

## G.N. RICHARDSON & ASSOCIATES

Engineering and Geological Services

July 29, 2005

Mr. Geof Little  
Environmental Engineer  
NCDENR – Division of Waste Management  
Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646

**RE: Response to Comments  
Davidson County Phase 2 MSW Site Suitability Application  
Lexington, North Carolina**

Dear Mr. Little:

G. N. Richardson and Associates, Inc. (GNRA) has received your comment letter regarding the above referenced Site Suitability Application for Davidson County dated January 11, 2005. This letter is sent in response to your comments. For ease in review your comments are included herein in italics.

**Comment #1:**

*Section 2.1 Regional and Local Characterizations*

*1. Text states that a "Special Use, Class A" permit application was submitted and being reviewed by the zoning board. Please provide documentation showing the proposed property use is consistent with local zoning requirements.*

Response:

A copy of the approved Special Use, Class A permit as approved by the zoning board is attached for your review.

**Comment #2:**

*Section 3.3 Wetlands*

*2. As noted in the previous review comments letter, the wetland delineation report contained in Appendix C is unsigned.*

Response:

A signed copy of the Wetland Report is attached for replacement in Appendix C.

**Comment #3:**

*3. Based on the drawing shown in Figure 5, construction will occur in a wetland area located near coordinate N766750 E1649250, and will apparently require a Section 404 permit prior to issuance of a permit for construction. [Rule .1622(3)]*

Response:

A Section 404 permit application will be submitted for the wetlands on-site that may be impacted during the first 20 years of landfill life. This is the longest time period allowable for permitting based on our discussions with the Division of Water Quality. GNRA is currently in the process of preparing the permit application for those impacts. Additional



wetland permitting will be secured prior to obtaining future Permits to Construct for waste disposal units where impacts are not covered by this initial permit.

**Comment #4:**

*Section 3.5 Seismic Impact Zones*

4. As noted in the previous review comments letter, the diagram submitted as Figure 6 shows a 10% or greater probability in 50 years. An acceptable alternative diagram for this demonstration is 2% or greater probability in 50 years. A Seismic Impact Zone demonstration is required showing the proposed landfill is not within a zone having a 10% or greater probability the maximum horizontal acceleration will exceed 0.10 g in 250 years. [Rule .1622(5)].

**Response:**

Based on a review of the most recent USGS information, the site is in a Seismic Impact Zone and has a peak ground acceleration of 0.12g (see attached printout from the USGS Earthquake Hazards Program website based on the site's latitude (35.9 degrees) and longitude (-81.1 degrees)). This acceleration is not particularly high and is not expected to create any stability problems with the proposed landfill configuration and liner materials. A stability analysis, including a seismic evaluation, will be performed as part of the Permit to Construct application for Area 1.

**Comment #5:**

*Appendix K Resolution to Approve Phase 2*

5. As noted in the previous review comments letter, Proof of Publication for the public notice used to advertise the public hearing to discuss local government approval of the municipal solid waste landfill is required documentation. The proof typically consists of a notarized statement from the newspaper verifying the advertisement was published on a certain date and accompanied by a copy of the advertisement. [Rule .1618 (c)(5)(A)(iii)].

**Response:**

A copy of the advertisement and notarized statement of its publication date are attached for your review.

*The following comments are regarding Appendix J containing the Phase 2 Proposed Facility Plan:*

**Comment #6:**

*Section 2.2.5 Procedures for Waste Segregation*

6. Please consider revising the wording to indicate that the procedure for handling unapproved hazardous waste at a solid waste facility would be to follow the approved Hazardous Waste Exclusion Plan approved for the facility. [Rule .1626 (1)(f)].

**Response:**

This section has been revised as follows:

"Procedures for waste segregation at the proposed landfill will be similar to existing operations in Phase 1 including requirements for waste screening and contingency plans for managing any identified hazardous and liquid wastes. Please refer to the currently approved facility Operations Manual for more information."

An updated copy of the Phase 2 Proposed Facility Plan (text in its entirety – no changes to drawings) is provided as an attachment to this letter.

**Comment #7:**

*2.3 Landfill Capacity*

*7. The capacity and service life of the proposed facility is based on a 10% volume of periodic cover and an average in-place compaction rate throughout the life of the proposed facility of 1,450 pcy. Also, the calculations do not take into account a gas venting layer and do not take into account a prescriptive final cover system. Variations in the values of those parameters may significantly change the amount of available landfill capacity.*

**Response:**

Based on current waste disposal practices in Phase 1, the assumed periodic cover ratio and waste density values are reasonable assumptions.

Based on the construction of similar landfill final covers to the alternative final cover system proposed, a specific gas venting layer covering the entire waste limits is not required. The only material quantity associated with the landfill gas collection system would be the volume of collection media (stone or tire chips/shreds) used in landfill gas wells. A 3-foot diameter landfill gas well would have only about 0.3 cubic yards per linear foot ( $(\pi \times 3^2)/4/(27 \text{ cubic feet per cubic yard})$ ). Assuming a 100-foot average well depth and a spacing of about 1 well per acre, only about 30 cubic yards of collection media will be required per acre. This quantity is basically negligible in comparison to the other calculated quantities.

The proposed final cover system, which eliminates the 18-inch thick ( $k \leq 1 \times 10^{-5} \text{ cm/sec}$ ) compacted soil barrier, is the same as that previously permitted for a number of sites in the State (including one site where the cover has been installed and has been in service for over 3 years). The use of a drainage layer above the final cover geomembrane (not required by State regulations – but, of course, required for stability reasons on side slopes) allows the proposed final cover system to have a much lower infiltration than the regulatory prescribed system which does not include the drainage layer. Thus, no plans are made to have this layer in the Phase 2 final cover system.

**Comment #8:**

*2.4 Available Soil Resources and Required Soil Quantities*

*8. Note for future review: The section describes the considerations for an alternative liner design in Section 2.4.2 and as a Special Engineering Feature in Section 2.9 due to the lack of on-site soils that meet the permeability standard of  $1 \times 10^{-7} \text{ cm/sec}$ . Section 2.6.2 Base Liner System lists both the prescriptive and alternate liners as possible liner systems, but notes that for purposes of the report, the alternative is used.*

**Response:**

The proposed alternative liner is anticipated to be used in lieu of the prescriptive liner system. However, the prescriptive liner system is included in the discussion to maximize the County's options. Note that the use of the prescriptive liner system, which is 6-inches thicker than the proposed alternative liner system, would reduce the gross volume of the landfill by only about 810 cubic yards per acre ( $0.5 \text{ feet} \times 43,560 \text{ feet/acre}/27 \text{ cubic feet per cubic yard}$ ).

Mr. Geof Little  
July 29, 2005  
Page 4

**Comment #9:**

*9. The material type and quantity for use in the final cover system including the Landfill Gas management system described in Section 2.6 is not estimated in Section 2.4.*

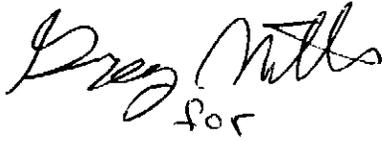
Response:

See the above response to Comment #7.

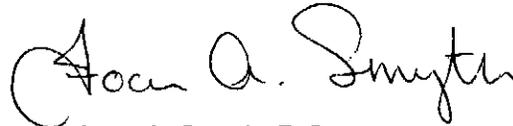
Please contact us at your convenience with any further questions or comments which you may have on this application.

Sincerely,

**G.N. Richardson & Associates, Inc.**

Handwritten signature of Pieter K. Scheer in cursive, with the word "for" written below it.

Pieter K. Scheer, P.E.  
Senior Project Engineer

Handwritten signature of Joan A. Smyth in cursive.

Joan A. Smyth, P.G.  
Project Manager

Attachments

cc: Charley Brushwood, Davidson County

**Attachment 1**  
**Special Use Permit**

COUNTY OF DAVIDSON  
STATE OF NORTH CAROLINA  
ORDER GRANTING ~~APPLYING~~ A SPECIAL USE PERMIT

The ~~North Carolina~~ Board of Commissioners for the County of Davidson, having held a public hearing on 6-25-02 to consider application number 3-02-S,  
date  
submitted by County of Davidson, a request for a special use permit to use  
(name of applicant)  
the property located at Lake Road and Old Hwy 29 for the purpose of Expansion of  
the existing County Landfill (address of property), and having heard all of the evidence and arguments presented at the hearing, makes the following FINDINGS OF FACT and draws the following CONCLUSIONS:

1. It is the Board's CONCLUSION that the proposed use (does ~~not~~) satisfy the first general standard listed in the Ordinance, namely "the use will promote the public health, safety and general welfare, if located where proposed and developed and operated according to the plan as submitted". In support of this conclusion, the Board makes the following FINDINGS OF FACT: Extensive environmental testing conducted on the property to determine suitability; latest design standards incorporated into the site plan as approved by DENR and EPA; commercial driveway permit to be applied for and approved by the Department of Transportation.

2. It is the Board's CONCLUSION that the proposed use (does ~~not~~) satisfy the second general standard listed in the Ordinance, namely "the use, which is listed as a Special Use in the district in which it is proposed to be located, complies with all required regulations and standards, including the provisions of Articles 4 and 5 of this Ordinance, unless greater or different regulations are contained in the individual standards for that special use". In support of this conclusion, the Board makes the following FINDINGS OF FACT: \_\_\_\_\_

All Federal, State, and Local regulations will be followed.

3. It is the Board's CONCLUSION that the proposed use (does ~~not~~) satisfy the third general standard listed in the Ordinance, namely "the use will maintain or enhance the value of contiguous property, or that the use is a public necessity". In support of this conclusion, the Board makes the following FINDINGS OF FACT: \_\_\_\_\_  
A safe and effective sanitary landfill is an essential facility for public disposal of their solid waste; required buffering should help lessen the impact such a facility would have on adjoining land.

4. It is the Board's CONCLUSION that the proposed use (does ~~not~~) satisfy the fourth general standard listed in the Ordinance, namely "the use is in compliance with the general plans for the physical development of the county as embodied in these regulations". In support of this conclusion, the Board makes the following FINDINGS OF FACT: The subject property is contiguous with the existing County Landfill property separated by only the railroad right-of-way. Property purchased years in advance with the intent to be eventually used for landfill expansion.

5. The Board FINDS as a FACT that all of the specific requirements set forth in section(s) 6-7 of the Ordinance for the proposed use (will ~~not~~ be satisfied if the property is developed in accordance with the plans submitted to the Board. (Specify which requirements, if any, are not satisfied by the proposed development). \_\_\_\_\_

6. Therefore, because the Board concludes that all of the general and specific conditions precedent to the issuance of a SPECIAL USE PERMIT (have ~~not~~ been satisfied, IT IS ORDERED that the application for the issuance of a SPECIAL USE PERMIT be (GRANTED/~~DENIED~~), subject to the following conditions:

- (1) The applicant shall fully comply with all of the specific requirements stated in the Ordinance for the proposed use, as well as any additional conditions stated below.
- (2) If any of the conditions stated below shall be held invalid, then this permit shall become void and of no effect.
- (3) Other: \_\_\_\_\_

To be designed, constructed, and operated as described by  
the site plan presented to the Board of Commissioners

Ordered this \_\_\_\_\_ day of \_\_\_\_\_

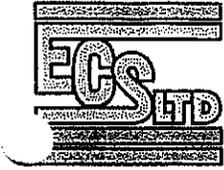


Chairman of the Board  
Larry W. Potts

  
Secretary to the Board  
Attorney Stephen Holton

Note: If you are dissatisfied with the decision of this Board, an appeal may be taken to the Superior Court of Davidson County within 30 days after receipt of this order by the applicant. See Sections 13.3.7 and 13.10 of the Davidson County Zoning Ordinance.

