of approximately 42 acres of wetland exist on the property. As shown on Exhibit 4 – Wetland Delineation Map below, the wetlands are distributed throughout the property but are focused around Red Hill Branch and McLeod Creek. A 50 foot buffer shall be maintained around all wetlands on the property. This investigation has also verified that the proposed Phase III expansion will not encroach or encompass any wetland located on the property. This finding is represented in Drawing 1.

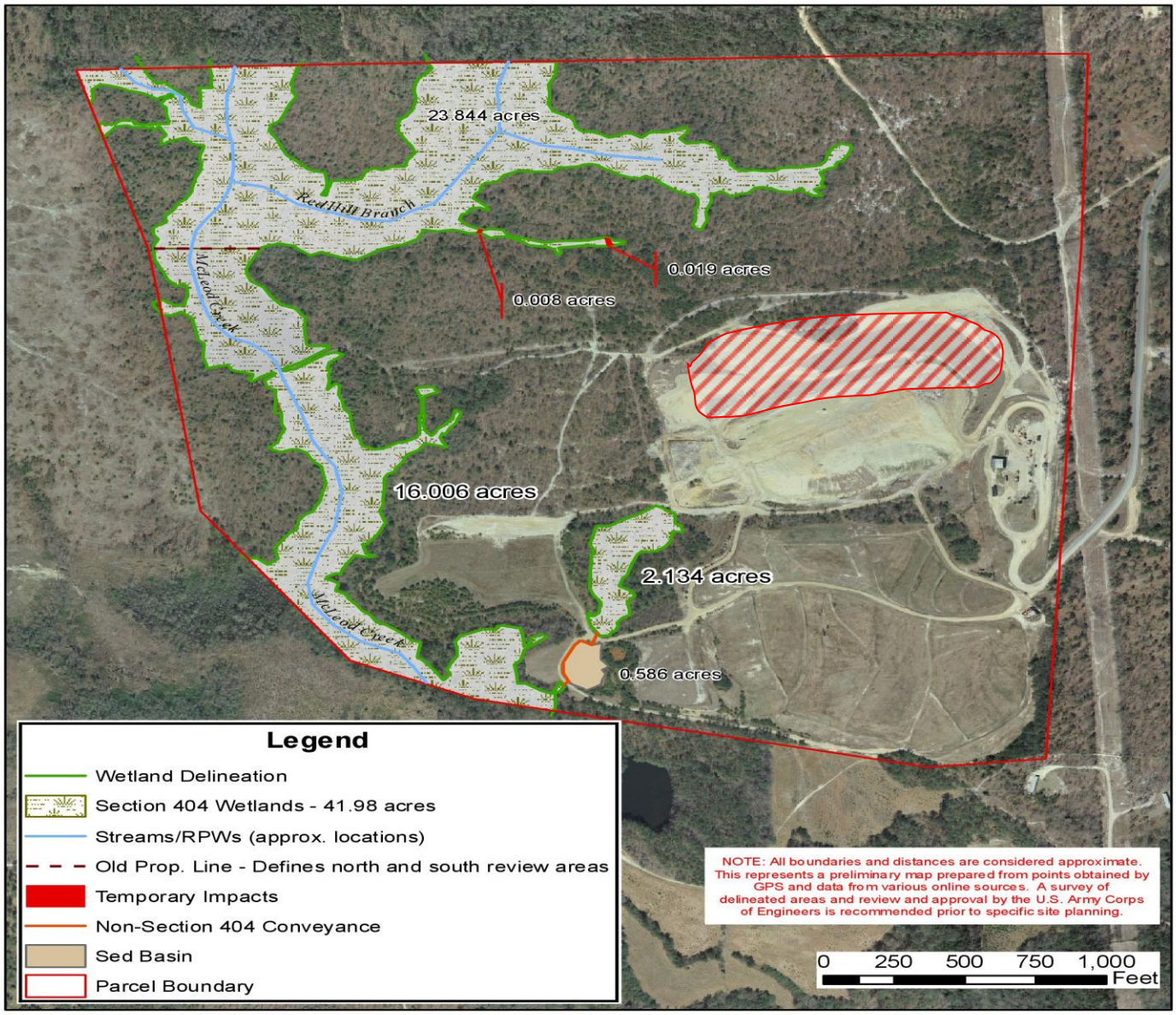


Exhibit 4 – Wetland Delineation Map

2.9 Unstable Area Location Restrictions

Multiple field inspections have been conducted at the ACLF during the years of operation for various projects and sampling events. During those inspections there were no unstable areas identified within the active landfill or in the area of expansion.

Based on boring logs and soil sample analysis, the soils that comprise the substrate of the ACLF property area consist of multiple forms of clay and sandy soils. These soils have a high compaction rating therefore unstable areas are unlikely throughout the property limits. The USDA Web Soil Survey of the area indicates that the expansion area soils consist almost entirely of a high concentration of both clay and Candor Sand. The compaction rate of these soils is equally high and will provide for a stable base for the landfill expansion. Exhibit 5 below illustrates the distribution of the soils throughout the area. Refer to Appendix II for more information on soils in the area of the expansion. In addition, the previously submitted Hydrogeologic Report (March 2013) gives detailed information on the soils underlying the site.

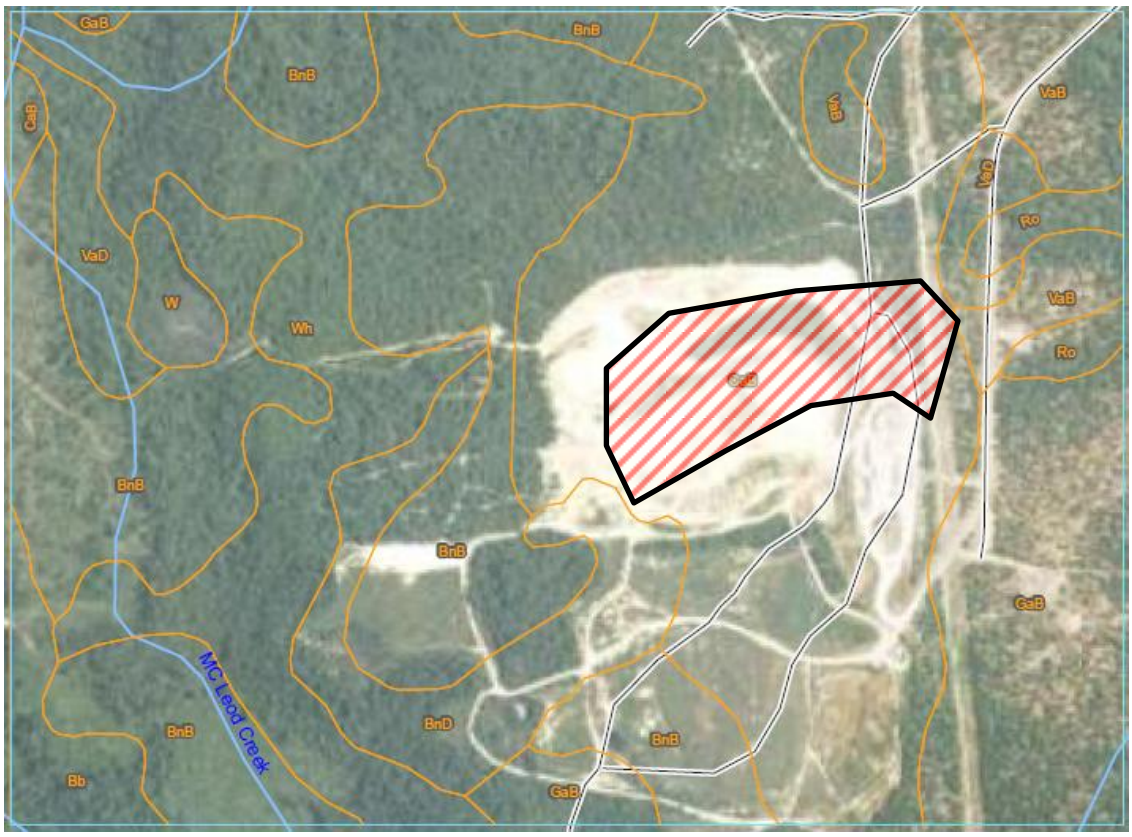
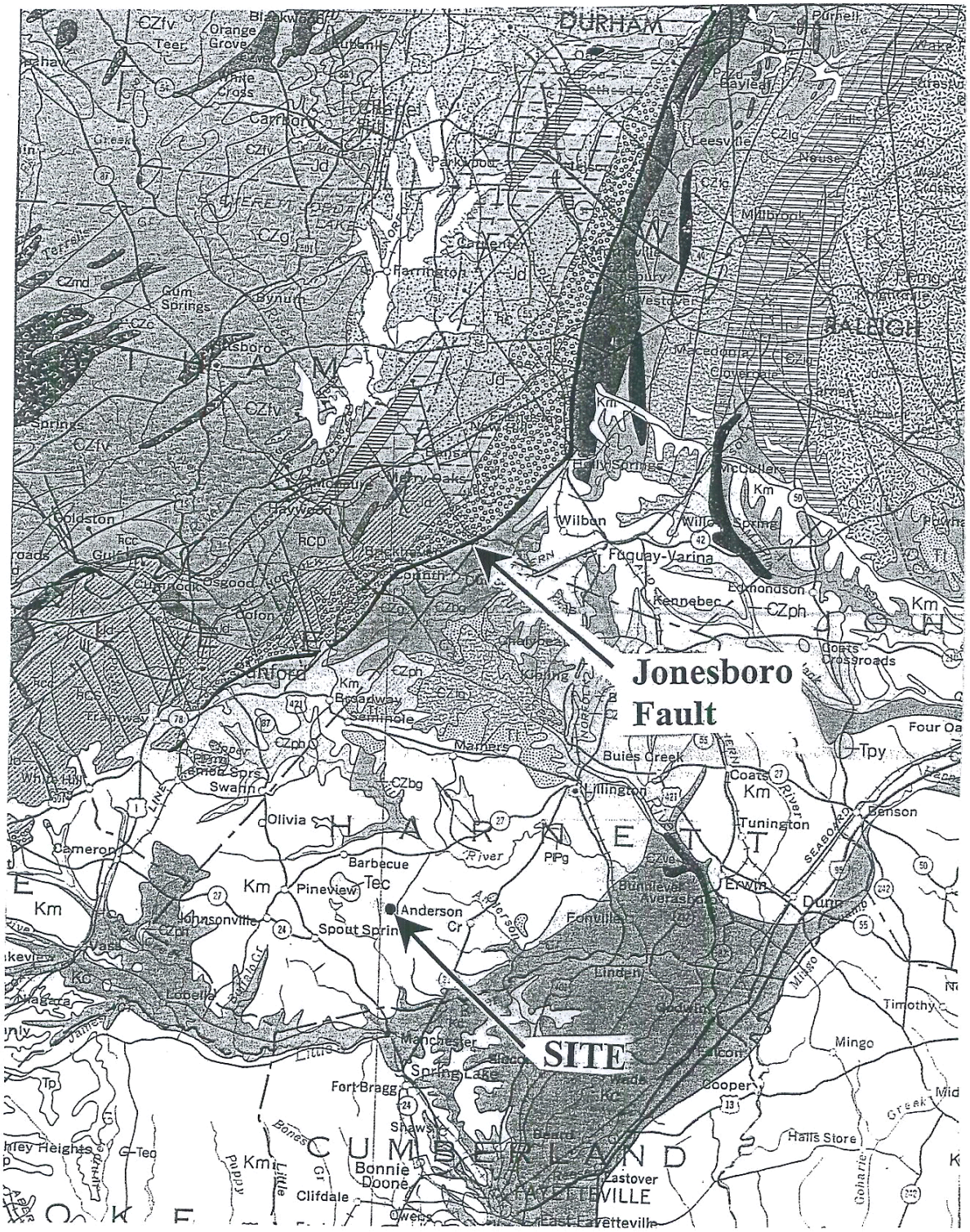


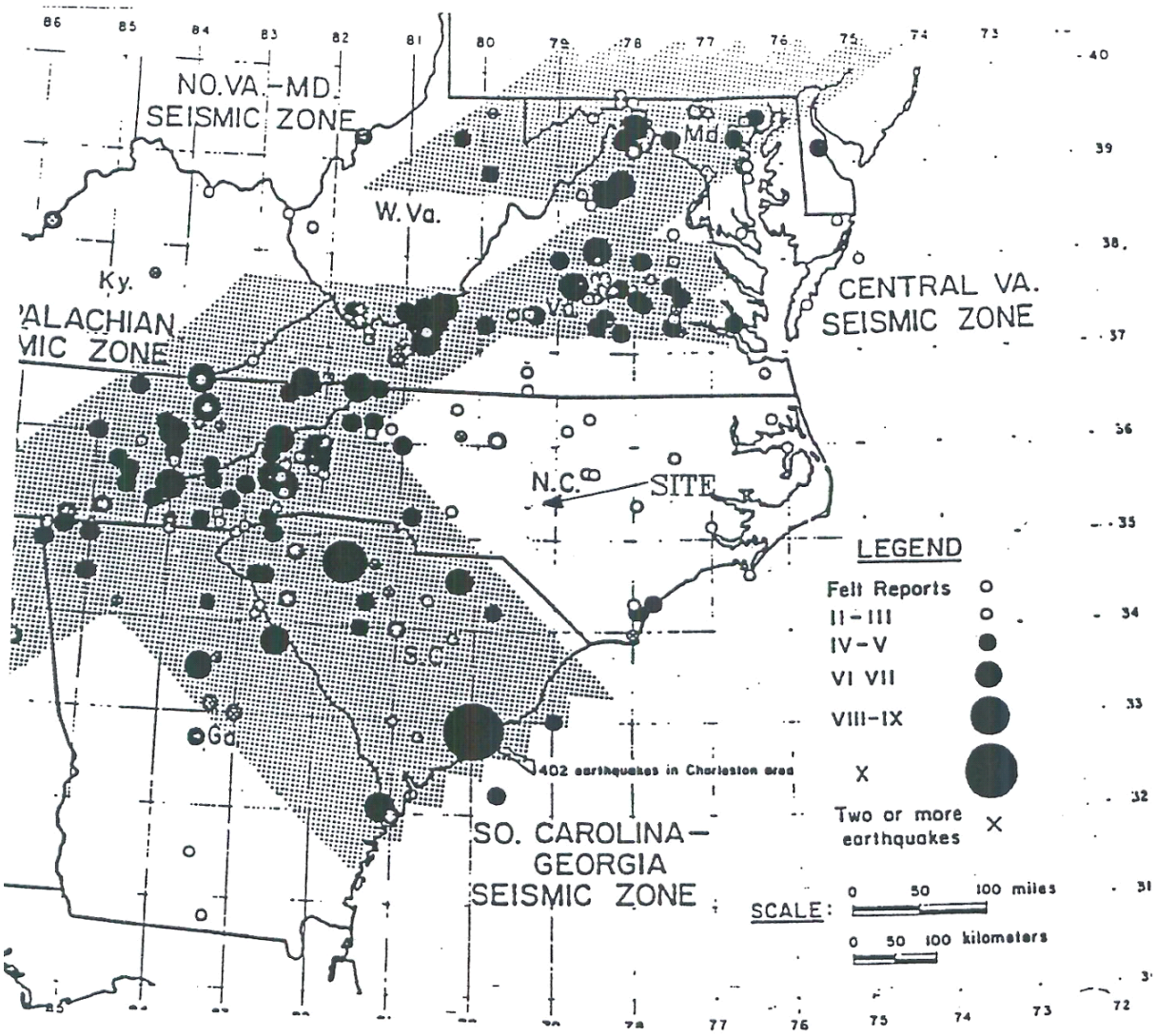
Exhibit 5 – Soils Map

Earthquakes or any subsurface shifting of the soils is unlikely due to the composition of the soils, and Exhibit 6 identifies any faults or subservice instabilities in the area as mentioned above. As indicated in Exhibit 7, the seismicity (dating from 1754 – 1971) for the ACLF property is very little if any. The seismic hazard map shown in Exhibit 8 further supports the unlikelihood of any shifting or seismic activity in the area of the ACLF property. See Exhibits 6, 7 & 8 on the following pages.



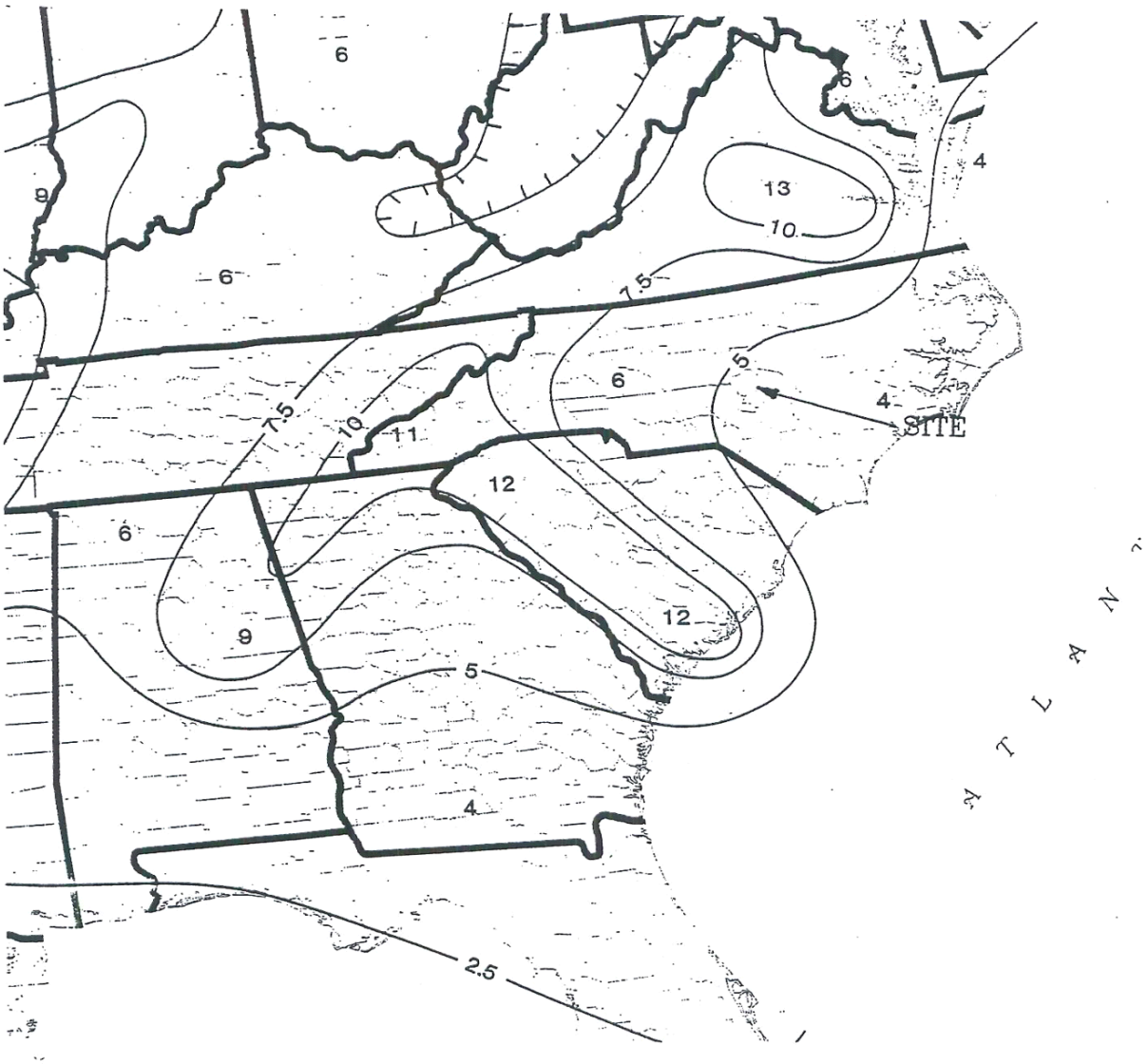
Scale: 1" = ~7 miles CTC PN 3001C	**EXHIBIT 6** **FAULT MAP** **ANDERSON CREEK LANDFILL** **HARNETT COUNTY, NC**	Clayton, Sr., P.E., Inc. Civil & Environmental Engineering

Source: Bollinger, G.W., Seismic Zones, Bull. Of the Seimological Society of America, 1973, pp. 1785-1808



Scale: AS SHOWN CTC PN 3001C	**EXHIBIT 7** **SEISMICITY (1754 - 1971) - S.E. U.S.** **ANDERSON CREEK LANDFILL** **HARNETT COUNTY, NC**	Clayton, Sr., P.E., Inc. Civil & Environmental Engineering

SOURCE: Algermissen, S. T. et al, Probabilistic Earthquake Acceleration for the United States and Puerto Rico: U.S. Geological Survey Map MF2120 (Map C)



HORIZONTAL ACCELERATION (90 PERCENT PROBABILITY OF NOT BEING EXCEEDED IN 250 YEARS)

EXPLANATION

——5—— Contour – Horizontal acceleration expressed as percent of gravity. Some areas show acceleration values without contours. Hachures indicate closed area of lower acceleration. No data available for Hawaii and Puerto Rico.

Scale: NONE CTC PN 3001C	**EXHIBIT 8** **SEISMIC HAZARD MAP** **ANDERSON CREEK LANDFILL** **HARNETT COUNTY, NC**	Clayton, Sr., P.E., Inc. Civil & Environmental Engineering

2.10 Floodplain Restrictions

As defined in 15A NCAC 13B.0536 (4) a C&D landfill must not be constructed in a 100 year floodplain unless a variance is in place. Also, the landfill unit can not adversely impact the proper drainage of a flood should one occur. Floodplain information for the C&D landfill is shown on Exhibit 9 on the following page. This information was taken from the Flood Insurance Rate Map (FIRM), from the North Carolina Floodplain Mapping Program. Based on this map, it does not appear that the proposed C&D landfill will restrict the flow of the 100-year flood. (Refer to Exhibit 10 on the following page)

2.11 Water Supply Watershed Restrictions

A water supply watershed is not located in the area of the ACLF. Per the "North Carolina Water bodies Listed by County" McLeod Creek, from source to Jumping Run Creek, is designated as a class C water body within the Cape Fear River basin. Refer to Appendix III for a copy of the North Carolina Water bodies listed by County.

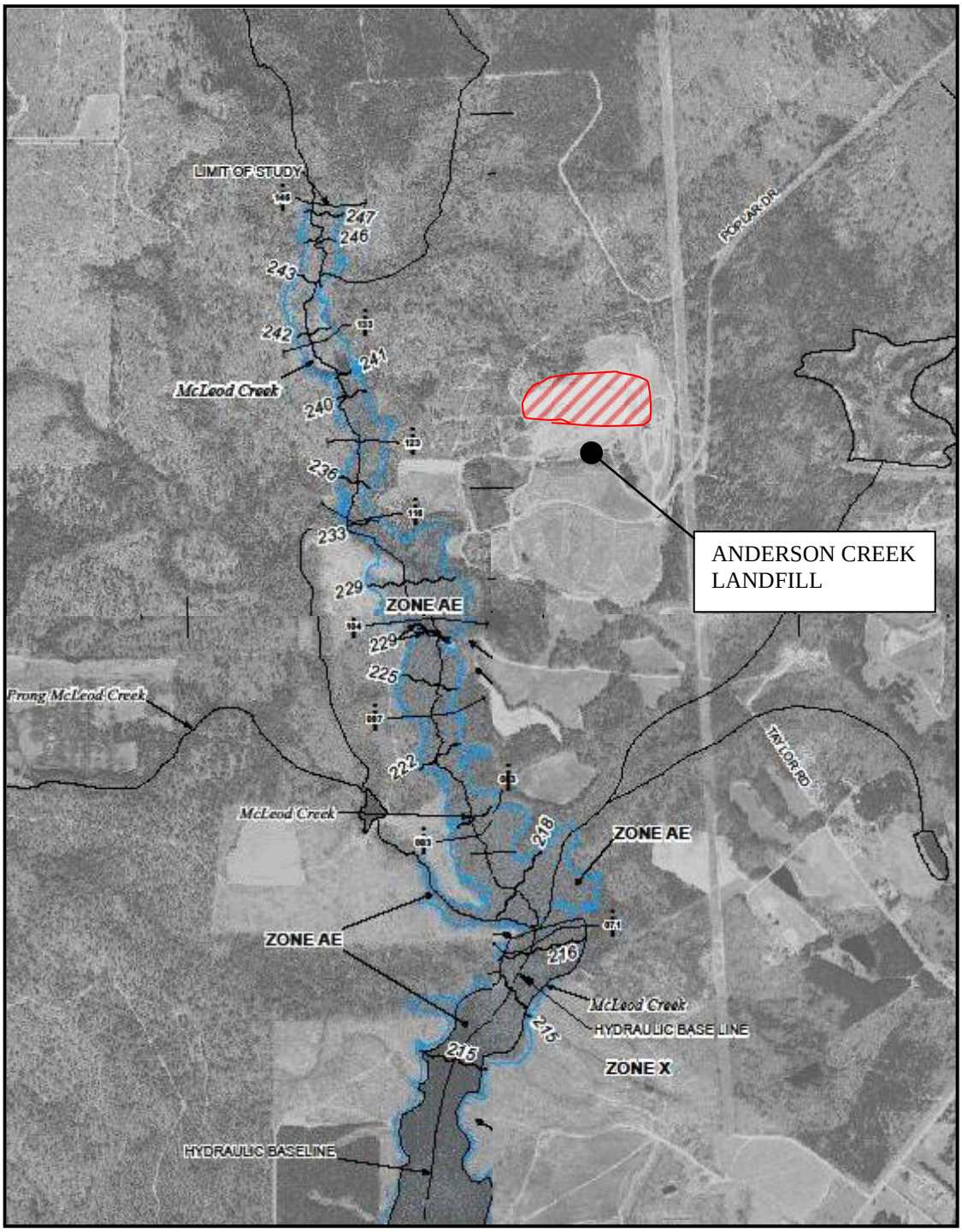


Exhibit 9 – Floodplain Map

3.0 *FACILITY PLAN*

The section below describes the Anderson Creek C&D Facility, specifically the waste stream, sources of waste, overall capacity for Phase III and assumed disposal rates. In addition, the Drawings attached to the end of this report show the following:

- Existing topography
- Property boundaries
- Area limits of the individual landfill units and buffer requirements
- Existing soil borrow areas and stockpile areas
- Physical features that may be considered location restrictions

3.1 Waste Stream Discussion

The following is a discussion of the characteristics of the waste to be received at the facility and the facility specific management plans.

3.1.1 Population and Area to be Served

The existing Anderson Creek Landfill Site serves primarily the section of Harnett County from the Cape Fear River westward to the county border. Because of its location, this landfill does not serve Angier, Buies Creek, Coats, Dunn or Erwin. In an effort to reduce the C&D transported to the Dunn-Erwin landfill, waste haulers and construction contractors have been and will continue to utilize the Anderson Creek facility. Municipal waste is hauled to the transfer station located at the facility and then hauled to the Waste Industry owned facility in Sampson County for proper disposal. Based on the 2011 Census data, Harnett County has a population of 119,256. Based on the area of the County this C&D landfill will serve, the potential service area population is estimated to be 48,000 people.

3.1.2 Type and Source of Waste

This landfill will only take waste designated as construction and demolition waste. Yard waste is also collected at this site but is ground and used for soil amendments, operational cover, or other onsite operational uses.

It is estimated that between 12,500 to 13,750 tons of C&D waste will be disposed of at the Anderson Creek Facility each year during the next 5 years. The total life of the Phase III landfill expansion will be for approximately 25 years and will hold approximately 299,000 tons of waste. The following table shows the historical waste generation numbers on a yearly basis as well as the estimated waste generation during the life of Cell 1 of the ACLF Phase III expansion.

Table 3.1
Yearly Waste Generation

Year	Input Tonnage	Percent Increase from Previous Year	
96-97	1890	--	
97-98	5442	188%	
98-99	9737	79%	
99-00	7872	-19%	
00-01	5928	-25%	
01-02	7690	30%	
02-03	6752	-12%	
03-04	10,538	56%	
04-05	10,695	1%	
05-06	13,237	24%	
06-07	13,168	-1%	
07-08	10,322	-22%	
08-09	9,313	-10%	
09-10	11,162	20%	
10-11	16,204	45%	
11-12	11,506	-29%	
12-13	12,000	4%	**
13-14	12,500	4%	**
14-15	13,000	4%	**
15-16	13,200	2%	**
16-17	13,500	2%	**
17-18	13,750	2%	**

** Estimated based on approximate population growth

3.1.3 Anticipated Equipment Requirements

The following equipment is anticipated, at a minimum, for Construction and Operation of the Anderson Creek C&D Landfill Expansion (Phase III):

- 1 Rubber Tire Front End Loader or Backhoe
- 1 13 Cubic Yard Pan
- 1 TD 20 Bulldozer (or equivalent)
- 1 Trackhoe
- 1 Sheepsfoot Compactor

3.1.4 Method for Waste Segregation Management

Due to the fact that in addition to the C&D landfill at this facility, Harnett County operates a MSW Transfer Station, Convenience Center, and a yard waste storage area at the facility, a method of waste separation must occur. All vehicles transferring waste, upon entering the facility, will be directed by easily visible signs to pass over the existing scales and stop at the scale house. At that time the scale house operator, will visually inspect the load of waste and verbally instruct the customer if the waste must be separated for disposal at the different onsite facilities and where each of the waste types are to be deposited.

The County follows a waste screening program as outlined in the Operations Plan, found in Section 6.

3.2 Landfill Capacity

AutoCAD Civil 3D 2009 software was utilized to design and estimate the gross capacity between the base grade and the top of the proposed final cover grades for the proposed Phase III of the C&D landfill. The gross capacity (waste, weekly, intermediate, and final cover) of Phase III of the C&D landfill is approximately 605,000 cubic yards.

It is estimated that on average during the life Cell 1 of the Phase III expansion, approximately 13,000 tons (21,600 cubic yards) of C&D waste will be disposed of onsite each year. This estimate is based on the tonnage trends that have been experienced at the facility from 2003 to 2011. It was assumed that the waste input would increase approximately 25% over the life of the Phase III C&D landfill expansion due to increase in population. Based upon these estimates, the total life of the proposed C&D landfill expansion, designated Phase III, will be for approximately 25 years and will hold about 330,000 tons of waste. Individual 5-year cell capacity estimates are presented below in Table 3.2.

Table 3.2 ACLF C&D Phase III Cell Sizing and Life Term			
	Waste Volume (Cu. Yds.)	Final Cover Volume (Cu. Yds.)	Approx. Life Term of Subcell
Cell 1	90,000	2,100	0-5 years
Cell 2	95,000	4,000	5-10 years
Cell 3	93,000	10,900	10-15 years
Cell 4	92,000	21,000	15-20 years
Cell 5	101,000	15,500	20-25 years
Estimates based on average of 1% increase in C&D tonnages per year			

Drawing 3 through Drawing 9 show the anticipated phases of construction. According to NCDENR SWS regulations, each permit term is limited to a maximum of 5 years.

Several types of soil will be needed for the construction, operation, and closure of the C&D Landfill Expansion. Grading (cut and fill) will be required to finalize the base grades to the design requirements for Phase III. However, this can be accomplished utilizing existing soils within the footprint and soils from existing permitted borrow areas on the facility. The borrow areas have been analyzed for available quantity and the required quantities of soils for construction, operation and closure have been calculated in AppendixVII. The table below summarizes the findings for Cell 1(an analysis of the entire Phase III is in Appendix VII):

Table 3.3 ACLF C&D Phase III Cell 1 Analysis of Soil Resources			
	Amount Required for Cell 1 (cubic yards)	Amount of Excess to be Stockpile for Weekly Cover (cubic yards)	Amount Available from permitted onsite resources (cubic yards)
Initial Grading & Construction of 24-Inch Impermeable Soil Base	17,300	17,000	17,300
Weekly/Interim Cover	13,000		13,000
18-Inch “Impermeable” Compacted Soil Cap – Closure	1,100		1,100*
18-inch Vegetative Support Layer	1,100		1,100*

** This assumes only closing a portion of Cell 1 that will not be covered by future cells. See Drawing 9 showing sections of Phase III with individual cells.*

Based upon the numbers in Table 3.3 above, one can see that there are more than adequate resources available for the construction, operation and final closure of Phase III, Cell 1. A borrow area was previously permitted to provide the necessary soils for the construction, operation and partial closure of Phase III. This permitted borrow area is shown on Drawing 1 as located in the south west corner of the landfill property. Initial investigation and planning indicate that a minimum of approximately 65,000 cubic yards of material is available for excavation and utilization from the Phase1 and Phase 2 of borrow area. Phase 3 of the borrow area includes pumping to lower the groundwater which will result in additional soil resources over the 65,000 cubic yard estimate.

In the event that additional soil resources, such as low permeable material, will be required for final closure activities of the entire C&D Phase III and not available from within the current permitted borrow area, the portion of the facility north of the proposed C&D Landfill Expansion (Phase III) is available to be permitted as an additional borrow source.

3.3 Summary of Facility Design

The following is a brief discussion of the design of the Anderson Creek C&D Landfill Expansion (Phase III). Even though original assumptions made during the design of the active C&D Landfill (Phase II) estimated the life of Phase II to last until the year 2016, it became apparent that this would not hold true. This was due to economic growth of the surrounding areas and the resulting development. Several commercial modular home manufacturers contributed significant amounts of waste to the existing C&D landfill during the previous years and residential housing construction has continued at a high rate within the service area due to the BRAC (base realignment) being experienced at nearby Fort Bragg. These two main factors were not anticipated during the design of Phase II. Since then, a majority of the modular home manufacturers have ceased operation but the residential construction boom has continued.

Due to the expedited reduction in available air space, the County was prompted to proceed with expansion plans of the existing C&D Landfill at this site. During the development of the existing C&D Landfill, the area immediately adjacent to the North was utilized as a

borrow and stockpile area for Phase II. This area was excavated down in elevation nearer to the base grades of the existing landfill. This offered a prime location for expansion, due to the cost savings in construction and excavation of an expansion site. Also, it would be advantageous operation wise. Incoming waste would not have to be directed to a distant location and County operation activities would not have to be relocated. Also, by "piggybacking" the existing cell, the overall closure area is reduced. In addition, the "piggyback" design allows for the elevation of the ultimate landfill to increase and thus make additional air-space available versus a separate stand-alone expansion. The detailed design is present in the attached Drawings.

3.3.1 Sediment and Erosion Control

The Anderson Creek facility currently has Erosion and Sediment Control plans in place as approved by NCDENR-Land Quality Section for the active C&D landfill and the borrow area. The C&D landfill is under LQS No. Harne-2005-004. The borrow area is under LQS No. Harne-2010-043. (Approval letters can be found in Appendix VIII)

Temporary devices, such as diversion berms will be utilized to minimize the amount of stormwater that comes in contact with waste. In addition, other temporary erosion control measures, such as silt fences, fast germinating vegetation, rock check dams, etc., will be implemented as necessary to reduce the amount of sedimentation and erosion during construction activities.

3.3.2 Landfill Subgrade

Per Rule .0542 (2), each proposed cell will be constructed so that the bottom elevation of the waste is a minimum of four feet above the seasonal high groundwater table as established in the project Hydrogeological Report(submitted separately in March 2013). In addition, on-site soils will be utilized to construct the upper two feet of separation to meet or exceed the required soil classification where the existing subgrade soils do not comply.

3.3.3 Landfill Closure System

A closure and cap system will be designed and constructed when portions of the C&D Landfill are at closure grades to reduce infiltration of stormwater and to inhibit erosion per Rule .0543 (c)(1). The closure/cap system will be a minimum of three feet thick and constructed to:

- Have a permeability less than or equal to the underlying subgrade soils, or the permeability specified in the effective solid waste permit, or a permeability no greater than 1 x 10-5 cm/sec, whichever is less;

- Minimize infiltration though the closed C&D landfill unit by the use of a low permeability barrier constructed of a minimum of 18 inches of earthen material, and;

- Minimize erosion of the cap containment system and protect the low permeable eathern layer from root penetration by use of a minimum of 18 inches of earthen material as an erosion layer and capable of sustaining native plant growth.

A detailed closure plan is described in more detail in Section 7 – Closure and Post Closure Plan.

4.0 *ENGINEERING PLAN*

The purpose of the Engineering Plan is to provide details relative to the design and intended performance of the Anderson Creek C&D Phase III Expansion containment and environmental control systems. This Engineering Plan has been prepared in accordance with the NC Solid Waste Rule 15A NCAC 13B .0539.

4.1 Overview of the Facility Design

4.1.1 Landfill Subgrade

The proposed landfill subgrade for Phase III expansion is designed in conformance with Rule .0540 (2) and will be constructed as follows:

a. The bottom of waste elevation will be a minimum of four feet above the seasonal high groundwater table as established in the previously submitted Hydrogeologic Report (March 2013) and shown on Drawing 9 attached; and

b. In-situ or modified soils making up the upper two feet of separation from waste will consist of the SC, SM, ML, CL, MH, or CH soils per the Unified Soil Classification System.

4.1.2 Final Closure/Cap System

The final closure and cap system has been designed to minimize the amount of stormwater infiltration into the waste unit and to resist erosion forces over time. The final closure/cap system consists of the layers listed from the waste up, to meet the requirements of Rule .0543(c)(1):

a. An 18-inch low permeability soil barrier with a permeability of no greater than 1.0×10^{-5} cm per second (or slower as determined by the approved final closure plan); and

b. An 18-inch vegetative support and erosion layer consisting of earthern material capable of supporting a vigorous stand of native plant growth.

The final grades of the top surface will not be less than 5 percent to prevent ponding as settlement occurs over time.

The Closure side slopes are designed at a maximum slope 4H:1V to encourage stormwater runoff while maintaining a mowable side slope for post closure care. Design Drawings demonstrating this are attached.

4.1.3 Stormwater Control

The C&D Phase III expansion will include the construction of internal cell drainage swales, side slope benches, and pipe installations to convey stormwater to previously constructed sediment basins as shown on Drawings attached. Design calculations for the stormwater control features were calculated based on the 10-year 24-hour storm event and are provided in Appendix IX.

Temporary erosion control devices, such as diversion berms will be utilized to minimize the amount of stormwater that comes in contact with waste. In addition, other temporary erosion control measures, such as silt fences, fast germinating vegetation, rock check dams, etc., will be implemented as necessary to reduce the amount of sedimentation and erosion during construction activities. These devices will remain in use until construction has been completed on an area, the area stabilized and all stormwater is diverted into and controlled by the permanent stormwater control system. Construction will follow the procedures for erosion and sediment control as detailed in the approved Erosion and Sediment Control Plans as approved by NCDENR Division of Land Resources Land Quality Section and per the standards and maintenance procedures included in the North Carolina Erosion and Sediment Control Planning and Design Manual.

4.2 Analysis of the Facility Design

The waste containment unit, the stormwater controls, and the erosion and sedimentation controls have been designed per the current agency and industry standards. Several critical conditions were analyzed and assumptions made during the design of the facility.

4.2.1 Critical Conditions and Assumptions

The following assumptions were made to design the various landfill components:

- The 10-year, 24-hour storm event was assumed in the design of the site drainage structures and sediment removal devices.
- A maximum side slope of 4H:1V was assumed to maintain proper drainage and provide for maintenance
- A top slope of 5% minimum was assumed to account for settlement over time and to still provide for proper drainage and prohibit ponding.
- Individual cells were designed to hold an approximate 5 year waste volume based on population predictions and historical waste tonnages received at the facility.