**Attachment 2**  
**Signed Copy of Wetland Report**  
**for Appendix C**



**ENGINEERING CONSULTING SERVICES, LTD.**  
Geotechnical • Construction Materials • Environmental

October 9, 2000

Mr. Philip May  
G.N. Richardson & Associates, Inc.  
425 North Boylan Avenue  
Raleigh, North Carolina 27603

Reference: Report of Jurisdictional Waters/Wetland Delineation Services  
Davidson County Landfill - Phase 2  
Davidson County, North Carolina  
ECS Project No. G-4352

Dear Mr. May:

Engineering Consulting Services, Ltd. (ECS) is pleased to submit this report of the jurisdictional waters/wetland delineation for the site located on SR 2123 in Davidson County, North Carolina. This report summarizes our findings for the site.

### **Background**

ECS was contracted to identify and delineate waters of the U.S, including wetlands, for the site located off SR 2123 in Davidson County, North Carolina. The site is an approximate 371 acre tract that is being evaluated for development with a landfill. Rich Fork is located along the site's western boundary.

Wetlands are defined by the U. S. Army Corps of Engineers and the United States Environmental Protection Agency as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions". In order for an area to be classified as wetland, hydrophytic vegetation, hydric soils, and wetland hydrology indicators must be present.

### **Literature Review**

We have reviewed the USGS topographic map, the Geologic Map of North Carolina and the Soil Survey of Davidson County to obtain information regarding the site.

- The USGS topographic map (Figure 1) indicates that Rich Fork is located along the site's western boundary. Elevations range from approximately 750 feet above mean sea level near the eastern boundary to approximately 650 feet above mean sea level near Rich Fork. Surface drainage on the site is generally toward this feature.
- According to the Geologic Map of North Carolina, the site is located in the Charlotte Belt of the Piedmont Physiographic Province. The soils encountered in this area are the residual product of in-place chemical weathering of rock presently underlying the site. In general, shallow unconfined groundwater movement within the overlying soils is controlled largely by topographic gradients.

Recharge occurs primarily by infiltration along higher elevations and typically discharges into streams or other surface water bodies. The elevation of the shallow water table is transient and can vary greatly with seasonal fluctuations in precipitation. Movement in this water table is generally from higher to lower elevations.

- According to the Soil Survey of Davidson County (Figure 2), soils at the site have been mapped in the Chewacla, Poindexter and Zion, Enon, Wickham, Wahee and Pacolet series. The Chewacla series consists of nearly level, somewhat poorly drained soils that occur along creeks and rivers. Chewacla soils are moderately permeable. The Poindexter and Zion series consist of well drained soils that occur on ridges and side slopes. The Poindexter soils are moderately permeable and the Zion soils are moderately slow to slowly permeable. The Enon series consists of well drained soils that occur on narrow ridges and side slopes. Enon soils are slowly permeable. The Wickham series consists of well drained soils that occur on low ridges and in broad, gently sloping areas on terraces of the larger streams. Wickham soils are slowly permeable. The Wahee series consists of somewhat poorly drained soils that occur on low stream terraces. Wahee soils are slowly permeable. The Pacolet series consists of well drained soils that occur on narrow ridges. Pacolet soils are moderately permeable. The Chewacla and Wahee series could contain inclusions of hydric soils.

### **Site Reconnaissance**

ECS personnel conducted the site reconnaissance in September 2000. The site is located on SR 2123 in Davidson County, North Carolina. A single family residence and a mobile home are located on the eastern portion of the site. The remainder of the site consists of undeveloped, wooded land and fields. Rich Fork is located along the western site boundary (Photograph 1).

Several small wetland pockets are located in scattered locations across the floodplain of Rich Fork. The smaller pockets are confined to low-lying depressional features located within the floodplain. Upland areas surrounding the wetland pockets are vegetated primarily with river birch, sycamore, red maple and other bottomland hardwood species (Photographs 2). The soils were bright and appeared to be well drained to depths of at least twelve inches below the surface of the ground. Sediment deposits are located throughout the floodplain.

One large wetland pocket is located in the floodplain adjacent to Rich Fork. The pocket appears to receive water from seeps that originate on hillsides. Remnants of a beaver dam and evidence of former beaver activity are located in a portion of the wetland. There is no evidence that beavers are currently occupying the area. Based on water marks on trees and the hydrophytic vegetation throughout the area, the beaver dam was significantly higher in the past. However, the hydrology has been altered and hydric soil indicators are not currently present in some areas. These areas were not delineated as wetland areas, although they are a candidate for future mitigation measures (Photograph 3). Upland areas surrounding the wetland are vegetated primarily with river birch, sycamore, red maple and other bottomland hardwood species. The soils were bright and appeared to be well drained to depths of at least twelve inches below the surface.

Railroad tracks are located along the southern boundary. A tributary of Hamby Creek originates on the southeastern portion of the site and flows south toward the railroad tracks. Small wetland pockets are located along the tributary. The tributary empties into a larger wetland located on the southern portion of the site. A second large wetland that is connected by a narrow, linear wetland and a stream is located

further west, along the southern boundary. A wetland that has formed in the basin of a drained pond is located further west. It appears that this wetland has formed as a result of a wetland seep located in the western corner of the pond basin. Areas surrounding the wetlands and tributary on the southern portion of the site are vegetated primarily with pines and young hardwood trees. In most areas, the wetland and upland are separated by distinct topographic breaks, vegetation breaks and soil breaks.

The wetlands and stream were flagged in the field by ECS personnel. The approximate locations of the jurisdictional boundaries are illustrated on Figure 3. The boundaries illustrated on Figure 3 indicate that there are approximately 1,000 linear feet of stream channel and more than one acre of wetlands located on the site.

In addition to the wetlands and streams, two ponds are located on the northwestern portion of the site (Photograph 4). The ponds were not flagged in the field because they are isolated and not connected to other surface waters or wetlands. Under the current regulations, the U.S. Army Corps of Engineers will not take jurisdiction on the two ponds and permits are not required for impacts to them. However, we understand that the current regulations that pertain to isolated surface waters are subject to change in the near future. Therefore, if the plans for the site involve draining the ponds, we recommend that the ponds be drained and filled as soon as possible.

### **Discussion**

Section 404 of the Clean Water Act regulates the discharge of dredge and fill materials into waters of the United States (lakes, rivers, ponds, streams, etc.), including wetlands. Waters of the United States include the territorial seas, navigable coastal and inland lakes, rivers and streams, intermittent streams, and wetlands. Activities that could be regulated under Section 404 include placement of fill for construction of roadways; residential, commercial or industrial structures; and the construction of water retention ponds along tributaries. The EPA and the U.S. Army Corps of Engineers jointly administer the Section 404 program. Section 401 of the Clean Water Act grants each state the authority to approve, condition, or deny any Federal permits that could result in a discharge to State waters.

The wetlands and stream located on the site are regulated by the U.S. Army Corps of Engineers and the North Carolina Division of Water Quality (NCDWQ). We understand that a metes and bounds survey of the jurisdictional boundaries is currently being conducted. Upon completion, a copy of the wetland survey map should be submitted to the U.S. Army Corps of Engineers for final approval. A site/grading plan can then be developed to determine the extent of the proposed impacts to jurisdictional waters and wetlands, if any. An attempt should be made to minimize or avoid working in these areas, if possible.

Based on the recent changes to the Nationwide Permit (NWP) program, it appears that permits will be required prior to impacting more than 1/10 acre of wetlands or any open waters including perennial or intermittent streams. Mitigation and a stormwater management plan may be a condition of any permits issued for the site. In addition, buffers may be required adjacent to wetlands and surface waters. The changes to the NWP program became effective in June 2000.

For impacts to more than one-half acre of wetlands or to more than 300 linear feet of stream channel, an individual permit (IP) may be required. An IP requires a habitat analysis, alternative site analysis, project justification, plans to avoid and minimize impacts, and a proposed mitigation plan. Depending on the habitat analysis and the extent of impacts, an Environmental Impact Statement may be required by the

U.S. Army Corps of Engineers. An IP allows for a public comment period and may require 4 to 18 months to obtain depending on conditions arising during the USACE review and public comment period.

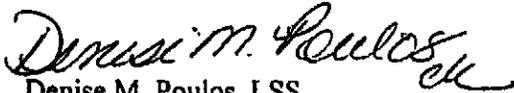
ECS appreciates the opportunity to provide wetland services for your project. Please contact Denise Poulos at (336) 856-7150 if you have questions concerning this report or the proposed changes to the NWPs.

Sincerely,

**ENGINEERING CONSULTING SERVICES, LTD.**



Michael T. Brame  
Environmental Scientist



Denise M. Poulos, LSS  
Principal Scientist

Attachments: Figure 1 - Site Location Map  
Figure 2 - Soil Map  
Figure 3 - Approximate Wetland/Stream Location Map  
Photographs  
Routine Wetland Determination Data Forms



SOURCE:

USGS TOPOGRAPHIC MAP,  
 LEXINGTON EAST, NC  
 QUADRANGLE, DATED 1950  
 AND REVISED 1994  
 SCALE: 1" = 2,000'

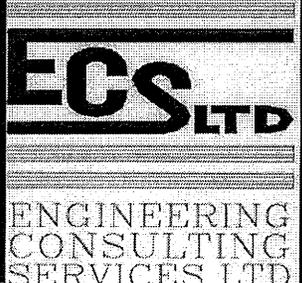


FIGURE 1

SITE LOCATION MAP  
 DAVIDSON COUNTY LANDFILL  
 PHASE 2  
 DAVIDSON COUNTY, NC  
 ECS PROJECT G-4352



**SITE** →



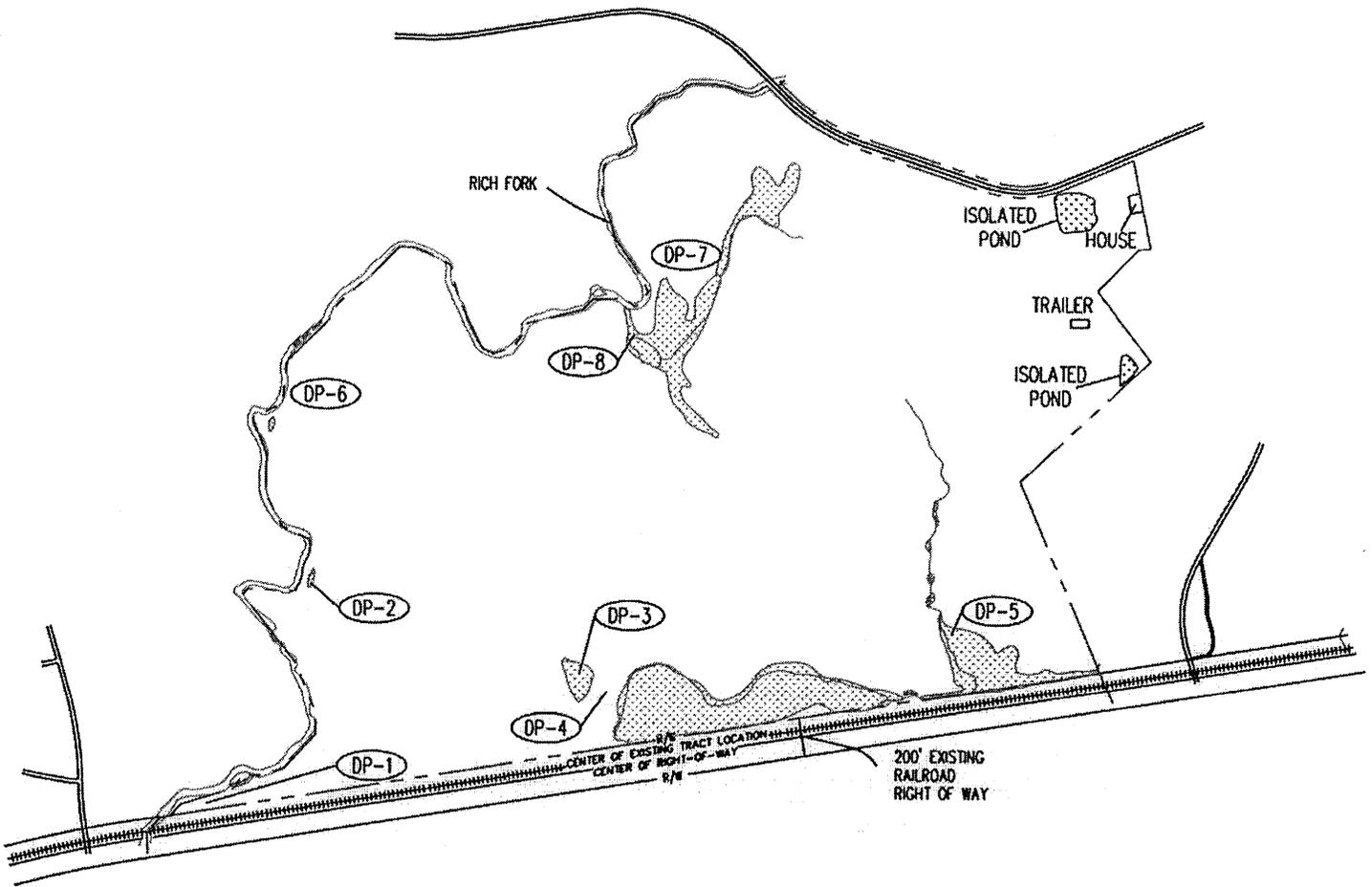
SOURCE:

SOIL SURVEY OF DAVIDSON COUNTY, SHEET 6, ISSUED JULY 1994

**ECS** LTD  
 ENGINEERING CONSULTING SERVICES LTD

FIGURE 2

SOIL MAP  
 DAVIDSON COUNTY LANDFILL  
 PHASE 2  
 DAVIDSON COUNTY, NC  
 ECS PROJECT G-4352



**LEGEND**

- PROPERTY LINE
- ▨ APPROXIMATE WETLANDS LOCATION
- DP-2 APPROXIMATE DATA POINT LOCATION
- STREAM/CREEK

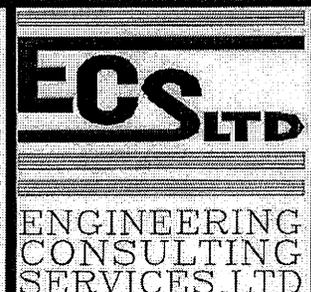
PLEASE NOTE THAT THE WETLAND LOCATIONS SHOWN ON THIS MAP ARE APPROXIMATE. THE WETLANDS DEPICTED ON THIS MAP HAVE NOT BEEN SURVEYED. THIS MAP IS INTENDED FOR PRELIMINARY PLANNING PURPOSES ONLY.



SOURCE:

SITE PLAN BY G.N. RICHARDSON & ASSOCIATES, INC. PROVIDED IN ELECTRONIC FORMAT AND FIELD NOTES BY ECS PERSONNEL

SCALE: 1" = 1,000'



**FIGURE 3**

APPROXIMATE WETLAND/STREAM LOCATION MAP  
 DAVIDSON COUNTY LANDFILL  
 PHASE 2  
 DAVIDSON COUNTY, NC  
 ECS PROJECT G-4352



1) Photograph showing the Rich Fork.



2) Photograph showing the upland areas in the floodplain.

Davidson County Landfill – Phase 2  
Davidson County, North Carolina  
ECS Project G-4352



3) Photograph showing potential mitigation area on the site.



4) Photograph showing an isolated pond on the site.

Davidson County Landfill – Phase 2  
Davidson County, North Carolina  
ECS Project G-4352

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Consultants: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-1
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Are Normal Circumstances exist on the site? <span style="float: right;">Yes <u>No</u></span> Is the site significantly disturbed (Atypical Situation:)? <span style="float: right;">Yes <u>No</u></span> Is the area a potential Problem Area? <span style="float: right;">Yes <u>No</u></span> (If needed, explain on the reverse side)	Community ID: Transect ID: Field Location: Near SW Boundary
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Boehmeria Cylindrica					
False Nettle	Herb	FACW+			
Parthenocissus Quinquefolia					
Virginia Creeper	Vine	FAC			
Toxicodendron Radicans					
Poison Ivy	Vine	FAC			
Rhus Rubra					
Slippery Elm	Sap	FAC			
Carya Tomentosa					
Mockernut Hickory	Tree	NI			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 100%	FAC Neutral: Numeric Index:
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Remarks:  
 The dominant vegetation is hydrophytic.

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p>___ Stream, Lake or Tide Gauge</p> <p>___ Aerial Photographs</p> <p>___ Other</p> <p><u>X</u> No Recorded Data</p> <p>Field Observations</p> <p>Depth of Surface Water: NA</p> <p>Depth to Free Water in Pit: &gt;12"</p> <p>Depth to Saturated Soil: &gt;12"</p>	<p><b>Wetland Hydrology Indicators</b></p> <p><b>Primary Indicators</b></p> <p>___ Inundated</p> <p>___ Saturated in Upper 12 Inches</p> <p>___ Water Marks</p> <p>___ Drift Lines</p> <p>___ Sediment Deposits</p> <p>___ Drainage Patterns in Wetlands</p> <p><b>Secondary Indicators</b></p> <p>___ Oxidized Root Channels in Upper 12 Inches</p> <p>___ Water-Stained Leaves</p> <p>___ Local Soil Survey Data</p> <p>___ FAC-Neutral Test</p> <p>___ Other (Explain in Remarks)</p>
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Remarks:  
 Wetland hydrology indicators were not observed.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Investigator: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-1
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**SOILS**

Map Unit Name (Series and Phase): Chewacla loam  
 Map Symbol: Ch Drainage Class: Somewhat poorly drained  
 Taxonomy (Subgroup): Fluvaquentic Dystrachrepts

Mapped Hydric Inclusion? Yes No  
 Field Observations Confirm Mapped Type: Yes No

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		10YR 4/4			Loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

Hydric soil indicators were not observed.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? <u>Yes</u> <u>No</u> Hydric Soils Present? <u>Yes</u> <u>No</u>	Is the Sampling Point within the Wetland? <u>Yes</u> <u>No</u>
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Remarks:

The three wetland criteria are not present. The sampling point is not located within a wetland.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Navigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-2
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Do Normal Circumstances exist on the site? Is the site significantly disturbed (Atypical Situation)? Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes No Yes No Yes No	Community ID: Transect ID: Field Location: WB
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Carex sp.	Herb	FAC			
Sedge					
Boehmeria Cylindrica	Herb	FACW+			
False Nettle					
Smilax Rotundifolia	Vine	FAC			
Common Greenbriar					
Betula Nigra	Tree	FACW			
River Birch					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 100%	FAC Neutral: Numeric Index:
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Remarks:  
 Hydrophytic vegetation is dominant.

**HYDROLOGY**

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other  <input checked="" type="checkbox"/> No Recorded Data  Field Observations  Depth of Surface Water: NA  Depth to Free Water in Pit: >12"  <input checked="" type="checkbox"/> Depth to Saturated Soil: >12"	<b>Wetland Hydrology Indicators</b> <b>Primary Indicators</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators</b> <input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:  
 Wetland hydrology indicators were observed.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Client/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-2
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**Soils**

Soil Unit Name (Series and Phase): Chewacla loam  
 Soil Symbol: Ch Drainage Class: Somewhat poorly drained  
 Taxonomy (Subgroup): Fluvaquentic Dystrorhepts  
 Profile Description

Mapped Hydric Inclusion? Yes No  
 Field Observations Confirm Mapped Type: Yes No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-5		2.5Y 6/3	7.5 YR 3/4	30%	Loam
5-12		2.5Y 6/2	5YR 4/6	30%	Loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

Hydric soil indicators were observed.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? <u>Yes</u> No Hydric Soils Present? <u>Yes</u> No	Is the Sampling Point within the Wetland? <u>Yes</u> No
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Remarks:

The three wetland criteria are present. The sampling point is located within a wetland.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Consultants: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-3
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Do Normal Circumstances exist on the site? <span style="float: right;">Yes <u>No</u></span> Is the site significantly disturbed (Atypical Situation:)? <span style="float: right;">Yes <u>No</u></span> Is the area a potential Problem Area? <span style="float: right;">Yes <u>No</u></span> (If needed, explain on the reverse side)	Community ID: Transect ID: Field Location: WC
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Boehmeria Cylindrica					
False Nettle	Herb	FACW+			
Impatiens Capensis					
Spotted touch-me-not	Herb	FACW			
Carex sp.					
Sedge	Herb	FAC			
Salix Nigra					
Black Willow	Tree	OBL			
Betula Nigra					
River Birch	Tree	FACW			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 100%	FAC Neutral: Numeric Index:
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Remarks:  
 Hydrophytic vegetation is dominant.

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data</p> <p>Field Observations</p> <p>Depth of Surface Water: NA</p> <p>Depth to Free Water in Pit: &gt;12"</p> <p>Depth to Saturated Soil: &gt;12"</p>	<p>Wetland Hydrology Indicators</p> <p><b>Primary Indicators</b></p> <p><input type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p><b>Secondary Indicators</b></p> <p><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
--	--

Remarks:  
 Wetland hydrology indicators are present.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-3
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**SOILS**

Map Unit Name (Series and Phase): Poindexter/Zion sandy loam  
 Map Symbol: PnE Drainage Class: Well drained  
 Taxonomy (Subgroup): Typic/Ultic Hapludults

Mapped Hydric Inclusion? Yes No  
 Field Observations Confirm Mapped Type: Yes No

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		2.5Y 5/1	5YR 4/6 10YR 5/6	20% 20%	Loam Loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks:

Hydric soil indicators are present.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? <u>Yes</u> No Hydric Soils Present? <u>Yes</u> No	Is the Sampling Point within the Wetland? <u>Yes</u> No
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Remarks:

The three wetland criteria are present. The sampling point is located within a wetland.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-4
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Do Normal Circumstances exist on the site? <span style="float: right;"><u>Yes</u> No</span> Is the site significantly disturbed (Atypical Situation:)? <span style="float: right;"><u>Yes</u> <u>No</u></span> Is the area a potential Problem Area? <span style="float: right;"><u>Yes</u> <u>No</u></span> (If needed, explain on the reverse side)	Community ID: Transect ID: Field Location: Near WDA 10
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Corylus Americana	Sap	FACU			
American Hazelnut					
Liquidambar Styraciflua	Sap/Tree	FAC+			
Sweet Gum					
Betula Nigra	Sap/Tree	FACW			
River Birch					
Toxicodendron Radicans	Vine	FAC			
Poison Ivy					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 75%	FAC Neutral: Numeric Index:
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**Remarks:**  
 Hydrophytic vegetation is dominant.