4.2.2 Technical References

The following references were used for the design and evaluation of the landfill components:

- North Carolina Erosion and Sediment Control Planning and Design Manual
- AutoCAD Civil 3D Design Software
- Hydrogeological Report for the Anderson Creek C&D Phase III Expansion (March 2013)
- SWANA Manager of Landfill Operations Training Manual

4.2.3 Location Restrictions

The design of the C&D Phase III expansion was located in compliance with the restrictions listed in Rule .0536(c)(4) through (10). These restrictions were met and documentation is discussed in Section 3- Facility Plan of this report.

4.2.4 Description of Materials and Construction Practices

A detailed description of the materials and construction practices to be utilized in each component of the landfill design is provided in detail in the Construction Quality Assurance (CQA) Plan, as found in Section 5 of this report.

4.2.5 Design Hydrogeological Report

A detailed Hydrogeological Report was prepared and submitted previously in March 2013 for the Anderson Creek C&D Phase III Expansion. The design of this expansion is based upon the data and information presented in that report.

4.2.6 Engineering Drawings

A complete set of Engineering Drawings are attached to the end of this report in the Section labeled Drawings.

5.0 *CONSTRUCTION QUALITY ASSURANCE PLAN*

5.1 Introduction

The Construction Quality Assurance (CQA) Plan is intended to fulfill Rule .0541, which requires that a CQA Plan be developed to ensure that the design materials meet the design specifications and the construction and certification requirements set forth in Rule .0540 for the closure of C&D landfills. This plan describes the observations and tests that will be used before, during, and upon completion of closure construction to ensure that the construction materials and workmanship meet the design specifications and the requirements set forth in Rule .0543.

5.1.1 Overview of Manual

Per .0541(b) (1) through (5) this CQA Plan addresses:

1. Responsibilities and authorities: The plan establishes responsibilities and authorities for the construction management organization. This includes a pre-construction meeting conducted prior to beginning of construction activities. The meeting shall include a discussion of the construction management organization, respective duties during construction, and periodic reporting requirements for tests results and construction activities. This information is presented in subsequent sections.

2. Inspection activities: A description of all field observations, tests, and equipment that will be used to ensure that the construction meets or exceeds all design criteria established in accordance with Rule .0543 (c) is presented in within.

3. Sampling strategies: A description of all sampling protocols, sample size, methods for determining sample locations and frequency of sampling is presented within.

4. Documentation: Reporting requirements for CQA activities are described in detail in Section 5.5 of the CQA plan.

5. Progress meetings: A plan will be prepared for holding periodic progress meetings. The proceedings of the meetings will be documented. Meeting information is included in Section 5.1of the CQA Plan.

5.1.2 Quality Assurance and Quality Control

In the context of this CQA Plan, quality assurance and quality control are defined as follows:

- Quality Assurance: A program of tests and observations, executed by a party independent of the contractor, performed in order to confirm that completed work meets contractual and regulatory requirements and will perform satisfactory in service.

- Quality Control: Those actions performed by the contractor or an agent of the contractor which provide a means to monitor the quality of the work being performed.

5.1.3 CQA Parties

The parties discussed in this section are associated with the ownership, design, construction, and quality assurance of the landfill liner construction. The definitions, responsibilities, and qualifications of these parties are outlined in the following subsections.

5.1.3.1. Contractor

The Contractor is the company with which the Owner has entered into agreement to construct the project. The responsibilities and qualifications of the Contractor are as follows:

- Responsibilities: The Contractor is ultimately responsible for meeting the requirements of the Contract Documents and the successful completion of the landfill liner construction. Some of the Contractor's specific responsibilities include (but are not limited to): providing qualified personnel to perform quality control, providing submittals for the various materials as required by the specifications, scheduling and coordinating the work with suppliers and subcontractors, providing a representative at all times during construction activity, provide surveying services, furnish

progress and record drawings, attending progress meetings, and notifying the Engineer of design discrepancies.

- The Contractor shall be experienced in all aspects of the work required to successfully construct the project. The Contractor shall be registered in the State of North Carolina and shall provide references from previous projects.
- The Contractor shall appoint a Contractor's Representative (CR). The CR is a qualified individual assigned to represent the Contractor onsite during construction activities.
- The CR is responsible for: communication with the Engineer and Owner, coordinating and supervising his crew, subcontractors, and quality control personnel, ensuring that construction activities are conducted in accordance with the plans and specifications, immediately notifying the Engineer's Field Representative (EFR) of any discrepancies between the plans and specifications and the field conditions, attending all meetings held on the project, and keeping a daily log of all construction activities onsite.
- The CR shall be an individual who demonstrates the capability to direct all tasks required for landfill liner construction. The CR shall demonstrate experience similar to the nature of the project and be knowledgeable of all aspects of the work.

5.1.3.2. Engineer

The Engineer is the party with which the Owner has entered into agreement with to provide project design and construction oversight. The responsibilities and qualifications of the Engineer are as follows:

- Responsibilities: The Engineer is responsible for performing the engineering design and preparing the associated construction drawings and specifications. The Engineer is responsible for approving all design and specification changes, clarifying the design, reviewing and approving shop drawings, and other tasks as required during construction. The Engineer conducts the pre-construction meeting and progress meetings outlined in this plan. The Engineer will certify that the construction was completed in accordance with the requirements of Rule .0543 (c) (7), and acceptable engineering practices.

- The Engineer shall be a professional engineer registered by the State of North Carolina. The Engineer shall have a working knowledge of landfill liner design and construction and all applicable regulatory requirements.

- The Engineer shall appoint an Engineer's Field Representative (EFR). The EFR is a qualified individual assigned by the Engineer to observe and document activities requiring quality assurance.

- The EFR is responsible for observing and documenting activities related to the quality assurance of the construction of the landfill liner/ cap. The EFR is responsible for implementation of this CQA Plan and coordination of the Quality Assurance Laboratory (QAL).

  The specific duties of the EFR are as follows:
  a. Review all construction drawings and specifications.
  b. Review other site-specific documentation, including permits.
  c. Review all changes to design drawings and specifications as issued by the Engineer.
  d. Act as the Owner's representative.
  e. Attend all quality assurance related meetings, e.g., resolution, pre-construction, progress, trouble-shooting, etc.
  f. Review Contractor's Daily Reports, logs, and photographs.
  g. Reports to the Engineer, and log any relevant observations.
  h. Review the results of laboratory testing.
  i. Report any unapproved deviations from the CQA Plan.
  j. Prepare the final certification report.
- The EFR shall be experienced with the implementation and preparation of quality assurance documentation including: quality assurance forms, reports, certifications, and manuals; and shall have prior experience with soil liner installation.

5.1.3.3. Quality Assurance Laboratory

The Quality Assurance Laboratory (QAL) is a firm, independent from the Contractor and Owner, responsible for conducting tests on samples of materials for the landfill liner construction. The responsibilities, qualifications, and submittals of the QAL are as follows:

- Responsibilities: The QAL shall be responsible for conducting the appropriate laboratory tests as directed by the Engineer and in accordance with the test methods outlined in this CQA Plan

- Qualifications: The QAL shall have experience in soil testing and be familiar with American Society for Testing and Materials (ASTM).

- The QAL shall deliver all test results to the Engineer in written form. Written test results shall be in an easily readable format and include references to the standard test method used.

5.1.4 CQA Meetings

Communication is essential to achieve a high level of quality during construction and to assure the final product that meets all project requirements. This section discusses and establishes the main forms of communication which are the pre-construction meeting and the progress meetings.

5.1.4.1. Pre-Construction Meeting

A pre-construction meeting shall be held before construction activity begins. The meeting shall be conducted by the Engineer and attended by the Owner, EFR, Contractor, and CR. The Solid Waste Section will be notified of this meeting and may attend as SWS deems necessary.

Per Rule .0541 (b) (1), the meeting will include a discussion of the construction management organization, the responsibilities and duties of each party during construction, and periodic reporting requirements for testing results and construction activities.

5.1.4.2. Progress Meeting

Per Rule .0541 (b) (5) progress meetings shall be conducted by the Engineer and attended by the Owner, EFR, and CR. Progress meetings shall be held as deemed necessary, but at a minimum frequency of one month. These meetings shall discuss current progress, planned activities to be accomplished prior to the next progress meeting, issues requiring resolution, and any new business or revisions to the work. The EFR shall log any problems, decisions, or questions arising at this meeting. If any matter remains unresolved at the end of this meeting, the EFR will be responsible for obtaining a resolution of the matter and for forwarding communication of the decision to the appropriate parties.

5.1.5 Units

In this CQA Plan, all properties and dimensions are expressed in U.S. units, with "equivalent" SI units in parentheses (). It should be noted that the conversion is typically only accurate within ten percent (10%). In case of conflict, the U.S. units shall be deemed to govern.

5.1.6 Referneces

The CQA Plan includes references to test procedures of the American Society for Testing Materials (ASTM).

5.2 Earthwork CQA

5.2.1 Subgrade Preparation

The Contractor shall be responsible for preparing the subgrade prior to placement of the liner/cap system and is responsible for constructing the subgrade with in accordance with the technical specifications.

Before beginning placement of the low permeability soil liner/cap:

1. The EFR shall document that a licensed land surveyor has verified that all grades and elevations are consistent with the SWS approved engineering plans.
2. The EFR shall document that the he/she has visually inspected the subgrade for project conformance.
3. The EFR shall conduct a proof-roll of the subgrade using equipment and procedures approved by the Engineer.
4. The EFR shall document that the subgrade has been tested for conformance to the construction specifications at the following minimum frequencies.

TABLE 5.1 - QA Testing Frequencies for Subgrade

Construction Testing		
Test	**ASTM Method**	**Quantity**
Field Density	D2922, D1556, D2167	1/10,000 FT^2/Lift
Field Moisture	D2216, D3017, D4643	1/10,000 FT^2/Lift

5.3 SOIL LINER CQA

5.3.1 LOW PERMEABILITY SOIL LINER

The materials, construction and certification requirements in this Section are intended to comply with Rule .0543 (c) (1) (A) and (B).

5.3.1.1. MATERIALS

1. Low permeability soil liner materials shall conform to the following properties:
   - Passing the 1-inch Sieve ASTM D422 100%
   - Passing the 200 Sieve ASTM D1140 45% minimum*
   - Liquid Limit ASTM D4318 30 minimum*
   - Plasticity Index ASTM D4318 7 minimum*
   - Soil Classification ASTM D2488 SC,CH,CL,CH,ML,MH
   - Hydraulic Conductivity ASTM D5084 $1.0x10^{-5}$ cm/s max.
   - Organic Content ASTM D2974 5% maximum

     ** The Engineer may modify these conformance test properties based on the results of initial conformance testing; provide modification of the results does not compromise the hydraulic conductivity or internal friction angle test results*

2. A soil-bentonite mixture can be used for the low permeability soil liner provided it achieves the specified hydraulic conductivity as presented above. Both onsite and offsite soils may be used for soil-bentonite mix. Soil to be used for the soil-bentonite mix shall conform to the following properties:
   - Passing the 1-inch Sieve ASTM D422 100%
   - Soil Classification ASTM D2488 SC,SM.CL.CH.ML.MH
   - Soils with organic materials of any kind, particularly leaves and roots, shall not be used in the mixture.

3. The soil-bentonite mixture shall consist of an acceptable soil described above; containing a sealant consisting of free flowing, high swelling sodium-based Wyoming type bentonite. The bentonite sealant shall conform to all items of this specification with all supporting test data certified, submitted to, and approved by the Engineer, prior to bid as follows:
   - The bentonite shall be covered by the Manufacturer's warranty against defects in the material and workmanship and shall have a useful life of 30 years under normal weathering and normal use conditions.

4. The low permeability soil liner or soil-bentonite mixture material used for construction shall be uniform in character, and after compaction, shall have an in-place saturated hydraulic conductivity of $1.0x10^{-5}$ cm/s or less.

5. The Contractor shall use adequate construction quality control (CQC) to verify the conformance of materials according to this section. The Contractor shall submit to the Engineer, within 30 days of the effective date of the agreement, representative samples from the soil source(s). In the case that the submitted samples fail to

conform to the required criteria, the contractor may locate another source, and upon approval of that source by the Engineer, submit samples from the new source for conformance testing at the cost of the Contractor.

6. If the Contractor plans to use any blending of soils as low permeability soil liner material, the Contractor shall submit the blended soil for the Engineer's approval in accordance with the requirements.

5.3.1.2. Conformance Testing

1. Initial conformance testing shall be permformed by the quality assurance laboratory (QAL) on samples from the soil source to assure compliance with the Specifications. The samples will be obtained from multiple test pits to be dug by the Contractor under the direction of the QAL. The following tests shall be performed on the samples.

TABLE 5.2 - QA Testing Frequencies and Criteria for Low Permeability Soil

Preconstruction Qualification		
Test	**ASTM Method**	**Quantity**
Moisture Content	D2216	1/1,000 YD^3
Grain Size	D422 or D1140	1/5,000 YD^3
Atterberg Limits	D4318	1/5,000 YD^3
Laboratory Compaction	D698 - Standard	1/5,000 YD^3
Permeability	D5084	1/5,000 YD^3
***Preconstruction test samples shall be taken from the borrow source and or low permeability soil stockpiled prior to construction.**		
Construction Testing		
Test	**ASTM Method**	**Quantity**
Field Density	D2922, D1556, D2167	1/10,000 FT^2/Lift
Field Moisture	D2216, D3017, D4643	1/10,000 FT^2/Lift
Permeability	D5084	1/40,000 FT^2/Lift
Atterberg Limits	D4318	1/5,000 YD^3
Grain Size	D422 or D1140	1/5,000 YD^3
Testing Criteria		
Classification	CL, CH, ML, or MH	
Maximum Particle Size		1/2-inch diameter

2. If a nuclear gauge is used as the primary method for construction testing of the low permeability soil liner, the test data shall be verified by alternate methods at least once for every 25 tests performed

3. Any modifications made to these testing frequencies will require prior approval from the Division of Solid Waste.

4. For natural low permeability soil sources, the QAL shall determine an acceptable zone of moisture contents, dry unit weights and compaction for which hydraulic conductivities are less than or equal to 1.0x10-5 cm/s by performing the following testing and analysis procedures:

- Using the samples extracted from the proposed source, perform Modified and Standard Proctor compaction tests to develop at least two moisture-density curves. For each of the compaction tests use up to five specimens at incremental moisture contents to develop a compaction curve showing dry density for each molding water content.
- Permeate each compacted specimen to determine its hydraulic conductivity in accordance with ASTM D5084.
- On the graph of dry density vs. moisture content, identify the samples which have a hydraulic conductivities less than or equal to 1x10-5 cm/s.
- Draw an "acceptable zone" of water content and dry density around the passing samples.
- Based on pertinent factors such as constructability, shrink/swell potential, dessication cracks, and consolidation, the QAL shall modify the acceptable zone as required.

5. For soil-bentonite mixes, prior to constructing the test pad, the QAL shall determine an acceptable zone of moisture contents and dry unit weights in which the hydraulic conductivity is less than or equal to 1x10-5 cm/s by following the procedures described above (with the exception that samples will be extracted from the pug mill operation). The samples will be taken from a soil-bentonite mix once the bentonite percentage for production has been firmly established. The Contractor shall be responsible for performing preliminary hydraulic conductivity tests on initial mix ratios (based on manufacturer's recommendation and adjusted based on contractor's experience) in order to establish the percentage of bentonite to be used in production.

6. Results of the tests will be submitted to the Engineer within 24 hours of test completion. The Engineer reserves the right to reject material based on the results of the conformance tests.

5.3.2 Construction

5.3.2.1. Site Surveying Requirements

Land surveying services shall be retained by the Contractor. The Land Surveyor shall be licensed in the state of North Carolina and should have a minimum prior experience of surveying 5 landfills. Survey services are required for initial site layout and final grade verification. All grade surveying shall be conducted on a 50-foot grid to be approved by

the Engineer. The same grid points shall be used for each subsequent lift of material. Certification surveys shall include the following items:

- Initial site layout
- Topographic survey of base grades
- Topographic survey of top of clay liner/cap
- Topographic survey of top of vegetative supportive soil cover (for cap only).

5.3.2.2. Test Pad

1. A test pad of a dimension of no less than 40-ft by 60-ft and 18 inch thickness shall be constructed onsite using the same equipment, processing and installation procedures that will be used during full scale liner construction. The low permeability soil or the soil-bentonite mixture to be used for the test pad shall be the same material that the Contractor proposes to use for construction of the base liner. If approved by the Engineer, the test pad may be installed within the liner/cap limits and incorporated in the work, provided the pad passes all testing requirements.

2. The construction of the pad shall be directed by the QCL. The QCL shall use the acceptable zone established by the QAL to set moisture contents and percent compaction. The QCL may perform tests as needed to assist in the construction of the test pad. However, only the results of the QAL's test will be recognized for determining the performance of the pad.

3. For each lift, the QAL shall perform testing of the moisture content and density at a minimum of three test locations. The QAL shall record moisture content, compaction procedures, and density throughout the construction of the test pad. Two Shelby Tube samples shall be obtained per lift by the QAL. One tube will be used to perform a hydraulic conductivity test. The second tube will be kept as a backup in case of damage to the first sample of dispute of test results.

4. For soil-bentonite mixtures, the bentonite content used for the test pad shall be set by the Contractor and written notification of the mix ratio will be submitted to the Engineer prior to constructing the test pad.

5. One triaxial type hydraulic conductivity test (ASTM D 5084) will be performed on each test pad per lift.

6. The cap thickness shall be determined from four locations selected by the QAL per test pad using a method that is approved by the Engineer, which will be determined prior to test pad construction.

5.3.2.3. Soil Liner Installation

1. The QCL shall supervise the soil liner installation. Work shall not be performed by the Contractor without the QCL onsite. The QCL shall perform field tests (ie. moisture content, densities, etc.) as required to ensure proper installation. The QAL shall perform tests as described in Section 5.3.1.2 to determine acceptance of the soil liner.

2. The placement moisture content shall be within the acceptable zone of moisture content as determined by the QAL during the conformance testing of the low permeability soil described in Section 5.3.1.1. The acceptable zone may be modified by the Engineer based on results and observations of the test pad.

3. Water for Compaction –

   - The Contractor shall provide water as required to guarantee constructability and proper condition of the in-place and stockpiled material.
   - Prior to installing the soil liner, the Contractor shall inspect the subgrade to ensure that it has been sufficiently wetted to prevent excessive absorption of moisture from the installed material.
   - Should the material be stockpiled for any length of time the Contractor shall slope and compact the stockpile to prevent erosion and oversaturation.
   - Should the material become oversaturated, the Contractor shall spread and dry the material as needed to adjust the moisture to the proper level.

4. The materials shall be uniformly compacted to no less than the minimum dry density of the acceptable zone that corresponds to the placement moisture content. The acceptable zone shall be as specified by the QAL in accordance with the procedures outlined in Section 5.3.1.2. This minimum density shall be uniformly obtained throughout the entire thickness of 6 inches per lift to assure achievement of the specified compaction in the lower part of the cap. However, the initial lift may be placed at 8 inches to prevent mixing with the existing base/operational cover during compaction.

5. Soil liner material which has been contaminated with clusters of rock or gravel, sand lenses, organic debris or other deleterious material shall be removed and replaced with uncontaminated low permeability soil materials.

6. The Contractor shall use a pugmill to produce the soil-bentonite mix at the required moisture content to achieve an in-place compacted minimum 18 inch thick layer of material with a hydraulic conductivity less than or equal 1x10-5 cm/s. Based on the soil material to be used, the Engineer may direct the

Contractor to screen the soils prior to placement in the pugmill. The pugmill must be approved by the Engineer prior to its arrival on site.

7. No low permeability soil liner material shall be placed, spread, or compacted while the existing operational cover or soil liner materials is frozen/thawed, saturated, desiccated, nor during unfavorable weather conditions or periods of precipitation. The cap surface must be made smooth and free from ruts or indentations at the end of any working day when significant precipitation is forecast and/or at the completion of the compaction operations in that area in order to prevent saturation of the soil liner material. Any regrading due to the above conditions or final preparation should be retested at those locations for liner thickness prior to placement of the next lift or erosion control layer. Thickness measurements should be performed as indicated in Section 5.3.3.

8. Work shall be limited to an area where a lift can be completed in one working day and shall continue in that area until three lifts have been placed. Completion of an area shall be defined as the construction of a liner of a minimum 18 inches that is homogenously installed at a moisture content and density within the acceptable zone, free rocks larger than 1 inch diameter, and possessing a smooth rolled surface.

9. If a lift is not to receive a subsequent lift within 16 hours of its completion, the lift shall be sealed with a smooth wheel compactor at the end of each day's work to protect the material from desiccation. Should desiccation cracks develop, soil liner material shall be scarified, disked, rewetted, rehomogenized and recompacted in accordance with the specifications to the depth of any such cracks or as instructed by the Engineer. If desiccation extends below half of the lift thickness, the lift shall be removed and replaced.

10. During construction, the Contractor shall make all necessary provisions to deal with inclement weather conditions. The Contractor shall be fully responsible for control of storm water during installation of the liner system and for moisture control and protection of the low permeability soil liner.

11. After final grading and smooth rolling is completed, the compacted soil liner thickness shall not be less than 18 inches. The surface is to be surveyed and compared to base layer elevations. Areas not meeting the thickness requirements shall be augmented with additional low permeability soil material at the expense of the Contractor. Any additional testing or CQA services associated with corrective action for achieving the 18 inch cap thickness requirements will be at the cost of the Contractor. The added material shall be worked into the in-place liner to ensure homogeneity and proper bonding. This shall be done by

scarification of the surface prior to addition of the new material. As a minimum, the top 4 inches of the soil liner shall be wetted, kneaded, compacted and reworked with the additional material to obtain the required thickness.

5.3.3 Certification

5.3.3.1. Field Quality Control

1. The QAL shall conduct designated tests at frequencies outlined in Table 5.2.
2. All holes made as a result of depth measurements, hydraulic conductivity samples, density tests, grade stakes or other means shall be completely filled by the Contractor with bentonite or soil-bentonite mix, as instructed by the Engineer.
3. The Engineer shall have the authority to request additional hydraulic conductivity tests in areas that, in the Engineer's judgment, may be suspect or deficient. Hydraulic conductivity tests shall be conducted in accordance with ASTM D5084. For each sample tested, one back-up sample will be extracted in the proximity of the sample location. These samples will be held in a controlled environment at the QAL laboratory as a precautionary measure. If adequate demonstration is presented that a sample was not representative of the low permeability soil liner or that an error in testing occurred, the backup samples will be tested and the original test will be disregarded.
4. Any sample or area tested shall be rejected, removed and replaced if it does not meet the requirements of the technical specifications. Reconstructed areas shall have feathered, overlapping edges that tie into adjacent liner areas.
5. Grade stakes for soil liner construction shall be numbered by the Contractor and located on an inventory map. The inventory map shall be submitted to the Engineer. Upon completion of an area, the removed stakes will be compared to the inventory map to ensure that none were left in place.
6. The Contractor shall submit a survey plan with final elevation of top of low permeability soil liner for Engineer's approval.

5.3.3.2. Corrective Action

If soil has been desiccated to a depth less than or equal to the thickness of a single lift, the desiccated lift may be disked, moistened, and recompacted. However, disking may produce large, hard clods that will require pulverization. Also, it should be recognized that if the soil is wetted, time must be allowed for water to be absorbed into the clods and hydration to take place uniformly. For this reason it may be

necessary to remove the desiccated soil from the construction area, process the lift in a separate processing area, and replace the soil accordingly.

5.4 Final Cover System CQA

The materials, construction and certification requirements in this Section are intended to comply with Rule .0543 (c) (1) (C).

5.4.1 Materials

1. Low permeability soil cap materials shall meet the requirements as outlined for low permeability soil liner in Section 5.3.
2. Vegetative Cover Material shall be capable of sustaining native plant growth. Vegetative cover soil shall not be compacted except by tracking during spreading operations.
3. If needed, erosion control blankets shall consist of wood excelsior with 80% 6 inch fibers or greater fiber length with the top of the blanket covered with photo-degradable netting. Blanket shall be of consistent thickness with fibers evenly distributed throughout the entire area of the blanket. Blanket shall be recommended by manufacturer for use on slopes up to 1.5H:1V, storm water channel velocities up to 5 feet per second, and flow shear stresses up to 2 pounds per square foot.

5.4.2 Conformance Testing

1. Vegetative cover material shall be tested for nutrient fertilizer requirements and pH requirements at a frequency of once per 5,000 cubic yards.
2. Low permeability soil cap materials shall meet the requirements and be subjected to the conformance testing as outlined for low permeability soil liner in Section 5.3.

TABLE 5.3 - QA Testing Frequencies and Criteria for Vegetative Support Soil Layer

Preconstruction Qualification		
Test	**ASTM Method**	**Quantity**
Grain Size	D422 or D1140	1/5,000 YD^3
Atterberg Limits	D4318	1/5,000 YD^3
pH	D4972	1/5,000 YD^3
Organic Content	D7348	1/5,000 YD^3
***Preconstruction test samples shall be taken from the borrow source and or soil stockpiled prior to construction.**		
Testing Criteria		
Classification	CL, CH, ML, MH, OH, or OL	
pH		5-8
Organic Content		5% min
Maximum Particle Size		3-inch diameter

Any modifications made to these testing frequencies will require prior approval from the Division of Solid Waste.

5.4.3 Construction

1. Low permeability soil cap shall be constructed in the same manner as outlined for low permeability soil liner in section 5.3 above.

2. The Contractor shall be responsible for identifying earthen material to be used for vegetative cover material and adding amendments to create suitable vegetative cover material. Stockpiled material may be used in areas disturbed by Contractor's activities as approved by the Engineer.

3. Commercial fertilizer, lime, peat, humus, sand or other additives shall be used to counter act soil deficiencies as recommended by the soil analysis and as directed by the Engineer.

5.4.4 Certification

Low permeability soil cap and vegetative cover material thickness will be verified by topographic survey. The thickness shall be measured from the top of daily cover to the top of low permeability soil cap and from the top of low permeability soil cap to the top of vegetative cover. Areas not meeting the thickness requirements shall be augmented with additional vegetative cover material.

5.5 Documentation

1. Upon completion of the construction activities, a Construction Quality Assurance Certification Report will be submitted to the Solid Waste Section in accordance with Rules .0541 and .0543. The report will summarize all quality assurance services performed during construction of the C&D landfill liner and will include, at a minimum the following:
   - Field observation inspection reports;
   - The results of all construction quality assurance and construction quality control testing required by this Plan;
   - Documentation of any failed test results, descriptions of procedures used to correct the improperly installed material and results of all retesting performed;
   - Record drawings documenting the completed project and noting any deviation from the approved engineering plans; and
   - A comprehensive narrative including, but not limited to, daily reports from the project engineer and a series of color photographs of major project features.

2. The CQA Certification report shall bear the seal of a North Carolina Professional Engineer who was involved during the construction and a certification that construction was completed in accordance with:
   - This CQA Plan;
   - The conditions of the Permit to Construct;
   - The requirements of Rules .0540 through .0543; and
   - Good engineering practices.

6.0 *OPERATION PLAN*

This C&D Landfill Operation Plan has been prepared in accordance with Rule 15A NCAC 13B. 0535. Harnett County shall maintain and operate the Anderson Creek Construction and Demolition Landfill (ACLF), in accordance with the design and drawings approved by the North Carolina Solid Waste Section (NCSWS), the permit to operate issued by the NCSWS, and the following requirements.

6.1 General Information

The Facility is operated in accordance with the conditions of Permit #43-03 issued by the State of North Carolina, Division of Waste Management, Solid Waste Section. Signs at the entrance announce the permit number, hours of operation, lists of acceptable and unacceptable waste and emergency contact name and telephone number. Signs within the facility direct traffic to designated areas to deposit waste.

6.1.1 Hours of Operation

The Anderson Creek C&D Landfill is open every day except Sundays and Holidays that are observed by the County. These hours may change in order to accommodate the conditions of unforeseen circumstances.

Hours are generally as follows:
Mon, Tue, Thur, Fri, & Sat 7:30 A.M. to 4:30 P.M.
Wed - 7:30 A.M. to 12:00 P.M.
Sun - CLOSED

6.2 Operations Description

Vehicles entering the facility are weighed just inside the gate and again as they leave in order to keep an account of the total waste received the type of waste and the origin of the waste. All this information is recorded and filed. In the interest of protecting public health and safeguarding the environment, the Solid Waste Department of Harnett County does require haulers to obtain permits. These permits are issued by the Solid Waste Department. These permits require the covering of transported materials, clear identification of trucks, and

compliance with local and state law regarding the collection, transport, and disposal of solid waste.

Vehicles are directed to the active permitted C&D cell or MSW Transfer Station, recycling areas or individuals with small quantities of solid waste are sent to the convenience center immediately after the inbound scale to place it here and leave the facility.

A spotter directs haulers where to back into and loads are dumped on the active fill area. The spotter assures the orderly unloading and exiting for haulers which includes keeping large trucks with refuse bodies that unload quickly separated from smaller trucks that do not dump and with drivers generally with less experience in hauling waste who may have to unload by hand.

6.3 Waste Acceptance and Disposal Requirements

The Harnett County Anderson Creek Landfill receives approximately 30,000 tons of waste per year from Harnett County (includes C&D, MSW, and Yard Waste). The waste stream consists of residential, industrial, institutional, and commercial wastes.

The incorporated Towns within the County provide collection and hauling solid waste management services to their residents themselves or by contracting with a private waste management company. Residents in the unincorporated areas of the county may use any of the 16 permitted private haulers or may personally take their garbage to the Dunn-Erwin Transfer/Landfill, the Anderson Creek Transfer/Landfill, or one of the four collection centers operated by the County.

Waste is also collected by the County from four collection ("convenience") centers located in rural areas of the County. Any county resident may use the collection sites to drop off recyclable materials and residential waste at an annual cost per household. The resident must have the household identification sticker displayed when dropping off materials. The collection centers are staffed through a contract with Republic Waste Services. An attendant is at each center from 7:30 am to 5:30 pm, Monday through Saturday. Residential household solid waste is accepted at each center in a roll-off container. The contractor hauls this waste to the transfer facility. Recyclable materials of glass, newspaper and aluminum are also accepted.

6.3.1 Accepted Wastes

The Anderson Creek C&D Landfill will accept construction/demolition debris, wastes acceptable for disposal in a land clearing-inert debris landfill, and other wastes specifically approved by the division. The ACLF only accepts waste generated in Harnett County, and will not knowingly dispose of any type of C&D waste generated within the boundaries of a unit of local government that by ordinance prohibits generators or collectors of C&D waste from disposing of such waste.

Construction/demolition debris is defined in the General Statutes as waste or debris resulting solely from construction, remodeling, repair, or demolition operations on pavement, building, or other structures.

Land clearing debris is defined in the rules as waste that is generated solely through land clearing activities such as stumps, trees, limbs, brush, grass and other naturally occurring vegetative matter.

Disposal of yard trash will not be allowed in the ACLF Facility. Yard trash is defined in the North Carolina General Statutes 130A-290 as "solid waste consisting solely of vegetative matter resulting from landscaping maintenance".

6.3.2 Material Processing

The Anderson Creek C&D Landfill facility will engage in material processing of Land Clearing and Inert Debris from time to time in order to divert and reduce the amount of waste disposed of in the C&D landfill. The operations of the material processing will be as follows:

a. Material determined to be acceptable for processing and diversion from the working face of the landfill shall be stored within the permitted limits of the facility. This will be on the base grades of the cell, cleared areas, or on areas of the landfill that have received final or intermediate cover.

b. Materials acceptable for grinding are as follows:
    i. Woody material
    ii. Untreated, unpainted, non-engineered wood
    iii. Wood pallets

c. Materials acceptable for crushing/screening:
    i. Unpainted concrete block

ii. Unpainted brick
iii. Unpainted and untreated concrete
iv. Uncontaminated soil, gravel or rock

d. All grinding, crushing and/or screening activities will be conducted within the approved landfill footprint. The grinding, crushing, screening and recovery operations will be conducted as needed, on a periodic basis, to facilitate landfill recovery and incoming waste operations by contracted equipment and operators. The contractor selected will be responsible for maintaining an adequate safety plan and procedures per current standards and the safety and maintenance literature of the equipment manufacturer.

e. Finished products anticipated to be produced from this process are as follows:
   i. Mulch
   ii. Amended Soil
   iii. Crushed aggregate

f. Final products are to be used onsite at the Anderson Creek Facility for operational uses such as, but not limited to:
   i. Road bed material
   ii. Drainage media
   iii. Topsoil amendment for seeding and stabilization
   iv. Daily/Periodic cover of waste areas
   v. Other uses as permitted by DWM

g. Processed materials will be stockpiled for use within the facility boundary in designated areas. A minimum buffer between stockpiles and other operations will be 20 feet. A minimum buffer between stock piles and the property boundary will be 100 feet. For safety and fire protection, stockpiles will be monitored for size and temperatures of less than 110 degrees Fahrenheit.

h. If the amount of stockpiled material is determined to exceed the quantity required for onsite operations, the County may choose to market the material to the County residents and businesses. If so, the rate at which the material is sold will be determined by the County Board of Commissioners and a policy on material sales established. The Landfill will keep weight records of all materials sold and leaving the site.

6.3.3 Prohibited Wastes

- Containers such as tubes, drums, barrels, tanks, cans, bottles, unless they are empty and perforated to ensure that no liquid, hazardous or municipal solid waste is contained therein.
- Garbage as defined by Statute GS 130A-290
- All municipal solid waste (MSW).
- All industrial waste.
- All medical waste.
- Hazardous waste as defined within 15A NCAC 13A, including hazardous waste from conditionally exempt small quantity generators.
- Polychlorinated biphenyls (PCB) waste as defined in 40 CFR 761.
- Radioactive waste as defined by Statute 104E-5(14).
- All liquid wastes are banned from the ACLF facility.

  NOTES: Liquid Waste means any waste material that is determined to contain "free liquids" as defined by Methods 9095 Paint Filter Liquids Test), as described in "Test Methods for evaluating solid Wastes, Physical/Chemical methods" (EPA Pub. No.SW-846).

  Paint Filter Liquids Test:

  The test is performed by placing a 100-milliliter sample of the waste in question, in a conical, 400-micron paint filter. The waste is considered to be a liquid if any liquid from the waste passes through the filter within five minutes.

- Waste prohibited in the Anderson Creek C&D landfill by Statute GS 130A-309.10 of the North Carolina Solid Waste Management Rules. These waste include:
  - used oil
  - yard trash
  - white goods
  - antifreeze (ethylene glycol)
  - whole scrape tires

- lead-acid batteries
- aluminum cans
- beverage containers that are required to be recycled under G.S. 18B-1006.1
- motor vehicle oil filters
- recyclable rigid plastic containers that have a neck smaller than the body of the container, and that accept a screw top, snap cap, or other closure
- re-usable wooden pallets, truck loads of pallets
- oyster shells
- Discarded computer equipment, as defined in G.S. 130A-309.91
- Discarded televisions, as defined in G.S. 130A-309.91.

- C&D waste that has been shredded, pulverized or processed to such an extent that the composition of the original waste cannot be determined, unless the waste is from a facility that received a permit from an authorized regulatory authority which specifies such activities are inspected by the authority and that the primary purpose is recycling and reuse of the C&D material.
- The following wastes are banned from the ACLF if separate from C&D waste: light bulbs or lamps, lighting ballast or fixtures, thermostats and light switches, batteries, lead pipes, lead roof flashing, transformers, capacitors and copper chrome arsenate (CCA) and creosote treated woods.

A report shall be prepared for any attempted delivery of waste of which the C&D Landfill is not permitted to receive, including waste from outside the permitted C&D Landfill service area. The report will be forwarded to:

Department of Environment, Health and Natural Resources
Solid Waste Division
PO Box 27687
Raleigh, North Carolina 27611-8787
(919) 733-0692

6.4 Waste Screening

Waste is screened by all personnel that operate the Transfer Station not only for unacceptable waste but for the correct destination on the property to deposit the load. Beginning with the scale house attendant who asks the waste hauler what he is disposing to equipment operators and attendants who see the contents of the load when it is uncovered, it is everyone's responsibility to assure that the waste is disposed in the correct location and rejected if it is unacceptable. There are five (5) certified transfer station operation specialists on staff. At least one (1) certified transfer operator is on site at all times during operational hours. Training is provided on spotting unacceptable waste during certification course. Also there is one (1) Certified Landfill Operator who was trained on spotting unacceptable waste. The loader operators and attendants who have not attended the Certification Courses have been trained by staff on spotting unacceptable waste. When unacceptable waste is identified and the hauler is still on site the hauler will be responsible for removal of the waste. If the hauler has left the site and cannot be identified then the County will be responsible for removal and proper disposal methods of the waste. Haulers who use the facility regularly generally know what waste is unacceptable and those who are not regular are informed by the signs at the gate and/or by information provided by the scale house attendant. Routine offenders can be turned over to the County's Environmental Officer / Sherriff Deputy for formal enforcement.

A minimum of two (2) incoming loads per week are randomly pulled aside and isolated from normal traffic for routine inspection. The inspection form is used to indicate if the load is within compliance and space is available to comment on non complying loads. Copies of the inspections are placed in the onsite operation file for a minimum of 3-years or per direction of the SWS. A blank form is attached.

Landfill attendants are constantly inspecting incoming loads for noncompliant non-hazardous waste such as tires, batteries, wood pallets, etc. Upon discovery these items are stockpiled temporarily off the working face of the landfill and relocated to the appropriate location at the convenience center or transfer station at the end of each working day.

If an unacceptable waste, and specifically hazardous waste, is found to be on the working face of the landfill, the general public will be evacuated from the immediate landfill area. An empty trailer will be hauled to the area and the waste will be placed into the trailer where it can

be contained and confined. Harnett County Emergency Management will be notified upon discovery and may offer additional instruction.

The County has relationships with several professional, properly certified hazardous materials cleanup firms which are available for handle any spills, etc which may occur. The SWS will be notified on an appropriate form of any incident and a description of the resolution.

Harnett County shall continue a program at the landfill for detecting and preventing the disposal of hazardous or liquid waste or any other waste that the ACLF facility is not permitted to receive. Waste is screened by all personnel that operate the ACLF facility not only for unacceptable waste but for the correct destination on the property to deposit the load. Beginning with the scale house attendant who asks the waste hauler what he is disposing to equipment operators and spotters who see the contents of the load.

The frequency of random inspections shall be based on the type and quantity of waste received daily, and the accuracy and confidence desired in conclusions drawn from inspection observations. All incoming waste of an unidentifiable nature or origin will be inspected. This shall include but not be limited to haulers with unknown service area, to loads brought to the facility in vehicles not typically used for disposal of C&D Waste, and to loads transported by previous would-be offenders. For waste of unidentifiable nature received from sources other than household (e.g., industrial or commercial establishments), the inspector should question the transporter about the source/composition of the materials. The program will include the following:

Landfill personnel will conduct random inspections of typical incoming loads. Inspections will occur at a designated site, adjacent to the working face of the landfill unit. The load will be carefully spread by a front-end loader with personnel trained to identify hazardous and liquid waste or any other unacceptable waste. A minimum of two (2) incoming loads per week are randomly pulled aside and isolated from normal traffic for routine inspection. The inspection form is used to indicate if the load is within compliance and space is available to comment on non complying loads. Copies of the inspections are placed in the onsite operation file for a minimum of 3-years or per direction of the SWS. A blank form is attached.

Harnett County will provide annual training to all landfill personnel in regard to recognizing hazardous and liquid waste.

6.5 Contingency Plan

Harnett County has developed a contingency plan to properly manage identified hazardous or liquid waste. The plan involves the identification of the waste by inspection. If the inspector determines a load to be of a hazardous nature, the landfill will not accept the waste and require that hauler remove the waste from the facility. If the inspector determines a load of waste to include wastes that should not be disposed of in the ACLF but can be disposed of in a permitted MSW Landfill, then the hauler will be required to load the waste back into his vehicle and transport the load to the MSW Transfer Facility.