**HYDROLOGY**

Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other  <input checked="" type="checkbox"/> No Recorded Data	<b>Wetland Hydrology Indicators</b> <b>Primary Indicators</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands  <b>Secondary Indicators</b> <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
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**Remarks:**  
 Wetland hydrology indicators were not observed.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-4
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**DILS**

Map Unit Name (Series and Phase): Chewacla loam  
 Map Symbol: Ch Drainage Class: Somewhat poorly drained Mapped Hydric Inclusion? Yes No  
 Taxonomy (Subgroup): Fluvaquentic Dystrochrepts Field Observations Confirm Mapped Type: Yes No  
 Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		10YR 6/6	5YR 4/4		Loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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**Remarks:**

Hydric soil indicators were not observed.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? Yes <u>No</u> Hydric Soils Present? Yes No	Is the Sampling Point within the Wetland? Yes <u>No</u>
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**Remarks:**

The three wetland criteria are not present. The sampling point is not located within a wetland.

**DATA FORM  
ROUTINE WETLAND DETERMINATION  
(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-5
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Do Normal Circumstances exist on the site? Is the site significantly disturbed (Atypical Situation:)? Is the area a potential Problem Area? (If needed, explain on the reverse side)	<u>Yes</u> No <u>Yes</u> <u>No</u> <u>Yes</u> <u>No</u>	Community ID: Transect ID: Field Location: WF
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Ilex Verticillata			Ilex Verticillata		
Chinese Privette	Shrub	FAC	Common Winterberry	Shrub	FACW
Nyssa Sylvatica					
Black Gum	Tree	FAC			
Liriodendron Tulipifera					
Culip Poplar	Tree	FAC			
Acer Rubrum					
Red Maple	Tree	FAC			
Juniperus Virginiana					
Eastern Red Cedar	Tree	FACU-			
Carpinus Caroliniana					
American Hornbeam	Tree	FAC			
Vaccinium Caesium					
Deerberry	Shrub	FAC			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 87.5 %	FAC Neutral: Numeric Index:
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Remarks:  
The dominant vegetation is hydrophytic.

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data</p> <p>Field Observations</p> <p>Depth of Surface Water: NA</p> <p>Depth to Free Water in Pit: Surface</p> <p>Depth to Saturated Soil: Surface</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p><input type="checkbox"/> Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators</p> <p><input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
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Remarks:  
Wetland hydrology indicators are present.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-5
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**Soils**

Map Unit Name (Series and Phase): \_\_\_\_\_

Map Symbol: Ch Drainage Class: Somewhat poorly drained

Taxonomy (Subgroup): Fluvaquentic Dystrochrepts

Profile Description: \_\_\_\_\_

Mapped Hydric Inclusion? Yes No  
 Field Observations Confirm Mapped Type: Yes No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		Gley 2 4/5PB	5YR 4/6	40%	Loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks: \_\_\_\_\_

Hydric soil indicators are present.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No	Is the Sampling Point within the Wetland? <u>Yes</u> No
Wetland Hydrology Present? <u>Yes</u> No	
Hydric Soils Present? <u>Yes</u> No	

Remarks: \_\_\_\_\_

The three wetland criteria are present. The sampling point is located within a wetland.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Consultants: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-6
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Are Normal Circumstances exist on the site? <span style="float: right;">Yes <input type="checkbox"/> No <input type="checkbox"/></span> Is the site significantly disturbed (Atypical Situation:)? <span style="float: right;">Yes <input type="checkbox"/> No <input type="checkbox"/></span> Is the area a potential Problem Area? <span style="float: right;">Yes <input type="checkbox"/> No <input type="checkbox"/></span> (If needed, explain on the reverse side)	Community ID: Transect ID: Field Location: Floodplain
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Lochneria Cylindrica					
False Nettle	Herb	FACW+			
Toxicodendron Radicans					
Poison Ivy	Vine	FAC			
Betula Nigra					
River Birch	Sap/Tree	FACW			
Platanus Occidentalis					
American Sycamore	Tree	FACW-			
Fraxinus Americana					
White Ash	Tree	FACU			

Percent of Dominant Species that are OBL, FACW or FAC: excluding FAC-) 80%	FAC Neutral: Numeric Index:
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Remarks:  
 The dominant vegetation is hydrophytic.

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data</p> <p>Field Observations</p> <p>Depth of Surface Water: NA</p> <p>Depth to Free Water in Pit: &gt;12"</p> <p>Depth to Saturated Soil: &gt;12"</p>	<p><b>Wetland Hydrology Indicators</b></p> <p><b>Primary Indicators</b></p> <p><input type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p><b>Secondary Indicators</b></p> <p><input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
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Remarks:  
 Wetland hydrology indicators were not observed.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-6
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**SOILS**

Map Unit Name (Series and Phase): Enon fine sandy loam Map Symbol: EnB Drainage Class: Well-drained Taxonomy (Subgroup): Ultic Hapludalfs Profile Description	Mapped Hydric Inclusion? Yes <u>No</u> Field Observations Confirm Mapped Type: <u>Yes</u> No
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Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
5Y 5/3		7.5 YR 4/4		20%	Loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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**Remarks:**

Hydric soil indicators were not observed.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? <u>Yes</u> <u>No</u> Hydric Soils Present? <u>Yes</u> No	Is the Sampling Point within the Wetland? Yes <u>No</u>
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**Remarks:**

The three wetland criteria are not present. The sampling point is not located within a wetland.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill – Phase 2 Applicant/Owner: Davidson County Investigator: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-7
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Do Normal Circumstances exist on the site? <span style="float:right"><u>Yes</u> No</span> Is the site significantly disturbed (Atypical Situation:)? <span style="float:right"><u>Yes</u> <u>No</u></span> Is the area a potential Problem Area? <span style="float:right"><u>Yes</u> <u>No</u></span> (If needed, explain on the reverse side)	Community ID: Transect ID: Field Location: Near WL 72
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Boehmeria Cylindrica	Herb	FACW+			
False Nettle					
Juncus Effusus	Herb	FACW+			
Soft Rush					
Ligustrum Sinense	Shrub	FAC			
Chinese Privette					
Platanus Occidentalis	Tree	FACW-			
American Sycamore					
Salix Nigra	Tree	OBL			
Black Willow					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 100%	FAC Neutral: Numeric Index:
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Remarks:  
 Hydrophytic vegetation is dominant.

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data</p> <p>Field Observations</p> <p>Depth of Surface Water: NA</p> <p>Depth to Free Water in Pit: &gt;12"</p> <p>Depth to Saturated Soil: &gt;12"</p>	<p>Wetland Hydrology Indicators</p> <p><b>Primary Indicators</b></p> <p><input type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p><b>Secondary Indicators</b></p> <p><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input checked="" type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
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Remarks:  
 Wetland hydrology indicators were observed.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Investigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-7
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**SOILS**

Map Unit Name (Series and Phase): \_\_\_\_\_  
 Map Symbol: Ch Drainage Class: Somewhat poorly drained  
 Taxonomy (Subgroup): Fluvaquentic Dystrachrepts  
 Profile Description \_\_\_\_\_

Mapped Hydric Inclusion? Yes No  
 Field Observations Confirm Mapped Type: Yes No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		2.5Y 5/3		5YR 4/6	Loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
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Remarks: \_\_\_\_\_

Hydric soil indicators were not observed.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? <u>Yes</u> No Hydric Soils Present? <u>Yes</u> No	Is the Sampling Point within the Wetland? Yes <u>No</u>
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Remarks: \_\_\_\_\_

The three wetland criteria are not present. The sampling point is not located within a wetland.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Consultants: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-8
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Are Normal Circumstances exist on the site? <span style="float: right;">Yes <u>No</u></span> Is the site significantly disturbed (Atypical Situation:)? <span style="float: right;">Yes <u>No</u></span> Is the area a potential Problem Area? <span style="float: right;">Yes <u>No</u></span> (If needed, explain on the reverse side)	Community ID: Transect ID: Field Location: WK
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**VEGETATION**

Dominant Plant Species (Latin/Common)	Stratum	Indicator	Plant Species (Latin/Common)	Stratum	Indicator
Boehmeria Cylindrica					
False Nettle	Herb	FACW+			
Uncus Effusus					
Soft Rush	Herb	FACW+			
Eulalia Vimeana					
Nepal Microstegium	Herb	FAC+			
Carex sp.					
Sedge	Herb	FAC			
Fraxinus Pennsylvanica					
Green Ash	Tree	FACW			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 100%	FAC Neutral: Numeric Index:
---	--------------------------------

Remarks:  
 The dominant vegetation is hydrophytic.

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data</p> <p>Field Observations</p> <p>Depth of Surface Water: 12"</p> <p>Depth to Free Water in Pit: Surface</p> <p>Depth to Saturated Soil: Surface</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p><input checked="" type="checkbox"/> Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators</p> <p><input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
---	--

Remarks:  
 Wetland hydrology indicators are present.

**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

Project/Site: Davidson County Landfill - Phase 2 Applicant/Owner: Davidson County Navigators: ECS, Ltd.	Project No: G-4352	Date: September 2000 County: Davidson State: NC Plot ID: DP-8
---	-----------------------	--

**SOILS**

Map Unit Name (Series and Phase): Map Symbol: Ch Drainage Class: Somewhat poorly drained Taxonomy (Subgroup): Fluvaquentic Dystrochrepts	Mapped Hydric Inclusion? <u>Yes</u> No Field Observations Confirm Mapped Type: <u>Yes</u> No
--	---

**Profile Description**

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		Gley 2 4/5 PB	5 YR 4/6	10%	Loam

**Hydric Soil Indicators:**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol<br><input type="checkbox"/> Histic Epipedon<br><input type="checkbox"/> Sulfidic Odor<br><input type="checkbox"/> Aquic Moisture Regime<br><input type="checkbox"/> Reducing Conditions<br><input checked="" type="checkbox"/> Gleyed or Low Chroma Colors | <input type="checkbox"/> Concretions<br><input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils<br><input type="checkbox"/> Organic Streaking in Sandy Soils<br><input type="checkbox"/> Listed on Local Hydric Soils List<br><input type="checkbox"/> Listed on National Hydric Soils List<br><input type="checkbox"/> Other (Explain in Remarks) |
|--|--|

**Remarks:**

Hydric soil indicators were observed.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <u>Yes</u> No Wetland Hydrology Present? <u>Yes</u> No Hydric Soils Present? <u>Yes</u> No	Is the Sampling Point within the Wetland? <u>Yes</u> No
--	---

**Remarks:**

The three wetland criteria are present. The sampling point is located within a wetland.

**Attachment 3**  
**Supplemental Information Regarding Advertisement**  
**for Public Notice Requirements**

**STATE OF NORTH CAROLINA  
COUNTY OF DAVIDSON**

**BEFORE THE  
DAVIDSON COUNTY  
BOARD OF COMMISSIONERS**

**NOTICE OF PUBLIC HEARING**

Notice is hereby given that the Davidson County Board of Commissioners will conduct a public hearing at 7:00 P.M. on May 11, 2004, at the Davidson County Commissioners' Meeting Room, fourth floor, Davidson County Governmental Center, 913 Greensboro Street, Lexington, North Carolina. The purpose of the public hearing is to consider permitting Phase II of the Davidson County Landfill. The public is invited to attend and offer comments relative to the proposed addition to the landfill.

This the 10<sup>th</sup> day of April, 2004.

Robert C. Hedrick, Clerk to the Board  
Davidson County Board of Commissioners

DAVIDSON COUNTY BOARD OF COMMISSIONERS

NOTICE OF PUBLIC HEARING

Notice is hereby given to the citizens of Davidson County, North Carolina, that the Board of Commissioners will conduct a public hearing at 7:00 P.M. on May 11, 2004, at the Davidson County Commissioners Meeting Room, Fourth Floor, Davidson County Governmental Center, 147 Greensboro Street, Lexington, North Carolina. The purpose of the public hearing is to consider permitting Phase II of the Davidson County landfill. The public is invited to attend and offer comments relative to the proposed addition to the landfill.

This the 10th day of April, 2004

Robert C. Hedrick, Clerk to the Board, Davidson County Board of Commissioners

April 10, 2004

AFFIDAVIT OF PUBLICATION

STATE OF NORTH CAROLINA  
DAVIDSON COUNTY

Lexington, N.C. April 10, 2004

I, Leslie Norris of THE DISPATCH, a newspaper published in the city of Lexington, County and State aforesaid, being duly sworn, says the foregoing legal of which the attached is a true copy, was published in said newspaper once the 10th day of April 2004.

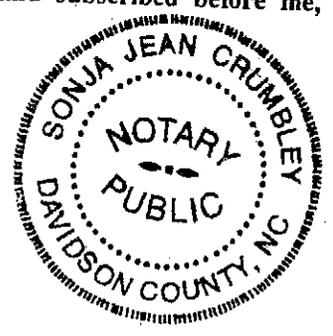
Publication Fee \$ 49.73

Leslie Norris (Seal)

Sworn to and subscribed before me, this 10th day of April 2004.

Sonja Jean Crumbley

My commission expires 8/29/06



0000300

**Attachment 4**  
**Seismic Impact Zone**  
**Peak Ground Acceleration Evaluation**

 **USGS**  
**Earthquake Hazards Program**

LOCATION 35.9 Lat. -81.1 Long.  
The interpolated Probabilistic ground motion values, in %g,  
at the requested point are:

	10%PE in 50 yr	2%PE in 50 yr
PGA	4.70	12.19
0.2 sec SA	10.83	26.92
1.0 sec SA	3.64	9.32

-----

*Handwritten annotations: A circle around the value 12.19 in the 2%PE column, and a cloud-like shape containing the text 0.12g with a line pointing to the circled value.*

PROJECT INFO: [Home Page](#)  
SEISMIC HAZARD: [Hazard by Lat/Lon, 2002](#)

**Attachment 5**  
**Revised Phase 2 Proposed Facility Plan**  
**(Text Only)**

# Phase 2 Proposed Facility Plan

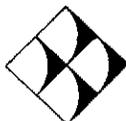
**Davidson County MSW Landfill  
Lexington, North Carolina**



Prepared For:

**Davidson County Integrated Solid Waste Management  
220 Davidson County Landfill Road  
Lexington, North Carolina 27292**

Prepared By:



**G.N. Richardson & Associates, Inc.**  
**Engineering and Geological Services**  
14 N. Boylan Avenue  
Raleigh, North Carolina 27603

**April 2002  
Revised: July 2005**

# DAVIDSON COUNTY MSW LANDFILL

## PHASE 2 PROPOSED FACILITY PLAN

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**ATTACHMENTS**

Attachment A	Calculations
	1.0 Landfill Life Expectancy
	2.0 Earthwork Quantities

## SECTION 1.0 INTRODUCTION

### 1.1 OVERVIEW

The Davidson County Landfill facility is located off of Roy Lopp Road in Lexington, North Carolina and operates under NC Solid Waste Permit 29-06. The landfill facility includes a  $\pm$  32 acre Subtitle D municipal solid waste (MSW) landfill (Phase 1), separate C&D landfill unit, a white goods area, a recycling building, a landfill office, scales and scalehouse, and three closed unlined MSW landfill units.

Disposal Area 2 is the last area approved for the facility under the County's current approved Facility Plan for the Phase 1 unit (Disposal Areas 1 and 3 were previously constructed.) and is currently in operation. Based on current projections, Phase 1 is expected to remain in operation until about 2007. Once Phase 1 has reached capacity, the County will need to either laterally expand the current Phase 1 unit or move operations to a new unit (Phase 2) constructed on County owned property north of the current facility and across a railroad right of way owned by Southern Railway. The potential for the lateral expansion of the current facility is limited due to the lack of remaining useable land. Thus, the purpose of this document is to present conceptual plans for the development of a MSW landfill on the Phase 2 site.

### 1.2 SITE DESCRIPTION

The Phase 2 site consists of approximately 290 acres located to the north of the current Phase 1 area. Phase 2 is bounded to the north by Old Highway 29, to the east by adjacent properties, to the south by the Southern Railway right of way, and to the west by Rich Fork Creek. There are wetland areas to the north and west along Rich Fork Creek and to the south of the proposed Phase 2 footprint adjacent to the railroad right of way. The topographic relief of the site is approximately 100 feet, ranging from elevation 640 feet to elevation 740 feet. Existing conditions are shown on **Drawing S1**.

The proposed Phase 2 Subtitle D landfill unit will occupy approximately 14.7 acres (lined) (Note that additional lined area is anticipated once site suitability requirements are met for additional portions of the site). At the projected gate rates described in **Section 2.0** (Facility Report), Phase 2 has been designed for approximately 5.9 years of disposal volume. The proposed landfill has been designed to meet current DWM setback and horizontal buffer requirements: 300 feet from property lines, 500 feet from residences or active water wells.

## **SECTION 2.0 FACILITY REPORT**

### **2.1 OVERVIEW**

This section presents a plan for the development of the proposed Phase 2 of the Davidson County MSW Landfill. This report has been prepared in accordance with the requirements of Rule .1619(d)(1), (d)(2), (e)(1), (e)(2), (e)(3), and (e)(5) of the North Carolina Solid Waste Management Regulations.

### **2.2 FACILITY SERVICES AND WASTE STREAM**

#### **2.2.1 Facility Services**

Currently, the following activities or services are provided at the Davidson County Landfill facility:

- Scales and scale house facilities
- Administrative offices and maintenance building
- Convenience center
- White goods handling facility
- Tire processing area
- Recycling building
- Household hazardous waste (HHW) center
- Lined municipal solid waste (MSW) landfill - (Phase 1)  
(NC Permit No. 29-06)
- Construction and demolition debris (C&D) landfill  
(NC Permit No. 29-06).

The following facilities are proposed for the facility:

- Additional scales and scale house facilities
- Lined MSW landfill - Phase 2.

#### **2.2.2 Types of Waste**

The proposed Davidson County MSW Landfill will accept mixed municipal solid waste (MSW) originating from residential, commercial, and industrial sources. Other wastes (i.e. C&D, and yard waste) will be segregated and directed to on-site facilities for disposal as described below.

#### **2.2.3 Disposal Rates and Estimated Variances**

Based on the 2002-2003 Solid Waste Management Annual Report information provided by the County, the landfill accepted 93,351 tons of MSW from 7/1/02 to 6/30/03 (average

7,779 tons per month or 301 tons per day based on 310 operating days per year). The population served during this time period was estimated as 151,163 which translates to 0.62 tons/person/year being disposed of at the landfill. Based on the anticipated population figures and increases projected through 2030 from the NC Office of State Planning (NCOSP) and the current per capita disposal rate, **Table 2.1** gives the projected annual and monthly tonnages to be disposed in the Davidson County MSW Landfill. Note that monthly variances shown in the table are based on County records which indicate that the maximum anticipated monthly variance is about plus or minus 20 percent from average. Also note that population figures after 2030 are based on an assumed constant percentage increase from 2030 onward.

#### **2.2.4 Service Area**

The landfill will serve Davidson County and additional areas as approved by the County.

#### **2.2.5 Procedures for Waste Segregation**

Procedures for waste segregation at the proposed landfill will be similar to existing operations in Phase 1 including requirements for waste screening and contingency plans for managing any identified hazardous and liquid wastes. Please refer to the currently approved facility Operations Manual for more information.

#### **2.2.6 Equipment Requirements**

The equipment requirements for operation and maintenance of the proposed Phase 2 are anticipated to be the same as that currently used in Phase 1.

### **2.3 LANDFILL CAPACITY**

#### **2.3.1 Total Operating Capacity and Life Expectancy**

**Drawing S2** (Site Development Plan - Base Grades) and **Drawing S3** (Site Development Plan - Final Cover Grades), show conceptual subgrade and final cover grades for the maximum development of the Phase 2 site. Subgrade contours were laid out based on the information provided in the report from site investigations performed by Westinghouse Environmental Services and GNRA in 1989 and 2000-2003, respectively. Subgrade contours were laid out to be a minimum of 4 feet above groundwater or bedrock elevations in accordance with State regulations. It is anticipated that some adjustments will be required to these contours once more detailed site investigations are performed for each disposal area.

The top elevation of the final cover grades is at approximately 758 feet. The exterior side slopes for the Phase 2 expansion will be at a 4H to 1V slope to an approximate elevation of 748 feet, then transition at a slope of 8 percent to the top elevations.

The estimated total gross and net operating capacities, life expectancies, and lined areas of Phase 2 are shown in **Table 2.2**. The net capacity for waste and corresponding life expectancy of each disposal area accounts for compacted soil liner, leachate collection media, protective cover, and daily, intermediate, and final cover. (Note that volumes were calculated from base grades (top of subgrade) to top of final cover grades.)

### **2.3.3 In-Place Ratio of Waste to Soil and Compaction Factor**

The capacities obtained above were based on a 10 percent periodic cover ratio and a compaction factor of 1,450 pounds per cubic yard. The assumed periodic cover ratio is indicative of the County's current practices of using a tarp as an alternative to placing 6 inches of daily cover soil. The assumed compaction factor is based on a recent analysis of waste density in Phase 1 and is typical for the use of large compactors for compaction of the waste.

## **2.4 AVAILABLE SOIL RESOURCES AND REQUIRED SOIL QUANTITIES**

### **2.4.1 Earthwork Quantities**

The soils required to construct the proposed landfill will be removed from on-site borrow sources or will be imported from off-site. The soils removed during excavation of the landfill may be used for structural fill, compacted soil liner, and general fill. These excavation (cut) and structural fill (fill) volumes are shown in **Table 2.3**.

### **2.4.2 Compacted Soil Liner**

The low permeability soil required for the compacted soil liner will be on-site soils (An adequate supply of  $1 \times 10^{-5}$  cm/sec or less soil is anticipated within the Phase 2 footprint). On the basis of the 1.5 foot thick compacted soil liner required for the landfill, the in-place volume required for each disposal area is shown in **Table 2.4**.

### **2.4.3 Leachate Collection System (LCS)**

The collection media (stone) used in the LCS will be imported from off-site sources. This layer is 12 inches thick on both the landfill base and side slopes. The estimated total in-place volume of this drainage media for each disposal area is shown in **Table 2.5**.

### **2.4.4 Protective Cover**

Overlying the leachate collection system is the protective cover. Davidson County plans to use either 12 inches of additional stone or 20 inches of tire shreds/chips for this layer. The thicker layer of tire shreds/chips used accounts for approximately 40% settlement in this material under planned loads. The required in-place volume of protective cover for each disposal area is shown in **Table 2.6**. Combined with the collection media of the LCR system, there will be a minimum of 24 inches of material between waste and the

geomembrane liner.

#### **2.4.5 Daily and Intermediate Cover**

Assuming the previously mentioned periodic cover ratio of 10 percent, the required in-place volume for use as daily and intermediate cover during landfill operations is shown in **Table 2.7**.