Beginning with the scale house attendant who asks the waste hauler what he is disposing to equipment operators and spotters who see the contents of the load when it is uncovered, it is everyone's responsibility to assure that the waste is disposed in the correct location and rejected if it is unacceptable. There are five (5) certified transfer station operation specialists on staff. At least one (1) certified transfer operator is on site at all times during operational hours. Training was provided on spotting unacceptable waste during certification course. Also there is one (1) Certified Landfill Operator who was trained on spotting unacceptable waste. The loader operators and spotters who have not attended the Certification Courses have been trained by staff on spotting unacceptable waste. When unacceptable waste is identified and the hauler is still on site the hauler will be responsible for removal of the waste. If the hauler has left the site and cannot be identified then the County will be responsible for removal and proper disposal methods of the waste. Haulers who use the facility regularly generally know what waste is unacceptable and those who are not regular are informed by the signs at the gate and/or by information provided by the scale house attendant.

When possible, nonconforming waste delivered to the facility will be discovered by the personnel at the site, rejected before it is unloaded and the hauler will be directed to transport it off the property. Noise and odors are usually not a problem since there are no dwellings or directly adjacent the landfill operational areas. Unusual traffic patterns are avoided by use of signs within the facility to direct haulers to designated areas.

Equipment over and above the minimum required has been acquired to compensate for break downs. Refer to the list at the end of Section 6.6.

Long-term power outages would affect not only the immediate receiving and transferring of waste, but record keeping and billing. If the outage is extensive, the facility may have to cease operation. In the event the facility would have to cease operations the County would notify the municipalities and waste haulers to direct them to another facility where they could dispose of their waste or to advise when the Harnett County Transfer Station facility would be back up in operation. This notification would be by phone and the use of the local media.

6.6 Personnel & Equipment

The following are responsible for the operation of the Harnett County Waste Handling Facility during daily operations:

- Director of Solid Waste - Manage Entire Operation
- Superintendent of Solid Waste - Manage Tipping Floor, Operators, Spotters
- Waste Enforcement Officer – (Sherriff Deputy) Prevent Illegal Dumping and Uncovered Loads
- Crew Leader (1) - Assists Superintendent in Management of Operations
- Solid Waste Mechanic (1) Trucks and Equipment Maintenance
- Scale House Attendant/Account Managers (2) Weigh Haulers In and Out
- Equipment Operators/Attendants (2) Operate Equipment and Direct Visitors for Proper Disposal

Five of these employees have completed operator's training courses approved by the Division of Solid Waste. At least one of these employees is present at the facility during operating hours. These employees will be provided a copy of the approved operations plan for them to become familiarized with.

The Solid Waste Superintendent performs daily, weekly, and monthly inspections which includes a variety of items to insure compliance with the Landfill's Operating Permit. Some things included but not limited to are inspection of monitoring wells, erosion and

sedimentation devices, weekly cover, edge of waste markers, litter, etc. A sample form is attached. Records are kept for a minimum of three years at the landfill office.

The Facility uses the following equipment for operations, maintenance and back-up:

- 70’ X 10’ Scale (inbound/outbound)
- Rubber-Tired Front End Loader (1) (for moving wastes on tipping floor)
- Transfer Trailers (property of the Contract Hauler) (Multiple)
- Yard Tractors (1) (for shifting trailers)
- Floor Wash down Equipment, hoses, shovels, brooms
- Dozer (2) (for C&D & general operations)
- Rubber Tire Backhoe (1) (backup for Rubber-Tired Front End Loader)
- Excavators (1) (for C&D & general operations)
- Farm Tractor with Pavement Brush (1)
- 13 Cubic Yard Pan (2)
- Sheepsfoot Waste Compactor

6.7 Cover Material Requirements

Harnett County shall cover the disposed waste with six (6) inches of earthen material once a week, or at more frequent intervals if necessary, to control disease, vectors, fire, odors, blowing litter, and scavenging.

As an alternative to the six inches of earthen material, Harnett County may use an alternative cover (AC) that has been approved by the Solid Waste Division.

The AC will only be placed in the vicinity of the active working face and primarily during wet weather conditions to assist in alleviating the muddy conditions that impede efficient operation. The AC will not be placed in areas that have a high potential for runoff, such as perimeter slopes. A full six (6) inch layer of native soil will continue to be placed in these areas in order to promote surface water runoff.

The weekly cover will reduce nuisances caused by odors, vectors, litter, etc., and will assist landfill operations during wet weather conditions. The soil component of the daily cover will create isolated pockets of waste within the cell to prevent and control landfill fires. However, as an additional precaution, a full six (6)-inch layer of soil will be used to cover the working face at least once each week. Using the AC material should not increase the potential for landfill fires, since the material will be placed in conjunction with a separate soil layer and will be predominately used in wet weather conditions.

The AC's will be placed to meet or exceed the performance criteria of an AC as outlined in Rule .1626 2 (b) by providing control of disease, vectors, fires, odors, blowing litter, and scavenging.

Harnett County shall cover all waste areas that will be inactive for more than twelve (12) months and have not reached final elevations with a minimum of one foot of intermediate cover.

6.8 Spreading and Compacting Requirements

Waste will be placed in the ACLF in lifts of approximately five (5) to ten (10) feet thick. Following placement in the initial lift, the solid waste will be compacted as densely as possible using compactors and/or dozers. Waste placement will be in lifts not to exceed 10 feet.

In order to increase compaction, waste should be placed from the down gradient to the up gradient direction when possible. The working face shall be maintained in as small an area as possible to increase compaction and to reduce the amount of daily cover required.

6.9 Disease Vector Control & Wind Blown Waste

Harnett County will control the spread of disease vectors by maintaining weekly cover requirements and picking up windblown trash at the end of each day.

6.10 Air Quality

Harnett County shall operate the Anderson Creek CDLF in compliance with all applicable requirements developed under the State Implementation Plan (SIP) approved or promulgated by the U.S. EPA Administrator pursuant to Section 110 of the Clean Air Act, as amended. The Harnett County landfill should not be required to obtain a Title V operating permit. Currently, the Anderson Creek Landfill facility does not anticipate reaching an on-site volume of more than 2.5 million Megagrams of waste.

No open burning of solid waste shall be allowed at the landfill, except for the infrequent burning of land clearing debris that is generated by on-site clearing or debris from emergency clean-up operations. Any such infrequent burning will be approved by the local fire marshall and all local and state guidelines will be followed. The county will obtain all applicable permits prior to burning.

6.11 Dust Control

Dust generated due to landfill activities will be controlled. Dust will be controlled through the application of water by truck or other approved dust control products, if necessary. Removal of mud and dirt from the roads will also be a part of the dust control measures. Additionally, final cover will be vegetated as soon as practical in order to minimize the blowing of dust on-site.

6.12 Fire Control

If a hot load of waste is delivered to the landfill, the driver shall <u>not</u> be allowed to dump the load. The driver shall be directed to gravel or paved area East of the C&D waste area and instructed to dump the load there. The fire should be extinguished if possible, by either

smothering it with soil or by utilizing the two inch water hydrant at the Transfer Station and the local fire department called immediately.

If a load of waste is unknowingly a "hot" load and is discharged onto the working face, it will immediately be smothered and extinguished by landfill personnel if possible and the local fire department will be called immediately. Equipment and a stockpile of soil shall be maintained in close proximity to the working face for controlling accidental fires.

The local fire department, which is approximately 15 miles from the Anderson Creek Landfill, will also be contacted and informed of the potential fire hazards at the landfill. Arrangements will be made with the fire department to provide access to the landfill site. They will also be provided with operational information of the facility in case of emergency.

A secondary fire control policy consists of hose bibs located on the transfer station tipping floor and at the transfer trailer loading area. The hose bibs are provided for daily floor wash down maintenance, but may be used to control small fires if feasible, and until the Fire Department can arrive. A fire hydrant with a pumper nozzle is located along the landfill entrance road. In addition, Underwriters Laboratory (UL) fire extinguishers are located on the tipping floor, the transfer trailer loading area, and in the office. Buildings receiving waste are metal construction with concrete floors.

In accordance with Rule. .0505(10)(c), fires that occur at the Anderson Creek Landfill Facility require verbal notice to the Division of Solid Waste within 24 hours and written notification shall be submitted within 15 days (example form is found in Appendix X). Verbal and written notification shall be submitted to the Raleigh Regional Waste Management Specialist:

Department of Environment and Natural Resources
Division of Waste Management, Solid Waste Division
1646 Mail Service Center
Raleigh, North Carolina 27699-1646
(919) 707-8200

6.13 Access and Safety Requirements

6.13.1 Access Restrictions

The site is currently enclosed by a fence with access controlled by means of gates. A security check station and weigh scales is located at the landfill entrance to evaluate waste stream and proper disposal. A properly trained and certified attendant will be on duty at the site at all times while it is open for public use to insure compliance with operation requirements. Restroom and maintenance facilities currently in place at the existing site will remain operational. Access roads to the site will be of all weather construction and maintained in good condition.

6.13.2 Signage

Signs providing information on disposal procedures, the hours which the site is open for public use, the permit number, stating that no hazardous or un-permitted waste can be received without written permission, stating that no liquid waste can be received for disposal, and other pertinent information will be posted at the site entrance. Most of these signs are located at the landfill entrance, which currently provides access to the MSW transfer station and also provides access to the ACLF. Therefore traffic signs and markers shall be provided as necessary to promote an orderly traffic pattern and direct incoming vehicles to the proper dumping area (MSW or C&D).

Adequate signage will be located along the access roads to direct vehicles to and from the discharge area and maintain efficient operating conditions. The scale house operator will give specific instructions to incoming waste loads as to the appropriate disposal area. A sign shall be placed in clear view of each incoming transporter, which shall read as follows:

> <u>NOTICE:</u> RANDOM WASTE SCREENING PRACTICED HERE. WE RESERVE THE RIGHT TO INSPECT ANY LOAD OR PORTION OF A LOAD ARRIVING AT OUR FACILITY. WE WILL REJECT ALL: HAZARDOUS WASTES, PCBs, LIQUIDS AND ANY UNACCEPTABLE WASTE AS DETERMINED BY OUR MANAGEMENT. YOUR PARTICIPATION IN THIS PROGRAM IS NOT OPTIONAL!

6.14 Erosion and sedimentation Control Requirements

Existing and proposed erosion/sedimentation control structures include sediment basins, storm drains, temporary slope drains, check dams, and diversion ditches. Sedimentation basins will be checked after periods of significant runoff. Sediment will be removed from the basin to its original dimension when sediment accumulates to one half of design depth. The sedimentation basins, embankment, ditches, inlets and outlets will also be inspected for erosion damage. All necessary repairs will be made immediately. Any trash or debris within the riser pipes will be removed.

Stormwater will be collected by constructing benches on the finished cap at an interval as depicted on the approved Drawings. A series of pipes will be used to transport water from the upper benches to the lower benches and eventually to a periphery ditch that will transport the storm water to an existing sediment basin. Each pipe will be sized for the final-developed condition, since the landfill will produce peak runoff at the final-developed condition. All of the Stormwater management structures and erosion control details are shown on the approved Drawings.

The erosion control structures are designed and will be maintained to manage the runoff generated by the 24- hour, 10-year storm event and will conform to the requirements of the Sedimentation Pollution Control Law (15A NCAC 4).

Storm drain outlets and diversion ditches will be inspected for damage after each runoff event. Riprap will be placed in ditches and at pipe outlets to prevent erosion and washouts. Provisions for a vegetative ground cover sufficient to control erosion must be accomplished within seven (7) calendar days upon completion of any phase of ACLF development. Temporary grassing will also be utilized as necessary to stabilize temporary slopes that are susceptible to erosion.

Embankment slopes shall be periodically inspected for erosion. The embankment slopes shall be mowed at a frequency sufficient to maintain a good stand of vegetation. The slopes shall be mowed once in any one (1) year period. The embankment slopes shall be re-fertilized in the second year unless vegetation growth is fully adequate. Any damaged areas will be reseeded, fertilized and mulched immediately. Seeding, fertilizing, and mulching shall be in accordance with the North Carolina Erosion and Sedimentation Control Guidelines.

6.15 Drainage Control and Water Protection Requirements

Surface water from outside the operation area will be diverted from the waste area by use of perimeter ditches. The perimeter ditches direct surface water to the sedimentation basins. There shall be no discharge of pollutants from the landfill into waters of the U.S., including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination Systems (NPDES) requirements, pursuant to Section 402.

Solid waste shall never be disposed of in standing water.

6.16 Leachate Management

Leachate seeps can occur due to a variety of circumstances. The goal in dealing with leachate seeps is to prevent seepage from leaving the limits of waste disposal areas and to minimize the potential for reoccurrence. If evidence of leachate seeps is observed, the Operator will take the following actions. Depending on the circumstances, various combinations of actions may be appropriate.

1. If leachate is observed outside of the limits of waste disposal areas, notify DENR.
2. Contain the flow of leachate using soil berms and/or excavation.
3. Excavate the area of seepage to attempt to allow flow into the underlying layers (i.e. break-up barriers that may be causing the seep.).
4. <u>Run-on Control: Surface water run-on, when identified will be re-routed through the use of diversion berms and/or diversion ditches to prevent infiltration into the debris facility.</u>
5. <u>Surface Grading:</u> Filling operations shall include grading with positive slopes (>5%) to promote runoff over the debris. At the end of each day, any low areas should be filled with debris and/or soil to prevent potential impounding of surface water. Furthermore, in the case of impending storms, periodic cover should be advanced to provide a “soil seal” to further promote runoff and minimize infiltration.
6. Facility Inspections: On a periodic basis, site personnel should conduct “walk-over” inspections to identify areas of settlement which may create additional areas of “ponding”. Any areas identified should be re-filled with debris and/or soil to further promote runoff. In the event, seeps are identified

on the slopes or near the base of the facility, the area above the seeps shall be inspected for signs of inadequate cover or settlement and re-grading by placement of additional debris and/or soil

7. Leachate Diversion Trenches: In the event leachate seeps are identified along the outer slopes of the landfill or at the base, trenches are diverted back into the limits of waste by excavating trenches at and around the location of the seeps. These trenches are filled with a granular material to encourage the leachate to re-enter the waste containment area. Then the trench and seep area are covered with an impermeable type soil material (clay, silt, or clay mix) and compacted.
8. For contained leachate that will not flow into underlying layers, a pump may be required to route the leachate to an existing leachate collection area (pump station) or to a tanker truck.
9. The use of soil (particularly clay) to plug the seepage may also be successful in the case where flows are minor
10. Repair landfill cover as necessary.

The Anderson Creek facility currently operates several leachate sump pump and haul stations to control leachate within the active C&D landfill and old closed MSW units. This system is operated per the Phase 1 of the Leachate Management Plan submitted and approved by the Solid Waste Section in August 2010 (SWS Doc ID# 11322).

6.17 Record Keeping Requirements

Landfill personnel shall record and retain the following information in an operating record at the landfill, or at an alternate location that has been approved by the Division:

- Inspection of existing facilities,
- Inspection records and waste determination records,
- Training received by landfill personnel,
- Waste amounts received by weight, which includes source or generation,
- Semi-annual monitoring of ground water wells, and
- Any demonstration, certification, finding, monitoring, testing, or other analytical data required by the North Carolina Solid Waste Management Rules (15A NCAC 13B).

The ACLF obtains conducts a topographic survey of all the active landfill areas between May 1st and June 30th of each year in order to keep record of yearly contour transitions. An individual survey of the facility can be preformed within 60 days of receiving a request to do so from the Division. The results of this survey, which shall include a map and discussion of whether or not operations are being conducted in accordance with the approved design and operational plans, will be supplied to the Division within 90 days of receiving the original request.

This information shall be collected and documentation of such collection kept in the permanent record of the ACLF or at an alternate location approved by the Division. The Operating Record, this Operations Plan, and a copy of the approved design drawings and construction drawings will remain at the Anderson Creek Facility or approved alternate location at all times. This information will be readily available for inspection by the Solid Waste Section.

6.18 Operational Forms

In order to adequately operate the Anderson Creek C&D Landfill and maintain proper records the following forms are available for use:

- Fire Occurrence Notification Form
- Routine Inspection Forms
- Waste Screening Forms

A copy of each of these forms can be found in Appendix X.

7.0 *CLOSURE AND POST CLOSURE REQUIREMENTS*

Harnett County has developed the following closure/post-closure plan for the Anderson Creek C&D Landfill Expansion project in compliance with Rule 15A NCAC I3B .0543 Closure and Post-Closure Requirements for C&DLF Facilities. The following is a preliminary Closure and Post-Closure plan, subject to revision, following the construction and receipt of a permit to operate the Anderson Creek C&D Landfill Expansion (Phase III).

7.1 Cap System

The proposed C&DLF unit shall install a cap system that is designed to minimize infiltration and erosion. The cap system shall be designed and constructed to:

1. have a permeability less than or equal to the soils underlying the landfill, or the permeability specified for the final cover in the effective permit, or a permeability no greater than 1.0 X 10^{-5} cm/sec, whichever is less;
2. minimize infiltration through the closed C&DLF unit by the use of a low permeability barrier that contains a minimum 18 inches of earthen material; and
3. minimize erosion of the cap system and protect the low-permeability barrier from root penetration by use of an erosion layer that contains a minimum 6 inches of earthen material that is capable of sustaining native plant growth.

Placement of the low permeability soil layer shall be closely monitored for moisture and density to achieve the minimum requirements set forth in the specifications. The vegetative soil layer should receive no compaction other than that provided by the dozer tracks. Pans or other heavy equipment should not operate on the vegetative soil layer.

Construction of the cap system for the Anderson Creek C&D Landfill shall conform to the plans prepared in accordance with Paragraphs (g) of Rule 15A NCAC 13B .0540 and the requirements that post-settlement surface slopes shall be a minimum of 5 percent and a maximum of 25 percent.

7.2 Surface Water Systems

Precipitation falling on the cover will infiltrate into the cover or run off the cover. Short-term the run-off runs down the surface of the intermediate cover. Long-term the run-off is collected in a series of drainage breaks built into the areas covered by final cover. These drainage breaks are in the form of "tack-on" berms provided along side slopes and near the upper edge of the slopes (cap diversion berms). The "tack-on" berms are designed with a maximum slope length of approximately 150 feet (horizontally projected) such that side slope erosion potential is minimized. Water captured by the "tack-on" berms is routed toward one of the down pipes. Flow in the down pipes is routed to the base of the landfill and to the site sediment basin.

The locations of berms, and down pipes are shown on Drawing No. 10 of the June, 2013 submittal.

7.2.1 Incremental Operation

During much of the life of the landfill, surface run-off will be handled by the intermediate cover system. Operations must strive to provide operational grading that encourages run-off from the intermediate cover to drain to the perimeter channels along the perimeter berms or to area covered by final cover. Corrugated polyethylene piping (CPP) and temporary soil berms must be installed if required to accomplish this run-off routing.

7.2.2 Required Maintenance

The surface water systems must be inspected annually and immediately after every major storm. Sediment build-up in the drainage features/devices must be cleaned out on a regular basis to promote run-off. Sediments removed can be used as daily or intermediate cover.

7.3 Closure Schedule

Prior to beginning any closure activities, Harnett County shall notify the Division that a notice of the intent to close the unit has been placed in the operating record. The County shall begin closure activities of the Anderson Creek C&D Expansion (Phase III) project following the time guidelines listed below:

- No later than 30 days after the date on which the landfill (complete facility) last receives waste and completes day to day operations;
- No later than 30 days after the date that a ten (10) acre or greater area of waste, is within 15 feet of final design grades: and
- No later than one (1) year after the most recent receipt of wastes on final outside slopes. Interim and interior slopes based on the approved facility plan included in the Site Study Application are not required for closure and shall be maintained to maintain intermediate cover and control erosion and sediment.

Harnett County shall complete closure activities in accordance with the closure plan within 180 days following the beginning of the closure as specified above, unless an extension of time is granted to the County by the Division, in which case the County must demonstrate that the C&DLF closure will take more than 180 days and that the County has and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed C&DLF unit.

7.4 Closure System Construction Quality Assurance

Prior to the start of the official closure construction a formal Construction Quality Assurance Plan (CQA Plan) will be issued for use during the closure construction. Testing criteria for the closure system can be found in Section 5.

7.5 Closure Verification

Following closure of the C&DLF unit, Harnett County shall implement the following procedures:

- A Construction Quality Assurance (CQA) report will be submitted to the DWM. This report will describe the observations and test used before, during, and upon completion of construction to ensure that the construction materials meet the final cover design specification and the construction and certification requirements. The CQA report will contain as-built drawings.
- A signed certification from a registered Professional Engineer verifying that closure has been completed in accordance with the closure plan will be submitted to the DWM.
- Following final receipt of waste and full facility closure, at least one sign notifying all persons of the closing of the landfill (or incremental portions thereof) and that wastes are no longer accepted will be posted. Suitable land barriers will be installed as necessary at former access points to prevent new waste from being deposited
- Within 90 days, a survey plat, prepared by a Professional Land Surveyor, indicating the location and dimensions of landfill disposal areas, will be prepared.
- A notation will be recorded on the deed notifying any potential purchaser of the property that the land has been used as a landfill facility and that future use is restricted under the approved closure plan. A copy of the deed notation as recorded will be filed with the operating record.

7.6 Post-Closure Plan

Following the closure of the C&DLF unit, Harnett County shall conduct post-closure care. Post-closure care shall be conducted for 30 years except as provided in Rule 15A NCAC 13B.0543(e)(2). Post-closure shall consist of at least the following:

1. Maintaining the integrity and effectiveness of any cap system, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or

otherwise damaging the cap system;

2. Monitoring the ground water and surface water in accordance with the requirements of Rules 15A NCAC 13B.0544 through .0545 and maintaining the ground-water monitoring system;
3. Maintaining run-on/run-off controls.

No public waste will remain exposed after closure of the landfill. Access to the closed site by the public will not pose a health hazard.

Following completion of the post-closure care period, the County shall notify the Division that a certification, signed by a registered professional engineer, verifying that the post-closure care has been completed in accordance with the post-closure plan, has been placed in the operating record.

7.6.1 Post Closure Contact

All correspondence and questions concerning the post-closure care of the unit should be directed to:

Mrs. Amanda Bader, PE, LEED AP, County Engineer
Harnett County Department of Solid Waste
PO Box 940
Lillington, NC 27546

7.6.2 Post-Closure Use

After filling operations cease at the landfill and it is officially closed in accordance with the closure Plan, the landfill will be maintained as a grassy hill. Harnett County will maintain control of the property and prevent public access to it during the post-closure period.

There may be (an) access road(s) on the final cover to allow proper maintenance during post-closure. Precise location of the access road(s) will be determined as part of operation. Low ground pressure and rubber tire vehicles will be used for maintenance.

7.7 Post Closure Maintenance

7.7.1 Repair of Security Control Devices

All security control devices will be inspected and maintained as necessary to ensure access to the site is controlled. Locks, vehicular gates, and fencing will be replaced if functioning improperly. Warning signs will be kept legible at all times and will be replaced if damaged by inclement weather or vandalism.

7.7.2 Erosion Damage Repair

If erosion of the final cover occurs during post-closure, the affected area will be repaired and re-seeded as necessary. If necessary, rolled erosion control products (RECPs) will be used to expedite rapid re-vegetation of slopes and to secure topsoil in place.

7.7.3 Correction of Settlement, Subsidence, and Displacement

Minimum slope of 5 percent will be maintained after settlement in order to prevent ponding and allow for proper drainage without infiltration. If vertical or horizontal displacement occurs due to differential settlement, cracks will be filled with appropriate material and final cover will be reestablished. Excessive vertical displacement is not anticipated.

7.7.4 Repair of Run-On/Run-Off Control Structures

All drainage swales, ditches, and perimeter channels will be repaired, cleaned, or realigned in order to maintain their original condition. Any culverts that are damaged will be repaired or replaced

7.7.5 Groundwater Monitoring Wells

Procedures outlined in the current Groundwater Monitoring Plan (GMP) or subsequent revision will take precedence; however, a brief description follows. All groundwater monitoring wells have been installed with concrete pads and protective casings to prevent accidental damage by vehicles and equipment. The wells are also equipped with a locking cap to discourage vandalism. Groundwater wells will be inspected regularly (at the time of sampling) to ensure integrity. Persons inspecting a well should look at the overall condition of the well, for signs of well tampering, and cracking or degradation of the concrete pad. Should a well require

replacement, the defective should be abandoned in accordance with specifications provided in the GMP Plan and a new well installed at a location that is approved by the DWM.

7.8 Monitoring Plan

The closed unit will be monitored for a minimum of 30 years. A series of inspections will be scheduled to ensure the integrity and effectiveness of the final cover system, surface water systems, groundwater monitoring systems, and to protect human health and the environment.

7.8.1 Inspection Frequencies

Inspections to be conducted during the post-closure care period will occur regularly as shown below:

INSPECTION ACTIVITY	Year 1	Years 2 - 30
Security Control Devices	Quarterly	Quarterly
Vegetative Cover Conditions	Quarterly[1]	Quarterly
Surface Water Systems	Quarterly[1]	Quarterly
Erosion Damage	Quarterly[1]	Quarterly
Cover Drainage System	Quarterly[1]	Semi-Annually
Cover Settlement, Subsidence, and Displacement	Quarterly[1]	Semi-Annually
Groundwater Monitoring System	Semi-Annually	Semi-Annually[2]
Benchmark Integrity	Annually	Annually

Notes:

1. These items will be inspected after each large storm event (i.e. ≥ 1 inch in any 24 hours).

2. Or in accordance with groundwater monitoring schedule described in the current Groundwater Monitoring Plan.

7.8.2 Quarterly Inspections

Quarterly inspections of the closed site will be conducted by Harnett County. These inspections will include examination of the security control devices for signs of deterioration or vandalism to ensure access to the site is limited to authorized persons. Each disposal area will be

checked to ensure the integrity of the final cover system is maintained, erosion damage is repaired, vegetative cover persists, and that cover settlement, subsidence, and displacement are minimal. Drainage swales and channels will be cleared of litter and debris and benchmark integrity will be noted and maintained.

7.8.3 Semi-Annual Inspections

Semi-annual inspections of the site during the post-closure period will be conducted by Harnett County with attention paid to integrity and drainage of the final cover systems and condition of the groundwater monitoring systems.

A report of findings will be made to the responsible party, including recommendations for actions deemed necessary to ensure the site continues to meet the closure performance standard.

7.9 Engineering Certification

Based on Harnett County's monitoring reports, annual certifications by a registered engineer will be placed in the operating record. They will certify that the closure plan has been followed, noting discrepancies along with the corrective actions undertaken. At the end of the post-closure period, the individual certifications will be compiled into a final document and forwarded to the DWM.

Appendix I

Local Government Approvals
&
Property Deed

Harnett
COUNTY
NORTH CAROLINA

Planning Department

www.harnett.org

PO Box 65
108 E. Front St.
Lillington, NC 27546

Ph: 910-893-7525
Fax: 910-814-6459

March 11, 2010

C.T. Clayton, Sr., P.E.
PO Box 12794
New Bern, NC 28561

To whom this may concern:

The existing Anderson Creek landfill was approved for a Conditional Use Permit on June 29, 1989. According to the Harnett County Zoning Ordinance this permit/ use is still valid, and therefore is in compliance with all Harnett County regulations.

If you should have any questions or need additional information, please contact the Planning Department at (910) 893-7525.

Sincerely,

Jay Sikes
Sr. Planner

ANDERSON CREEK CONSTRUCTION AND DEMOLITION LANDFILL RESOLUTION

BE IT RESOLVED:

That the Board of County Commissioners of Harnett County, NC does hereby grant prior approval for the issuance of sanitary landfill permit by the Division of Waste Management to Harnett County Anderson Creek Landfill, said landfill (facility boundary) to as established by Solid Waste Permit NO. 43-03, as shown on the attached map, which is located within the Barbeque Township. The Board of County Commissioners hereby approves the following items related to this proposed solid waste management facility:

1. The area to be served and population shall consist of the following county:
   a. Harnett County current population: 115,761
2. The facility shall accept land clearing, construction, and demolition debris to be disposed of in the above reference facility in a quantity not to exceed 35,000 tons during any given year that may originate within the service area identified above in item 1.

Adopted, this the 15th day of November, 2010.

BOARD OF COUNTY COMMISSIONERS
COUNTY OF HARNETT

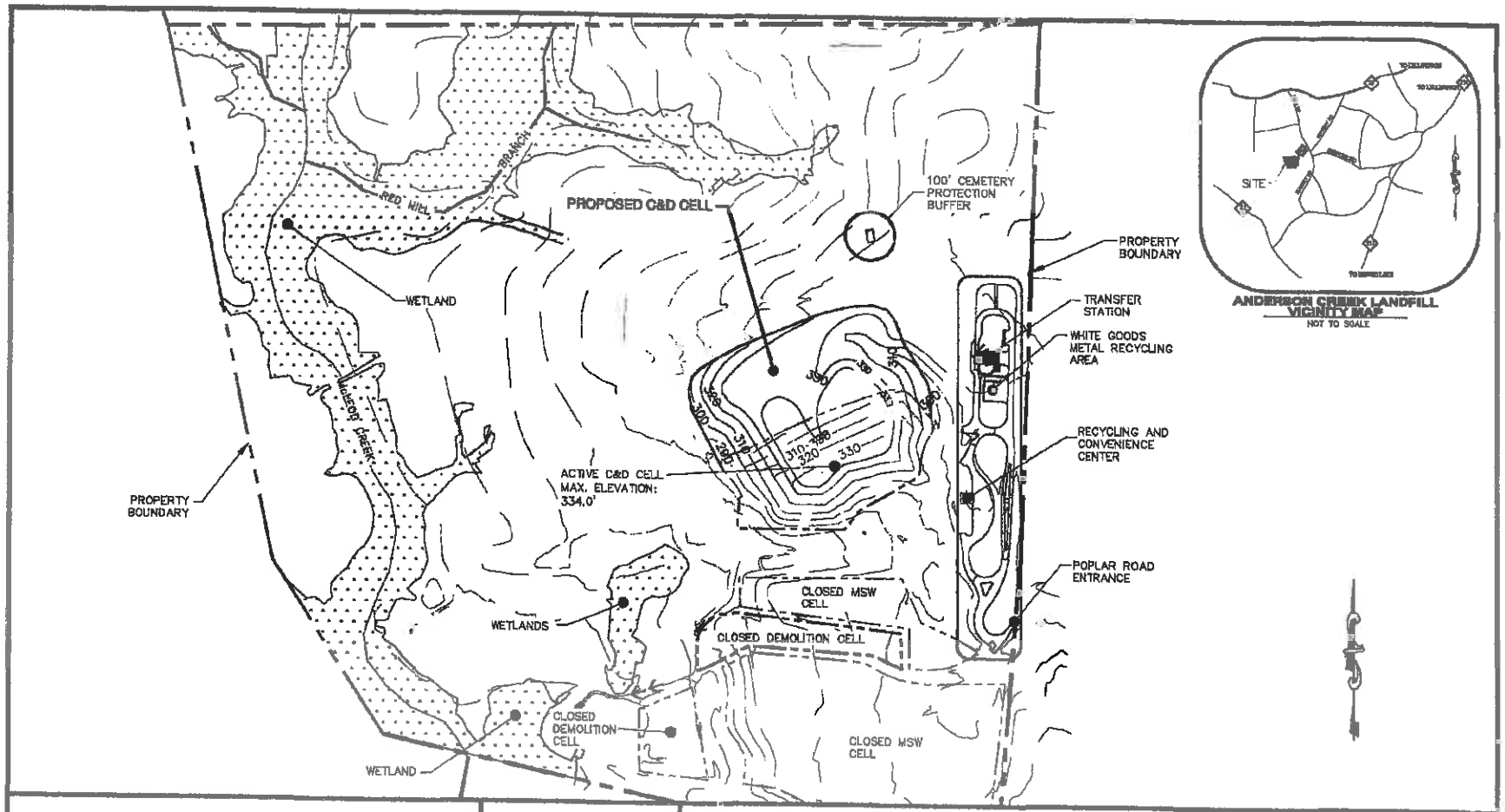
Timothy B. McNeill

Timothy B. McNeill, Chairman

ATTEST:

Margaret Regina Wheeler

Margaret Regina Wheeler, Clerk



CLAYTON Engineering
dba C. T. Clayton, Jr. PE, Inc.
Civil and Environmental
PO Box 576 · Coats, North Carolina 27521
Phone 910-897-7070 · Fax 910-897-6767
License No. C-2570 · www.ctclayton.com
email: tyrus@ctclayton.com

ANDERSON CREEK LANDFILL

SITE PLAN

HARNETT COUNTY NORTH CAROLINA

PROJECT #	: 3035
PROJ. ENG.	: RS
DRAWN BY	: SBK
FIELD BK.	: —
CAD FILE	: ACLF Proposed Cell Exhibit.DWG
SCALE	: 1" = 400'
DATE	: 5 November 2010
SHEET #	: 1 of 1

02074

STATE OF NORTH CAROLINA
HARNETT COUNTY
MAR 15 '89
REAL ESTATE EXCISE TAX
$ 70.50
3-15-89
70.50

Excise Tax

BOOK 879 PAGE 316-317
MAR 15 11 43 AM '89
GAYLE P. HOLDER
REGISTER OF DEEDS
HARNETT COUNTY, NC

Recording Time, Book and Page

Tax Lot No. ..... Parcel Identifier No. 0305070073

Verified by ..... County on the ..... day of ....., 19.....

by .....

Mail after recording to Johnson and Johnson, P. A., Attorneys at Law, 31 East Harnett Street, Post Office Box 69, Lillington, North Carolina 27546

This instrument was prepared by W. Glenn Johnson, Attorney at Law, Lillington, NC

Brief description for the Index 77.96 Acres-Barbecue T.

NORTH CAROLINA GENERAL WARRANTY DEED

THIS DEED made this 15th day of March, 19 89, by and between

GRANTOR	GRANTEE
IOMA McGAHA STRICKLAND, Widow Route 2, Box 166 Lillington, NC 27546	HARNETT COUNTY, a body politic and corporate Post Office Box 759 Lillington, NC 27546

8902074

Enter in appropriate block for each party: name, address, and, if appropriate, character of entity, e.g. corporation or partnership.

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in the City of ....., Barbecue Township, Harnett County, North Carolina and more particularly described as follows:

BEGINNING at an existing concrete monument, common corner with the Anderson Creek landfill property owned by the County of Harnett, and runs thence as a dividing line with the property owned now or formerly by J. J. Barnes North 08° 37' 29" West 1086.47 ft. to an existing lightwood stake, corner with the property of B. Leon Johnson described by deed recorded in Book 566, Page 168, Harnett County Registry; thence as a dividing line with the property of Johnson South 88° 28' 49" East 3254.99 ft. to a new iron pipe in the Carolina Power & Light transmission line 100 ft. right-of-way; thence as a common dividing line with property owned now or formerly by Wellons Realty South 04° 26' 15" West 1101.69 ft. to an existing iron pipe; thence as a dividing line with the Anderson Creek landfill property owned by the County of Harnett North 87° 54' 28" West 415.96 ft. to an existing iron pipe; thence continuing as a dividing line with the Anderson Creek landfill property owned by the County of Harnett North 87° 53' 30" West 2591.75 ft. to the point and place of BEGINNING, and being a parcel of property containing 77.96 acres according to an actual survey by Ragsdale Consultants, P. A., dated November 22, 1988, and entitled "Survey for Anderson Creek Landfill Addition 1," and being the same property described in the deed recorded in Book 339, Page 503, Harnett County Registry.

316

N.C. Bar Assoc. Form No. 3 © 1976, Revised 1977.

Excepted from this conveyance and retained by the grantor shall be all crop allotments on the above described property, it being understood and agreed by the grantor and the grantee that no crop allotments shall be conveyed with this instrument.

The property hereinabove described was acquired by Grantor by instrument recorded in .....

A map showing the above described property is recorded in Plat Book D page 102-C

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And the Grantor covenants with the Grantee, that Grantor is seized of the premises in fee simple, has the right to convey the same in fee simple, that title is marketable and free and clear of all encumbrances, and that Grantor will warrant and defend the title against the lawful claims of all persons whomsoever except for the exceptions hereinafter stated. Title to the property hereinabove described is subject to the following exceptions:

HARNETT COUNTY, N.C.
FILED DATE 3-15-89 TIME 11:43am
BOOK 879 PAGE 316-317
REGISTER OF DEEDS
GAYLE P. HOLDER

IN WITNESS WHEREOF, the Grantor has hereunto set his hand and seal, or if corporate, has caused this instrument to be signed in its corporate name by its duly authorized officers and its seal to be hereunto affixed by authority of its Board of Directors, the day and year first above written.

USE BLACK INK ONLY

..... (Corporate Name)

By: .....

..... President

ATTEST:

..... Secretary (Corporate Seal)

Ioma McGaha Strickland (SEAL)
Ioma McGaha Strickland

..... (SEAL)

..... (SEAL)

..... (SEAL)

SEAL-STAMP

Use Black Ink

NORTH CAROLINA, Harnett County.

I, a Notary Public of the County and State aforesaid, certify that Ioma McGaha Strickland Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument. Witness my hand and official stamp or seal, this 15th day of March, 1989.

My commission expires: 8/18/91 Elaine McNeill Brown Notary Public

Use Black Ink

NORTH CAROLINA, ... County.

I, a Notary Public of the County and State aforesaid, certify that ....., personally came before me this day and acknowledged that ..... he is ..... Secretary of ..... a North Carolina corporation, and that by authority duly given and as the act of the corporation, the foregoing instrument was signed in its name by its ..... President, sealed with its corporate seal and attested by ..... as its ..... Secretary.

Witness my hand and official stamp or seal, this ..... day of ....., 19.....

My commission expires: ..... Notary Public

The foregoing Certificate(s) of Elaine McNeill Brown, Notary of Harnett County

is/are certified to be correct. This instrument and this certificate are duly registered at the date and time and in the Book and Page shown on the first page hereof.

Gayle P Holder REGISTER OF DEEDS FOR Harnett COUNTY

By Kathy C Coleman (Deputy) Assistant - Register of Deeds

Unofficial Copy

EX. PINE STUMP

914.62' S 08°20'05"E

EIS

N 08°20'05"W 203.00'

EIS

COUNTY OF HARNETT
DB: 880,PG:48 PC D,SLIDE 102-A
PARCEL ID.030507 0079

S 88°28'49"E
3299.93'

15.05 ACRES

S 88°28'49"E
3254.99'

EX. 60' EASEMENT MB:11,PG:111

605.88'

CEMETARY

COURSE	BEARING	DISTANCE
L1	S 01°31'11"W	41.43' (THE LINE)
L2	S 09°22'52"E	50.35'
L3	S 79°28'27"W	28.93'
L4	N 07°45'18"W	49.95'
L5	N 78°33'30"E	27.52'

ECM

899.74' S 04°26'15"W

EIS

200.26' S 04°26'15"W

EIS

MAGNETIC NORTH PC D,SLIDE 102-C

COUNTY OF HARNETT
DB: 879,PG:316
PC D,SLIDE 102-C
PARCEL ID. 030507 0073

77.96 ACRES

CAROLE H.JONES
DB:1943,PG:12

1086.47' N 08°37'29"W

1101.69' S 04°26'15"W

C P & L TRANSMISSION LINE
100' R/W

NCSR 1164

ECM

GART T. MCKERRELL
DB:743,PG:389

2591.75'
N 87°53'31"W

EIP

415.96'
N 87°54'28"W

EIP

COUNTY OF HARNETT
DB:932,PG:630
PARCEL ID.030507 0076
2 ACRES

DEAD END

TOTAL AREA IN THREE TRACTS

153.01 ACRES

825.42' N 30°14'11"W

DB:621,PG:166
UNRECORDED MAP ENTITLED "HARNETT COUNTY ANDERSON CREEK SANITARY LANDFILL" DATED APRIL 8,1983 BY RAGSDALE CONSULTANTS,PA
PARCEL ID. 030506 9000

58.00 ACRES

(MAP SHOWS 95.96 ACRES)

1111.82' S 04°38'32"W

WELCO CONTRACTORS INC.
DB:863,PG:792

2004016666

NORTH CAROLINA HARNETT COUNTY
I,Mickey R.Bennett,PLS do certify that this plat was drawn under my supervision(deed description recorded in Book SEE, Page MAP, etc) that the boundaries not surveyed are clearly indicated as drawn from information found in Book SEE, Page MAP, that the ratio of precision as calculated is 1:10000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, registration number and seal this 30TH day of AUGUST .A.D. 2004

MICKEY R. BENNETT
L - 1514

NORTH CAROLINA PROFESSIONAL SEAL No. 1514 LAND SURVEYOR MICKEY R. BENNETT

I MICKEY R. BENNETT PLS DO HERE BY CERTIFY THAT THIS IS AN EXISTING PARCEL OR PARCELS OF LAND AND DOES NOT CREATE A NEW STREET OR CHANGE ANY EXISTING STREETS.