#### **2.4.6 Vegetative Soil Layer**

On the basis of the 2 foot thick vegetative soil layer required for the landfill final cover, the in-place volume required for each disposal area is shown in **Table 2.8**.

#### **2.4.7 Soil Summary**

The above on-site and off-site soil quantities are summarized in **Table 2.9**. Note that, based on the proposed base grades, long-term there is a soil surplus of on-site soil. However, due to compaction factors, waste, other potential uses, etc., this surplus should be minor.

### **2.5 FACILITY DESIGN CRITERIA**

The base liner and final cover systems will be constructed in accordance with Section .1624 (b)(8)(9) of the North Carolina Administrative Code, Title 15A, Chapter 13, Subchapter 13B including the following requirements.

#### **2.5.1 Horizontal Separation Requirements**

The horizontal separation requirement between the disposal boundary (edge of waste) and the property lines is a minimum of 300 feet, the minimum buffer between private residences and wells and the disposal boundary is 500 feet, and the minimum buffer between any surface water (stream, river, creek) and the disposal boundary is 50 feet. The proposed design satisfies all buffer requirements.

#### **2.5.2 Vertical Separation Requirements**

The post-settlement bottom elevation of the base liner system will meet the minimum requirement of four feet above the seasonal high groundwater table and bedrock.

### **2.6 CONTAINMENT AND ENVIRONMENTAL CONTROL SYSTEMS**

The following is an overview of the proposed containment and environmental control systems. Detailed design of these components will be prepared and submitted later as part of the Permit to Construct application submitted for each disposal area.

### **2.6.1 Landfill Subgrade and Perimeter Berms**

The landfill subgrade elevations have been designed for minimum post-settlement slopes of 2 percent (NCAC .1624(b)(7)). The subgrade elevations will be achieved by excavation or placement of compacted structural fill (embankment). During excavation, a determination of unsuitable soils (i.e. soils which are too soft, wet, or organic) will be made. Where unsuitable soils are found, the soils will be undercut and backfilled with structural fill.

In addition to providing the liner foundation in fill areas, structural fill will be used for berm and roadway construction. Structural fill will consist of on-site soils removed during excavation of the landfill units or imported borrow soils, except that no CH, OL, or OH soils will be allowed.

### **2.6.2 Base Liner System**

The base liner area for Phase 2 is approximately 14.7 acres and is shown on **Drawing S2** (Site Development Plan - Base Grades). The base liner will consist of either a standard composite liner system or an alternative liner system as allowed under North Carolina regulations. The components of this liner system will consist of the following components (bottom-up):

#### **Standard Liner System:**

- a 24 inch thick compacted soil liner with a permeability of no more than  $1 \times 10^{-7}$  cm/sec.;
- a 60 mil HDPE geomembrane liner; and
- a leachate collection system (LCS).

**OR**

#### **Alternative Liner System:**

- an 18 inch thick compacted soil liner with a permeability of no more than  $1 \times 10^{-5}$  cm/sec.;
- geosynthetic clay liner (GCL);
- a 60 mil HDPE geomembrane liner; and
- a LCS.

The compacted soil liner will consist of compacted on-site or imported borrow soils. The compacted soil liner will be placed in 6 inch lifts and compacted to achieve the required permeability and strength requirements.

The GCL will consist of a layer of sodium bentonite bonded between two geotextiles. The GCL will provide a maximum hydrated permeability of  $5 \times 10^{-9}$  cm/sec.

The geomembrane component of the liner system will consist of a 60 mil thick High Density Polyethylene (HDPE) synthetic liner. This geomembrane will be installed by a qualified contractor.

For the purposes of this report and the calculations of volumes, an alternative liner has been assumed. A demonstration of the proposed alternative liner system will be made in the Permit to Construct application for the first disposal area.

### **2.6.3 Leachate Collection System (LCS)**

The LCS will be constructed directly above the geomembrane on both the base and side slopes of the landfill. The LCS functions to collect leachate as quickly as is practical and to conduct the fluid out of the landfill via the sump areas. The goal of the LCS is to minimize the hydraulic head acting on the liner, thereby reducing the leak potential.

On both the base and side slopes of the landfill, the LCS will consist of 12 inches of collection media (typically NCDOT No. 78 stone) having a permeability of at least  $5 \times 10^{-1}$  cm/sec and a series of perforated collection pipes. Collection pipes within each cell as well as the main headers will have coarse aggregate (typically NCDOT No. 57 stone) placed over and around them and are referred to as "gravel columns". These gravel columns provide a significant amount of storage, provide primary leachate removal capacity, and are designed to be resistant to biological clogging. Since the gravel column aggregate extends through the protective cover and is in direct contact with the waste (no geotextile is placed between the waste and gravel), the long-term clogging potential is significantly reduced. Cleanout ports will be provided, where possible, at the end of leachate collection piping along the perimeter berms to allow periodic hydro-washing of the piping when necessary.

In order to provide protection of the base geomembrane against damage due to the granular leachate collection media, a cushion (Type GT-C) geotextile will be placed between the between the base geomembrane and collection media.

The collection piping of the LCS conducts the leachate to the sump areas for the removal from the landfill by pump and force main to leachate storage tanks. Note that a potential location for leachate storage tanks is shown on **Drawing S2** (Site Development Plan - Base Grades). The actual location and type of storage facility will be finalized as part of the Permit to Construct application for the first disposal area.

### **2.6.4 Protective Cover**

A protective cover layer of stone or tire shreds/chips will be placed over the LCS as was done in the Phase 1 landfill unit.

### **2.6.5 Stormwater/Leachate Separation System**

In order to increase facility operating efficiency by reducing the leachate treatment quantities, stormwater/leachate separation is planned for Phase 2. Leachate is considered to be any precipitation or fluid that comes in direct contact with the waste. This liquid will be collected by the LCS and conveyed to the leachate storage tanks. Precipitation that falls in areas where it does not contact waste, such as within inactive areas, does not have to be treated as leachate. This fraction of the precipitation is treated as stormwater - that is, treated for removal of sediment only.

For disposal areas that have waste placed in them, precipitation is allowed to percolate or run-off into the LCS. For areas that have no waste, the percolation or run off to the sump where a pump conducts the water to a perimeter drainage structure. This runoff does not contact waste or leachate.

### **2.6.6 Final Cover System**

As a minimum, the components of the final cover system (bottom up) will consist of a 6 to 12 inch foundation layer (daily or intermediate cover), 30 mil textured LLDPE geomembrane, drainage geocomposite (pore pressure reduction), and a 24 inch thick vegetative soil layer which includes a 6 inch thick topsoil layer. This system differs from the standard regulatory final cover in that an 18 inch layer of  $1 \times 10^{-5}$  cm/sec soil below the geomembrane is removed and the drainage geocomposite is added above the geomembrane. The addition of the drainage geocomposite reduces head on the geomembrane for both reduced infiltration through the geomembrane and increased stability of the overlying soil veneer. A demonstration of this final cover system will be presented as part of the Permit to Construct application for the first disposal area.

### **2.6.7 Erosion and Sedimentation Control**

The erosion and sedimentation control structures provided will be designed and maintained to manage the run-off generated by the 24-hour, 25-year storm event, and conform to the requirements of the Sedimentation Pollution Control Law (15A, NCAC, 4). Note that potential sediment basin locations are shown on **Drawing S2** (Site Development Plan - Base Grades).

### **2.6.8 Landfill Gas Control**

Landfill gas control for Phase 2 will consist of a series of surficial collection trenches placed beneath the final cover and/or vertical/horizontal wells which are connected to passive vents or utility flares or to an active gas extraction system. The selected system will be designed to limit the gas pressures on the final cover geosynthetics.

At sometime during the active life of the proposed landfill, the volume of MSW waste at the facility will exceed 2.75 million tons and will, thus, require a Title V air quality

permit. The timetable for this will be further evaluated in the Permit to Construct application for the first disposal area.

### **2.6.9 Access and Roadways**

The site will be designed to provide all-weather access to active cells as well as cells under intermediate cover. Access ramps into the lined areas will be provided where necessary.

Due to the presence of the railroad between Phase 2 and the current Phase 1 site, a new site access point will be required along Old Highway 29 and some site infrastructure will need to be moved or duplicated. At a minimum, scales and a scalehouse will be required along with the necessary site roads.

## **2.7 SLOPE STABILITY AND SETTLEMENT**

The slope stability of the overall waste mass and perimeter berms, the protective cover veneer, and the final cover veneer, as well as estimates of foundation settlement will be addressed in the Permit to Construct application for each disposal area.

## **2.8 LEACHATE MANAGEMENT**

The general leachate management system includes the collection, storage, treatment (if required), and disposal of the leachate generated. The collection and transmission of leachate to the on-site storage tanks will be as described above. From the storage tanks, the leachate will be pumped into tanker trucks and hauled on a regular basis to a local wastewater treatment plant (WWTP) for disposal. Pretreatment, if required, will be employed on-site to meet the standards for disposal into the WWTP. Alternatively, the County may install a force main if deemed feasible.

## **2.9 SPECIAL ENGINEERING FEATURES**

Special engineering features proposed for Phase 2 include an alternative liner system, wetlands mitigation, and an alternative final cover system.

### **2.9.1 Alternative Liner**

An alternative liner as described above is proposed for use in Phase 2 due to the lack of  $1 \times 10^{-7}$  cm/sec soil on-site.

### **2.9.2 Wetlands Mitigation**

Several areas of Phase 2 contain wetlands and may require mitigation. Permitting of these areas, as necessary, will take place through the Army Corps of Engineers and the North Carolina Division of Water Quality.

### **2.9.3 Alternative Final Cover**

An alternative final cover as described in **Section 2.6.6** is proposed for use in Phase 2 to eliminate the compacted soil barrier component.

**TABLE 2.1  
PROJECTED LANDFILL TONNAGES**

Year	Population	Projected Annual MSW Tonnage	Projected Average Monthly MSW Tonnage	Projected Monthly Variance (± 20%)
2004 - 2006 Operations in Phase 1				
2007	160,957	99,793	8,316	6,653 - 9,979
2008	162,916	101,008	8,417	6,734 - 10,101
2009	164,874	102,222	8,519	6,815 - 10,222
2010	166,833	103,436	8,620	6,896 - 10,344
2011	168,783	104,646	8,720	6,976 - 10,465
2012	170,733	105,855	8,821	7,057 - 10,585
2013	172,684	107,064	8,922	7,138 - 10,706
2014	174,634	108,273	9,023	7,218 - 10,827
2015	176,584	109,482	9,124	7,299 - 10,948
2016	178,534	110,691	9,224	7,379 - 11,069
2017	180,484	111,900	9,325	7,460 - 11,190
2018	182,435	113,109	9,426	7,541 - 11,311
2019	184,385	114,319	9,527	7,621 - 11,432
2020	186,335	115,525	9,627	7,702 - 11,553
2021	188,262	116,722	9,727	7,781 - 11,672
2022	190,189	117,917	9,826	7,861 - 11,792
2023	192,115	119,112	9,926	7,941 - 11,911
2024	194,042	120,306	10,026	8,020 - 12,031
2025	195,969	121,501	10,125	8,100 - 12,150
2026	197,896	122,695	10,225	8,180 - 12,270
2027	199,823	123,890	10,324	8,259 - 12,389
2028	201,749	125,085	10,424	8,339 - 12,508
2029	203,676	126,279	10,523	8,419 - 12,628
2030	205,603	127,474	10,623	8,498 - 12,747