444.30' N 74°53'05"W

CAROLE H.JONES
DB:1943,PG:12

(1244.30' TOTAL)

800.00' N 74°53'05"W

ROBERT B. MORGAN
DB:1414,PG:862

833.64' N 77°03'47"W

ROBERT B. MORGAN
DB:1414,PG:862

72.83' N 33°07'55"W

432.43' S 83°37'29"W

DARRELL RAY SHOEMAKE
BETSY H.SHOEMAKE
DB:1227,PG:958

FOR REGISTRATION REGISTER OF DEEDS
KIMBERLY S. HARGROVE
HARNETT COUNTY, NC
2004 SEP 03 09:11:26 AM
BK:2004 PG:896-897 FEE:$21.00

INSTRUMENT # 2004016666

NO APPROVAL NECESSARY

REVIEW OFFICER

MAP WAS DRAWN TO CORRECT AN ERROR IN THE AREA OF MAP RECORDED IN PLAT CABINET F,SLIDE 593-A
NO NEW SURVEY WAS DONE AT THIS DATE.

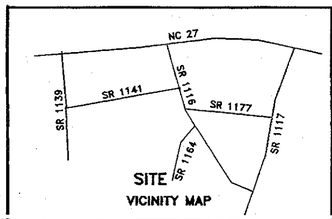
EXISTING PARCEL

REVISION OF MAP RECORDED IN PLAT CABINET F,SLIDE 593-A

LEGEND

LINES NOT SURVEYED
LINES SURVEYED
EIP------EXISTING IRON PIPE
ECM------EXISTING CONCRETE MONUMENT
EIS------EXISTING IRON STAKE
EPKN------EXISTING P.K.NAIL
PKNS------P.K.NAIL SET
ELS------EXISTING LIGHTWOOD STAKE
N/F------NOW OF FORMALLY
R/W------RIGHT OF WAY
C/L------CENTER LINE
NIS------NEW IRON STAKE
NIP------NEW IRON PIPE
ERRS------EXISTING RAILROAD SPIKE
NRRS------NEW RAILROAD SPIKE
CP------CALCULATED POINT
EMN------EXISTING MAGNETIC NAIL
NMN------NEW MAGNETIC NAIL
ECS------EXISTING COTTON SPINDLE
NCS------NEW COTTON SPINDLE
EIP/EIS---(CONTROL CORNERS)
ECM/PKN/ECS (CONTROL CORNERS)

NORTH CAROLINA
HARNETT COUNTY
This Map/Plat was presented for registration and recorded in this office at Map Number 2004-896
This 3rd day of September 2004
at 9:11 o'clock A M.
KIMBERLY S. HARGROVE Register of Deeds
By: Judi Smith
Assistant/Deputy Register of Deeds



VICINITY MAP

~~SURVEY FOR:~~
HARNETT COUNTY
ANDERSON CREEK LANDFILL

BENNETT SURVEYS, INC.
1662 CLARK RD.,LILLINGTON,N.C. 27546
(910) 893-5252

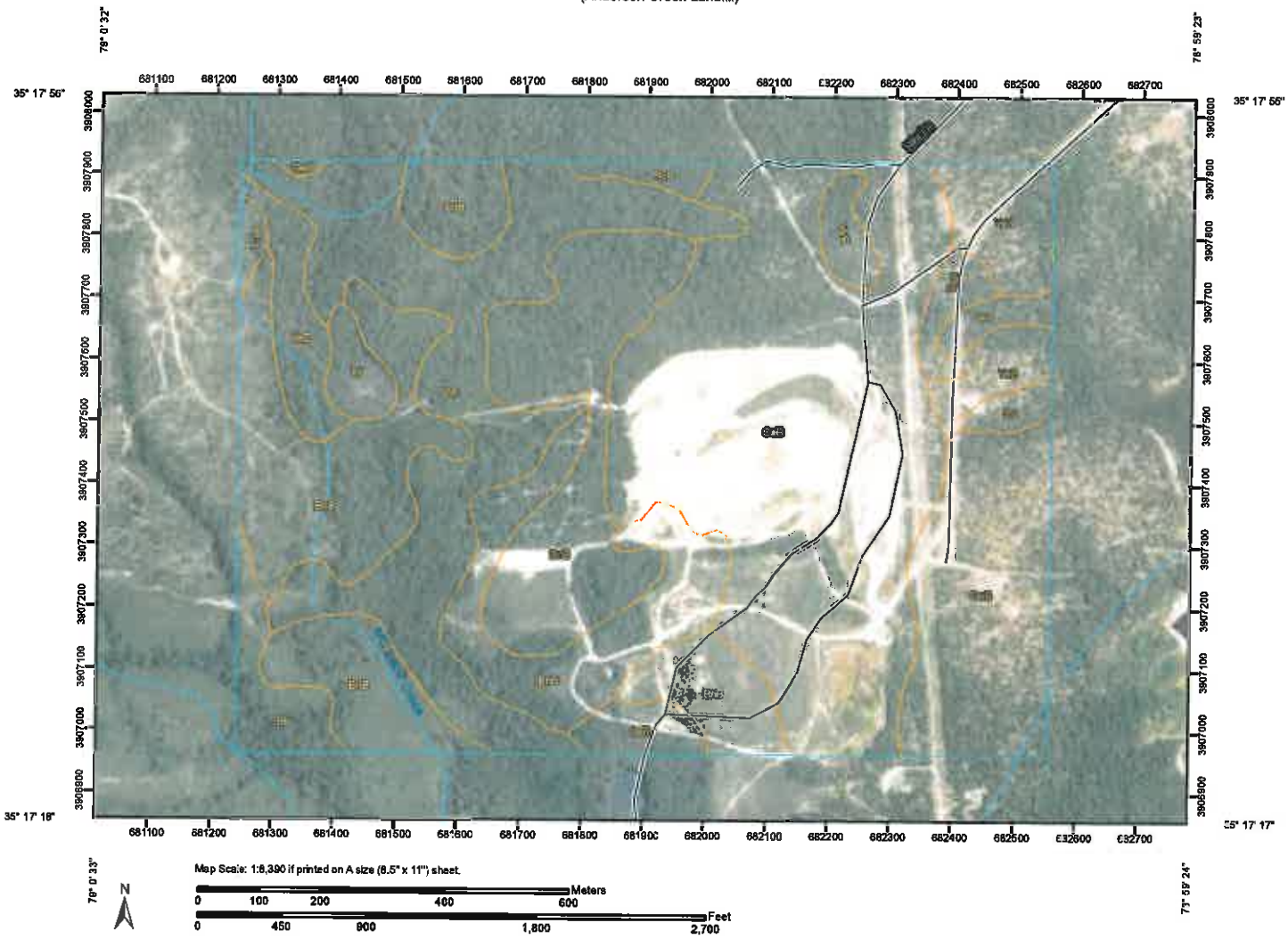
TOWNSHIP BARBECUE		COUNTY HARNETT	100' 0 200'	SURVEYED BY: N/A	FIELD BOOK
STATE: NORTH CAROLINA		DATE: AUGUST 30,2004	SCALE: 1" = 200'	DRAWN BY: MRB	DRAWING NO.
ZONE RA-20R	WATERSHED DISTRICT N/A	TAX PARCEL ID#: SEE MAP	CHECKED & CLOSURE BY: MRB		04398

Map # 2004-896

Appendix II

Soil Classifications

Soil Map—Harnett County, North Carolina
(Anderson Creek Landfill)



Map Scale: 1:8,390 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 450 900 1,800 2,700

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:8,390 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Harnett County, North Carolina
Survey Area Data: Version 8, Jul 5, 2012

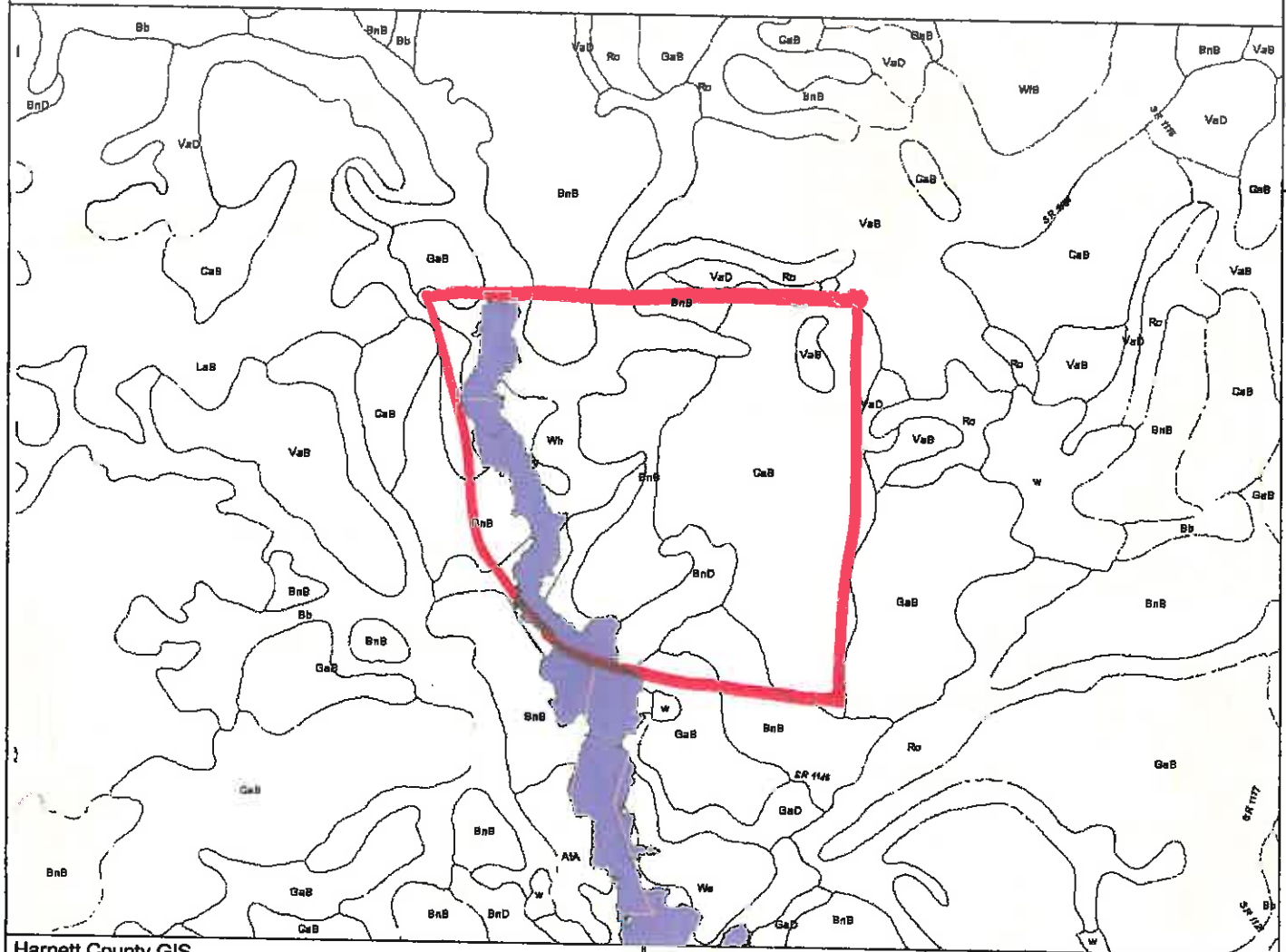
Date(s) aerial images were photographed: 6/22/2006

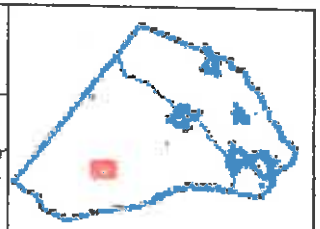
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Harnett County, North Carolina (NC085)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bb	Bibb soils, frequently flooded	6.6	2.1%
BnB	Blaney loamy sand, 2 to 8 percent slopes	80.8	25.9%
BnD	Blaney loamy sand, 8 to 15 percent slopes	20.0	6.4%
CaB	Candor sand, 0 to 8 percent slopes	89.7	28.7%
GaB	Gilead loamy sand, 2 to 8 percent slopes	32.0	10.3%
Ro	Roanoke loam, occasionally flooded	4.5	1.5%
VaB	Vaucluse loamy sand, 2 to 8 percent slopes	15.4	4.9%
VaD	Vaucluse loamy sand, 8 to 15 percent slopes	10.6	3.4%
W	Water	3.4	1.1%
Wh	Wehadkee loam, frequently flooded	49.1	15.7%
Totals for Area of Interest		**312.2**	**100.0%**

HARNETT COUNTY, NORTH CAROLINA GIS/LAND RECORDS





schpts
roads
Parcels
city

Angier
Broadway
Coats
Dunn
Erwin
Lillington

Major Roads

FEMA Flood Zones 2005

AE
AEFW
SHADED X

Soils

Harnett County GIS
305 W Cornelius Harnett Blvd, Suite 100
Lillington, NC 27546
Phone: 910-893-7523 WWW.HARNETT.ORG

Any use of this map shall be at the sole risk of the user of this map.Although, all effort has been taken to insure accuracy in the data presented, Harnett County makes no warranty, expressed or implied, as to the accuracy of this information represented herein. Any user of this product shall hold harmless Harnett County, its elected officials, employees and agents from and against any claim, damage, loss, action, cause of action, or liability arising from the use of this GIS product.

Harnett County
strong roots • new growth

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alpin	Thermic, coated Typic Quartzipsamments
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Augusta	Fine-loamy, mixed, thermic Aeric Endoaquults
Aycock	Fine-silty, siliceous, thermic Typic Paleudults
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Blaney	Loamy, siliceous, thermic Arenic Hapludults
Candor	Sandy, siliceous, thermic Arenic Paleudults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Coxville	Clayey, kaolinitic, thermic Typic Paleaquults
Dothan	Fine-loamy, siliceous, thermic Plinthic Paleudults
Enon	Fine, mixed, thermic Ultic Hapludalfs
Exum	Fine-silty, siliceous, thermic Aquic Paleudults
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Gilead	Clayey, kaolinitic, thermic Aquic Hapludults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Grantham	Fine-silty, siliceous, thermic Typic Paleaquults
Helena	Clayey, mixed, thermic Aquic Hapludults
Lakeland	Thermic, coated Typic Quartzipsamments
Lillington	Loamy-skeletal, siliceous, thermic Typic Hapludults
Louisa	Loamy, micaceous, thermic, shallow Ruptic-Ultic Dystrochrepts
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Marlboro	Clayey, kaolinitic, thermic Typic Paleudults
Nahunta	Fine-silty, siliceous, thermic Aeric Paleaquults
Nason	Clayey, mixed, thermic Typic Hapludults
Norfolk	Fine-loamy, siliceous, thermic Typic Paleudults
Orangeburg	Fine-loamy, siliceous, thermic Typic Paleudults
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Pactolus	Thermic, coated Aquic Quartzipsamments
Pocalla	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Polawana	Sandy, mixed, thermic Cumulic Humaquepts
Portsmouth	Fine-loamy over sandy or sandy-skeletal, mixed, thermic Typic Umbraquults
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Roanoke	Clayey, mixed, thermic Typic Endoaquults
State	Fine-loamy, mixed, thermic Typic Hapludults
Toisnot	Coarse-loamy, siliceous, thermic Typic Fragiaquults
Vaucluse	Fine-loamy, siliceous, thermic Typic Hapludults
Wagram	Loamy, siliceous, thermic Arenic Paleudults
Wahee	Clayey, mixed, thermic Aeric Endoaquults
Wakulla	Sandy, siliceous, thermic Psammentic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
Wickham	Fine-loamy, mixed, thermic Typic Hapludults

☆ U.S. GOVERNMENT PRINTING OFFICE : 1994—300-438/00510/SCS

fine roots; few thin faint patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—48 to 64 inches; mottled red (2.5YR 4/8), brownish yellow (10YR 6/6), and light gray (10YR 7/1) silty clay loam; weak coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few thin faint patchy clay films on faces of peds; very strongly acid.

The solum is 60 inches or more thick. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or hue of 2.5Y, value of 4 or 5, and chroma of 2. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is silt loam, very fine sandy loam, or loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is mottled in shades of brown or red, and gray mottles are common below a depth of about 30 inches. The lower part may be mottled in shades of these colors. Texture is silty clay loam, clay loam, or loam.

The BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown, red, and gray, or it may be mottled in shades of these colors. It is silty clay loam, clay loam, or loam.

Bibb Series

The Bibb series consists of poorly drained, moderately permeable soils that formed in sandy alluvial sediments. These soils are on flood plains. Slopes range from 0 to 2 percent.

Typical pedon of Bibb loam, frequently flooded; about 4.0 miles south of Angier at the intersection of Secondary Roads 1542 and 1510, about 0.5 mile west on Secondary Road 1510, about 50 feet northeast of a bridge, about 50 feet east of West Buies Creek:

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; many medium and large roots; strongly acid; clear smooth boundary.

Cg1—10 to 24 inches; dark gray (10YR 4/1) sandy loam; weak medium granular structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.

Cg2—24 to 48 inches; gray (10YR 5/1) sandy loam that has pockets of loamy sand; massive; friable; few fine roots; strongly acid; clear wavy boundary.

Cg3—48 to 60 inches; light gray (10YR 7/1) loamy sand that has pockets of sandy loam; single grained; loose; strongly acid.

The loamy underlying material extends to a depth of more than 60 inches and is underlain by stratified sediments. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2. The Cg horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 3 to 7. It is sandy loam, fine sandy loam, loam, or silt loam. In most pedons it is thinly stratified. In many pedons it has layers of sand. In some pedons the lower part of the Cg horizon contains gravel.

Blaney Series

The Blaney series consists of well drained, moderately slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 2 to 15 percent.

Typical pedon of Blaney loamy sand, 2 to 8 percent slopes; about 3.2 miles south of Clark's Bridge, about 375 feet east of Secondary Road 1117:

Ap—0 to 9 inches; grayish brown (10YR 5/2) loamy sand; single grained; loose; many fine and medium roots; common fine quartz gravel; strongly acid; abrupt smooth boundary.

E—9 to 22 inches; light yellowish brown (10YR 6/4) loamy sand; single grained; loose; few fine and medium roots; common coarse quartz gravel; strongly acid; clear wavy boundary.

Bt1—22 to 28 inches; very pale brown (10YR 7/4) sandy clay loam; weak medium subangular blocky structure; friable, brittle in 20 percent of the mass; few fine roots; common coarse quartz gravel; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—28 to 33 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct reddish yellow (5YR 6/8) mottles; weak medium subangular blocky structure; friable, brittle in 20 percent of the mass; few fine roots; common coarse quartz gravel; few thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—33 to 46 inches; brownish yellow (10YR 6/6) sandy clay loam; many coarse prominent reddish yellow (5YR 6/8) and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, brittle in 20 percent of the mass; common flakes of mica; about 5 percent coarse quartz gravel; very strongly acid; gradual wavy boundary.

C—46 to 64 inches; reddish yellow (5YR 6/8) sandy clay loam that has pockets of sandy loam and sandy clay; common coarse prominent light gray (10YR 7/1) and very pale brown (10YR 7/4) mottles;

massive; friable; common flakes of mica; about 5 percent fine quartz gravel; very strongly acid.

The solum is 40 to more than 60 inches thick. The content of coarse fragments ranges from 0 to 10 percent. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. The E horizon has hue of 10YR, value of 6, and chroma of 2 to 4 or hue of 2.5Y, value of 6, and chroma of 3 or 4. It is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of yellow, brown, or red. In most pedons it has mottles in shades of gray in the lower part. It is sandy clay loam or sandy loam. In some pedons it is sandy clay in the lower part.

The C horizon has hue of 5YR to 10YR, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of yellow, brown, red, or gray. It is dominantly sandy clay loam, clay loam, or sandy loam and is commonly stratified with sandy or clayey material. In some pedons, however, it is loamy coarse sand.

Candor Series

The Candor series consists of somewhat excessively drained soils that formed in sandy and loamy sediments. These soils are rapidly permeable in the upper part and moderately permeable in the lower part. They are on uplands. Slopes range from 0 to 15 percent.

Typical pedon of Candor sand, 0 to 8 percent slopes; about 1.5 miles south of Lillington on North Carolina Highway 27, about 600 feet west of the road:

A—0 to 3 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; few fine roots; very strongly acid; abrupt smooth boundary.

E—3 to 25 inches; yellowish brown (10YR 5/4) sand; weak fine granular structure; very friable; few fine roots; strongly acid; abrupt wavy boundary.

Bt—25 to 35 inches; yellowish brown (10YR 6/6) loamy sand; weak fine subangular blocky structure parting to weak fine granular; very friable; very strongly acid; gradual wavy boundary.

E′—35 to 60 inches; yellow (10YR 7/6) sand; single grained; loose; very strongly acid; gradual smooth boundary.

B′t1—60 to 70 inches; reddish yellow (7.5YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B′t2—70 to 85 inches; reddish yellow (7.5YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable; common large flakes of mica; very strongly acid.

The solum is more than 60 inches thick. The thickness of the sandy horizons and depth to the B′t horizon range from 40 to 80 inches. The content of coarse fragments, which are mostly quartz pebbles or ironstone, ranges from 0 to 5 percent in the A and Bt horizons and is as much as 15 percent in the E′ and B′t horizons. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 6.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8.

The E′ horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8. It is sand or loamy sand.

The B′t horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8, or it is mottled in shades of yellow, brown, red, or gray. It is sandy loam, sandy clay loam, or sandy clay. In some pedons on smooth to gently undulating interstream divides, it contains as much as 5 percent plinthite between depths of 60 and 80 inches.

The BC and C horizons, if they occur, have hue of 7.5YR or 10YR, value of 6 to 8, and chroma of 4 to 8. They are mottled in shades of yellow, brown, red, gray, or white. In some pedons they have fine or medium bodies of white kaolin and flakes of mica. They are sandy loam, sandy clay loam, clay loam, sandy clay, or clay and may be stratified. In some pedons they are dense and compact.

Cecil Series

The Cecil series consists of well drained, moderately permeable soils that formed in material weathered from acid crystalline rocks. These soils are on uplands. Slopes range from 2 to 15 percent.

Typical pedon of Cecil fine sandy loam, 2 to 8 percent slopes; about 10.7 miles northwest of Lillington on U.S. Highway 421, north 2.6 miles on Secondary Road 1265, about 50 feet east of the road:

A—0 to 2 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; about 10 percent quartz pebbles; strongly acid; clear smooth boundary.

E—2 to 4 inches; reddish yellow (7.5YR 6/6) fine sandy loam; weak fine granular structure; very friable; common fine roots; about 5 percent quartz pebbles; strongly acid; abrupt smooth boundary.

The capability subclass is Vw. Based on loblolly pine ; the indicator species, the woodland ordination symbol is 9W.

BnB—Blaney loamy sand, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Blaney and similar soils on side slopes and narrow ridges in the uplands. Mapped areas are in long, narrow bands above and parallel to most of the streams in the sandhills. They range from about 10 to more than 100 acres in size.

Typically, the surface layer is grayish brown loamy sand 9 inches thick. The subsurface layer is light yellowish brown loamy sand 13 inches thick. The subsoil extends to a depth of 46 inches. The upper part is very pale yellow and light yellowish brown sandy clay loam. The lower part is brownish yellow sandy clay loam that has reddish yellow and light gray mottles. The underlying material to a depth of 64 inches is reddish yellow sandy clay loam that has light gray and very pale brown mottles and pockets of sandy loam and sandy clay.

Permeability is moderately slow. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched water table may be above the brittle subsoil for brief periods after heavy rains.

Included in mapping are small areas of Gilead, Vaucluse, and Candor soils. Gilead soils contain more clay than the Blaney soil, and Vaucluse soils have a thinner sandy surface layer. These soils are adjacent to side slopes and are on short, steep slopes. Candor soils contain less clay than the Blaney soil and are adjacent to sandy areas. They are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. The remaining acreage is used mainly for row crops or pasture.

This map unit is moderately suited to cultivated crops, such as corn, soybeans, tobacco, and small grain. Droughtiness and low fertility are the main limitations. Winter cover crops, conservation tillage, and crop residue management help to conserve moisture and maintain tilth. No-till planting, windbreaks, and a crop rotation that includes close-growing crops also conserve soil and water. Erosion is a moderate hazard where surface runoff concentrates in cultivated fields.

This map unit is well suited to hay and pasture plants, especially coastal bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during t periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant native trees are loblolly pine and longleaf pine. The understory species include sassafras and blackjack oak. The brittle subsoil may retard, but does not restrict, penetration by tree roots. The sandy surface texture results in a moderate seedling mortality rate and limits the use of equipment.

This map unit is moderately suited to most urban and recreational uses. Streams that flow through the unit are commonly dammed to make lakes for recreational purposes. Housing developments commonly surround these lakes. The moderately slow permeability is a limitation on sites for septic tank absorption fields. The sandy surface layer is a limitation affecting some recreational uses.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

BnD—Blaney loamy sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Blaney and similar soils on side slopes in the uplands. Mapped areas are in long, narrow bands above and parallel to most of the streams in the sandhills. They range from about 10 to more than 100 acres in size.

Typically, the surface layer is grayish brown loamy sand 9 inches thick. The subsurface layer is light yellowish brown loamy sand 13 inches thick. The subsoil extends to a depth of 46 inches. The upper part is very pale yellow and light yellowish brown sandy clay loam, and the lower part is brownish yellow sandy clay loam that has reddish yellow and light gray mottles. The underlying material to a depth of 64 inches is reddish yellow sandy clay loam that has light gray and very pale brown mottles and pockets of sandy loam and sandy clay. In places the soil is sandy within a depth of 60 inches.

Permeability is moderately slow. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched water table may be above the brittle subsoil for brief periods after heavy rains.

Included in mapping are small areas of Gilead, Vaucluse, and Candor soils. Gilead soils contain more clay than the Blaney soil, and Vaucluse soils have a thinner sandy surface layer. These soils are adjacent to side slopes and are on short, steep slopes. Candor soils contain less clay than the Blaney soil and are adjacent to sandy areas. They are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most areas of this map unit are woodland. A small acreage is used for cultivated crops or pasture.

This map unit is poorly suited to cultivated crops

because of the hazard of erosion caused by the slope. Contour farming, stripcropping, conservation tillage, crop residue management, and a crop rotation that includes 1 or more years of grasses or legumes help to control erosion.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant native trees are loblolly pine and longleaf pine. The understory species include sassafras and blackjack oak. The brittle subsoil may retard, but does not restrict, penetration by tree roots. The sandy surface texture and the slope result in a moderate seedling mortality rate and limit the use of equipment. Care should be taken to control erosion during planting and harvesting in disturbed areas.

This map unit is poorly suited to most urban uses and moderately suited to recreational uses. Streams that flow through the unit are commonly dammed to make lakes for recreational purposes. Housing developments commonly surround these lakes. The slope and the restricted permeability in the subsoil are limitations on sites for septic tank absorption fields. The slope is a limitation on sites for dwellings. The sandy surface layer and the slope limit some recreational uses.

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

CaB—Candor sand, 0 to 8 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, somewhat excessively drained Candor and similar soils in broad upland areas, and, to a lesser extent, on rounded side slopes in the uplands. Mapped areas are irregular in shape and range from about 5 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown sand 3 inches thick. The subsurface layer is yellowish brown sand about 22 inches thick. The upper subsoil to a depth of 35 inches is yellowish brown loamy sand. An intermediate layer of yellow sand is between depths of 35 and 60 inches. The lower subsoil to a depth of 85 inches is reddish yellow sandy clay loam.

Permeability is rapid in the upper part and moderate in the lower part. Available water capacity is very low. Reaction ranges from extremely acid to strongly acid in the subsoil, except where the surface layer has been limed.

Included in mapping are small areas of Blaney, Fuquay, and Wagram soils. These soils contain less sand than the Candor soil and are in areas adjacent to side slopes and at the lowest elevations. Also included are small areas of Wakulla and Lakeland soils. These soils contain more sand than the Candor soil and are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. The remaining acreage is mainly woodland.

This map unit is poorly suited to cultivated crops, such as corn, soybeans, small grain, and truck crops. The main limitation is the very low available water capacity. Soil blowing also is a limitation. Conservation tillage, crop residue management, windbreaks, and a cropping sequence that includes close-growing grasses and legumes help to control soil blowing and conserve moisture.

This map unit is moderately suited to hay and pasture. Coastal bermudagrass and bahiagrass are the preferred grasses. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant trees are loblolly pine and longleaf pine. The main understory species are blackjack oak and turkey oak. The thick, sandy surface layer may limit the use of equipment.

This map unit is moderately suited to most urban and recreational uses. Lawns and shrubs may be difficult to establish and to maintain because of leaching of plant nutrients and droughtiness. Seepage and the instability of ditchbanks and trench walls are limitations (fig. 2).

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 4S.

CaD—Candor sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, somewhat excessively drained Candor and similar soils on side slopes in the uplands. Mapped areas are long and narrow and range from about 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown sand 3 inches thick. The subsurface layer is yellowish brown sand about 22 inches thick. The upper subsoil to a depth of 35 inches is yellowish brown loamy sand. An intermediate layer of yellow sand is between depths of 35 and 60 inches. The lower subsoil to a depth of 85 inches is reddish yellow sandy clay loam.

Permeability is rapid in the upper part and moderate in the lower part. Available water capacity is very low. Reaction ranges from extremely acid to strongly acid in the subsoil, except where the surface layer has been limed.

Included in mapping are small areas of Blaney, Fuquay, and Wagram soils. These soils contain less

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
AnB---------- Alpin	0-5	Sand----------	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	5-38	Fine sand, loamy sand, sand.	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	38-86	Fine sand, sand	SP-SM, SM	A-2-4	0	95-100	90-100	60-100	11-20	---	NP
AtA---------- Altavista	0-8	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	8-35	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	35-60	Variable---------	---	---	---	---	---	---	---	---	---
Au---------- Augusta	0-12	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0	90-100	75-100	50-98	30-60	<25	NP-7
	12-50	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	50-60	Variable---------	---	---	---	---	---	---	---	---	---
AyA, AyB---------- Aycock	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-80	<25	NP-10
	10-64	Clay loam, silty clay loam, loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-90	22-49	8-30
Bb---------- Bibb	0-60	Loam, sandy loam, loamy sand.	ML, CL-ML	A-4	0-5	95-100	90-100	80-90	50-80	<25	NP-7
BnB, BnD---------- Blaney	0-22	Loamy sand-------	SM, SP-SM	A-2, A-3	0	95-100	95-100	60-85	8-30	---	NP
	22-46	Sandy clay loam, sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6, A-1-b	0	95-100	90-100	25-85	20-49	<40	NP-20
	46-64	Sandy loam, sandy clay loam, loamy sand.	SM, SC, SC-SM	A-2, A-4, A-6, A-1-b	0	95-100	90-100	24-85	15-49	<36	NP-14
CaB, CaD---------- Candor	0-25	Sand----------	SM, SP-SM	A-2, A-3, A-2-4	0-2	98-100	96-100	55-90	5-15	---	NP
	25-35	Loamy sand-------	SM, SP-SM	A-2, A-2-4	0-2	98-100	96-100	63-90	10-25	---	NP
	35-85	Sand----------	SM, SP-SM	A-2, A-3	0-7	90-100	90-100	55-90	5-15	---	NP
CeB, CeD---------- Cecil	0-4	Fine sandy loam	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	4-15	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	75-100	75-100	68-95	38-81	21-35	3-15
	15-27	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	27-68	Variable---------	---	---	---	---	---	---	---	---	---
Ch*:											
Chewacla--------	0-24	Loam----------	SM, SC-SM	A-2, A-4	0	98-100	95-100	60-90	30-50	<30	NP-7
	24-38	Silt loam, silty clay loam, clay loam.	ML, CL	A-4, A-6, A-7	0	96-100	95-100	80-100	51-98	30-49	4-22
	38-62	Clay loam, loam, sandy loam.	SM, SC-SM, ML, CL	A-4, A-7-6, A-6	0	96-100	95-100	60-100	36-70	20-45	2-15

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(Th ymbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

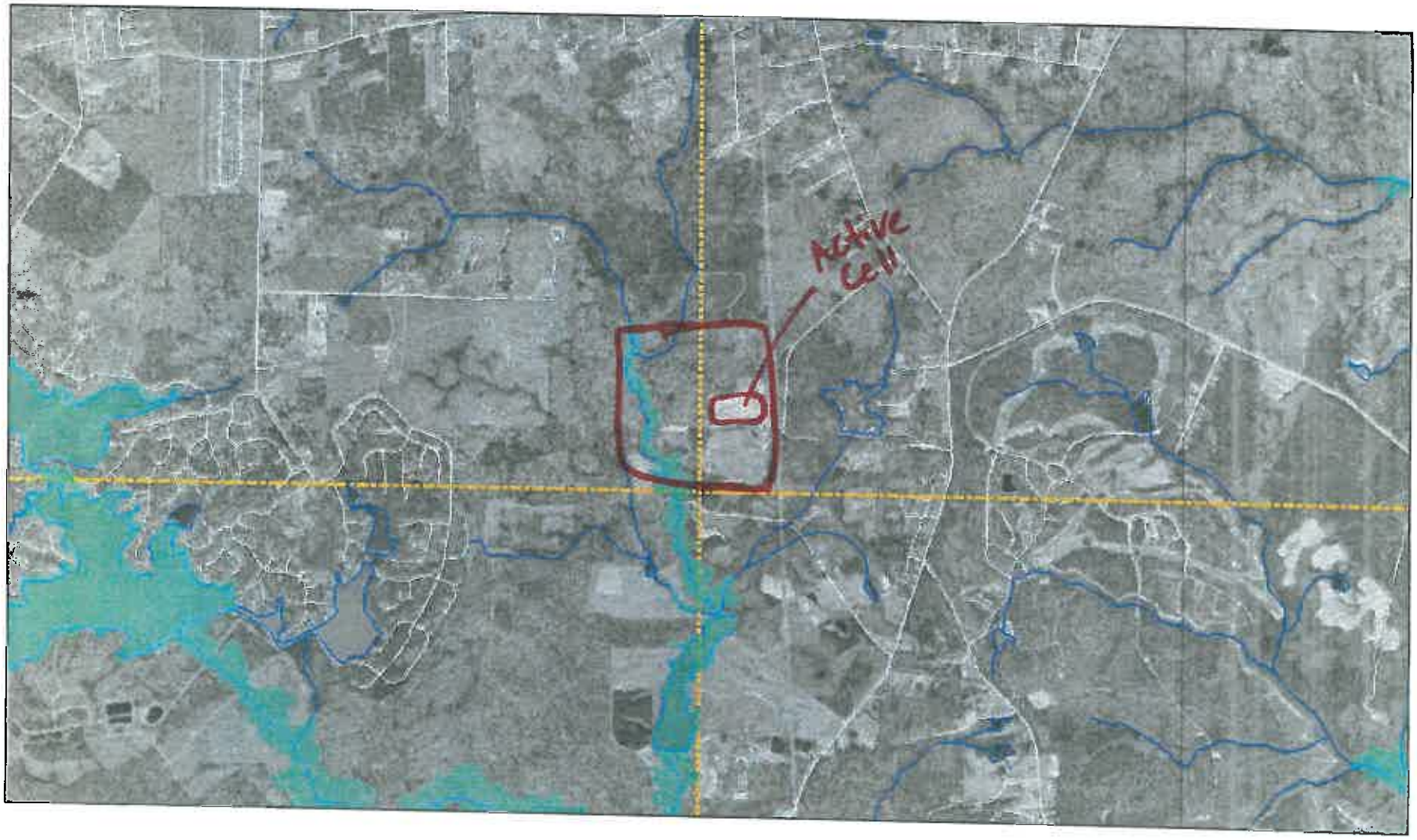
Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AnB---------- Alpin	0-5	1-10	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.5	Low----------	0.10	5	1	0-2
	5-74	1-7	1.40-1.55	6.0-20	0.03-0.09	4.5-6.5	Low----------	0.10			
	74-86	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.5	Low----------	0.10			
AtA---------- Altavista	0-8	10-20	1.30-1.50	2.0-6.0	0.12-0.20	3.6-6.0	Low----------	0.24	5	3	.5-3
	8-35	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-6.0	Low----------	0.24			
	35-60	---	---	---	---	---	----------	----			
Au---------- Augusta	0-12	5-20	1.40-1.70	2.0-6.0	0.10-0.15	4.5-6.0	Low----------	0.20	4	---	.5-2
	12-50	20-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low----------	0.24			
	50-60	---	---	0.6-20	---	---	----------	----			
AyA, AyB--------- Aycock	0-10	4-15	1.30-1.60	2.0-6.0	0.15-0.20	4.5-5.5	Low----------	0.37	5	3	1-4
	10-64	18-35	1.30-1.60	0.2-2.0	0.15-0.20	4.5-5.5	Low----------	0.43			
Bb---------- Bibb	0-60	2-18	1.20-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.28	5	5	.5-2
BnB, BnD--------- Blaney	0-22	2-10	1.35-1.75	>6.0	0.03-0.06	4.5-5.5	Low----------	0.15	4	2	<1
	22-46	18-35	1.75-1.95	0.2-0.6	0.05-0.10	4.5-5.5	Low----------	0.28			
	46-64	10-25	1.70-1.90	0.2-0.6	0.03-0.08	4.5-5.5	Low----------	0.28			
Cal D--------- Candor	0-25	1-4	1.60-1.70	6.0-20	0.02-0.06	3.6-5.5	Low----------	0.10	5	1	.5-1
	25-35	6-12	1.55-1.70	6.0-20	0.06-0.10	3.6-5.5	Low----------	0.10			
	35-60	1-4	1.60-1.70	6.0-20	0.02-0.05	3.6-5.5	Low----------	0.10			
	60-85	10-35	1.35-1.60	0.6-2.0	0.12-0.16	3.5-5.5	Low----------	0.20			
CeB, CeD--------- Cecil	0-4	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-5.5	Low----------	0.28	4	3	.5-2
	4-15	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28			
	15-27	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low----------	0.28			
	27-68	---	---	---	---	---	----------	----			
Ch*:											
Chewacla--------	0-24	5-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.5	Low----------	0.24	5	3	1-4
	24-38	18-35	1.30-1.50	0.6-2.0	0.15-0.24	4.5-6.5	Low----------	0.32			
	38-62	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low----------	0.28			
Congaree--------	0-18	5-15	1.30-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low----------	0.24	5	3	<4
	18-70	18-35	1.20-1.50	0.6-2.0	0.12-0.20	4.5-7.3	Low----------	0.37			
Co---------- Coxville	0-6	5-27	1.45-1.65	0.6-2.0	0.12-0.17	3.6-5.5	Low----------	0.24	5	3	2-4
	6-60	35-60	1.25-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Moderate------	0.32			
DoA, DoB--------- Dothan	0-12	5-15	1.30-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Very low------	0.15	5	2	<.5
	12-80	18-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.28			
DtB---------- Dothan	0-12	5-15	1.20-1.50	2.0-6.0	0.04-0.08	4.5-6.0	Low----------	0.10	5	---	<.5
	12-80	18-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low----------	0.28			
EyF. Dystrochrepts											
EnB, EnD--------- Enon	0-5	10-20	1.45-1.65	2.0-6.0	0.11-0.15	5.1-6.5	Low----------	0.28	3	3	.5-2
	5-24	35-60	1.20-1.40	0.06-0.2	0.12-0.16	5.1-7.8	High----------	0.28			
	24-60	---	---	---	---	---	----------	----			

See footnote at end of table.

Appendix III

North Carolina Water Bodies listed by County

ANDERSON CREEK LANDFILL



- Major Cities
- Benchmarks
- DFIRM Grid
- Rivers and Streams
- Transects (Coastal)
- County Boundaries
- Coastal Barrier Resource Systems

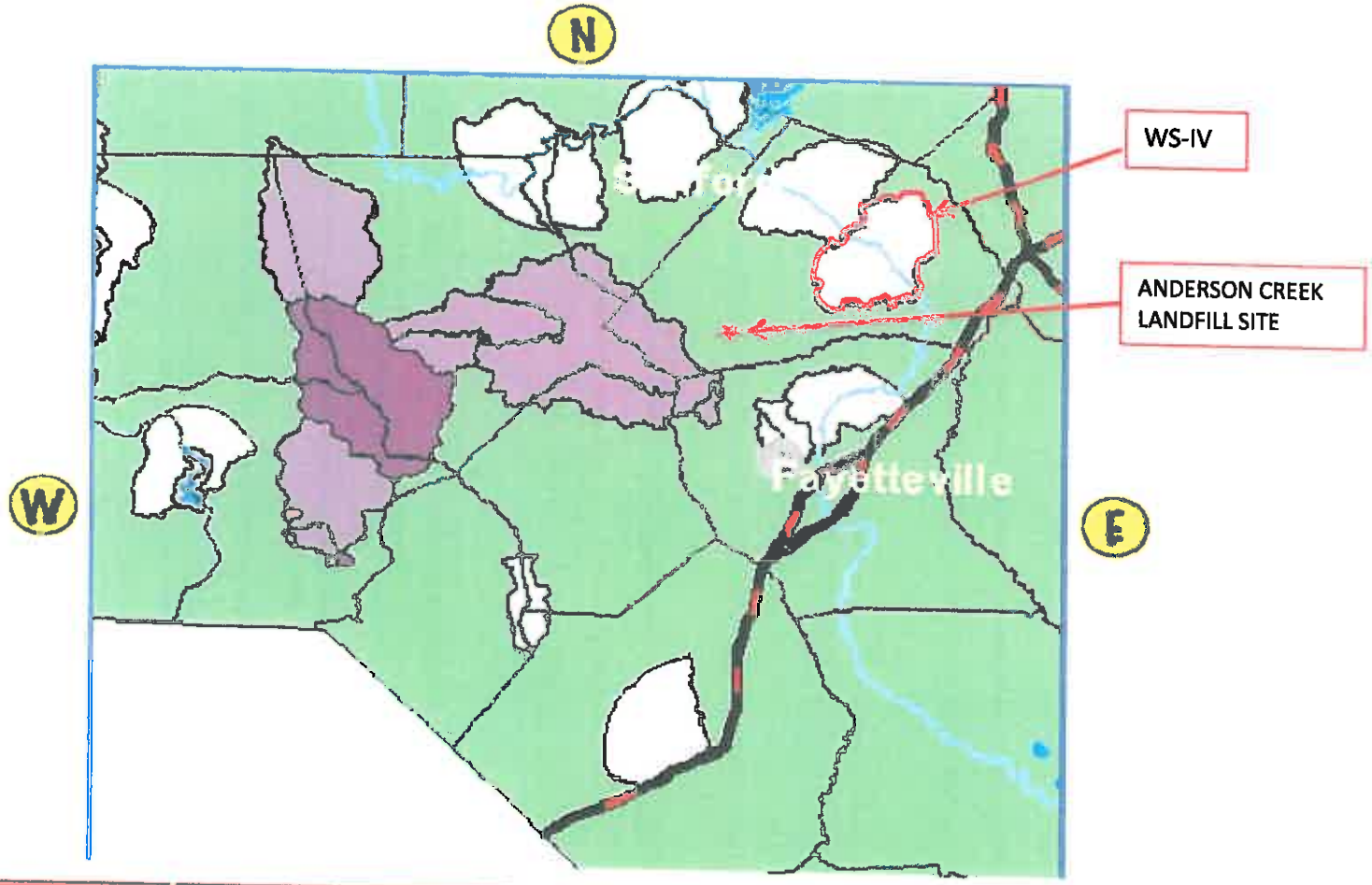
Roads:
- NC Highway
- US Highway
- Interstate Highway
- Political Areas
- Extraterritorial Jurisdictions
- Coastal Sounds

- 100yr Flooding - Floodway (AE)
- 100yr Flooding - Has BFE's (AE)
- 100yr Flooding - No BFE's (A)
- 100yr Flooding - Velocity Zone
- 500yr Flooding (Shaded X)
- Base Flood Elevation (Symbol)
- Cross Sections

0 3000 Feet

North Carolina
Floodplain Mapping Program

NORTH CAROLINA WATER SUPPLY WATERSHEDS



Watershed Class	River Basin	Watershed Name	Approval Date	Area Type	Acreage
WS-IV	Cape Fear	Cape Fear River (Dunn)	8/3/92	Protected Area	59130.648

Image Source: http://wire.enr.state.nc.us/wswp/interact/imapindex.html
Accessed on 11/1/2010

Name of Stream	Description	Curr. Class	Date	Basin	Stream Index #
Gardners Branch	From source to Upper Little River	WS-IV	08/03/92	Cape Fear	18-20-32
First Silver Run	From source to Upper Little River	WS-IV	08/03/92	Cape Fear	18-20-33
Second Silver Run	From source to First Silver Run	WS-IV	08/03/92	Cape Fear	18-20-33-1
Juniper Creek	From source to Cape Fear River	C	09/01/74	Cape Fear	18-21
Stewart Creek	From source to Juniper Creek	C	09/01/74	Cape Fear	18-21-1
Little River (Lower Little River)	From Fort Bragg lower water supply intake to Cape Fear River	C	09/01/74	Cape Fear	18-23-(24)
Cypress Creek	From source to Lake Surf, Crane Creek	WS-III	08/03/92	Cape Fear	18-23-16-10
Middle Prong Cypress Creek	From source to Cypress Creek	WS-III	08/03/92	Cape Fear	18-23-16-10-1
Reedy Branch	From source to Cypress Creek	WS-III	08/03/92	Cape Fear	18-23-16-10-2
McDougald Branch	From source to Cypress Creek	WS-III	08/03/92	Cape Fear	18-23-16-10-3
Big Branch	From source to Cypress Creek	WS-III	08/03/92	Cape Fear	18-23-16-10-4
Deep Branch	From source to Cypress Creek	WS-III	08/03/92	Cape Fear	18-23-16-10-5
Beaver Creek	From source to Crane Creek	WS-III	08/03/92	Cape Fear	18-23-16-8
Long Branch	From source to Beaver Creek	WS-III	08/03/92	Cape Fear	18-23-16-8-5
Horse Branch	From source to Crane Creek	WS-III	08/03/92	Cape Fear	18-23-16-9
Buffalo Creek	From source to Little River	WS-III	08/03/92	Cape Fear	18-23-18
Duncans Creek	From source to Buffalo Creek	WS-III	08/03/92	Cape Fear	18-23-18-1
Wildcat Branch	From source to Duncans Creek	WS-III	08/03/92	Cape Fear	18-23-18-1-1
Hector Creek	From source to Little River	WS-III	08/03/92	Cape Fear	18-23-21
Muddy Creek (Overhills Lake)	From source to Little River	C	08/03/92	Cape Fear	18-23-26
Jumping Run Creek	From source to Little River	C	07/01/73	Cape Fear	18-23-29
McLeod Creek	From source to Jumping Run Creek	C	07/01/73	Cape Fear	18-23-29-1
Red Hill Branch	From source to McLeod Creek	C	09/01/74	Cape Fear	18-23-29-1-1
South Prong McLeod Creek	From source to McLeod Creek	C	09/01/74	Cape Fear	18-23-29-1-2
Reedys Swamp	From source to Jumping Run Creek	C	09/01/74	Cape Fear	18-23-29-2

Appendix IV

Public Hearing Documentation

Clayton Engineering
Civil & Environmental

MEETING MINUTES

Harnett County
SOLID WASTE EXPANSION

PUBLIC MEETING
October 8, 2008 – 9:00 AM – Lillington, NC Public Library

CTC Inc. PN# 03001C, 03007A

Attendees:
See the attached Meeting Sign-In Sheet.

Distribution:
File

Minutes:

1. The single attendee, Mr. Darwin Haire was introduced to the presenters, Mr. Tyrus Clayton, Jr., P.E. of C.T. Clayton Engineering and Mr. Jerry Blanchard of Harnett County Solid Waste.
2. Mr. Haire has interests in property adjacent to the Anderson Creek Landfill entrance. Mr. Clayton and Mr. Blanchard described the proposed expansion and showed Mr. Haire the proposed location of the expansion on an 24"x36" exhibit map. Topics covered included buffer requirements, finished cell height, capacity, and wastes accepted. No questions were received during this presentation.
3. Mr. Haire had no questions regarding the Dunn-Erwin Landfill expansion.
4. The meeting adjourned at approximately 9:30 AM

October 11, 2010

Ryan Sadler, Project Manager

This report is the opinion of a C. T. Clayton, Sr., P.E., Inc. representative. Unless written notice disputing the information contained in this report is received within seven (7) days of the report date, it shall be assumed that all parties are in agreement that this information is true and correct.

PO Box 578 – 46 West Washington Street - Coats, North Carolina 27521
Phone: 910-897-7070 - Fax: 910-897-6767
Offices located in Coats and New Bern, North Carolina
License No. C-2570 - dba C. T. Clayton, Sr., P. E., Inc. - www.ctclayton.com

Clayton Engineering
Civil & Environmental

ATTENDANCE SIGN-UP SHEET

MEETING: HARNETT COUNTY SOLID WASTE PUBLIC MEETING PROJECT NAME: DUNN/ERWIN & ANDERSON CREEK LF EXPANSIONS

DATE: 10/08/10 TIME: 9:00 AM PLACE: LILLINGTON PUBLIC LIBRARY PN: 03002 PAGE: 1

	NAME	COMPANY/ORGANIZATION	CELL PHONE	PHONE	FAX
1	Ryan Sadler	CT Clayton		910-897-7070	910-897-6767
2	Tyrus Clayton	CT Clayton		910-897-7070	910-897-6767
3					
4	Darwin Harris	Wellco Const		910-497-2136	910 497-0277
5	Jerry Blackwood	Harnett County		910-893-7536	910 814 4041
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

STATE OF NORTH CAROLINA
COUNTY OF HARNETT

In the matter of:

Ref ad #: 180546 HARNETT CTY SOLID WASTE/L

I, Brenda Fryar, being duly sworn, say: tha
CLASSIFIED CLERK of THE DAILY RECORD,
a newspaper published at Dunn, Harnett Coun
and that the attached clipping is a copy of
Published said newspaper for 1 days, as fol

09/08/2010

as required by law in the above entitled suit.

This newspaper is qualified for legal advertising
in accordance with G.S. 1-597 and 1-598.

Brenda Fryar
Classified Clerk, THE DAILY RECORD

Subscribed and sworn to before me,
this 8th day of September, 2010

Gayle W Gass

My commission expires 11-19-2014

NOTICE OF PUBLIC MEETING

County Plans Public Meeting to Discuss Landfill Expansion

Dunn, NC - (September 7, 2010) - The Harnett County Solid Waste Depar ment has scheduled a public meeting in accordance with Title 15A NCA 13B .0536 to discuss the proposed expansions at its Dunn-Erwin an Anderson Creek C&D Landfill facilities.

Expansions are proposed to occur within the existing facilities as they ar currently located. Services offered and types of wastes received will not b changing.

The public meeting will be held October 8, 2010 at the Harnett County Publi Library, 601 North Main Street, Lillington, North Carolina, at 9:00AM.

All Harnett County residents are invited to attend.

Harnett County Solid Waste
PO Box 940
Lillington, NC 27546
9/8, 2010

VOLUME 58, NO. 205 DUNN, N.C. MONDAY SEPTEMBER 20, 2010

The Daily Record

ANGIER BENSON BUIES CREEK BUNNLEVEL COATS DUNN ERWIN FALCON GODWIN LILLINGTON LINDEN NE

Charges Still Likely In Fatal Spring Lake Wreck

The Harnett County State Highway Patrol is still investigating a fatal wreck on N.C. 210 on Sept. 11 to determine who will be charged in the death of a Bunnlevel man.

Investigators are hoping phone records will help them decide who is at fault in the crash.

Jerry Dockery, 44, was killed when the Dodge Stratus he was riding in collided with a Dodge Intrepid. Mr. Dockery's wife, Connie Jane Dockery, 53, was driving the Stratus. Brittany Deana Nash-Martin, 19, of Fayetteville was driving the Intrepid.

Both Mrs. Dockery and Ms. Nash-Martin were treated and released from Cape Fear Valley Medical Center in Fayetteville.

Last week, troopers reconstructed the crash to better deter-

SAT Results Bring More Bad N

For Harnett Schools

Johnston, Sampson scores improved in 2010.

By BRIAN HANEY and TOM WOERNER
For the Record

New numbers released last week show last year's high school seniors in Harnett County performed lower than their predecessors on tests most colleges require for admission.

The SAT scores are just the latest in a string of bad news for the county's school system, which saw only two of its 27 schools meet Annual Yearly Progress standards earlier this year.

Meanwhile, both Sampson and Johnston County students showed improvement over last year's SAT scores.

In Harnett County, SAT scores at all four high schools were lower in 2010 than they were just a year before.

The average critical reading and math composite score for students who took the SATs in 2010 in Harnett County was 953, down from an average score of 975 in 2009. Writing scores for 2010 were 449, down from 453 the previous year.

Harnett County is behind the state average on the tests by 55 points in reading and math and by 28 points in writing.

The state average was 1,008 for math and critical reading composite and 477 for writing. The national average was 1,017 for math and critical reading, 492 for writing.

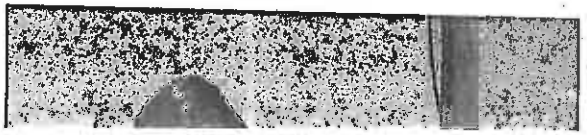
Harnett County Assistant Superintendent for Curriculum and Instruction Dr. Nancy Holmes said there ar negatives in

"Overall w but there are always want said. "We wer years ago so that we fell b

She said t

See SAT Resu

Fall Festival A Winner



Fire Two Buil Over

County To Start Recycling Shingles, Expand Landfills

By BRIAN HANEY
Of The Record Staff

Harnett County Commissioners have voted to reduce the cost of carrying clean shingles to the Anderson Creek landfill as part of a new pilot program to recycle shingles.

The board also received updates on plans to expand the county's two construction and demolition landfills and four convenience sites.

The county will partner with Johnson Brothers Asphalt Company, located just outside Lillington, which will come in and collect the used shingles from the landfill and use them to make asphalt.

As a result of the county no longer having to dispose of the shingles, the tipping fee for clean shingles at the Anderson Creek landfill has been cut in half from $40 to $20 per ton.

For now, the shingle recycling initiative will operate as a pilot program. If proven successful, the program could be expanded to the Dunn-Erwin landfill.

The county hopes reducing the tipping fee will give the public more incentive to bring in clean loads of shingles which can be easily recycled.

According to county General Services Director Jerry Blanchard, clean shingles are shingles without any foreign materials mixed in like pieces of bad wood or metal stripping.

He said tar paper and nails are not a big issue and can be removed during the grinding process, but other materials should be kept out.

Mr. Blanchard said the removal of shingles should take a lot of tonnage out of the landfill, considerably more than other recyclables like plastic bottles.

"Shingles are heavy," he said. "They mash the scales down."

He said the program will begin as soon as possible and will hopefully start this month.

"We're excited about that," he said of the program. "It's a win-win for everybody."

Facilities To Be Expanded

At the same time the county is looking to decrease tonnage at the landfills, Mr. Blanchard said both the Dunn-Erwin and Anderson Creek sites need to be expanded.

He said the cell currently in use at the Dunn-Erwin landfill is at around 85 percent capacity while the Anderson Creek cell is even closer to reaching its limit at 90 percent capacity.

The land where the new cells will be constructed is located within the existing landfill sites and already owned by the county.

Mr. Blanchard said construction of the new cells will involve

See County, Page 3

County

Continued From Page One

clearing the land, designing the cells and figuring out where groundwater is located beneath each site.

The cost of completing a site study and permit to construct were included in General Services' 2010-11 budget.

Permits for cells are only issued in five-year increments. Mr. Blanchard expects the new cells could last for as many as 15 years.

Before work can start on the expansion, general services must hold a public meeting to inform the community, notifying adjacent property owners via certified mail. The board of commissioners must also approve the expansion.

Mr. Blanchard said he anticipates holding the public meeting around the first of October. It will be held at the Harnett County Library in Lillington.

He also gave an update on plans to expand the county's four convenience sites due to increased interest in recycling.

Mr. Blanchard suggested the Johnsonville site as the first to be expanded as it has more participation than any other site.

On average, the Johnsonville site takes in 4.2 tons of recyclables each month. The Bunnlevel site receives 3.15 tons while both the Mamers and Buckhorn sites see 2.1 tons of recycling come in each month.

The Johnsonville site also receives an average of 4.46 tons of cardboard every month while the three other sites all take in around 1.12 tons of cardboard.

During the 2009-10 fiscal year, the Johnsonville site saw 1803 tons of solid waste, the most of any site. The Mamers site was second with 1535 tons, Buckhorn in third with 877 tons and finally Bunnlevel with 492 tons of solid waste.

Mr. Blanchard recommended the county try to purchase the property prior to making any improvements. The county currently leases all four of its convenience sites.

Harnett
COUNTY
NORTH CAROLINA

General Services Department

www.harnett.org

PO Box 940
Lillington, NC 27546

ph: 910-893-7536
fax: 910-814-3967

September 3, 2010

Ms. Carole Jones
2025 W. Bearss Ave.
Tampa, FL 33618

RE: County Plans Public Meeting to Discuss New C&D Cell at the Existing Anderson Creek Landfill Facility

Dear Neighbor,

The Harnett County Solid Waste Department has scheduled a public meeting in accordance with Title 15A NCAC 13B .0536 of the NC solid waste rules to discuss the proposed new cell at its Anderson Creek Landfill Facility.

The public meeting will be held October 8, 2010 at the Harnett County Public Library, 601 North Main Street, Lillington, North Carolina, at 9:00AM. All Harnett County residents are invited to attend.

A new Construction and Demolition cell is proposed within the existing facility as it is currently located. Services offered and types of wastes received will not be changing. The proposed Construction and Demolition (C&D) Landfill cell will hold approximately 20 years worth of waste (~377,000 cubic yards) with a proposed closure elevation of 338 feet above sea level. The facility will also continue to operate its Municipal Solid Waste Transfer Station.

The access road to the Anderson Creek Landfill will remain Poplar Drive off of Docs Road, in Spring Lake, North Carolina. An aerial map of the proposed C&D Landfill location is attached.

If you have any concerns regarding this proposed expansion, please attend the meeting referenced above where a detailed presentation will be conducted and questions answered.

Sincerely,

HARNETT COUNTY

Jerry Blanchard

Jerry Blanchard - Manager
Harnett County General Services

Harnett
COUNTY
NORTH CAROLINA

General Services Department

www.harnett.org

PO Box 940
Lillington, NC 27546

ph: 910-893-7536
fax: 910-814-3967

September 3, 2010

Land Owner
New Forestry LLC
3715 Northside Pkwy Bld 200, Suite 500
Atlanta, GA 30327

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Harnett County General Services

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NORTH CAROLINA

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PO Box 940
Lillington, NC 27546

ph: 910-893-7536
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September 3, 2010

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796 Colonial Hills Drive
Lillington, NC 27546

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Harnett County General Services

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COUNTY
NORTH CAROLINA

General Services Department

www.harnett.org

PO Box 940
Lillington, NC 27546

ph: 910-893-7536
fax: 910-814-3967

September 3, 2010

Mr. Kurt Haushalter
280 West Dove Ridge Lane
Spring Lake, NC 28390

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Harnett County General Services

Harnett
COUNTY
NORTH CAROLINA

General Services Department

www.harnett.org

PO Box 940
Lillington, NC 27546

ph. 910-893-7536
fax: 910-814-3967

September 3, 2010

Land Owner
Wellco Contractors, LLC
PO Box 766
Spring Lake, NC 28390

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HARNETT COUNTY

Jerry Blanchard

Jerry Blanchard - Manager
Harnett County General Services

Harnett
COUNTY
NORTH CAROLINA

General Services Department

www.harnett.org

PO Box 910
Lillington, NC 27546

ph: 910-893-7536
fax: 910-814-3967

September 3, 2010

Mr. Robert Morgan
PO Box 1057
Lillington, NC 27546

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Sincerely,

HARNETT COUNTY

Jerry Blanchard

Jerry Blanchard - Manager
Harnett County General Services

CERTIFIED MAIL RECEIPT
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Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 5.71

Postmark Here

Sent To: Mr. Robert Morgan
Street, Apt. No.; or PO Box No.: PO Box 1057
City, State, ZIP+4: Lillington NC 27546
PS Form 3800, June 200 See Reverse for Instructions

General Services Department
www.harnett.org
PO Box 940
Lillington, NC 27546
ph: 910-893-7536
fax: 910-814-3967

g to Discuss New C&D Cell at the Existing Anderson Creek Landfill Facility

SENDER: COMPLETE THIS SECTION
- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Robert Morgan
P.O. Box 1057
Lillington, NC 27546

COMPLETE THIS SECTION ON DELIVERY
A. Signature: X Donetta Daughtry ☐ Agent ☐ Addressee
B. Received by (Printed Name): Donetta Daughtry C. Date of Delivery: 10-12-10
D. Is delivery address different from item 1? ☐ Yes If YES, enter delivery address below: ☐ No

3. Service Type: ☑ Certified Mail ☐ Express Mail ☐ Registered ☐ Return Receipt for Merchandise ☐ Insured Mail ☐ C.O.D.
4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label): 7005 1160 0003 6671 1611
PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

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Jerry Blanchard

Jerry Blanchard - Manager
Harnett County General Services

CERTIFIED MAIL RECEIPT
Domestic Mail Only; No Insurance Coverage Provided
For delivery information visit our website at www.usps.com

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 5.71

Postmark Here

Sent To
Landowner Wellco Contractors, LLC
Street, Apt. No.; or PO Box No. PO Box 766
City, State, ZIP+4 Spring Lake, NC 28390

PS Form 3800, August 2006 See Reverse for Instructions

General Services Department
www.harnett.org
PO Box 940
Lillington, NC 27546
ph: 910-893-7536
fax: 910-814-3967

ng to Discuss New C&D Cell at the Existing
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SENDER: COMPLETE THIS SECTION
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1. Article Addressed to:

Land Owner
Wellco Contractors, LLC
P.O. Box 766
Spring Lake, NC 28390

COMPLETE THIS SECTION ON DELIVERY
A. Signature X [signature] ☐ Agent ☐ Addressee
B. Received by (Printed Name) Eric Svoboda C. Date of Delivery [illegible]
D. Is delivery address different from item 1? ☒ Yes If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.
4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7008 1300 0001 1342 5122

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

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Harnett County General Services

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(Domestic Mail Only; No Insurance Coverage Provided)
For delivery information visit our website at www.usps.com

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 5.71

Postmark Here

Sent To Mr. Kurt Haushalter
Street, Apt. No.; or PO Box No. 280 W Dove Ridge Lane
City, State, ZIP+4 Spring Lake NC 28390

PS Form 3800, June 2002 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION
- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Kurt Haushalter
280 West Dove Ridge Lane
Spring Lake, NC 28390

COMPLETE THIS SECTION ON DELIVERY
A. Signature X HAUSHLter ☐ Agent ☐ Addressee
B. Received by (Printed Name) KD. C. Date of Delivery 9/18/10
D. Is delivery address different from item 1? ☐ Yes If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
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☐ Insured Mail ☐ C.O.D.
4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7005 1160 0003 6671 1635

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

General Services Department
www.harnett.org
PO Box 940
Lillington, NC 27546
ph: 910-893-7536
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Jerry Blanchard - Manager
Harnett County General Services

9108144041 Line 1 09:22:00 a.m. 10-11-2010 9 /9

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Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 5.21

Postmark Here

Sent To: Mr. Kevin Facemyer
Street, Apt. No.; or PO Box No.: 796 Colonial Hills Drive
City, State, ZIP+4: Lillington NC 27546
PS Form 3800, June 2002 See Reverse for Instructions

General Services Department

www.harnett.org

PO Box 940
Lillington, NC 27546

ph: 910-893-7536
fax: 910-814-3967

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Dear Neighbor.

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1. Article Addressed to:

Mr. Kevin Facemyer
796 Colonial Hills Drive
Lillington, NC 27546

COMPLETE THIS SECTION ON DELIVERY
A. Signature X ☐ Agent ☐ Addressee
B. Received by (Printed Name): Kevin F. Facemyer
C. Date of Delivery
D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7005 1160 0003 6671 1628

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

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HARNETT COUNTY

Jerry Blanchard

Jerry Blanchard - Manager
Harnett County General Services

Ryan Sadler

From: UPS Quantum View [auto-notify@ups.com]
Sent: Wednesday, September 08, 2010 6:12 PM
To: ryan@ctclayton.com
Subject: UPS Delivery Notification, Tracking Number 1Z3816WF2993038029

***Do not reply to this e-mail. UPS and C.T.Clayton,Sr.,P.E., Inc. will not receive your reply.

At the request of C.T.Clayton,Sr.,P.E., Inc., this notice is to confirm that the following shipment has been delivered.

Important Delivery Information

Tracking Number: 1Z3816WF2993038029
Delivery Date / Time: 08-September-2010 / 5:32 PM

Delivery Location: RESIDENTIAL
Signed by: JONES

Shipment Detail

Ship To:
Ms. Carole Jones
2025 W BEARSS AVE
TAMPA
FL
33618
US

Number of Packages 1
UPS Service: NEXT DAY AIR SAVER
Weight: 1.0 LBS
Reference Number 1: 03001C

Ryan Sadler

From: UPS Quantum View [auto-notify@ups.com]
Sent: Wednesday, September 08, 2010 11:11 AM
To: ryan@ctclayton.com
Subject: UPS Delivery Notification, Tracking Number 1Z3816WF2993116015

***Do not reply to this e-mail. UPS and C.T.Clayton,Sr.,P.E., Inc. will not receive your reply.

At the request of C.T.Clayton,Sr.,P.E., Inc., this notice is to confirm that the following shipment has been delivered.

Important Delivery Information

Tracking Number: 1Z3816WF2993116015
Delivery Date / Time: 08-September-2010 / 10:23 AM

Delivery Location: OFFICE
Signed by: RUSH

Shipment Detail

Ship To:
New Forrestry LLC
3715 NORTHSIDE PKWY NW
ROOM 2500
ATLANTA
GA
30327
US

Number of Packages 1
UPS Service: NEXT DAY AIR SAVER
Weight: 1.0 LBS
Reference Number 1: 03001C

Appendix V

National Heritage and SHPO Correspondance

NCDENR

North Carolina Department of Environment and Natural Resources
Division of Natural Resources Planning and Conservation

Beverly Eaves Perdue
Governor

Linda Pearsall
Director

Dee Freeman
Secretary

February 25, 2009

Mr. Ryan Sadler
C.T. Clayton, Sr., P.E., Inc
P.O. Box 578
46 W. Washington St.
Coats, NC 27521

Subject: Anderson Creek Landfill Facility – Proposed Expansion; Harnett County
SWS Permit No. 43-03

Dear Mr. Sadler:

The Natural Heritage Program has no record of rare species, significant natural communities, significant natural heritage areas, or conservation/managed areas at the site nor within a mile of the project area. Although our maps do not show records of such natural heritage elements in the project area, it does not necessarily mean that they are not present. It may simply mean that the area has not been surveyed. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at www.ncnhp.org for a listing of rare plants and animals and significant natural communities in the county and on the quad map. Our Program also has a new website that allows users to obtain information on element occurrences and significant natural heritage areas within two miles of a given location: <http://nhpweb.enr.state.nc.us/nhis/public/gmap75_main.phtml>. The user name is "public" and the password is "heritage". You may want to click "Help" for more information.

NC OneMap now provides digital Natural Heritage data online for free. This service provides site specific information on GIS layers with Natural Heritage Program rare species occurrences and Significant Natural Heritage Areas. The NC OneMap website provides Element Occurrence (EO) ID numbers (instead of species name), and the data user is then encouraged to contact the Natural Heritage Program for detailed information. This service allows the user to quickly and efficiently get site specific NHP data without visiting the NHP workroom or waiting for the Information Request to be answered by NHP staff. For more information about data formats and access, visit <www.nconemap.com>, then click on "FTP Data Download", and then "nheo.zip" [to the right of "Natural Heritage Element Occurrences"]. You may also e-mail NC OneMap at <dataq@ncmail.net> for more information.

Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

Sincerely,

Harry E. LeGrand Jr.

Harry E. LeGrand, Jr., Zoologist
Natural Heritage Program
1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-715-4195 \ FAX: 919-715-3060 Internet: www.oneNCNaturally.org

An Equal Opportunity \ Affirmative Action Employer

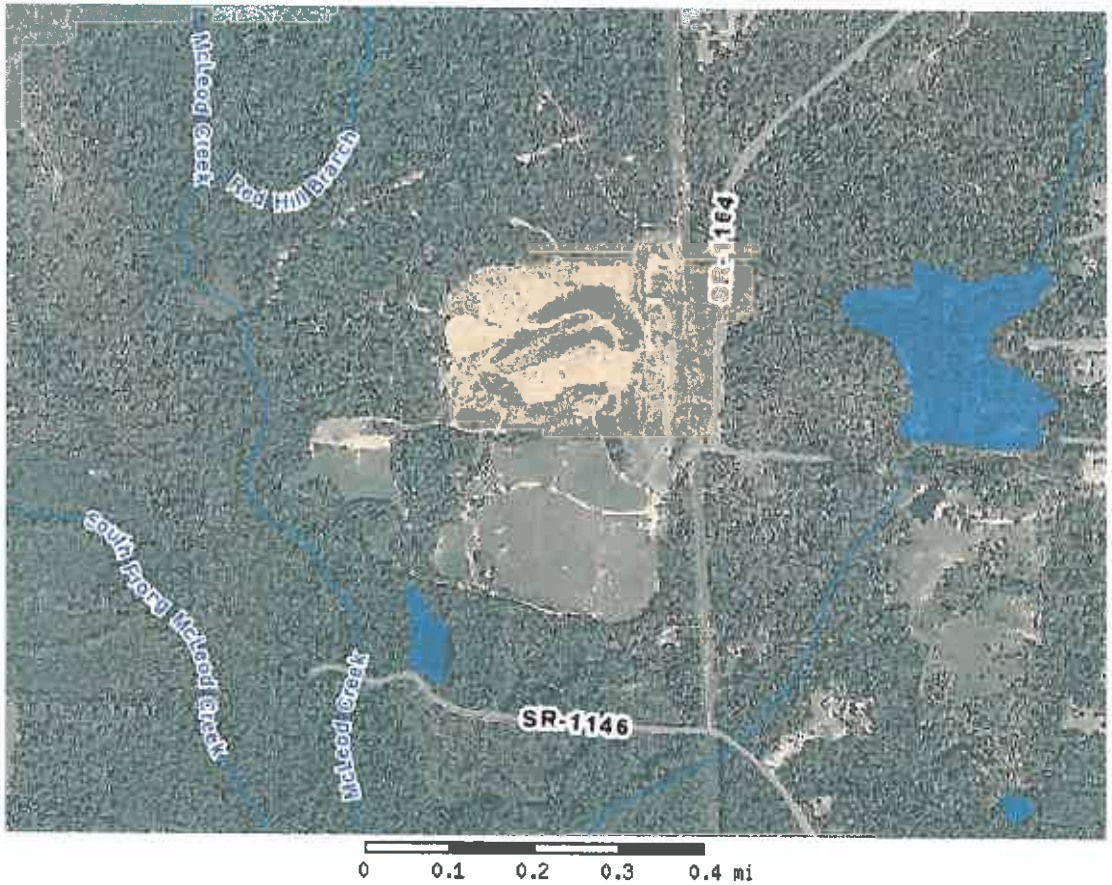
One NorthCarolina Naturally
Natural Resources Planning and Conservation

Home Help

Legend

- Element Occurrences (not displayed)
- Significant Natural Heritage Areas
- Managed Areas
- Roads
- Municipalities
- Rivers and Lakes
- Topo Maps
- Aerial Photos (2009)
- Topo Boundaries
- County Boundaries
- Redraw Map

NC Natural Heritage Program Virtual Workroom



GIS Data Sources: NCNHP, CGIA, NCDOT, USGS. NCNHP data updated on: 2010-Oct-21

Locator Map

Map Size: 600 x 450

Functions

- Zoom In
- Zoom Out
- Pan
- Identify

Quick View

--Choose Region--

Problems or Questions?

Powered By: MapServer PHP PostgreSQL PostGIS

RECEIVED JUL 7 - 2006

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

June 30, 2006

Ryan Sadler
CT Clayton, P. E., Inc.
3100 NC 27 East
Coats, NC 27521

Re: Historic Structures Inquiry, Construction and Demolition Landfill, Harnett County, ER 06-1584

Dear Mr. Grose:

Thank you for your letter of June 8, 2006, concerning the above project.

We have conducted a search of our files and are aware of no structures of historical or architectural importance located within the planning area. However, since a comprehensive historical architectural inventory of has never been conducted, there may be structures of which we are unaware located within the planning area.

If there are any structures more than fifty years old on or adjacent to the project site, please send us photographs (digital snapshots are fine) of each structure. These photographs should be keyed to a map that clearly shows the site location. If there are no buildings over fifty years old on or adjacent to the project site, please notify us of this in writing.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

If you have questions concerning the comments, please contact Renee Gledhill-Early, environmental review coordinator, at 919-733-4763, Ext. 246. In all future communication concerning this project, please remember to cite the above-referenced tracking number.

Sincerely,

Renee Gledhill-Early

Peter Sandbeck

BORROW PIT/WASTE AREA INFORMATION FORM FOR STATE HISTORIC PRESERVATION OFFICE REVIEW

RECEIVED FEB 2 0 2009

Please Print or Type

County Harnett Pit Name Anderson Creek GOLF Acreage 10

Highway Project No. and Description

Contractor Harnett County - Ryan Sadler
Company and Contact Name

PO Box 578
Street Address or P.O. Box

Coats, NC 27521
Town, State, Zip Code

910-897-7070 910-897-6767
Telephone/Fax Numbers

2/18/09
Date Submitted

HISTORIC PRESERVATION OFFICE
ER 09-0312
A- TM
ARB-5
2/27/09
S NP
2/19/09
CBS
Due 3/5/09

ARCHITECTURAL RESOURCES

1. Are there any buildings or structures on the project site? (Include abandoned barns, farmhouses, tobacco sheds, bridges, etc.) NONE.
2. If yes, submit one set of photographs of any structures which appear to have been built before World War II (Polaroid-type snapshots are okay). Photos should show the front and one side of structure and area behind structure.

ARCHAEOLOGICAL RESOURCES

1. Present and previous land uses of the proposed borrow area. Mix of clearing + wooded.
2. What kind of site preparation, if any, has taken place on the project site? NONE.
3. Have any artifacts (arrowheads, pottery, etc.) been found on the site? No.
4. Are any marked or unmarked cemeteries located within the proposed pit area? No.
5. Has the area been surveyed by an archaeologist? If yes, give the name of the archaeologist and the date of the survey, if know. No.

Please attach a copy of a map showing the exact location of the proposed borrow pit/waste area. A portion of an identified USGS quad sheet is preferred and will ensure timely review of your project. Submit the completed form and map to: Renee Gledhill-Earley, Environmental Review Coordinator, State Historic Preservation Office, 4617 Mail Service Center, Raleigh, NC 27699-4617 (telephone 919/807-6584).
****Allow at least thirty days for our review and comment****

X We have no comment on the project as proposed.

_____ Additional information is needed to complete our review.

_____ An archaeological survey is recommended.

Signed: Renee Gledhill-Earley
Renee Gledhill-Earley

Date: 3-4-09

February 2008

FEB 20 2009

Appendix VI

Endangered Species Information / Correspondence

Clayton Engineering
Civil & Environmental

PO Box 578 – 46 West Washington Street
Coats, North Carolina 27521

Phone: 910-897-7070 - Fax: 910-897-7070
Offices located in Coats and New Bern, North Carolina
www.ctclayton.com

MEMORANDUM

To: File
Copy: N/A
From: C. Tyrus Clayton, Jr., P. E.
Date: October 21, 2010

RE: ENDANGERED SPECIES INVESTIGATION AT ANDERSON CREEK LANDFILL SITE

This memorandum is intended to address the requirements of the United Fish and Wildlife Service for the construction of the Anderson Creek Construction and Demolition (C&D) Landfill near Anderson Creek, North Carolina.

The attached list of endangered species, as provided by the United States Fish and Wildlife Service, was used to determine if endangered species are present on the property. After a site investigation, discussions with the site owner and site representatives, it was determined that there are no signs of the listed species on the property.