**TABLE 2.1 (CONTINUED)**

<b>Year</b>	<b>Population</b>	<b>Projected Annual MSW Tonnage</b>	<b>Projected Average Monthly MSW Tonnage</b>	<b>Projected Monthly Variance (± 20%)</b>
2031	207,548	128,680	10,723	8,579 - 12,868
2032	209,511	129,897	10,825	8,660 - 12,990
2033	211,493	131,126	10,927	8,742 - 13,113
2034	213,494	132,366	11,031	8,824 - 13,237
2035	215,514	133,619	11,135	8,908 - 13,362
2036	217,553	134,883	11,240	8,992 - 13,488
2037	219,611	136,159	11,347	9,077 - 13,616
2038	221,688	137,447	11,454	9,163 - 13,745
2039	223,785	138,747	11,562	9,250 - 13,875
2040	225,903	140,060	11,672	9,337 - 14,006
2041	228,040	141,385	11,782	9,426 - 14,138
2042	230,197	142,722	11,894	9,515 - 14,272
2043	232,375	144,072	13,006	9,605 - 14,407
2044	234,573	145,435	12,120	9,696 - 14,544
2045	236,792	146,811	12,234	9,787 - 14,681
2046	239,032	148,200	12,350	9,880 - 14,820
2047	241,293	149,602	12,467	9,973 - 14,960
2048	243,576	151,017	12,585	10,068 - 15,102
2049	245,880	152,446	12,704	10,163 - 15,245
2050	248,206	153,888	12,824	10,259 - 15,389
2051	250,554	155,344	12,945	10,356 - 15,534
2052	252,925	156,813	13,068	10,454 - 15,681
2053	255,317	158,297	13,191	10,553 - 15,830
2054	257,733	159,794	13,316	10,653 - 15,979
2055	260,171	161,306	13,442	10,754 - 16,131

**TABLE 2.2  
TOTAL OPERATING CAPACITY AND LIFE EXPECTANCY**

Disposal Area	Area (Acres)	Total Gross Capacity (CY) <sup>1</sup>	Net Capacity (CY/Tons)	Life Expectancy (Years)
1	14.7	1,065,388	841,455 (610,055)	5.9
<b>Total:</b>	<b>14.7</b>	<b>1,065,388</b>	<b>841,455 (610,055)</b>	<b>5.9</b>

Notes:

1. The Total Gross Capacity is calculated from the proposed base grades (top of subgrade) to the top of final cover contours.

**TABLE 2.3  
GENERAL EARTHWORK QUANTITIES**

Disposal Area	Cut (CY)	Fill (CY)
1 (See Note 1)	412,771	172,957
<b>Total:</b>	<b>412,771</b>	<b>172,957</b>

Notes:

1. Quantities include landfill access roads.

**TABLE 2.4  
COMPACTED SOIL LINER QUANTITIES**

Disposal Area	Required Volume (CY)
1	35,574
<b>Total:</b>	<b>35,574</b>

**TABLE 2.5  
NATURAL DRAINAGE MEDIA QUANTITIES**

<b>Disposal Area</b>	<b>Required Volume (CY)</b>
1	23,716
<b>Total:</b>	<b>23,716</b>

**TABLE 2.6  
PROTECTIVE COVER QUANTITIES**

<b>Disposal Area</b>	<b>Required Volume (CY)</b>
1 (See Note 1)	23,716
<b>Total:</b>	<b>23,716</b>

Notes:

1. The quantity shown above is for 12 inches of stone. Should tire shreds/chips be used, a thickness of 20 inches will be required to account for approximately 40% settlement. Thus, approximately 39,527 CY of tire shreds/chips will be required.

**TABLE 2.7  
DAILY AND INTERMEDIATE COVER QUANTITIES**

<b>Disposal Area</b>	<b>Required Volume (CY)</b>
1	93,495
<b>Total:</b>	<b>93,495</b>

**TABLE 2.8  
VEGETATIVE SOIL LAYER QUANTITIES**

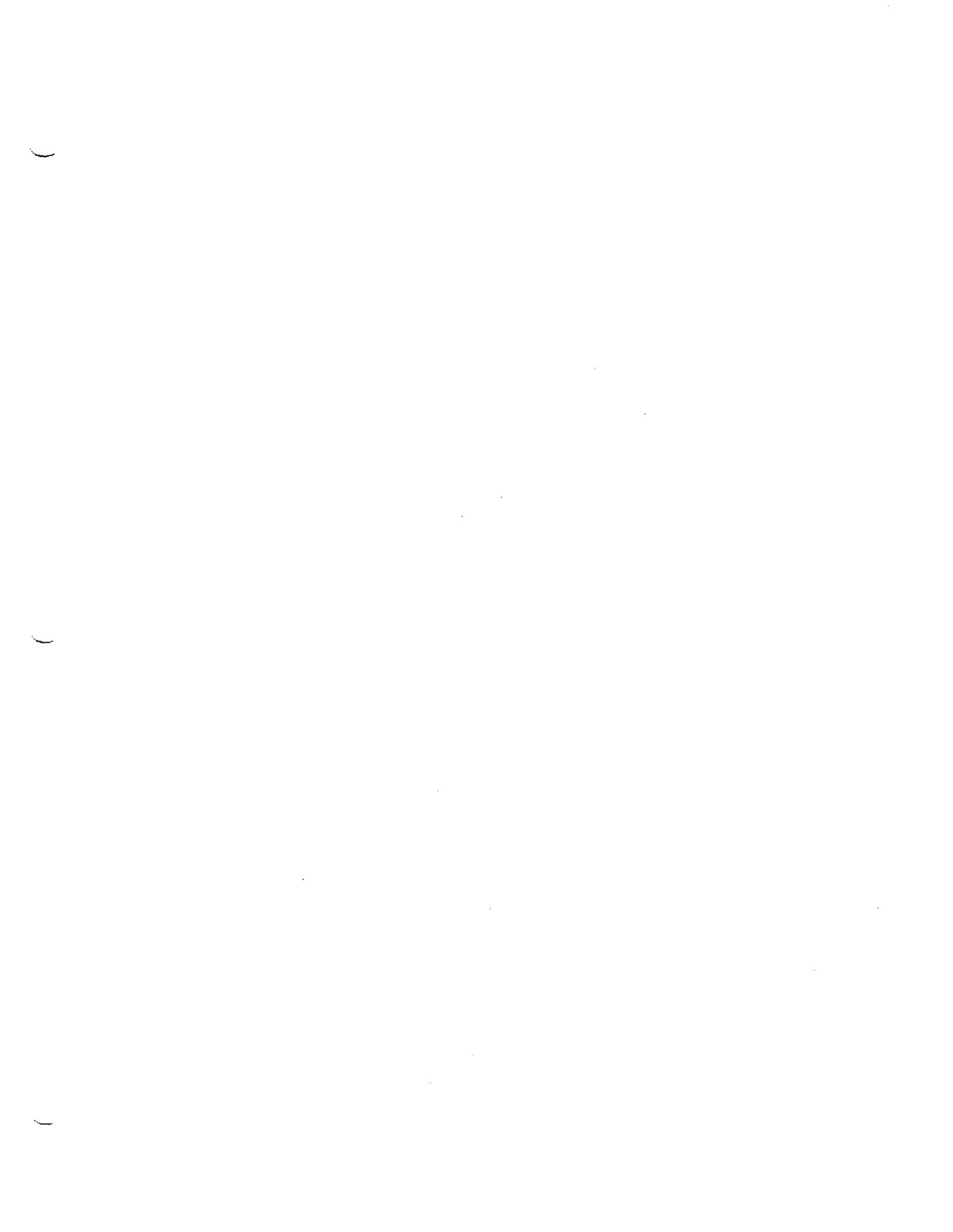
Disposal Area	Required Volume (CY)
1	47,432
<b>Total:</b>	<b>47,432</b>

**TABLE 2.9  
PHASE 2 SOIL SUMMARY**

Material	Quantity (CY)
<b>On-Site<sup>1</sup>:</b>	
Excavation	412,771
Structural Fill	(172,957)
Compacted Soil Liner	(35,574)
Daily/Intermediate Cover	(93,495)
Vegetative Soil Layer	(47,432)
<b>On-Site Total<sup>2</sup>:</b>	<b>63,313</b>
<b>Off-Site:</b>	
Collection Media (Stone)	(23,716)
Protective Cover (Stone/Tire Shreds/Chips)	(23,716/39,527)

**Notes:**

1. On-site material refers to materials available and used within the conceptual Phase 2 footprint only.
2. Soil surplus shown will likely be less due to compaction factors, waste, other possible uses, etc.



**Attachment A**

**Calculations**

**DAVIDSON COUNTY MSW LANDFILL  
PHASE 2 PROPOSED FACILITY PLAN**

**ATTACHMENT A: CALCULATIONS**

**TABLE OF CONTENTS**

- 1.0 Landfill Life Expectancy
- 2.0 Earthwork Quantities

PROJECT Davidson County MSW Landfill - Phase 2

SUBJECT Landfill Life Expectancy

SHEET 1 OF 5

JOB NO. DAVDCO-A

DATE 9/22/04

COMPUTED BY PKS

CHECKED BY \_\_\_\_\_

**Objective** To determine the expected life of landfill Phase 2 given the proposed contours.

**Assumptions**

1. Density of Waste.
2. Waste to Periodic Cover (i.e. daily and intermediate) Ratio.
3. Waste Generation/Disposal Rates

**Analysis** AutoCAD was used to generate volumes.

LIFE.WPD



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# G.N. Richardson & Associates

ENGINEERING AND GEOLOGICAL SERVICES

SHEET: 215

JOB #: DAVDCO-A

DATE: 9/22/04

BY: PKS

CHKD BY:

## Davidson County MSWLF - Phase 2 Analysis of Life Expectancy - Area 1

### Waste Parameters:

Unit Weight (pcy) =	1,450
Unit Weight (tcy) =	0.725
Percentage of Periodic Cover =	10
Area of Waste Footprint (Ac.) =	14.7

### Volume Calculations:

Volume From AutoCAD =	1,065,388 cy	(See Attached)
-----------------------	--------------	----------------

### Adjustment For Other Layers:

1.5 feet Liner System =	35,574 cy
2 feet LCS/Pro. Cover =	47,432 cy
2 feet (Avg.) of Final Cover =	47,432 cy
Sum =	130,438 cy

Volume of Waste and Periodic Cover (cy) =	934,950
---	---------

Volume of Periodic Cover (cy) =	93,495
---------------------------------	--------

Volume of Waste (cy) =	841,455
------------------------	---------

Volume of Waste (tons) =	610,055
--------------------------	---------

LIFE-REV.WB3

Area 1 Handles 2007-2011 → 511,105 Tons

$$+ \frac{98,950}{105,855} = 93\% \text{ of } 2012$$

≈ 5.9 Yrs

3/5

volume report 092204.txt

Site Volume Table: Unadjusted

Cut yards	Fill yards	Net yards	Method
--------------	---------------	--------------	--------

Site: AREA1

Stratum: fcvr-air-space	sgrd-081904	fcvr-081904	
1	1065388	1065387	(F) Composite
Stratum: topo to sbgrd	topo-overall	sgrd-081904	
412771	172957	239814	(C) Composite

Lined Area = 14.7 Ac.