NORTH CAROLINA'S THREATENED & ENDANGERED SPECIES LIST
(Source: http://nc-es.fws.gov/es/es.html, accessed October 21, 2010)

Mammals
Carolina Northern Flying Squirrel - Glaucomys sabrinus coloratus
Finback Whale - Balaenoptera physalus
Eastern Cougar - Puma concolor couguar
Gray Bat - Myotis grisescens
Gray Wolf - Canis lupus
Humpback whale - Megaptera novaeangliae
Indiana Bat - Myotis sodalis
Red Wolf- Canis rufus
Right Whale - Balaena glacialis
Sei Whale - Balaenoptera borealis
Sperm Whale - Physeter catodon
Virginia Big-eared Bat- Corynorhinus townsendii virginianus
West Indian Manatee - Trichechus manatus

Birds
Bachman's Warbler - Vermivora bachmanii
Ivory-billed Woodpecker - Campephilus principalis
Kirtlands Warbler - Dedroica kirtlandii
Piping Plover -Charadrius melodus
*Red - Cockaded Woodpecker - Picoides borealis
Roseate Tern -Sterna dougallii
Wood Stork -Mycteria americana

Reptiles and Amphibians
American Alligator - Alligator mississippiensis
Bog Turtle - Clemmys muhlenbergii
Green Sea Turtle - Chelonia mydas
Hawksbill Turtle - Eretmochelys imbricata imbricata
Kemp's Ridley Sea Turtle - Lepidochelys kempii
Leatherback Sea Turtle - Dermochelys coriacea
Loggerhead Sea Turtle - Caretta caretta

Fish
*Cape Fear Shiner - Notropis mekistocholas
Roanoke Logperch
Shortnose Sturgeon - Acipenser brevirostrum
Spotfin Chub - Cyprinella monacha
Waccamaw Silverside - Menidia extensa

Insects and Spiders
Saint Francis' Satyr Butterfly - Neonympha mitchellii francisci
Spruce-fir Moss Spider - Microhexura montivaga

NORTH CAROLINA'S THREATENED & ENDANGERED SPECIES LIST
(Source: http://nc-es.fws.gov/es/es.html, accessed October 21, 2010)
(continued)

Mussels and Snails
Applachian Elktoe - Alasmidonta raveneliana
Carolina Heelsplitter - Lasmigona decorata
Cumberland Bean Pearlymussel - Villosa trabalis
Dwarf Wedge Mussel - Alasmidonta heterodon
James Spinymussel - Pleurobema collina
Little-wing Pearlymussel - Pegius fabula
Oyster Mussel - Epioblasma capsaeformis
Tan Riffleshell - Epioblasma florentina walkei
Tar Spinymussel - Elliptio steinstansana
Noonday Globe - Mesodon clarki nantahala

Plants
American Chaffseed - Schwalbea americana
Blue Ridge Goldenrod - Solidago spithamaea
Bunched Arrowhead - Sagittaria fasciculata
Canby's Dropwort - Oxypolis canbyi
Cooley's Meadowrue - Thalictrum cooleyi
Dwarf-flowered Heartleaf - Hexastylis naniflora
Golden Sedge - Carex lutea
Green Pitcher Plant - Sarracenia oreophila
Harperella - Ptilimnium nodosum
Heller's Blazing Star - Liatris helleri
Michaux's Sumac - Rhus michauxii
Mountain Golden Heather - Hudsonia montana
Mountain Sweet Pitcher Plant - Sarracenia rubra ssp. jonesii
Pondberry -Lindera melissifolia
Roan Mountain Bluet - Hedyotis [=Houstonia] purpurea var. montana
Rock Gnome Lichen - Gymnoderma lineare
*Rough-leaf Loosestrife - Lysimachia asperulifolia
Schweinitz's Sunflower - Helianthus schweinitzii
Seabeach Amaranth - Amaranthus pumilus
Sensitive Joint-vetch -Aeschynomene virginica
Small-anthered Bittercress - Cardamine micranthera
Small Whorled Pogonia - Isotria medeoloides
Smooth Coneflower - Echinacea laevigata
Spreading Avens - Geum radiatum
Swamp Pink - Helonias bullata
Virginia Spiraea - Spiraea virginiana
White Irisette - Sisyrinchium dichotomum

*Found in Harnett County

RECEIVED MAR 5 2009

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

March 2, 2009

Mr. Ryan Sadler
Clayton, Sr., P.E., Inc.
P. O. 578
46 W. Washington, St.
Coats, North Carolina 27521

Re: Anderson Creek Construction and Demolition Landfill, Harnett County, NC

Dear Mr. Sadler:

The U.S. Fish and Wildlife Service (Service) has reviewed the information concerning the above referenced project. For your convenience a list of all federally protected endangered and threatened species in North Carolina is now available on our website at < http://www.fws.gov/raleigh/es_tes.html >. The link to "County List" leads to a complete and frequently updated list of all endangered and threatened species that are known to occur in each county in North Carolina and protected by the ESA. The county list also shows federal species of concern[1] (FSC) that occur in the county. A link on the county list (but not the statewide list) to a particular species leads to a fact sheet for that species which provides information on the species' life histories and habitat(s). Information on completing a biological assessment or evaluation and can be found on our web page < http://www.fws.gov/raleigh/es_consultation.html >. Please check the web site often for updated information or changes.

Additional information on special status species, both State and federal, can be obtained through the Virtual Workroom of the North Carolina Natural Heritage Program (NCNHP). This site can be accessed at < http://www.ncnhp.org/Pages/heritagedata.html >. The NCNHP Virtual Workroom is a web-based GIS application that allows users to obtain information on rare species, natural communities, and natural areas. This site allows the public to generate a list of all NCNHP records within two miles of the location specified by the user, and reflects the data as it currently exists in the program's database. The list provides brief comments on the habitat of each species with an occurrence record. Before using the Virtual Workroom, users should review the User's Manual (available through the "Help" link at the upper right of the Web page).

You should compare the biological communities that would be impacted by your project with the habitats used by federally protected species that could occur on the site. If your project contains

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1 The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of NCNHP data should not be substituted for actual field surveys. A link to the optimal survey windows for North Carolina's federally threatened and endangered plant species is given below the state-wide species list on our web page.

If you determine that the proposed action may affect (i.e., likely to adversely affect or may affect, but is not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

The Service appreciates the opportunity to review and provide comments on the proposed action. Should you have any questions regarding the project, please contact Howard Hall at (919) 856-4520, extension 27, or by e-mail at < howard_hall@fws.gov >.

Sincerely,

Howard F. Hall

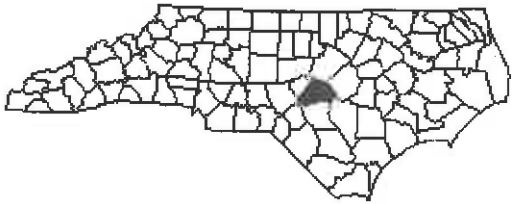
for Pete Benjamin
Field Supervisor

cc: WRC, Raleigh

U.S. Fish & Wildlife Service

Endangered Species, Threatened Species,Federal Species of Concern, and Candidate Species,

Harnett County, North Carolina



Updated: 09-22-2010

Common Name	Scientific name	Federal Status	Record Status
Vertebrate:			
American eel	*Anguilla rostrata*	FSC	Current
Bachman's sparrow	*Aimophila aestivalis*	FSC	Current
Bald eagle	*Haliaeetus leucocephalus*	BGPA	Current
Cape Fear shiner	*Notropis mekistocholas*	E	Current
Carolina redhorse	*Moxostoma* sp. *2*	FSC	Current
Northern pine snake	*Pituophis melanoleucus melanoleucus*	FSC	Obscure
Red-cockaded woodpecker	*Picoides borealis*	E	Current
Sandhills chub	*Semotilus lumbee*	FSC	Current
Invertebrate:			
Atlantic pigtoe	*Fusconaia masoni*	FSC	Current
Septima's clubtail	*Gomphus septima*	FSC	Current
Yellow lampmussel	*Lampsilis cariosa*	FSC	Current

Vascular Plant:

Bog oatgrass	*Danthonia epilis*	FSC	Current
Buttercup phacelia	*Phacelia covillei*	FSC	Current
Carolina bogmint	*Macbridea caroliniana*	FSC	Current
Carolina grass-of-parnassus	*Parnassia caroliniana*	FSC	Current
Georgia lead-plant	*Amorpha georgiana* var. *georgiana*	FSC	Current
Pickering's dawnflower	*Stylisma pickeringii* var. *pickeringii*	FSC	Current
Ravine sedge	*Carex impressinervia*	FSC	Current
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	Current
Roughleaf yellow-eyed grass	*Xyris scabrifolia*	FSC	Current
Sandhills bog lily	*Lilium pyrophilum*	FSC	Current
Sandhills milk-vetch	*Astragalus michauxii*	FSC	Current
Spring-flowering goldenrod	*Solidago verna*	FSC	Current
Sun-facing coneflower	*Rudbeckia heliopsidis*	FSC	Historic
Well's sandhill pixie-moss	*Pyxidanthera barbulata* var. *brevifolia*	FSC	Current

Nonvascular Plant:

Lichen:

Definitions of Federal Status Codes:

E = endangered. A taxon "in danger of extinction throughout all or a significant portion of its range."
T = threatened. A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."
C = candidate. A taxon under consideration for official listing for which there is sufficient information to support listing. (Formerly "C1" candidate species.)
BGPA =Bald and Golden Eagle Protection Act. See below.
FSC = federal species of concern. A species under consideration for listing, for which there is insufficient information to support listing at this time. These species may or may not be listed in the future, and many of these species were formerly recognized as "C2" candidate species.
T(S/A) = threatened due to similarity of appearance. A taxon that is threatened due to similarity of appearance with another listed species and is listed for its protection. Taxa listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation. See below.
EXP = experimental population. A taxon listed as experimental (either essential or nonessential). Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and as species proposed for listing on private land.
P = proposed. Taxa proposed for official listing as endangered or threatened will be noted as "PE" or "PT", respectively.

Bald and Golden Eagle Protection Act (BGPA):

In the July 9, 2007 Federal Register(72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8,2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles. For mor information, visit http://www.fws.gov/migratorybirds/baldeagle.htm

Threatened due to similarity of appearance(T(S/A)):

In the November 4, 1997 Federal Register (55822-55825), the northern population of the bog turtle (from New York south to Maryland) was listed as T (threatened), and the southern population (from Virginia south to Georgia) was listed as T(S/A) (threatened due to similarity of appearance). The T(S/A) designation bans the collection and interstate and international commercial trade of bog turtles from the southern population. The T(S/A) designation has no effect on land management activities by private landowners in North Carolina, part of the southern population of the species. In addition to its official status as T(S/A), the U.S. Fish and Wildlife Service considers the southern population of the bog turtle as a Federal species of concern due to habitat loss.

Definitions of Record Status:

Current - the species has been observed in the county within the last 50 years.
Historic - the species was last observed in the county more than 50 years ago.
Obscure - the date and/or location of observation is uncertain.
Incidental/migrant - the species was observed outside of its normal range or habitat.
Probable/potential - the species is considered likely to occur in this county based on the proximity of known records (in adjacent counties), the presence of potentially suitable habitat, or both.

Appendix VII

Soil Resource Analysis

Clayton, Sr., P.E., Inc.
Civil & Environmental Engineering

Project:	Anderson C&D Phase III
PN:	03001C
Date:	3-May-13
By:	CTC Jr.
Soil Resources Analysis	

Cell Construction

Cell 1 Initial Grading

Cut	(31,500.00)	cy
Fill	13,800.00	cy (does not account for constructed 24" impermeable material)
=	(17,700.00)	cy excess to be stockpiled for Interim/Weekly Cover
24"Liner	17,300.00	cy (from borrow source)

Entire Phase III Initial Grading

Cut	(37,000.00)	cy
Fill	32,000.00	cy (does not account for constructed 24" impermeable material)
=	(5,000.00)	cy excess to be stockpiled for Interim/Weekly Cover
24"Liner	33,000.00	cy (from borrow source)

Weekly/Interim Cover Requirements

Cell 1

Total Airspace Available	103,000	cy
Cover Waste to Soil Ratio	8	:1 (Weekly and Interim)
Cover Soils Required	13000	cy
Airspace Available for Waste	90,000	cy
Assumed Compaction	1400	lbs/cy
Total Tonnage	63000	tons
Average Annual Tonnage	12600	tons

Entire Phase III

Total Airspace Available	551,000	cy
Cover Waste to Soil Ratio	8	:1 (Weekly and Interim)
Cover Soils Required	69000	cy
Airspace Available for Waste	482,000	cy
Assumed Compaction	1550	lbs/cy (average over 25 years, accounting for some decomp)
Total Tonnage	373550	tons
Average Annual Tonnage	14942	tons

Final Cap Construction

Cell 1

Area of Final Closure	19250	sf
Soils Required for 18" Impermeable	1100	cy
Soils Required for 18" Veg Support	1100	cy
Total Soils Required	2200	cy

Entire Phase III

Area of Final Closure	482600	sf
Soils Required for 18" Impermeable	26800	cy
Soils Required for 18" Veg Support	26800	cy
Total Soils Required	53600	cy

Appendix VIII

NCDENR-Division of Land Resources
Land Quality Section
Approvals

FN: 5001E
E&S Permit

NCDENR

North Carolina Department of Environment and Natural Resources
Division of Land Resources
Land Quality Section

James D. Simons, PG, PE
Director and State Geologist

Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

June 9, 2010

LETTER OF APPROVAL

County of Harnett
Attn: Scott T. Sauer, Manager
P.O. Box 759
Lillington, NC 27546-

RE: Project Name: Anderson Creek Lanfilll Borrow Area Acres Approved: 13
Project ID: HARNE-2010-043
County: Harnett Anderson Creek Poplar Drive
River Basin: Cape Fear Stream Classification: Other
Submitted By: C. T. Clayton, Sr., P.E., Inc.
Date Received by LQS: 5/26/2010
Plan Type: Revised

Dear Mr. Sauer:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval. The enclosed Certificate of Approval must be posted at the job site. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0129.

Title 15A NCAC 4B .0118(a) requires that a copy of the approved erosion control plan be on file at the job site. Also, this letter gives the notice required by G.S. 113A-61.1(a) of our right of periodic inspection to insure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Act is performance-oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to insure compliance with the Act.

The developer is responsible for obtaining any and all permits and approvals necessary for the development of this project prior to the commencement of this land disturbing activity. This could include agencies such as the Division of Water Quality's stormwater regulations, their enforcement requirements within Section 401 of the Clean Water Act, the Environmental Protection Agency and/or the U.S. Army Corps of Engineers' jurisdiction of Section 404 of the Clean Water Act, the Division of Solid Waste Management's landfill regulations, local County or Municipalities' ordinances, or others that may be required. This approval cannot supersede any other permit or approval; however, in the case of a Cease and Desist Order from the Corps of Engineers, that Order would only apply to wetland areas. All upland areas would still have to be in compliance with the N.C. Sedimentation Pollution Control Act.

If any area on site falls within the jurisdiction of Section 401 or 404 of the Clean Water Act, the developer is responsible for compliance with the requirements of the Division of Water Quality, the Corps of Engineers and the Environmental Protection Agency (EPA) respectively. Any erosion control measures that fall within jurisdictional wetland areas must be approved by the aforementioned agencies prior to installation. The Land Quality Section must be notified of a relocation of the measures in question to the transition point between the wetlands and the uplands to assure that the migration of sediment will not occur. If that relocation presents a problem or contradicts any requirements of either DWQ, the Corps, or the EPA, it is the responsibility of the developer to inform the Land Quality Section regional office so that an adequate contingency plan can be made to assure sufficient erosion control remains on site. Failure to do so will be considered a violation of this approval.

Please be aware that your project will be covered by the enclosed NPDES General Stormwater Permit NCGO1000 (Construction Activities). You should first become familiar with all of the requirements for compliance with the enclosed general permit.

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility Form, which you provided. You are requested to file an amended form if there is any change in the information included on the form. In addition, it would be helpful if you notify this office of the proposed starting date for this project. Please notify us if you plan to have a preconstruction conference.

Your cooperation is appreciated.

Sincerely,

Jodi Pace

Jodi Pace, EI
Land Quality Section

Enclosures: Certificate of Approval
NPDES Permit

cc: C. T. Clayton, Sr., P.E., Inc.
Linwood McDonald, Building Inspector
Belinda Henson, Division of Water Quality
Land Quality Section - Fayetteville Regional Office File

Department of Environment and Natural Resources

Michael F. Easley, Governor
William G. Ross Jr., Secretary

James D. Simons, P.G., P.E.
Director and State Geologist

NCDENR

Division of Land Resources

October 19, 2004

Jerry Blanchard
P. O. Box 940
Lillington, NC 27548

Re: Approval of Soil Erosion and
Sediment Control Plan
Anderson Creek Landfill
Harnett County, North Carolina

Dear Jerry Blanchard:

The review of the above-referenced erosion control plan has been completed. The plan has been found to be acceptable subject to the following stipulations:

1. The grass-lined Channels Nos. 1, 3, 6, 7, 11, 13, 14, 19 and 20 should be provided with temporary liners of adequate shear strength for design flow conditions to aid in the establishment of vegetation

2. Enclosed is a Certificate of Plan Approval, which must be displayed at the job site. Title 15A, Section 4B.0127(c) of the North Carolina Administrative Code requires that no person may initiate a land-disturbing activity before notifying this agency of the date the land-disturbing activity will begin. Failure to provide notification will result in a violation of this plan approval.

3. In order to ensure the early coordination and implementation of the erosion control plan for this project, it is requested that a preconstruction conference be held. As a minimum, representatives of the owner, engineer, contractor, and this office should attend, subject to the availability of staff. Please notify Todd Milam of this office as to when this conference is scheduled. It is also requested that you notify this office of the proposed starting date for this project.

4. Title 15, Section 4B.0017 (A) of the North Carolina Administrative Code requires that a copy of the approved plan be on file at the job site and that inspections of the project be made by this office to ensure compliance with the approved plan.

5. Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility/Ownership Form, which you provided. You are required to file an amended form if there is any change in the information included on the form.

6. Acceptance and approval of this plan is conditioned upon your compliance with federal and state water quality laws, regulations, and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This does not supersede any other permit or approval. The developer is responsible for obtaining any and all permits and approvals necessary for the developing of this project prior to the commencement of this land-disturbing activity. This could include the Division of Water Quality under storm water regulations, the US Army Corps of Engineers under Article 404 jurisdiction, local county or town agencies under their local ordinances, or others that may be required. This approval cannot supersede any other permit or approval; however, in the case of a Cease and Desist Order from the Corps of Engineers, that Order would only apply to wetland areas. All other lands must still be in compliance with the Sedimentation Pollution Control Act.

7. If any area on site falls under the jurisdiction of Section 404 of the Clean Water Act, the developer is responsible to the orders of the US Army Corps of Engineers. Any erosion control measures that fall within jurisdictional wetland area must be relocated to the transition point between the wetlands and the highlands to assure that the migration of sediment will not occur. If that relocation presents a problem or contradicts any requirements of the Corps of Engineers, it is the responsibility of the developer to inform the Land Quality Section's Regional Office so that an adequate contingency plan can be made to assure sufficient erosion control on-site. Failure to do so will be considered a violation of this approval.

8. Any borrow material brought onto this site must be from a legally permitted mine site or other approved source. A single use borrow site is only permissible if all of the following apply: (1) The excavation or grading is conducted to provide soil or other unconsolidated material to be used without further processing for a single off-site construction project for which an erosion control plan has been approved in accordance with Article 4 of Chapter 113A of the NCGS. (2) The affected land, including nonpublic access roads, does not exceed five acres. (3) The excavation or grading is completed within one year. (4) the excavation or grading does not involve blasting, the removal or material from rivers of streams, the disposal of off-site waste on the affected land, or the surface disposal of groundwater beyond the affected land. (5) The excavation or grading is not in violation of any local ordinance. (6) An erosion control plan for the excavation or grading has been approved in accordance with Article 4 of Chapter 113A of the NCGS.

9. Following the completion of the project, you should notify this office to schedule a final inspection. The purpose of this inspection is to ensure that all erosion control requirements have been met.

10. This project is subject to the National Pollutant Discharge Elimination System (NPDES) and covered by the enclosed general storm water permit NCG010000 (Construction Activities). You should become familiar with all of the requirements for compliance with the enclosed general permit.

This approval is subject to the satisfactory performance of the erosion control measures under field conditions. Should it be determined that the requirements of the Sedimentation Pollution Control Act of 1973 (GS 113A, 51-66) are not being met, revisions to the plan and its implementation will be required.

This permit allows for a land disturbance, as called for on the application plan, not to exceed **21.5 acres** and/or the limits of the submitted plans. Exceeding these limits will be a violation of this permit and would require a revised plan and additional application fee. Amendments to the plan should be submitted to this office under the same procedures as followed for the original plan. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as is required by Title 15A NCAC 4B .0029.

We look forward to working with you on this project.

Sincerely,

Steve Cook

Steve Cook, C.P.E.S.C.
Assistant Regional Engineer
Land Quality Section

MSC/fcp

Enclosure

cc: Clayton, Sr., P.E., Inc.
Lindwood McDonald, Building Inspector
LQ Section Regional File
Ricky Revels, Water Quality Section

Project Name: Anderson Creek Landfill
Project Number: Harne-2005-004
Submitted By: Clayton, Sr., P.E., Inc.
Date Received by LQ: 10/4/2004
River Basin: Cape Fear

Appendix IX

Stormwater Calculations

Project:	Anderson Creek Landfill C&D Unit
Project #:	03001C
Date:	May 7, 2013
By:	WLF

Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

RUNOFF CALCULATIONS

DA 1

to SW 1 lower reach

Drainage Area, A: 184,730 ft^2
4.24 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 4.24
= 13.19 ft^3/sec

DA 1A

to SW 1 middle reach

Drainage Area, A: 109,825 ft^2
2.52 acre

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 2.52
= 7.84 ft^3/sec

DA 1B

to SW 1 upper reach

Drainage Area, A: 67,365 ft^2
1.55 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 1.55
= 4.82 ft^3/sec

DA 2

to SB 2

Drainage Area, A: 54,937 ft^2
1.26 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 1.26
= 3.92 ft^3/sec

DA 3

to SB 3

Drainage Area, A: 72,644 ft^2
1.67 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 1.67
= 5.20 ft^3/sec

DA 4

to SW 4

Drainage Area, A: 44,921 ft^2
1.03 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 1.03
= 3.21 ft^3/sec

DA 5 to SW 5

Drainage Area, A: 52,123 ft^2
1.2 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 1.2
= 3.73 ft^3/sec

DA 6 to SW 6

Drainage Area, A: 47,159 ft^2
1.08 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 1.08
= 3.36 ft^3/sec

DA 7 to SD 9

Drainage Area, A: 21,107 ft^2
0.48 acres

Runoff Coefficient, C: 0.40

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.4 x 7.78 x 0.48
= 1.49 ft^3/sec

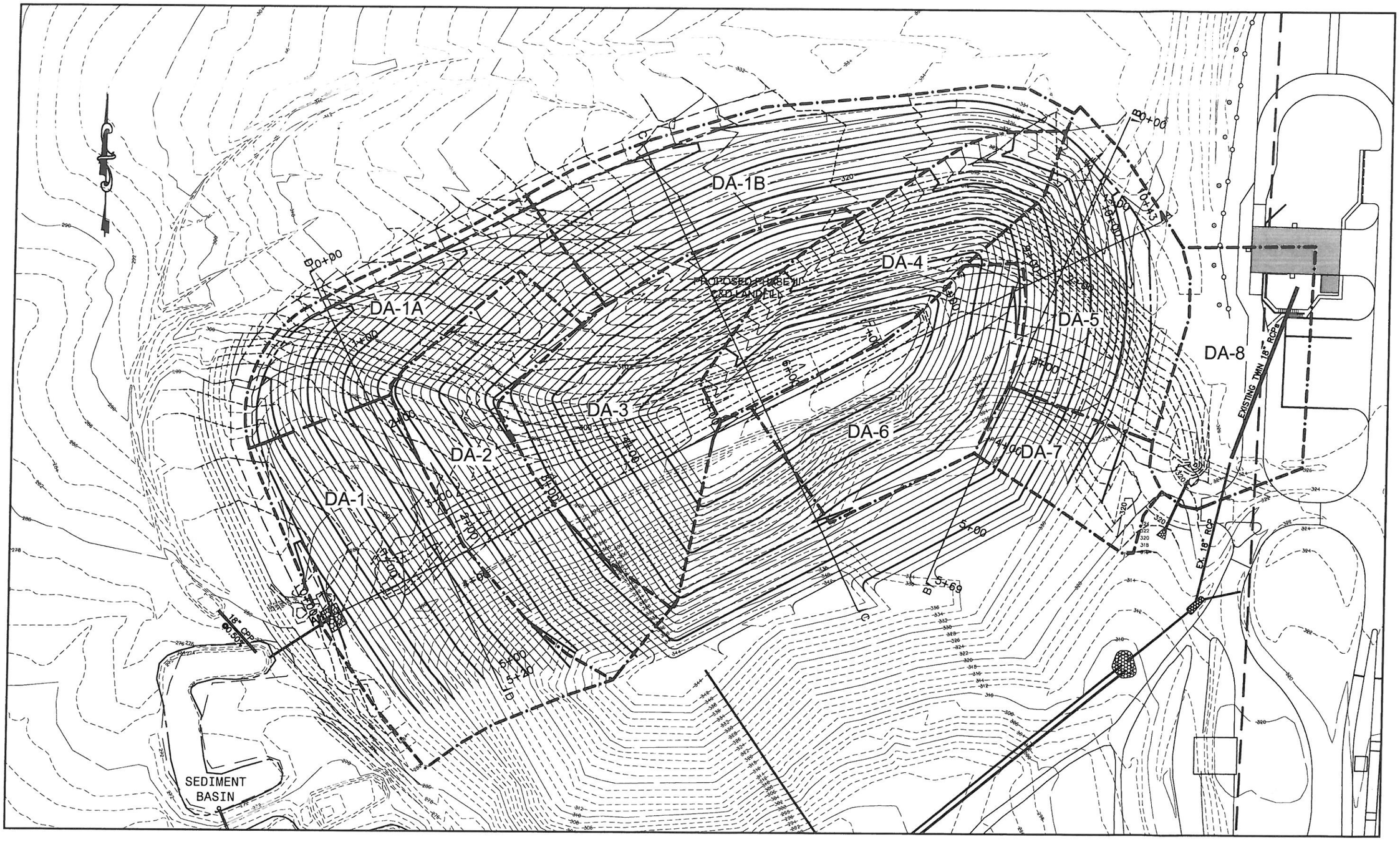
DA 8 to Culvert C3

Drainage Area, A: 42,862 ft^2
0.98 acres

Runoff Coefficient, C: 0.70

Time of Concentration: 5 min
Return Frequency: 10 years
Rainfall intensity, I: 7.78 in/hr

Runoff, Q= C x I x A
= 0.7 x 7.78 x 0.98
= 5.34 ft^3/sec



DRAINAGE AREAS

SCALE: 1" = 100'

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Clayton, Sr., P.E., Inc.
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SLOPE DRAIN SD 2

Runoff

Drainage Areas 2 & 3

10-year runoff: 9.12 ft^3/sec

Pipe Capacity

Pipe material: Corrugated plastic

Roughness Coeffiicient, n: 0.024

Pipe diameter, d: 18 in

= 1.50 ft

Pipe radius, r = 1.5 / 2

= 0.75 ft

Area, A = π x $(d/24)^2$

= 1.8 ft^2

Wetted perimeter, WP = π x d / 12

= 4.71 ft

Hydraulic Radius, R = A / WP

= 1.77 / 4.71 ft^2

= 0.38 ft

Pipe slope, S: 0.040 ft/ft

Velocity, V = 1.49 / n x $R^{2/3}$ x $S^{1/2}$

= 6.464 ft/sec

Flow, Q = A x V ft

= **11.44** ft^3/sec

Pipe Inlet Capacity

Coefficient of discharge, Cd: 0.6

Inlet area, A: 1.8 ft^2

Inlet radius, r: 0.75 ft

Water depth, wd: 1.05 ft

Driving head, h = wd - r

= 1.05 - 0.75

= 0.3 ft

Acceleration of gravity, g: 32.2 ft/sec2

Flow, Q_i = $CdA(2gH)^{1/2}$

= 0.6 x 1.77 x (2 x 32.2 x 0.3)^.5

= 4.67 ft^3/sec

Number of inlets required = Q / Q_i

= 9.12 / 4.67

= 2

Number of inlets provided: 2

Project:	Anderson Creek Landfill C&D Unit
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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SLOPE DRAIN SD 3

Runoff

Drainage Area 3

10-year runoff: 5.20 ft^3/sec

Pipe Capacity, Lower Section

Pipe material: Corrugated plastic

Roughness Coeffiicient, n: 0.024

Pipe diameter, d: 15 in

= 1.25 ft

Pipe radius, r = 1.25 / 2

= 0.625 ft

Area, A = π x $(d/24)^2$

= 1.2 ft^2

Wetted perimeter, WP = π x d / 12

= 3.93 ft

Hydraulic Radius, R = A / WP

= 1.23 / 3.93 ft^2

= 0.31 ft

Pipe slope, S: 0.040 ft/ft

Velocity, V = 1.49 / n x $R^{2/3}$ x $S^{1/2}$

= 5.722 ft/sec

Flow, Q = A x V

= **7.04** ft^3/sec

Pipe Inlet Capacity

Coefficient of discharge, Cd: 0.6

Inlet area, A: 1.2 ft^2

Inlet radius, r: 0.625 ft

Water depth, wd: 0.85 ft

Driving head, h = wd - r

= 0.85 - 0.625

= 0.225 ft

Acceleration of gravity, g: 32.2 ft/sec2

Flow, Q_I = $CdA(2gH)^{1/2}$

= 0.6 x 1.23 x (2 x 32.2 x 0.225)^.5

= 2.81 ft^3/sec

Number of inlets required = Q / Q_I

= 5.2 / 2.81

= 1.9

Number of inlets provided: 2

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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SLOPE DRAIN SD 6

Runoff

Drainage Area 6

10-year runoff: 3.36 ft^3/sec

Pipe Capacity

Pipe material: Corrugated plastic

Roughness Coeffiicient, n: 0.024

Pipe diameter, d: 15 in

= 1.25 ft

Pipe radius, r = 1.25 / 2

= 0.625 ft

Area, A = π x $(d/24)^2$

= 1.2 ft^2

Wetted perimeter, WP = π x d / 12

= 3.93 ft

Hydraulic Radius, R = A / WP

= 1.23 / 3.93 ft^2

= 0.31 ft

Pipe slope, S: 0.040 ft/ft

Velocity, V = 1.49 / n x $R^{2/3}$ x $S^{1/2}$

= 5.722 ft/sec

Flow, Q = A x V

= **7.04** ft^3/sec

Pipe Inlet Capacity

Coefficient of discharge, Cd: 0.6

Inlet area, A: 1.2 ft^2

Inlet radius, r: 0.625 ft

Water depth, wd: 0.75 ft

Driving head, h = wd - r

= 0.75 - 0.625

= 0.125 ft

Acceleration of gravity, g: 32.2 ft/sec2

Flow, Q_I = $CdA(2gH)^{1/2}$

= 0.6 x 1.23 x (2 x 32.2 x 0.125)^.5

= 2.09 ft^3/sec

Number of inlets required = Q / Q_I

= 3.36 / 2.09

= 1.6

Number of inlets provided: 2

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Date:	May 14, 2013
By	WLF

Clayton, Sr., P.E., Inc.
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CULVERT CAPACITY CALCULATION SHEET

Number	Discharge Flow	Slope	Theoretical Diameter	# Pipes	Actual Dia.	Velocity Full Flow	Length	Upper Invert	Lower Invert
	(cfs)	(%)	(in)		(in)	(ft/sec)	(ft)	(ft)	(ft)
C1	22.31	14.75%	14.40	1	15	20.19	80	287.80	276.00
C2	13.92	6.71%	12.07	1	15	13.62	383	307.80	282.10
C3	5.34	2.00%	9.76	1	15	7.43	62	319.00	317.76

Project:	Anderson Creek Landfill C&D Unit
Project #:	03001C
Date:	May 7, 2013
By:	WLF

Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SWALE SW1, LOWER REACH

Runoff

Drainage Area 1

10-year runoff: **13.19** ft^3/sec

Swale Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	8.0 ft	8.0 ft
Side Slope Ratio, Left:	4.0 ft h/ft v	4.0 ft h/ft v
Side Slope Ratio, Right:	3.0 ft h/ft v	3.0 ft h/ft v x ft
Water Depth:	0.52 ft	0.65 ft
Side Slope Width Left =	4 x 0.52	4 x 0.65
=	4.16 ft	5.20 ft
Side Slope Width Right =	3 x 0.52	3 x 0.65
=	1.56 ft	1.95 ft
Area, A =	8 x 0.52 + 4.16 x 0.52 / 2 + 1.56 x 0.52 / 2	8 x 0.65 + 5.2 x 0.65 / 2 + 1.95 x 0.65 / 2
	5.65 ft^2	**7.52** ft^2
Wetted Perimeter:	13.84 ft	15.30 ft
Hydraulic Radius, R:	0.408 ft	0.492 ft
VR:	0.96	0.88
Roughness Coeffiicient, n:	0.060 (2"-6" grass)	0.090 (6"-10" grass)
Slope, S:	0.030 ft/ft	0.030 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**2.36** ft/sec	1.78 ft/sec
Flow, Q:	13.32 ft^3/sec	**13.41** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

Use temporary synthetic mat.

Flow Required: 13.19 ft^3/sec

Conclusion: ADEQUATE

Project:	Anderson Creek Landfill C&D Unit
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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SWALE SW1, MIDDLE REACH

Runoff

Drainage Area 1A

10-year runoff: **7.84** ft^3/sec

Swale Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	6.0 ft	6.0 ft
Side Slope Ratio, Left:	4.0 ft h/ft v	4.0 ft h/ft v
Side Slope Ratio, Right:	3.0 ft h/ft v	3.0 ft h/ft v x ft
Water Depth:	0.51 ft	0.66 ft
Side Slope Width Left =	4 x 0.51	4 x 0.66
=	3.06 ft	3.96 ft
Side Slope Width Right =	3 x 0.51	3 x 0.66
=	1.53 ft	1.98 ft
Area, A =	6 x 0.51 + 3.06 x 0.51 / 2 + 1.53 x 0.51 / **2**	6 x 0.66 + 3.96 x 0.66 / 2 + 1.98 x 0.66 / 2
	4.23 ft^2	5.92 ft^2
Wetted Perimeter:	10.71 ft	12.10 ft
Hydraulic Radius, R:	0.395 ft	0.489 ft
VR:	0.76	0.65
Roughness Coeffiicient, n:	0.066 (2"-6" grass)	0.110 (6"-10" grass)
Slope, S:	0.025 ft/ft	0.025 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**1.92** ft/sec	1.33 ft/sec
Flow, Q:	8.10 ft^3/sec	**7.85** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

Use temporary synthetic mat.

Flow Required: 7.84 ft^3/sec

Conclusion: ADEQUATE

Project:	Anderson Creek Landfill C&D Unit
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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SWALE SW1, UPPER REACH

Runoff

Drainage Area 1B

10-year runoff: **4.82** ft^3/sec

Swale Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	4.0 ft	4.0 ft
Side Slope Ratio, Left:	4.0 ft h/ft v	4.0 ft h/ft v
Side Slope Ratio, Right:	3.0 ft h/ft v	3.0 ft h/ft v x ft
Water Depth:	0.49 ft	0.68 ft
Side Slope Width Left =	4 x 0.49	4 x 0.68
=	1.96 ft	2.72 ft
Side Slope Width Right =	3 x 0.49	3 x 0.68
=	1.47 ft	2.04 ft
Area, A =	4 x 0.49 + 1.96 x 0.49 / 2 + 1.47 x 0.49 / 2	4 x 0.68 + 2.72 x 0.68 / 2 + 2.04 x 0.68 / 2
	2.80 ft^2	4.34 ft^2
Wetted Perimeter:	7.57 ft	8.95 ft
Hydraulic Radius, R:	0.370 ft	0.485 ft
VR:	0.64	0.54
Roughness Coeffiicient, n:	0.070 (2"-6" grass)	0.130 (6"-10" grass)
Slope, S:	0.025 ft/ft	0.025 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**1.73** ft/sec	1.12 ft/sec
Flow, Q:	4.84 ft^3/sec	**4.84** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

No temporary lining required.

Flow Required: 4.82 ft^3/sec

Conclusion: ADEQUATE

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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SWALE SW4

Runoff

Drainage Area 4

10-year runoff: **3.21** ft^3/sec

Swale Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	2.0 ft	2.0 ft
Side Slope Ratio, Left:	3.0 ft h/ft v	3.0 ft h/ft v
Side Slope Ratio, Right:	4.0 ft h/ft v	4.0 ft h/ft v x ft
Water Depth:	0.37 ft	0.48 ft
Side Slope Width Left =	3 x 0.37	3 x 0.48
=	0.74 ft	0.96 ft
Side Slope Width Right =	4 x 0.37	4 x 0.48
=	1.48 ft	1.92 ft
Area, A =	2 x 0.37 + 0.74 x 0.37 / 2 + 1.48 x 0.37 / 2	2 x 0.48 + 0.96 x 0.48 / 2 + 1.92 x 0.48 / 2
	1.15 ft^2	1.65 ft^2
Wetted Perimeter:	4.35 ft	5.05 ft
Hydraulic Radius, R:	0.264 ft	0.327 ft
VR:	0.76	0.66
Roughness Coeffiicient, n:	0.067 (2"-6" grass)	0.110 (6"-10" grass)
Slope, S:	0.100 ft/ft	0.100 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**2.88** ft/sec	2.02 ft/sec
Flow, Q:	3.32 ft^3/sec	**3.34** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

Use temporary synthetic mat.

Flow Required: 3.21 ft^3/sec

Conclusion: ADEQUATE

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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SWALE SW5

Runoff

Drainage Areas 4 & 5

10-year runoff: **6.94** ft^3/sec

Swale Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	8.0 ft	8.0 ft
Side Slope Ratio, Left:	3.0 ft h/ft v	3.0 ft h/ft v
Side Slope Ratio, Right:	4.0 ft h/ft v	4.0 ft h/ft v x ft
Water Depth:	0.55 ft	0.75 ft
Side Slope Width Left =	3 x 0.55	3 x 0.75
=	4.40 ft	6.00 ft
Side Slope Width Right =	4 x 0.55	4 x 0.75
=	2.20 ft	3.00 ft
Area, A =	8 x 0.55 + 4.4 x 0.55 / 2 + 2.2 x 0.55 / 2	8 x 0.75 + 6 x 0.75 / 2 + 3 x 0.75 / 2
	6.22 ft^2	9.38 ft^2
Wetted Perimeter:	14.70 ft	17.14 ft
Hydraulic Radius, R:	0.423 ft	0.547 ft
VR:	0.49	0.42
Roughness Coeffiicient, n:	0.080 (2"-6" grass)	0.145 (6"-10" grass)
Slope, S:	0.013 ft/ft	0.013 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**1.17** ft/sec	0.77 ft/sec
Flow, Q:	7.27 ft^3/sec	**7.19** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

No temporary lining required.

Flow Required: 6.94 ft^3/sec

Conclusion: ADEQUATE

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CIVIL & ENVIRONMENTAL ENGINEERING

SWALE SW7

Runoff

Drainage Areas 4, 5 & 7

10-year runoff: **8.43** ft^3/sec

Swale Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	8.0 ft	8.0 ft
Side Slope Ratio, Left:	3.0 ft h/ft v	3.0 ft h/ft v
Side Slope Ratio, Right:	3.0 ft h/ft v	3.0 ft h/ft v x ft
Water Depth:	0.35 ft	0.46 ft
Side Slope Width Left =	3 x 0.35	3 x 0.46
=	2.80 ft	3.68 ft
Side Slope Width Right =	3 x 0.35	3 x 0.46
=	1.05 ft	1.38 ft
Area, A =	8 x 0.35 + 2.8 x 0.35 / 2 + 1.05 x 0.35 / 2	8 x 0.46 + 3.68 x 0.46 / 2 + 1.38 x 0.46 / 2
	3.47 ft^2	4.84 ft^2
Wetted Perimeter:	11.93 ft	13.16 ft
Hydraulic Radius, R:	0.291 ft	0.368 ft
VR:	0.73	0.66
Roughness Coeffiicient, n:	0.067 (2"-6" grass)	0.110 (6"-10" grass)
Slope, S:	0.067 ft/ft	0.067 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**2.52** ft/sec	1.79 ft/sec
Flow, Q:	8.75 ft^3/sec	**8.69** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

Use temporary synthetic mat.

Flow Required: 8.43 ft^3/sec

Conclusion: ADEQUATE

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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SLOPE BENCH SB 2

Runoff

Drainage Area **2**

10-year runoff: **3.92** ft^3/sec

Bench Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	0.0 ft	0.0 ft
Side Slope Ratio, Left:	4.0 ft h/ft v	4.0 ft h/ft v
Side Slope Ratio, Right:	10.0 ft h/ft v	10.0 ft h/ft v x ft
Water Depth:	0.70 ft	0.94 ft
Side Slope Width Left =	4 x 0.7	4 x 0.94
=	2.80 ft	3.76 ft
Side Slope Width Right =	10 x 0.7	10 x 0.94
=	7.00 ft	9.40 ft
Area, A =	0 x 0.7 + 2.8 x 0.7 / 2 + 7 x 0.7 / 2	0 x 0.94 + 3.76 x 0.94 / 2 + 9.4 x 0.94 / 2
	3.43 ft^2	6.19 ft^2
Wetted Perimeter:	9.92 ft	13.32 ft
Hydraulic Radius, R:	0.346 ft	0.464 ft
VR:	0.40	0.30
Roughness Coefficient, n:	0.090 (2"-6" grass)	0.195 (6"-10" grass)
Slope, S:	0.020 ft/ft	0.020 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**1.15** ft/sec	0.65 ft/sec
Flow, Q:	3.94 ft^3/sec	**4.00** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: **STABLE**

No lining required.

Flow Required: 3.92 ft^3/sec

Conclusion: ADEQUATE

Project:	Anderson Creek Landfill C&D Unit
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Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SLOPE BENCH SB 3

Runoff

Drainage Area 2

10-year runoff: **3.36** ft^3/sec

Bench Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	0.0 ft	0.0 ft
Side Slope Ratio, Left:	4.0 ft h/ft v	4.0 ft h/ft v
Side Slope Ratio, Right:	10.0 ft h/ft v	10.0 ft h/ft v x ft
Water Depth:	0.68 ft	0.91 ft
Side Slope Width Left =	4 x 0.68	4 x 0.91
=	**2.72** ft	3.64 ft
Side Slope Width Right =	10 x 0.68	10 x 0.91
=	6.80 ft	9.10 ft
Area, A =	0 x 0.68 + 2.72 x 0.68 / 2 + 6.8 x 0.68 / 2	0 x 0.91 + 3.64 x 0.91 / 2 + 9.1 x 0.91 / 2
	3.24 ft^2	5.80 ft^2
Wetted Perimeter:	9.64 ft	12.90 ft
Hydraulic Radius, R:	0.336 ft	0.449 ft
VR:	0.35	0.26
Roughness Coeffiicient, n:	0.098 (2"-6" grass)	0.210 (6"-10" grass)
Slope, S:	0.020 ft/ft	0.020 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**1.04** ft/sec	0.59 ft/sec
Flow, Q:	3.35 ft^3/sec	**3.40** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

No lining required.

Flow Required: 3.36 ft^3/sec

Conclusion: ADEQUATE

Project:	Anderson Creek Landfill C&D Unit
Project #:	03001C
Date:	May 7, 2013
By:	WLF

Clayton, Sr., P.E., Inc.
CIVIL & ENVIRONMENTAL ENGINEERING

SLOPE BENCH SB 6

Runoff

Drainage Area 5

10-year runoff: **3.36** ft^3/sec

Bench Design

Lining: Grass-legume mixture, easily erodible soil

	Check stability	Check capacity
Bottom Width:	0.0 ft	0.0 ft
Side Slope Ratio, Left:	4.0 ft h/ft v	4.0 ft h/ft v
Side Slope Ratio, Right:	10.0 ft h/ft v	10.0 ft h/ft v x ft
Water Depth:	0.68 ft	0.91 ft
Side Slope Width Left =	4 x 0.68	4 x 0.91
=	2.72 ft	3.64 ft
Side Slope Width Right =	10 x 0.68	10 x 0.91
=	6.80 ft	9.10 ft
Area, A =	0 x 0.68 + 2.72 x 0.68 / 2 + 6.8 x 0.68 / 2	0 x 0.91 + 3.64 x 0.91 / 2 + 9.1 x 0.91 / 2
	3.24 ft^2	5.80 ft^2
Wetted Perimeter:	9.64 ft	12.90 ft
Hydraulic Radius, R:	0.336 ft	0.449 ft
VR:	0.35	0.26
Roughness Coeffiicient, n:	0.097 (2"-6" grass)	0.210 (6"-10" grass)
Slope, S:	0.020 ft/ft	0.020 ft/ft
Velocity, $V=1.49/nxR^{2/3}xS^{1/2}$:	**1.05** ft/sec	0.59 ft/sec
Flow, Q:	3.39 ft^3/sec	**3.40** ft^3/sec

Permissible Velocity: 3.50 ft/sec

Conclusion: STABLE

No lining required.

Flow Required: 3.36 ft^3/sec

Conclusion: ADEQUATE

Appendix X

Operational Plan Forms

Fire Occurrence Notification Form
Routine Inspection Forms
Waste Screening Form

SOLID WASTE MANAGEMENT FACILITY
FIRE OCCURRENCE NOTIFICATION
NC DENR Division of Waste Management
Solid Waste Section

Notify the Section verbally within 24 hours and submit written notification within 15 days of the occurrence.
(If additional space is needed, use back of this form.)

NAME OF FACILITY: _____ PERMIT # _____

DATE AND TIME OF FIRE: _____ @ _____

HOW WAS THE FIRE REPORTED AND BY WHOM:

LIST ACTIONS TAKEN:

WHAT WAS THE CAUSE OF THE FIRE:

DESCRIBE AREA, TYPE, AND AMOUNT OF WASTE INVOLVED:

WHAT COULD HAVE BEEN DONE TO PREVENT THIS FIRE:

DESCRIBE PLAN OF ACTIONS TO PREVENT FUTURE INCIDENTS:

NAME: _____ TITLE: _____ DATE: _____

****

THIS SECTION TO BE COMPLETED BY SOLID WASTE SECTION REGIONAL STAFF

DATE RECEIVED _____

List any factors not listed that might have contributed to the fire or that might prevent occurrence of future fires:

FOLLOW-UP REQUIRED:

☐ NO ☐ PHONE CALL ☐ SUBMITTAL ☐ MEETING ☐ RETURN VISIT BY:_____ (DATE)

ACTIONS TAKEN OR REQUIRED:

Revised 6/8/09

HARNETT COUNTY LANDFILL DAILY/WEEKLY CHECK LIST

Inspector: _____

Inspection Dates: __/__/20__ to __/__/20__

Facility: DELF ACLF

Landfill Cell: ☐ Active C&D ☐ Active LCID ☐ Closed MSW/C&D(Weekly)

	DAILY OPERATION REQUIREMENTS	Mon	Tue	Wed	Thu	Fri	Sat	COMMENTS/NOTES (utilize back of form for more description as necessary)
Daily Inspection Items for Active Cells	Trucks using designated roads/approved parking areas per permit							
	Operations conducted during permitted operating hours							
	Access controlled per plan							
	Access road(s) maintained (erosion, dust, litter, mud, etc) per plan							
	Vehicles directed promptly to unloading area							
	Vehicles promptly unloaded							
	Inspection procedures implemented for prohibited wastes per plan							
	No unapproved wastes							
	Solid waste spread and compacted into layers per plan							
	No waste <15 ft. from edge of liner, berm, edge marked, etc.							
	Procedures followed for special handling and residual wastes							
	No open burning							
	Vectors minimized and controlled per plan							
	Odors minimized and controlled per plan							
	Other nuisances minimized and controlled per plan							
	Litter minimized and controlled per plan							
	Approved weekly cover placed							
Daily & Weekly Inspection Items- All Cells	Vegetation established and maintained per plan							
	Surface and groundwater pollution discharges prevented/controlled							
	Soil and erosion control BMPs are maintained per plan							
	Leachate popouts detected							
	Leachate popouts repaired							
	Flow from leachate management system monitored daily							
	Leachate management facilities operated and maintained							
	Landfill gas controlled per plan/ LFG Flare Operational							
	Daily operational records being made and maintained							
	Salvaged materials are stored in an approved area							
	Recyclable materials collection center maintained							
	No immediate threats to public health and safety							

Inspector Signature: _____ **Date:** _____

Key = Yes, No, NA (not applicable), ND (not determined)

(FRONT)

HARNETT COUNTY LANDFILL DAILY/WEEKLY CHECK LIST

ADDITIONAL INSPECTION COMMENTS:

(BACK)

HARNETT COUNTY DUNN-ERWIN LANDFILL QUARTERLY INSPECTION CHECK LIST

Inspector: _____ **Quarterly Inspection Date:** ☐ Jan ☐ April ☐ July ☐ October 20 ____

GROUNDWATER, GAS, & SURFACE WATER INSPECTION

	WELL ID	Properly Locked?	ID Tag Present?	Well or Casing Damaged?	Well accessible and mowed?	Other Issue(s)?	COMMENTS/NOTES (utilize back of form for more description as necessary)
GROUNDWATER MONITORING WELLS	MW-1						
	MW-2						
	MW-3R						
	MW-4						
	MW-5						
	MW-6						
	MW-7B						
	MW-8						
	MW-9						
	MW-10						
	MW-11						
	MW-12						
	MW-13						
	MW-14						
	MW-15						
	MW-16						
	MW-23B						
	MW-31						
	MW-32						
	MW-33						
	MW-34						
	MW-35						
GEOPROBE WELLS	GP-24W						
	GP-25W						
	GP-27W						
	GP-28W						
	GP-30W						
	GP-33W						
	GP-34W						
	GP-35W						
	GP-36W						
	GP-37W						
	GP-38W						
GAS WELLS	GW-1						
	GW-2						
	GW-3						
	GW-4						
	GW-5						
SURFACE WATER	SW-1						
	SW-2						
	SW-3						

Key = Yes, No, NA (not applicable), ND (not determined)
Please be sure to complete the back of the form!

HARNETT COUNTY DUNN-ERWIN LANDFILL QUARTERLY INSPECTION CHECK LIST

EDGE OF WASTE MARKER INSPECTION					
LANDFILL CELL	**All Markers in Place?**	**Markers Visible from Each Other?**	**Any Markers Damaged?**	***Perimeter of LF maintained /mowed?***	***COMMENTS/NOTES*** *(utilize below for more description as necessary)*
ACTIVE C&D/ CLOSED MSW					
ACTIVE LCID					
CLOSED MSW					
CLOSED C&D					
ASBESTOS & TIRE MONOFILL					

Key = Yes, No, NA (not applicable), ND (not determined)

ADDITIONAL INSPECTION COMMENTS:

Inspector Signature: _____ **Date:** _____

HARNETT COUNTY ANDERSON CREEK LANDFILL QUARTERLY INSPECTION CHECK LIST

Inspector: _____ **Quarterly Inspection Date:** ☐ Jan ☐ April ☐ July ☐ October 20 ____

GROUNDWATER, GAS, & SURFACE WATER INSPECTION

	WELL ID	Properly Locked?	ID Tag Present?	Well or Casing Damaged?	Well accessible and mowed?	Other Issue(s)?	COMMENTS/NOTES (utilize back of form for more description as necessary)
GROUNDWATER MONITORING WELLS	MW-2						
	MW-3						
	MW-4						
	MW-5						
	CDMW-1						
	CDMW-2						
	CDMW-3						
	CDMW-5						
	CDMW-6B						
SURFACE WATER	SW-1						
	SW-2						

Key = Yes, No, NA (not applicable), ND (not determined)

EDGE OF WASTE MARKER INSPECTION

LANDFILL CELL	All Markers in Place?	Markers Visible from Each Other?	Any Markers Damaged?	*Perimeter of LF maintained /mowed?*	*COMMENTS/NOTES (utilize back of form for more description as necessary)*
ACTIVE C&D					
CLOSED MSW #1					
CLOSED MSW #2					
CLOSED C&D					

Key = Yes, No, NA (not applicable), ND (not determined)

(Be sure to sign Page 2 of the form!)

HARNETT COUNTY ANDERSON CREEK LANDFILL QUARTERLY INSPECTION CHECK LIST

ADDITIONAL INSPECTION COMMENTS:

Inspector Signature: _____ **Date:** _____

RANDOM WASTE SCREENING FORM

GENERAL INFORMATION (completed by transporter or landfill personnel)

Date & Time : _____

Transporter Name : _____

License Plate No. : _____

Drivers License No. : _____

Source of Waste : _____

Waste Description : _____

_____

_____

INSPECTION OBSERVATIONS (completed by landfill personel)

Hazardous waste labels or placards ?	YES / NO
PCB transformers, labels or placards ?	YES / NO
Lead-acid batteries ?	YES / NO
Unrinsed pesticide containers ?	YES / NO
Bulk or containerized liquids ?	YES / NO
Free liquids present ?	YES / NO
Sludges, pastes or slurries ?	YES / NO
Powders, dusts, smoke or vapors ?	YES / NO
Petroleum odors ?	YES / NO
Unusual odors ?	YES / NO
Other suspicious conditions ?	YES / NO

If YES, describe : _____

_____

_____

Photos Taken ? YES / NO (attach when available)

Will the wastes pass the Paint Filter Liquids Test ? YES / NO

Waste Accepted ? YES / NO

If NO, complete information of the back of this form

_____ _____

Signature (landfill personnel) Date

WASTE REJECTION INFORMATION (completed by landfill personnel only if waste is rejected)

Why was the waste rejected ?

_____

_____

_____

_____

_____

_____

What happened to the rejected waste ? (who took it where?)

_____

_____

_____

_____

_____

_____

Who was contacted at the SHWD ?

_____

Time : _____ AM / PM

Date : _____

ORIGINAL : Facility Records
COPY : Generator or Transporter

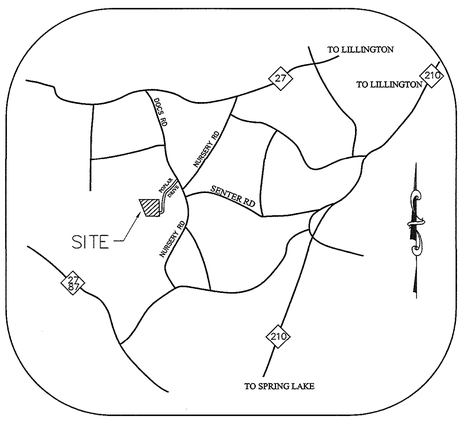
ANDERSON CREEK LANDFILL

HARNETT COUNTY

C&D UNIT PHASE III EXPANSION

MAY 2013

Final Drawings
For Permitting
Not For Construction



VICINITY MAP
NOT TO SCALE

SHEET INDEX

COVER SHEET
EXISTING CONDITIONS 1
GROUND WATER CONTOUR MAP 2
BASE GRADING 3
CELL 1 GRADING 4
CELL 2 GRADING 5
CELL 3 GRADING 6
CELL 4 GRADING 7
CELL 5 FINAL CONTOURS 8
SECTIONS 9
STORM WATER CONTROL PLAN 10
DETAILS 11
2000' PERIMETER LOCATION MAP 12

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DESIGNED CTC Jr.
DRAWN WLF
CHECKED CTC Jr.
PROJ. ENG. CTC Jr.

DATE: 2013
CTC PROJ. # 03001C
DWG FILE: 03001C ACLF Exp MAS-1.dwg

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER CYRUS CLAYTON, JR.

P.E.
5/31/2013 DATE

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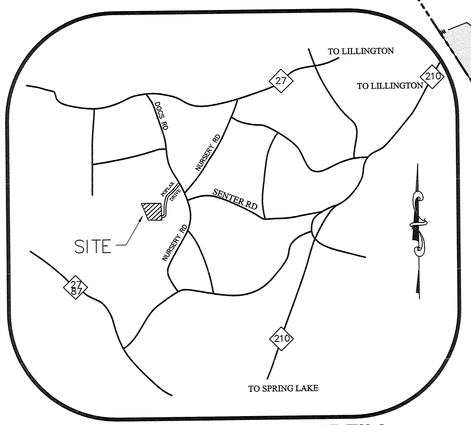

ANDERSON CREEK LANDFILL VICINITY MAP

NOT TO SCALE

General Notes

- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- PZ-28 P-8 PIEZOMETER LOCATION AND ID
- CDMW-3 C & D MONITORING WELL LOCATION AND ID
- MW #4 MSW MONITORING WELL LOCATION AND ID
- WETLANDS
- BLUE LINE STREAM

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

GRAPHIC SCALE: 1" = 150'
0 75 150 300 450

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 02890 ENGINEER CYRUS CLAYTON, JR.

Signature

5-31-2013
Date

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No:	03001C	File Name:	03001C ACLF EXP MAS-1
Designed By:	SBK	Drawn By:	SBK
Checked By:	RS	Proj. Eng.:	CTC Jr.
Sheet Title	EXISTING CONDITIONS		
Date	5/29/13	DRAWING	1
Scale	1" = 150'		

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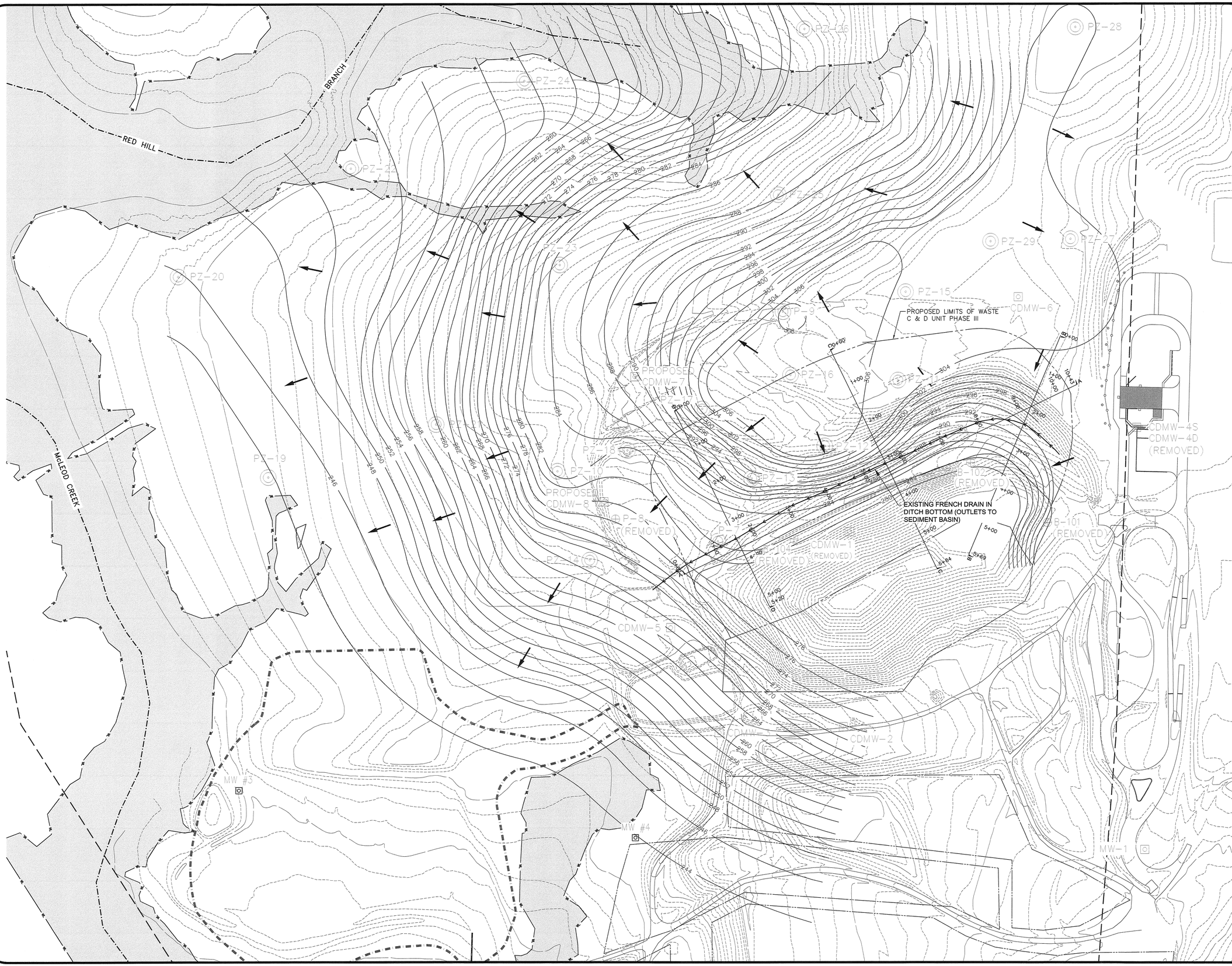

General Notes

- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- WETLAND
- PZ-28 / P-8 — PIEZOMETER LOCATION AND ID
- CDMW-3 — C & D MONITORING WELL LOCATION AND ID
- DIRECTION OF GROUND WATER FLOW
- SEASONAL HIGH GROUND WATER CONTOURS

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER CYRUS CLAYTON, JR.

Signature

5/31/2013
Date

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ANDERSON CREEK LANDFILL PHASE III EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: GROUNDWATER CONTOUR MAP	
Date: 5/29/13	DRAWING 2
Scale: 1" = 60'	

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CEMETERY

PREVIOUSLY PERMITTED
LIMITS OF DISTURBANCE
LQS # : HARNE-2005-004

PROPOSED LIMITS OF
WASTE C & D PHASE III

EXTERIOR HAUL ROAD

PROPOSED PHASE III
C&D LANDFILL

EXISTING FRENCH DRAIN

SEE FRENCH DRAIN
COVER DETAIL, SHEET 11

LIMITS OF WASTE
C & D UNIT PHASE II

LIMITS OF WASTE
C & D UNIT PHASE I

EXISTING TWIN 18" RCP

INVERT
319.0

INVERT
317.8

EXISTING 18" RCP

CUT & REMOVE
SECTION OF
EXISTING PIPE

CLASS B
RIPRAP
BASIN

INVERT
307.8±

INVERT 277.8

INVERT 276.0
CLASS B RIPRAP

EXISTING 15" CPP
PROPOSED 383 LF 15" CPP @ 6.7%
EXISTING HAUL ROADS

INVERT
282.1

EXISTING SEDIMENT
BASIN

EXIST. SEDI-
MENT TRAP

EXISTING SEDIMENT BASIN

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- EXISTING SWALE
- 300 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR

NOTE: BASE GRADE MAY BE EXCAVATED AND LINER SECTION CONSTRUCTED IN PHASES TO ALLOW FOR CELL 1 TO BEGIN OPERATION PRIOR TO OVERALL BASE GRADE COMPLETION.

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER C. TRUIS CLAYTON, JR.

Signature

Date 5-31-2013

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: PHASE III PROPOSED BASE GRADES	
Date: 5/29/13	DRAWING 3
Scale: 1" = 60'	

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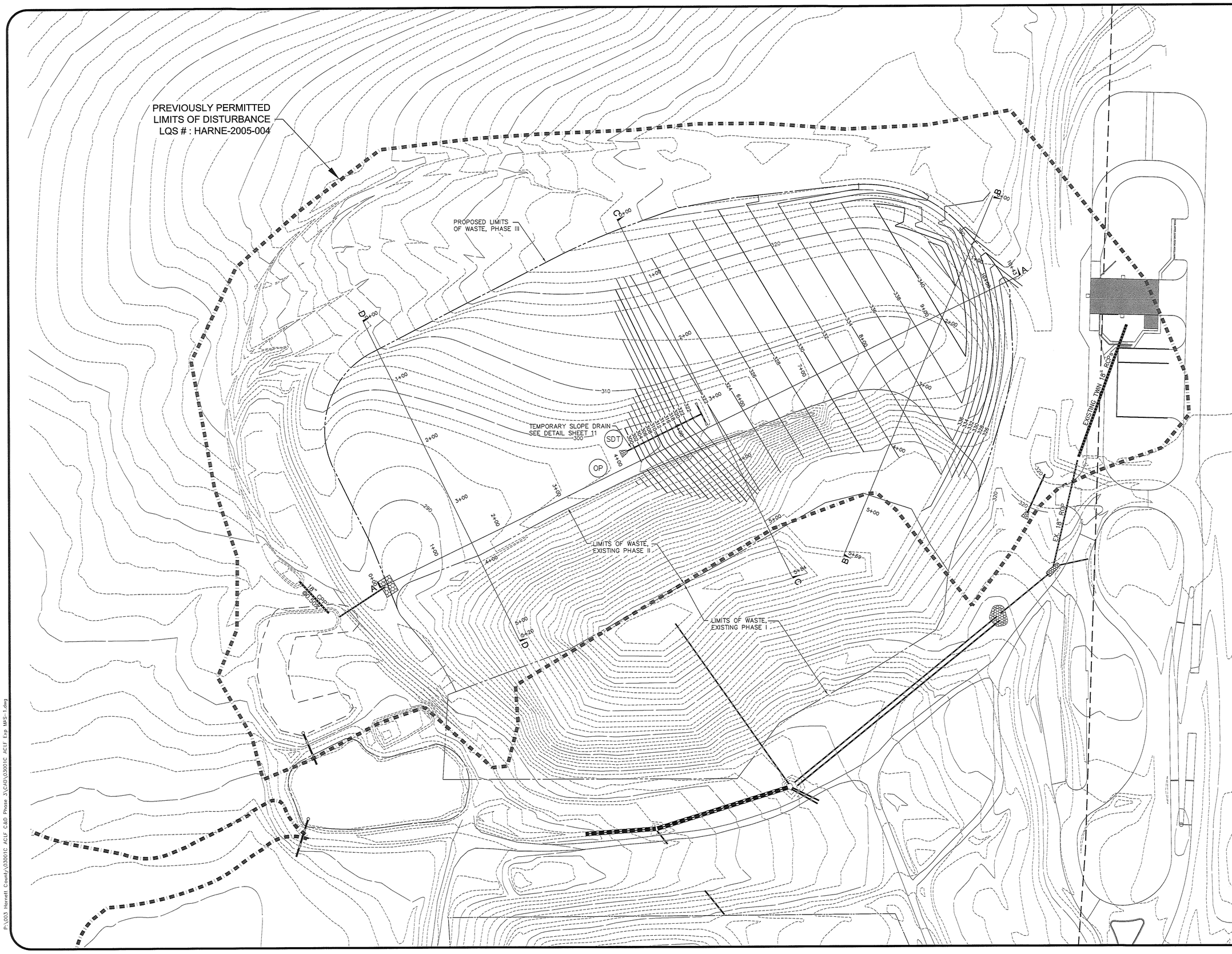

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- CELL 1 CONTOURS

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 026909 ENGINEER C. TYRUS CLAYTON, JR.

Signature: C. Tyrus Clayton Jr.
Date: 5-31-2013

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: CELL 1 GRADING	
Date: 5/29/13	DRAWING 4
Scale: 1" = 60'	

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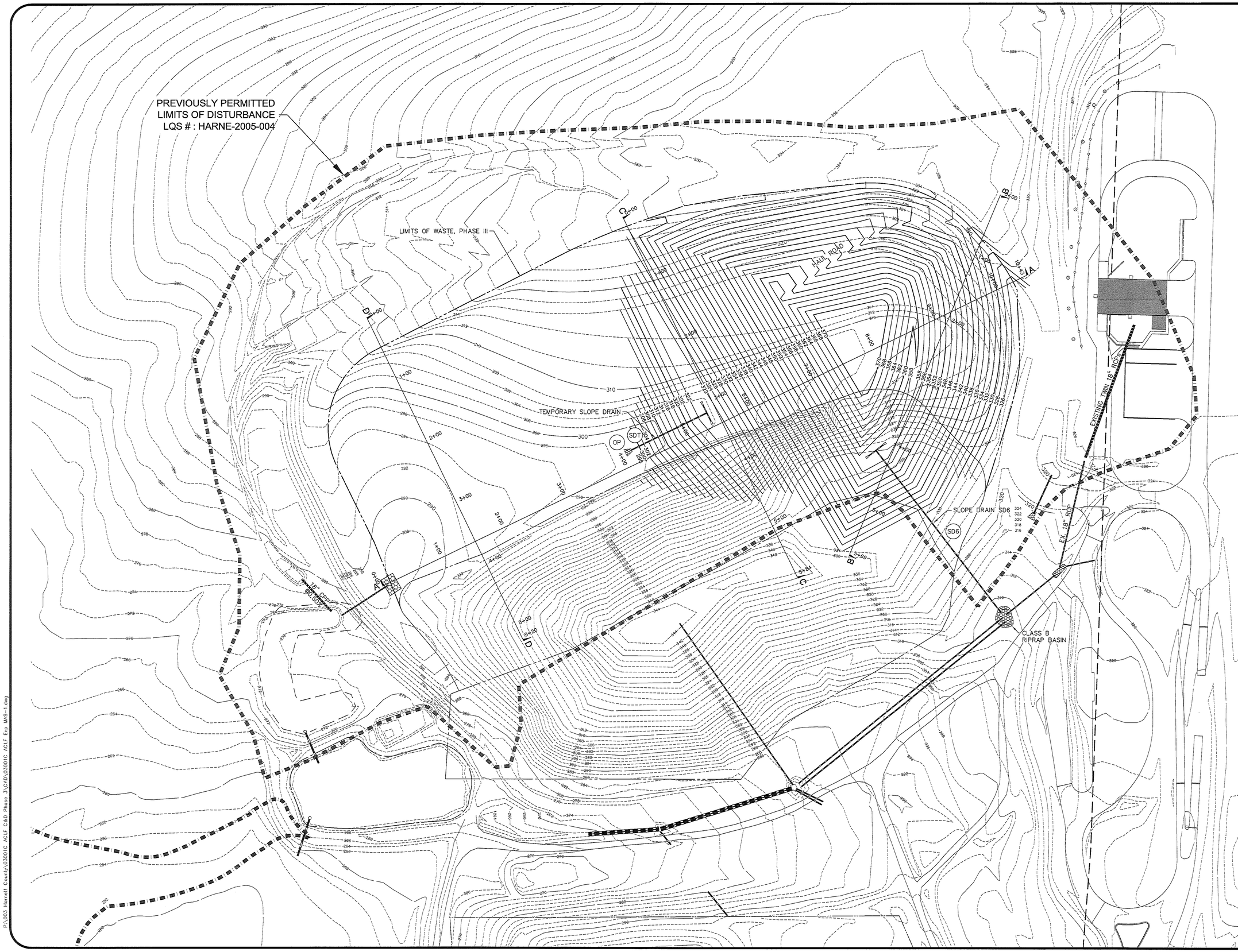

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- CELL 2 CONTOURS

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 029909 ENGINEER CYRUS CLAYTON, JR.

Signature

5-31-2013
Date

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ANDERSON CREEK LANDFILL PHASE III EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.

Sheet Title: CELL 2 GRADING

Date 5/29/13	DRAWING 5
Scale 1" = 60'	

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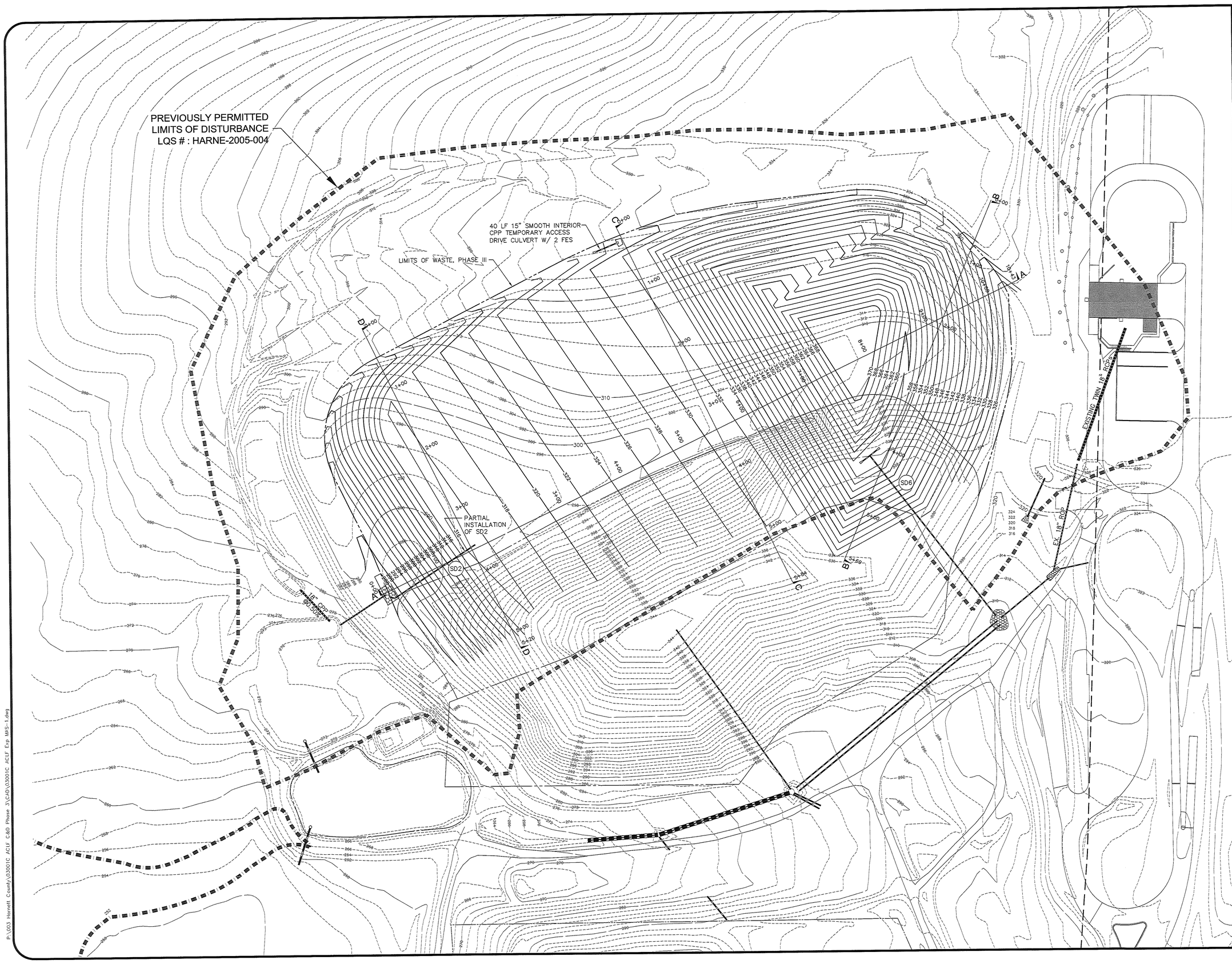

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- CELL 3 CONTOURS

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 029909 ENGINEER CITRUS CLAYTON, JR.

Signature

Date 5-31-2013

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ANDERSON CREEK LANDFILL PHASE III EXPANSION

HARNETT COUNTY, NC

Project No:	03001C	File Name:	03001C ACLF EXP MAS-1
Designed By:	SBK	Drawn By:	SBK
Checked By:	RS	Proj. Eng.:	CTC Jr.
Sheet Title	CELL 3 GRADING		
Date	5/29/13	DRAWING	6
Scale	1" = 60'		

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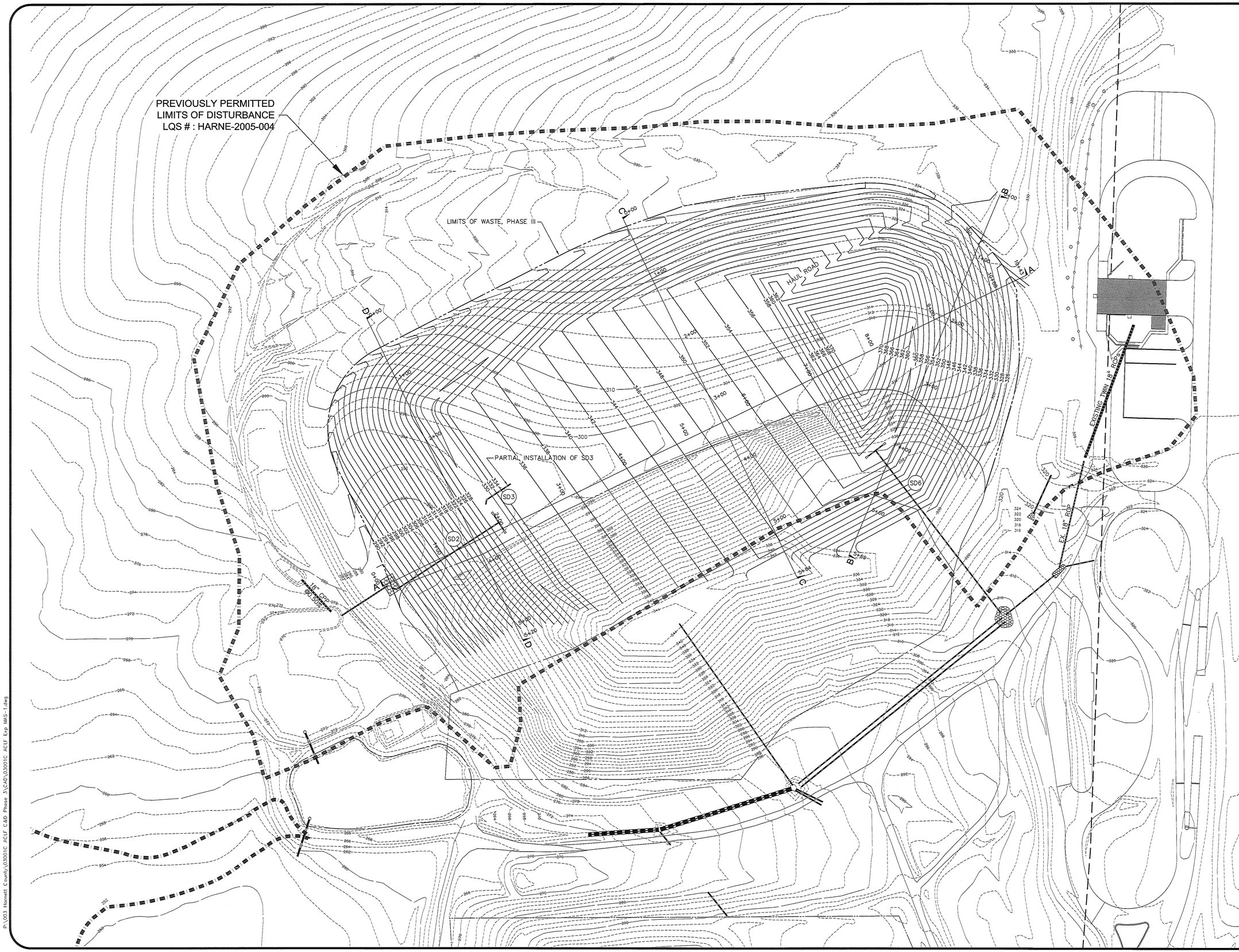

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- CELL 4 CONTOURS

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER C. TARIS CLAYTON, JR.

Signature

5-31-2013
Date

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ANDERSON CREEK LANDFILL PHASE III EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.