**Davidson County MSWLF  
Waste Generation Analysis**

Data from NC Office of State Planning Website (10/17/03):

Year	Population	% Increase
2000	147,246	----
2010	166,833	13.3
2020	186,335	11.7
2030	205,603	10.3

Year	Population	% Increase From Previous	Projected MSW Tonnage	Projected Average Monthly MSW Tonnage	Projected Monthly Variance (Min.)	Projected Monthly Variance (Max.)
2000	147,246	----	----	----	----	----
2001	149,205	1.33	----	----	----	----
2002	151,163	1.31	93,351	7,779	6,223	9,335
2003	153,122	1.30	94,936	7,911	6,329	9,494
2004	155,081	1.28	96,150	8,013	6,410	9,615
2005	157,040	1.26	97,364	8,114	6,491	9,736
2006	158,998	1.25	98,579	8,215	6,572	9,858
2007	160,957	1.23	99,793	8,316	6,653	9,979
2008	162,916	1.22	101,008	8,417	6,734	10,101
2009	164,874	1.20	102,222	8,519	6,815	10,222
2010	166,833	1.19	103,436	8,620	6,896	10,344
2011	168,793	1.17	104,646	8,720	6,976	10,465
2012	170,733	1.16	105,855	8,821	7,057	10,585
2013	172,684	1.14	107,064	8,922	7,138	10,706
2014	174,634	1.13	108,273	9,023	7,218	10,827
2015	176,584	1.12	109,482	9,124	7,299	10,948
2016	178,534	1.10	110,691	9,224	7,379	11,069
2017	180,484	1.09	111,900	9,325	7,460	11,190
2018	182,435	1.08	113,109	9,426	7,541	11,311
2019	184,385	1.07	114,319	9,527	7,621	11,432
2020	186,335	1.06	115,528	9,627	7,702	11,553
2021	188,282	1.03	116,722	9,727	7,781	11,672
2022	190,189	1.02	117,917	9,826	7,861	11,792
2023	192,115	1.01	119,112	9,926	7,941	11,911
2024	194,042	1.00	120,306	10,026	8,020	12,031
2025	195,969	0.99	121,501	10,125	8,100	12,150
2026	197,896	0.98	122,695	10,225	8,180	12,270
2027	199,823	0.97	123,890	10,324	8,259	12,389
2028	201,749	0.96	125,085	10,424	8,339	12,508
2029	203,676	0.96	126,279	10,523	8,419	12,628
2030	205,603	0.95	127,474	10,623	8,498	12,747
2031	207,548	0.95	128,668	10,723	8,579	12,868
2032	209,511	0.95	129,897	10,825	8,660	12,990
2033	211,493	0.95	131,126	10,927	8,742	13,113
2034	213,494	0.95	132,366	11,031	8,824	13,237
2035	215,514	0.95	133,619	11,135	8,908	13,362
2036	217,553	0.95	134,883	11,240	8,992	13,488
2037	219,611	0.95	136,159	11,347	9,077	13,616
2038	221,688	0.95	137,447	11,454	9,163	13,745
2039	223,785	0.95	138,747	11,562	9,250	13,875
2040	225,903	0.95	140,060	11,672	9,337	14,006
2041	228,040	0.95	141,385	11,782	9,426	14,138
2042	230,197	0.95	142,722	11,894	9,515	14,272
2043	232,375	0.95	144,072	12,006	9,605	14,407
2044	234,573	0.95	145,435	12,120	9,696	14,544
2045	236,792	0.95	146,811	12,234	9,787	14,681
2046	239,032	0.95	148,200	12,350	9,880	14,820
2047	241,293	0.95	149,602	12,467	9,973	14,960
2048	243,576	0.95	151,017	12,585	10,068	15,102
2049	245,880	0.95	152,446	12,704	10,163	15,245
2050	248,206	0.95	153,888	12,824	10,259	15,389
2051	250,554	0.95	155,344	12,945	10,356	15,534
2052	252,925	0.95	156,813	13,068	10,454	15,681
2053	255,317	0.95	158,297	13,191	10,553	15,830
2054	257,733	0.95	159,794	13,316	10,653	15,979
2055	260,171	0.95	161,306	13,442	10,754	16,131

Areal

Notes:

- Population figures and increases from 2000 to 2030 are from the NC Office of State Planning (NCOSP). Figures after 2030 are based on an assumed constant percentage increase from 2030 onward.
- Projected MSW tonnage is based on the per capita disposal rate of 0.62 tons per person per year to this facility (based on tonnage disposed in FY 2002-2003 (93,351 tons) divided by the 2002 County population).

# G.N. Richardson & Associates

ENGINEERING AND GEOLOGICAL SERVICES

## Davidson County MSW Landfill - Phase 2 Anticipated Monthly Disposal Rates and Variances

SHEET: 515  
 JOB #: DAVDCO-A  
 DATE: 10/22/01  
 BY: PKS  
 CHKD BY:

Fiscal Year	Month	Tonnage	% of Annual Total	Difference from Avg. Month (%)		
1995-96	07/98	9,012	9.4	17.4		
	08/98	9,713	10.2	26.5		
	09/98	9,147	9.6	19.1		
	10/98	8,996	9.4	17.2		
	11/98	8,722	9.1	13.6		
	12/98	7,258	7.6	-5.5		
	01/99	6,381	6.7	-16.9		
	02/99	5,976	6.3	-22.2		
	03/99	6,372	6.7	-17.0		
	04/99	6,728	7.0	-12.4		
	05/99	7,269	7.6	-5.3		
	06/99	6,563	6.9	-14.5		
					FY 1995-96 Total (tons) =	92,137
					FY 1995-96 Average Month (tons) =	7,678
					Maximum Monthly Difference (%) =	26.5
1996-97	07/99	7,094	7.0	-1.6		
	08/99	7,553	7.4	4.7		
	09/99	7,015	6.9	-2.7		
	10/99	7,544	7.4	4.6		
	11/99	6,628	6.5	-8.1		
	12/99	7,542	7.4	4.6		
	01/00	7,360	7.2	2.0		
	02/00	6,404	6.3	-11.2		
	03/00	7,106	7.0	-1.5		
	04/00	7,398	7.3	2.6		
	05/00	7,674	7.5	6.4		
	06/00	7,225	7.1	0.2		
					FY 1996-97 Total (tons) =	86,544
					FY 1996-97 Average Month (tons) =	7,212
					Maximum Monthly Difference (%) =	-11.2
1997-98	07/00	7,041	6.9	6.4		
	08/00	6,678	6.5	0.9		
	09/00	6,523	6.4	-1.4		
	10/00	6,396	6.3	-3.3		
	11/00	5,736	5.6	-13.3		
	12/00	6,590	6.5	-0.4		
	01/01	6,747	6.6	2.0		
	02/01	6,028	5.9	-8.9		
	03/01	6,692	6.6	1.1		
	04/01	6,828	6.7	3.2		
	05/01	6,786	6.7	2.6		
	06/01	7,360	7.2	11.2		
					FY 1997-98 Total (tons) =	79,403
					FY 1997-98 Average Month (tons) =	6,617
					Maximum Monthly Difference (%) =	-13.3
1998-99	07/98	7,599	8.0	-4.5		
	08/98	7,901	8.3	-0.8		
	09/98	7,372	7.7	-7.4		
	10/98	8,617	9.0	8.2		
	11/98	7,583	7.9	-4.7		
	12/98	8,718	9.1	9.5		
	01/99	7,577	7.9	-4.8		
	02/99	6,986	7.3	-12.2		
	03/99	8,197	8.6	3.0		
	04/99	8,012	8.4	0.6		
	05/99	8,224	8.6	3.3		
	06/99	8,739	9.1	9.8		
					FY 1998-99 Total (tons) =	95,524
					FY 1998-99 Average Month (tons) =	7,960
					Maximum Monthly Difference (%) =	-12.2
1999-00	07/99	8,763	8.6	3.2		
	08/99	8,498	8.3	0.1		
	09/99	8,204	8.1	-3.4		
	10/99	8,279	8.1	-2.5		
	11/99	8,266	8.1	-2.6		
	12/99	8,444	8.3	-0.5		
	01/00	7,303	7.2	-14.0		
	02/00	8,460	8.3	-0.3		
	03/00	9,297	9.1	9.5		
	04/00	8,044	7.9	-5.2		
	05/00	9,579	9.4	12.8		
	06/00	8,727	8.6	2.8		
					FY 1999-00 Total (tons) =	101,864
					FY 1999-00 Average Month (tons) =	8,489
					Maximum Monthly Difference (%) =	-14.0
2000-01	07/00	8,160	8.0	-4.0		
	08/00	9,619	9.4	13.2		
	09/00	8,412	8.2	-1.0		
	10/00	8,595	8.4	1.1		
	11/00	8,054	7.9	-5.2		
	12/00	7,771	7.6	-8.6		
	01/01	8,341	8.2	-1.9		
	02/01	7,516	7.4	-11.6		
	03/01	8,709	8.5	2.5		
	04/01	8,643	8.5	1.7		
	05/01	9,415	9.2	10.8		
	06/01	8,755	8.6	3.0		
					FY 2000-01 Total (tons) =	101,991
					FY 2000-01 Average Month (tons) =	8,499
					Maximum Monthly Difference (%) =	13.2

Source: Davidson County Waste Disposal Tonnages.

PROJECT Davidson County MSW Landfill - Phase 2

SHEET 1 OF 3

JOB NO. DAVIDSON-A

DATE 9/22/04

SUBJECT Earthwork Quantities

COMPUTED BY PKS

CHECKED BY \_\_\_\_\_

**Objective**

To determine the required volumes of soil and aggregate required for the construction and operation of landfill Phase 2.

**Analysis**

The volumes of each material will be calculated by taking design thicknesses and/or cross sections and multiplying by design areas and/or lengths. Areas and lengths are determined using AutoCAD, a planimeter, and/or direct measurement.

EARTHWORK.WPD



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# G.N. Richardson & Associates

ENGINEERING AND GEOLOGICAL SERVICES

## Davidson County MSW Landfill - Phase 2 Earthwork Quantities

SHEET: 213

JOB #: DAVDCO-A

DATE: 9/22/04

BY: PKS

CHKD BY:

### Subgrade Cut and Fill Volumes:

Volume of Cut (cy) = 412,771 (User Input - From AutoCAD - See Attached)  
Volume of Fill (cy) = 172,957 (User Input - From AutoCAD - See Attached)

### Compacted Soil Liner (CSL) Volume:

Area of CSL (Ac.) = 14.7 (User Input - From AutoCAD)  
Thickness of CSL (ft) = 1.5 (User Input)  
Volume of CSL (cy) = 35,574

### Natural Drainage Media (NDM) Volume:

Area of NDM (Ac.) = 14.7 (User Input - From AutoCAD)  
Thickness of NDM (ft) = 1 (User Input)  
Volume of NDM (cy) = 23,716

### Protective Cover Volume:

Area of Protective Cover (Ac.) = 14.7 (User Input - From AutoCAD)  
Thickness of Protective Cover (ft) = 1 (User Input)  
Volume of Protective Cover (cy) = 23,716

### Daily/Intermediate Cover Volume:

Volume of Daily/Intermediate Cover (cy) = 93,495 (User Input - From Life Expectancy Calcs.)

### Vegetative Soil Layer (VSL) Volume:

Area of VSL (Ac.) = 14.7 (User Input - From AutoCAD)  
Thickness of VSL (ft) = 2 (User Input)  
Volume of VSL (cy) = 47,432

20" TIRE CHIPS/SHREDS:  
→ 39,527 CY

Site Volume Table: Unadjusted

Cut	Fill	Net	Method
yards	yards	yards	

---

Site: AREA1

Stratum: fcvr-airspace	sgrd-081904	fcvr-081904	
	1	1065388	1065387 (F) Composite
Stratum: topo to sbgrd	topo-overall	sgrd-081904	
	412771	172957	239814 (C) Composite

Lined Area = 14.7 Ac.