Sheet Title: CELL 4 GRADING

Date: 5/29/13	DRAWING 7
Scale: 1" = 60'	

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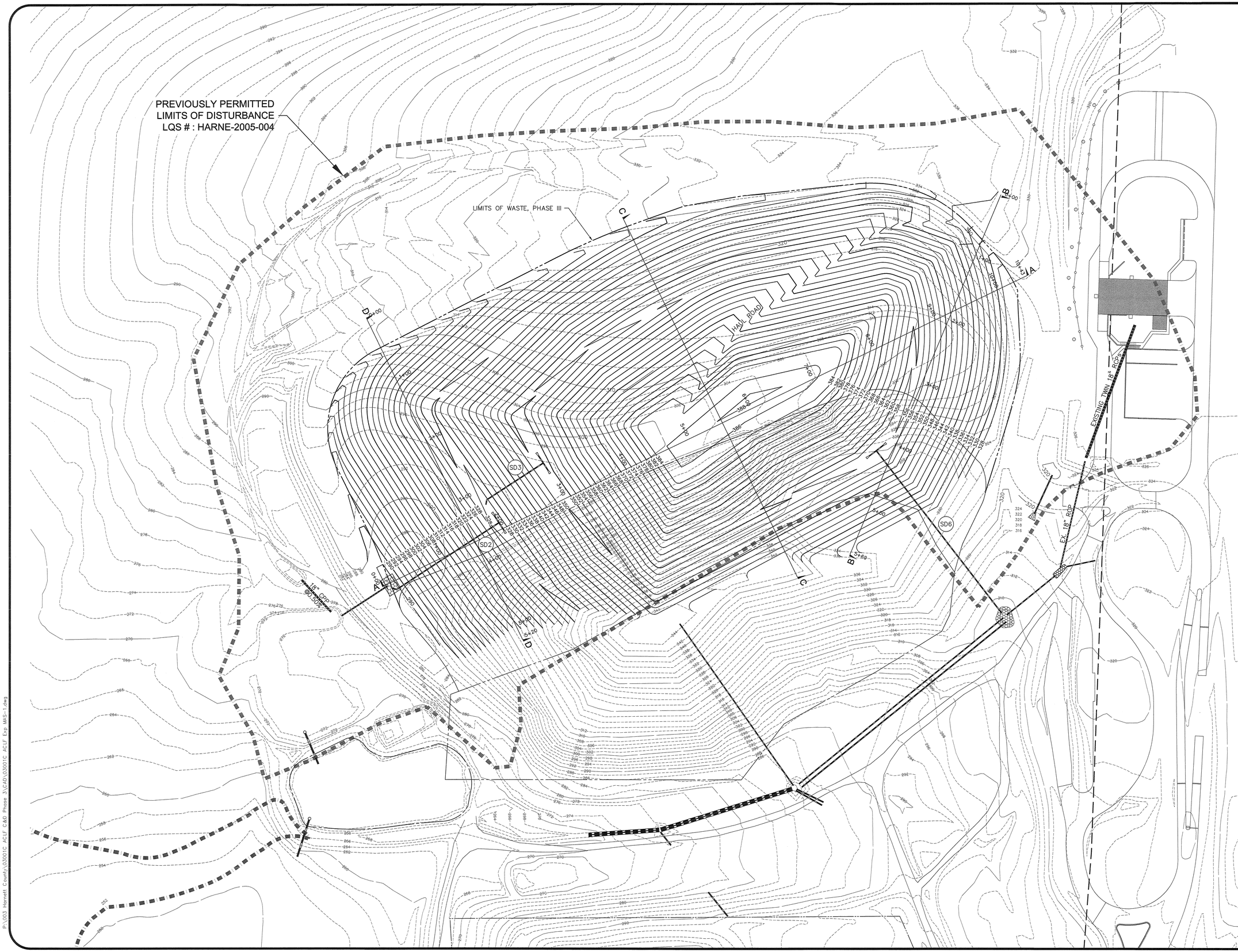

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- CELL 5 CONTOURS

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 022690 ENGINEER C. TYRUS CLAYTON, JR.

Signature: C. Tyrus Clayton Jr.
Date: 5/31/2013

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: CELL 5 GRADING FINAL CONTOURS	
Date: 5/29/13	DRAWING 8
Scale: 1" = 60'	

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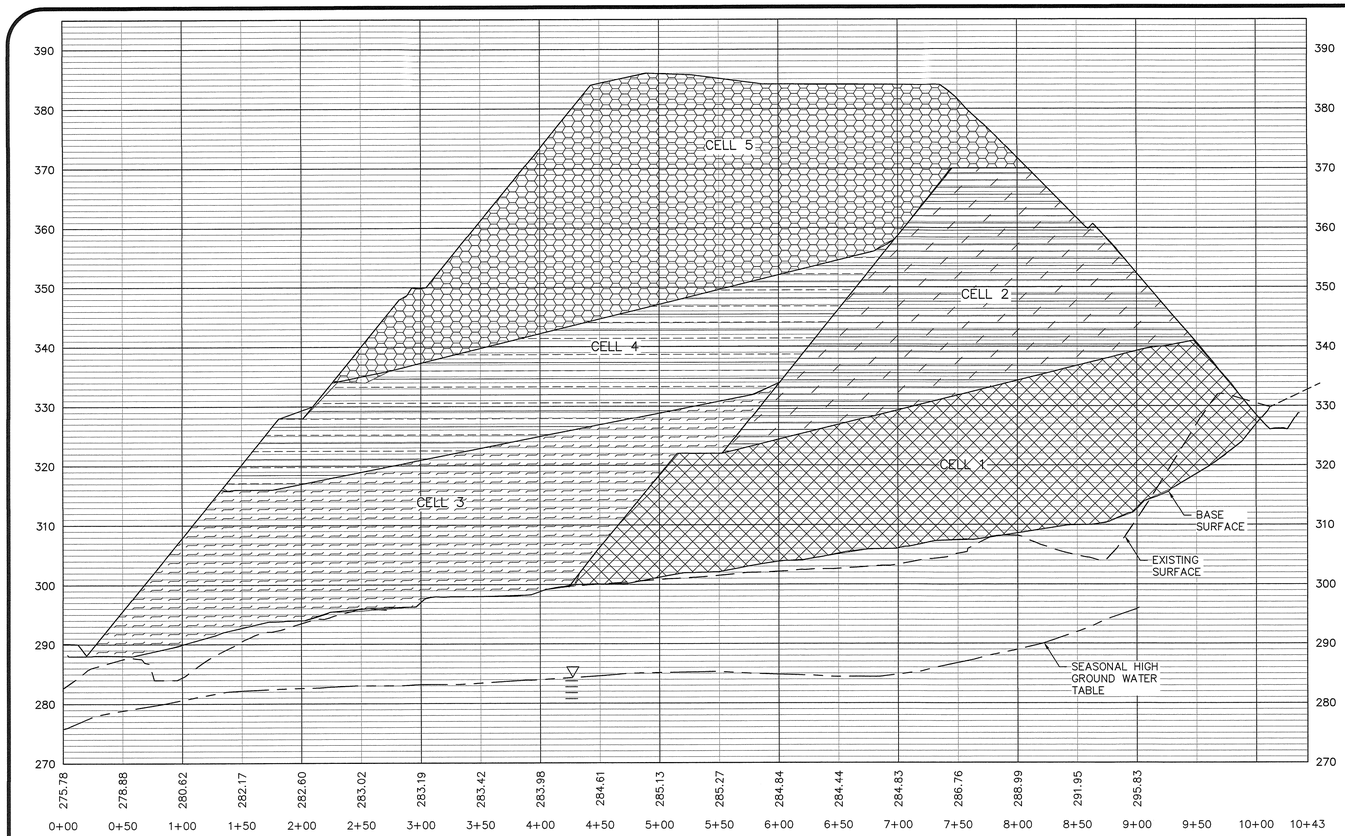
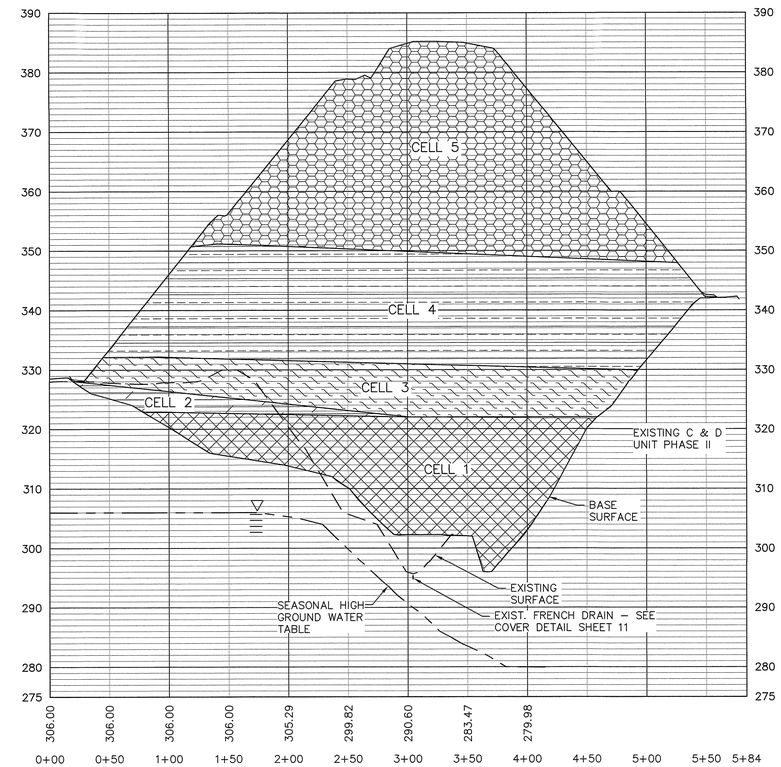


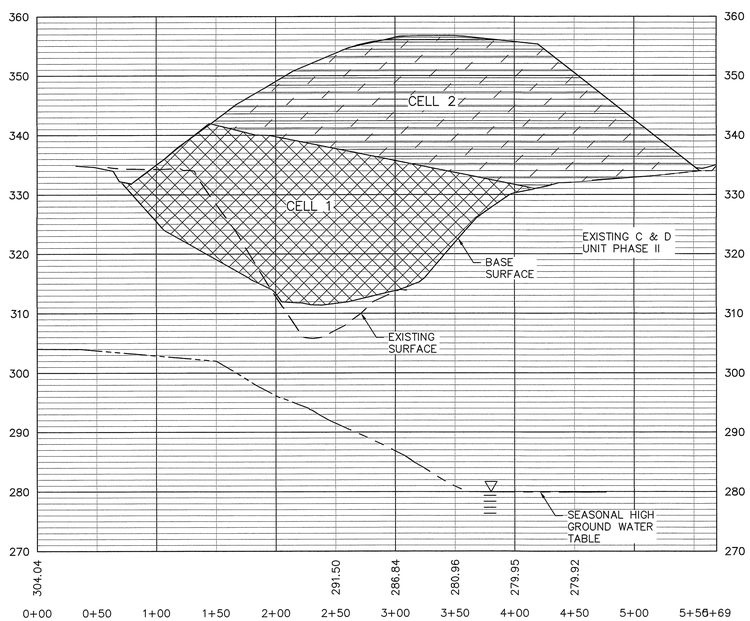
SECTION A-A

HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 12'



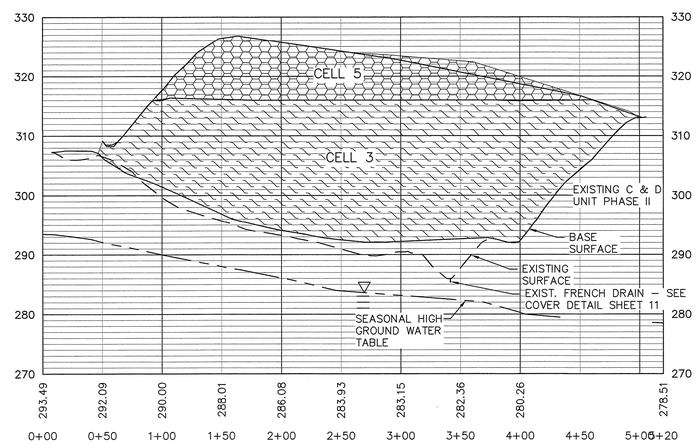
SECTION C-C

HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 12'



SECTION B-B

HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 12'



SECTIOND-D

HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 12'

General Notes

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No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER CYRUS CLAYTON, JR.

Signature: C T Clayton

Date: 5-31-2013

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: WLF
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: SECTIONS	
Date: 5/29/13	DRAWING 9
Scale: AS NOTED	

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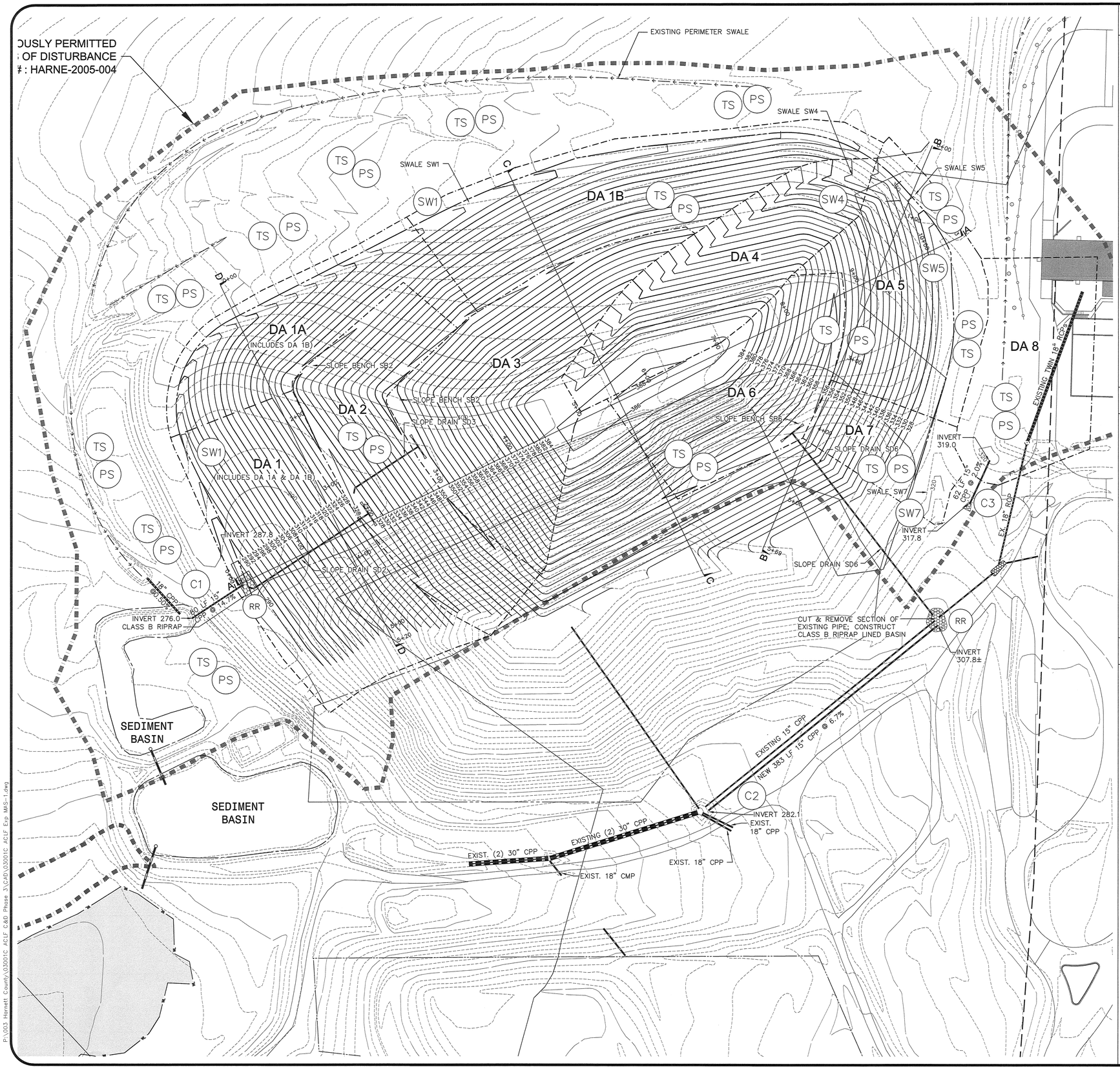

STORM WATER CONTROL LEGEND

TITLE	KEY	SYMBOL
PERMANENT SEEDING	PS	
TEMPORARY SEEDING	TS	
LIMITS OF DISTURBANCE		
SLOPE BENCH	SB	
SWALE	SW	
RIPRAP	RR	

TEMPORARY SEEDING SCHEDULE (TS)

Shoulders, Side Ditches, Slopes

DATE:	TYPE:	PLANTING RATES:
Aug 15 – Dec 31		Rye (grain) 120 lbs./acre
Dec 31 – May 1		Rye (grain) 120 lbs./acre Annual Lespedeza* 50 lbs./acre
May 1 – Aug 15		German Millet 40 lbs./acre

Consult the Conservation Engineer or the Soil Conservation Service for additional information concerning other alternative for vegetation of denuded areas.

Ground cover must be installed on exposed slopes within 15 working days or 30 calendar days following completion of any phase of grading.

* Omit annual lespedeza when duration of temporary cover is not to extend beyond June.

**Temporary – Reseed according to optimum season for desired permanent vegetation, Do not allow temporary cover to grow over 12" in height before mowing, otherwise fescue may be shaded out.

SEEDBED PREPARATION

1. Chisel compacted areas and spread topsoil 3" deep over adverse soil conditions, if available.
2. Rip the entire area to 6" depth.
3. Remove all loose rock, roots, and other obstructions leaving surface reasonably smooth and uniform.
4. Apply agricultural lime, fertilizer, and superphosphate uniformly and mix with soil (see below*).
5. Continue tillage unit a well-pulverized, firm, reasonably uniform seedbed is prepared 4" to 6" deep.
6. Seed on a freshly prepared seedbed and cover seed lightly with seeding equipment or cultipack after seeding.
7. Mulch immediately after seeding and anchor mulch.
8. Inspect all seeded areas and make necessary repairs or reseeding within the planting season, if possible. If stand should be over 60% damaged reestablish following original lime, fertilizer and seeding rates.
9. Consult the Conservation Inspector on maintenance treatment and fertilization after permanent cover is established.

*Apply: Agricultural Limestone – 2 tons/acre or 3 tons/acre in clay soils.
Fertilizer – 750 lbs/acre (10–20–10)
Mulch – 2 tons/acre (small grain straw)
Anchor – asphalt emulsion at 450 gal./acre is straw is not crimped in place.

PERMANENT SEEDING SCHEDULE (PS)

Shoulders, Side Ditches, Slopes (Max. 3:1)

DATE:	TYPE:	PLANTING RATES:
Aug 15 – Nov 1		Tall Fescue 300 lbs./acre
Nov 1 – Mar 1	Abruzzi Rye	Tall Fescue and 300 lbs./acre 25 lbs./acre
Mar 1 – Apr 15		Tall Fescue 300 lbs./acre
Apr 15 – Jun 30		Hulled Common Bermudagrass 25 lbs./acre
Jul 1 – Aug 15	*Browntop Millet *or Sorghum – Sudan Hybrids	Tall Fescue and 120 lbs./acre 35 lbs./acre 30 lbs./acre
	Slopes (3:1 to 2:1)	
Mar 1 – Jun 1 (Mar 1 – Apr 15)		Sericea Lespedeza (scarified) and 50 lbs./acre Add Tall Fescue 120 lbs./acre
(Mar 1 – Jun 30) lbs./acre		Or Add Hulled Common Bermudagrass 25
Jun 1 – Sep 1	*Browntop Millet * or Sorghum – Sudan Hybrids	*Tall Fescue and 120 lbs./acre 35 lbs./acre 30 lbs./acre
Sep 1 – Mar 1		Tall Fescue 120 lbs./acre
(Nov 1 – Mar 1)		Add Abruzzi Rye 25 lbs./acre

Consult the Conservation Engineer or the Soil Conservation Service for additional information concerning other alternative for vegetation of denuded areas.

Permanent ground cover must be installed on all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development.

**Temporary – Reseed according to optimum season for desired permanent vegetation, Do not allow temporary cover to grow over 12" in height before mowing, otherwise fescue may be shaded out.

SEEDBED PREPARATION

1. Chisel compacted areas and spread topsoil 3" deep over adverse soil conditions, if available.
2. Rip the entire area to 6" depth.
3. Remove all loose rock, roots, and other obstructions leaving surface reasonably smooth and uniform.
4. Apply agricultural lime, fertilizer, and superphosphate uniformly and mix with soil (see below*).
5. Continue tillage unit a well-pulverized, firm, reasonably uniform seedbed is prepared 4" to 6" deep.
6. Seed on a freshly prepared seedbed and cover seed lightly with seeding equipment or cultipack after seeding.
7. Mulch immediately after seeding and anchor mulch.
8. Inspect all seeded areas and make necessary repairs or reseeding within the planting season, if possible. If stand should be over 60% damaged reestablish following original lime, fertilizer and seeding rates.
9. Consult the Conservation Inspector on maintenance treatment and fertilization after permanent cover is established.

*Apply: Agricultural Limestone – 2 tons/acre or 3 tons/acre in clay soils.
Fertilizer – 1000 lbs/acre
Superphosphate – 500 lbs/acre (20%)
Mulch – 2 tons/acre (small grain straw)
Anchor – asphalt emulsion at 450 gal./acre

General Notes

- LIMITS OF DISTURBANCE
- EXISTING MAJOR CONTOUR LINE
- EXISTING MINOR CONTOUR LINE
- PROPOSED CONTOUR LINE

FINAL DRAWINGS
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NOT FOR CONSTRUCTION

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

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER C. TYRUS CLAYTON, JR.

Signature

5-31-2013
Date

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: STORM WATER CONTROL PLAN	
Date: 5/29/13	DRAWING 10
Scale: 1" = 60'	

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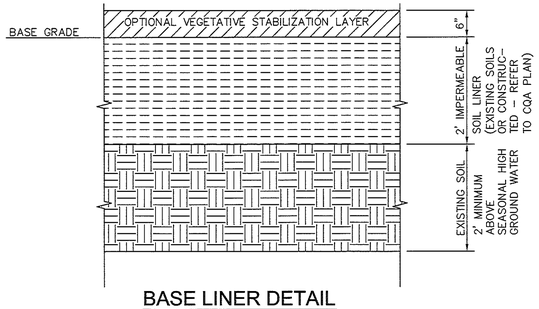
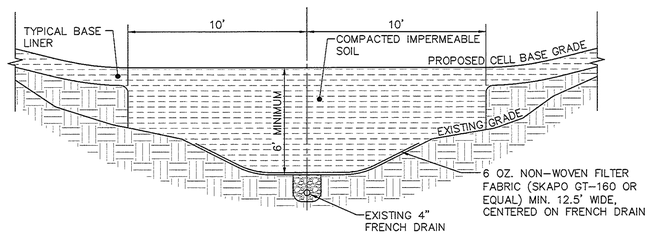


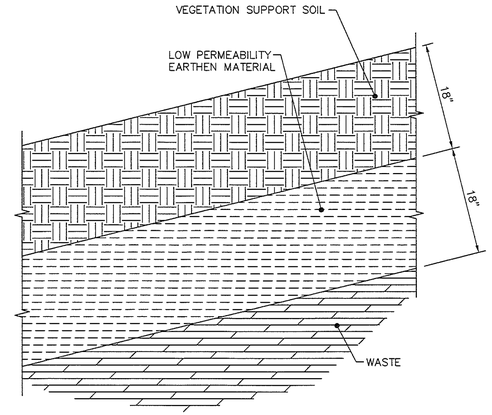
BASE LINER DETAIL

NOT TO SCALE



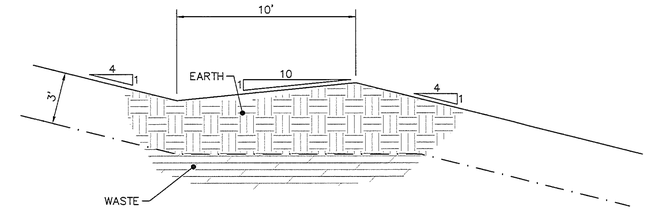
FRENCH DRAIN COVER DETAIL

NOT TO SCALE



TYPICAL CAP DETAIL

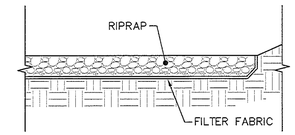
NOT TO SCALE



SB

TYPICAL SLOPE BENCH DETAIL

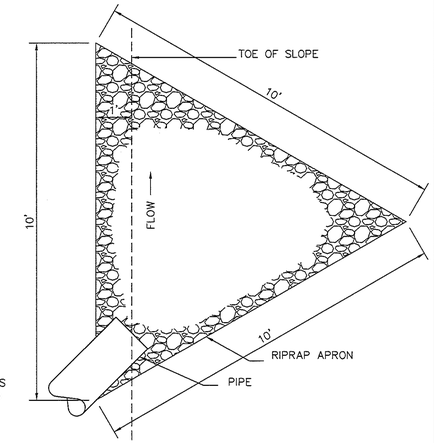
SCALE: 1/4" = 1'-0"



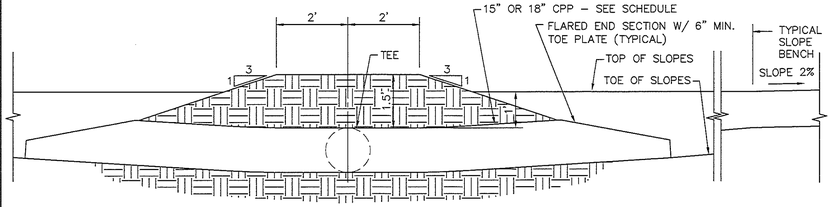
RR

RIPRAP DETAIL

SCALE: 1/4" = 1'-0"



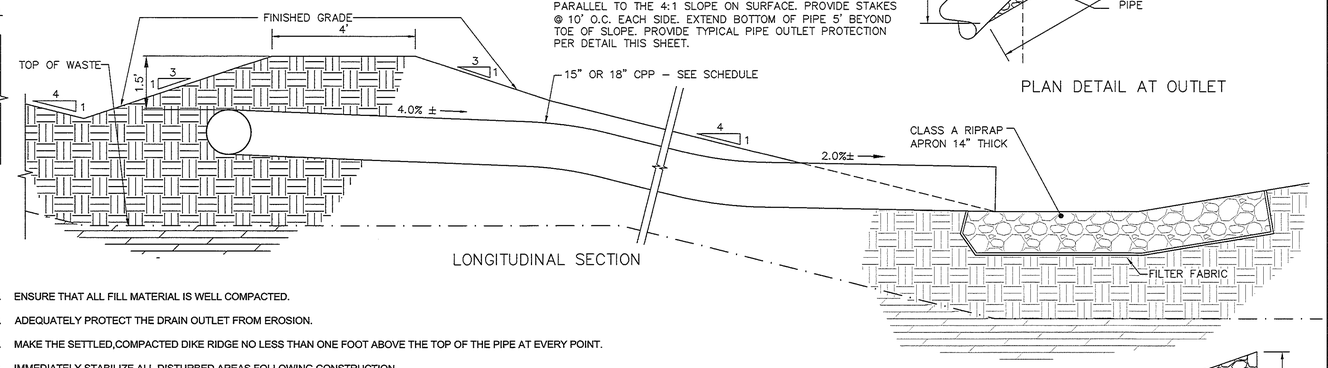
PLAN DETAIL AT OUTLET



CROSS SECTION

SLOPE DRAIN PIPE SCHEDULE	
NO.	DIAMETER
SD2	18"
SD3	15"
SD6	15"

NOTE:
FOR TEMPORARY DRAINS, PLACE THE PORTION OF PIPE PARALLEL TO THE 4:1 SLOPE ON SURFACE. PROVIDE STAKES @ 10' O.C. EACH SIDE. EXTEND BOTTOM OF PIPE 5' BEYOND TOE OF SLOPE. PROVIDE TYPICAL PIPE OUTLET PROTECTION PER DETAIL THIS SHEET.



LONGITUDINAL SECTION

SPECIFICATIONS
A COMMON FAILURE OF SLOPE DRAINS IS CAUSED BY WATER SATURATING THE SOIL AND SEEPING ALONG THE PIPE. THIS CREATES VOIDS FROM CONSOLIDATION AND PIPING AND CAUSES WASHOUTS. PROPER BACKFILLING AROUND AND UNDER THE PIPE "HAUNCHES" WITH STABLE SOIL MATERIAL AND HAND COMPACTING IN 6-INCH LIFTS TO ACHIEVE FIRM CONTACT BETWEEN THE PIPE AND THE SOIL AT ALL POINTS WILL ELIMINATE THIS TYPE OF FAILURE.

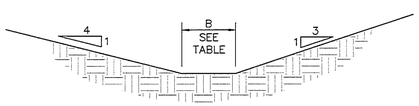
1. PLACE SLOPE DRAINS ON UNDISTURBED SOIL OR WELL COMPACTED FILL AT LOCATIONS AND ELEVATIONS SHOWN ON THE PLAN.
2. SLIGHTLY SLOPE THE SECTION OF PIPE UNDER THE DIKE TOWARD ITS OUTLET.
3. HAND TAMP THE SOIL UNDER AND AROUND THE ENTRANCE SECTION IN LIFTS NOT TO EXCEED 6 INCHES.
4. ENSURE THAT ALL SLOPE DRAIN CONNECTIONS ARE WATERTIGHT.
5. ENSURE THAT ALL FILL MATERIAL IS WELL COMPACTED.
6. ADEQUATELY PROTECT THE DRAIN OUTLET FROM EROSION.
7. MAKE THE SETTLED,COMPACTED DIKE RIDGE NO LESS THAN ONE FOOT ABOVE THE TOP OF THE PIPE AT EVERY POINT.
8. IMMEDIATELY STABILIZE ALL DISTURBED AREAS FOLLOWING CONSTRUCTION.

MAINTENANCE
INSPECT THE SLOPE DRAIN AND SUPPORTING DIVERSION AFTER EVERY RAINFALL, AND PROMPTLY MAKE NECESSARY REPAIRS. WHEN THE PROTECTED AREA HA BEEN PERMANENTLY STABILIZED, TEMPORARY MEASURES MAY BE REMOVED, MATERIALS DISPOSED OF PROPERLY, AND ALL DISTURBED AREAS STABILIZED APPROPRIATELY.

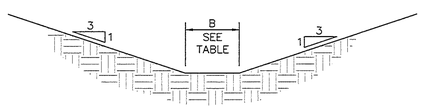
SD

SLOPE DRAIN DETAIL

SCALE: 1/2" = 1'-0"



CROSS SECTION LOOKING DOWNSTREAM
SW1 AND SW4



CROSS SECTION, SW5

CONSTRUCTION SPECIFICATIONS
1. REMOVE AND PROPERLY DISPOSE OF ALL TREES, BRUSH, STUMPS OR OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA AND DISPOSE OF PROPERLY.
2. EXCAVATE THE SWALEE, AND SHAPE IT TO NEAT LINES AND DIMENSIONS SHOWN ON THE PLANS PLUS A 0.2 FOOT OVERCUT AROUND THE SWALE PERIMETER TO ALLOW FOR BULKING DURING SEED BED PREPARATIONS AND SOD BUILDUP.
3. REMOVE AND DISPOSE OF ALL EXCESS SOIL SO THAT SURFACE WATER MAY ENTER THE SWALE FREELY.
4. THE PROCEDURE USED TO ESTABLISHE GRASS IN THE SWALE WILL DEPEND UPON THE SEVERITY OF CONDITIONS AND SELECTION OF SPECIES. PROTECT THE SWALE WITH MULCH OR OR A TEMPORARY LINER SUFFICIENT TO WITHSTAND ANTICIPATED VELOCITIES DURING THE ESTABLISHMENT PERIOD.

MAINTENANCE
DURING THE ESTABLISHMENT PERIOD, CHECK SWALES AFTER EVERY RAINFALL. AFTER GRASS IS ESTABLISHED, PERIODICALLY CHECK THE SWALES; CHECK THEM AFTER EVERY HEAVY RAINFALL. IMMEDIATELY MAKE REPAIRS. IT IS PARTICAULARLY IMPORTANT TO CHECK THE SWALE OUTLET AND ALL ROAD CROSSINGS FOR BANK STABILITY AND EVIDENCE OF PIPING OR SCOUR HOLES. REMOVE ALL SIGNIFICANT SEDIMENT ACCUMULATIONS TO MAINTAIN THE DESIGN CARRYING CAPACITY. KEEP THE GRASS IN A HEALTHY, VIGOROUS CONDITION AT ALL TIMES, SINCE IT IS THE PRIMARY EROSION PROTECTION FOR THE SWALE.

SW

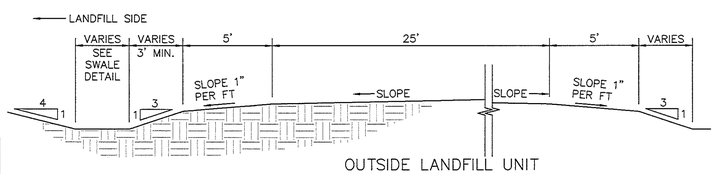
VEGETATED SWALE DETAIL

SCALE: 1/4" = 1'-0"

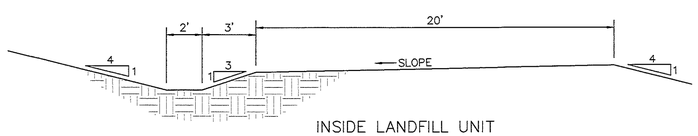
DIMENSIONS & FLOW DATA BASED ON 10 YEAR STORM WITH 2"-6" GRASS

NUMBER, REACH	DEPTH	B	SLOPE	VELOCITY	LINER
SW1, LOWER	0.52'	8'	3.0%	2.36 ft/sec	S75*
SW1, MIDDLE	0.51'	6'	7.0%	1.92 ft/sec	S75*
SW1, UPPER	0.49'	4'	2.5%	1.73 ft/sec	NONE
SW4	0.37'	2'	10.0%	2.88 ft/sec	S75*
SW5	0.55'	8'	1.25%	1.17 ft/sec	NONE
SW5	0.35'	8'	6.7%	2.52 ft/sec	S75*

* NORTH AMERICAN GREEN CATALOG NO. – APPROVED SUBSTITUTE BY OTHER MANUFACTURER MAY BE USED



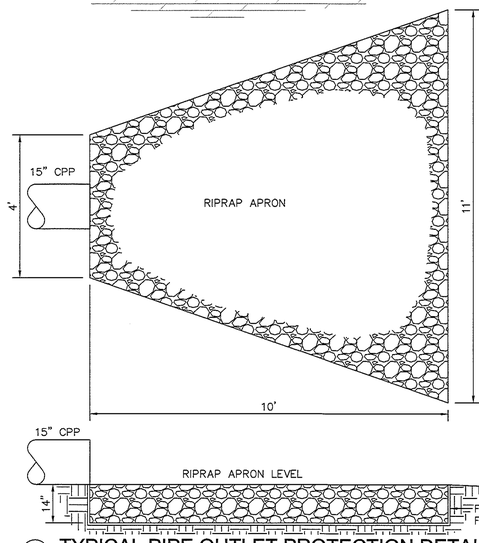
OUTSIDE LANDFILL UNIT



INSIDE LANDFILL UNIT

PROPOSED HAUL ROAD DETAIL

SCALE: 1/4" = 1'-0"



OP

TYPICAL PIPE OUTLET PROTECTION DETAIL

SCALE: 1/2" = 1'-0"

General Notes

FINAL DRAWINGS
FOR PERMITTING
NOT FOR CONSTRUCTION

No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 028909 ENGINEER C. TYRUS CLAYTON, JR.

Signature

5-31-2013
Date

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License No. C-2570 - www.ctclayton.com

ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: WLF
Checked By: RS	Proj. Eng.: CTC Jr.
Sheet Title: LANDFILL CONSTRUCTION DETAILS	
Date: 5/29/13	DRAWING 11
Scale: AS NOTED	

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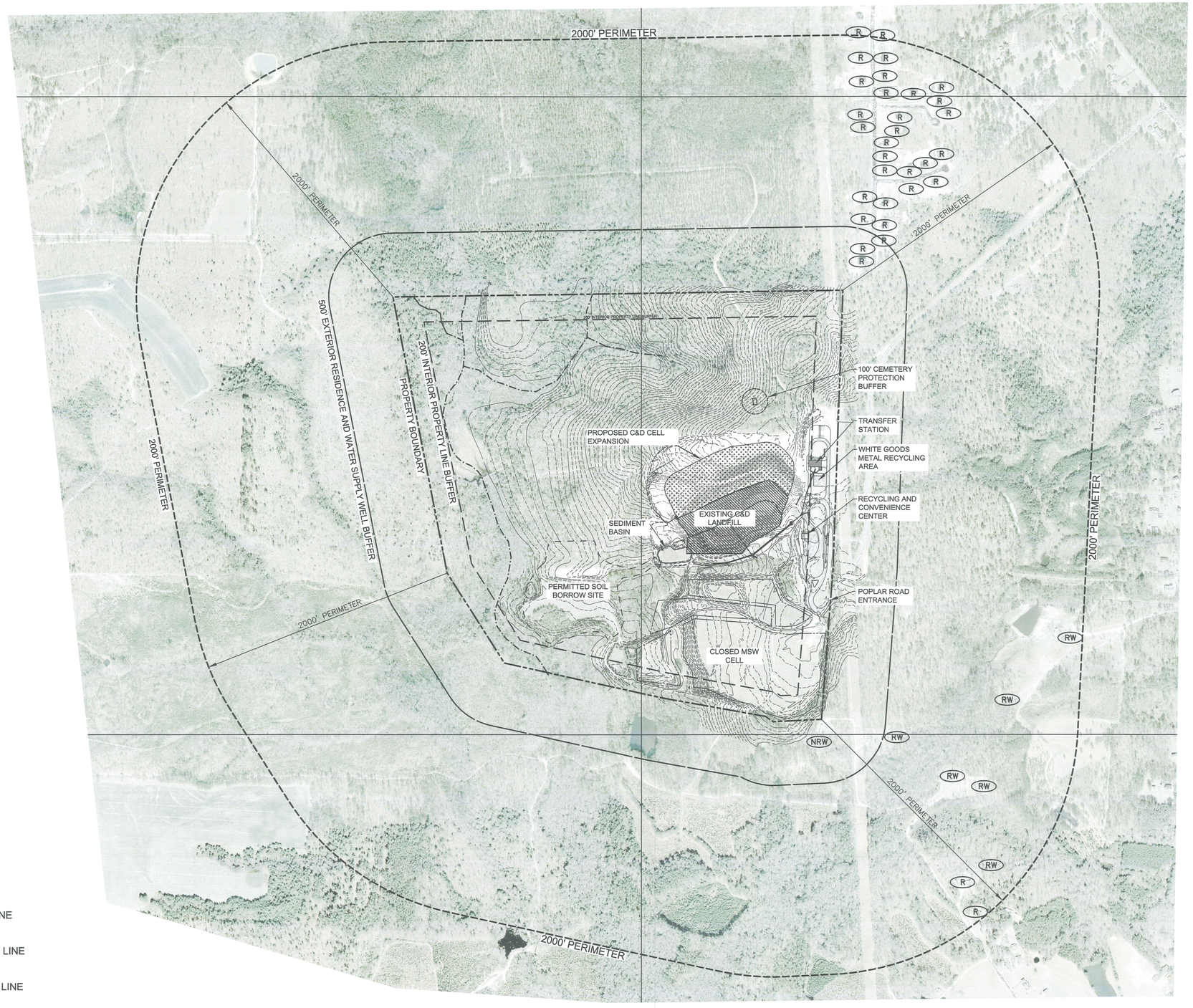

EXISTING CREEK CENTERLINE

EXISTING MAJOR CONTOUR LINE

EXISTING MINOR CONTOUR LINE

PROPERTY BOUNDARY

R — RESIDENCE WITHIN 2000' PERIMETER

RW — RESIDENCE WITH WELL WITHIN 2000' PERIMETER

NRW — WELL WITHIN 2000' PERIMETER, BUT NO RESIDENCE (MOBILE HOME REMOVED)

GRAPHIC SCALE: 1" = 400'

0 200 400 800 1200

General Notes

FINAL DRAWINGS
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No.	Revision/Issue	Date

NORTH CAROLINA PROFESSIONAL SEAL 026909 ENGINEER C. TYRUS CLAYTON, JR.

Signature

Date 5-31-2013

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ANDERSON CREEK LANDFILL
PHASE III
EXPANSION

HARNETT COUNTY, NC

Project No: 03001C	File Name: 03001C ACLF EXP MAS-1
Designed By: SBK	Drawn By: SBK
Checked By: RS	Proj. Eng.: CTC Jr.

Sheet Title: 2000' PERIMETER LOCATION MAP

Date -	DRAWING
Scale 1" = 400'	12

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