

City of Greensboro
North Carolina



June 23, 2008

Ms. Jaclynne Drummond
Hydrogeologist – Solid Waste Section
NCDENR – Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-1646

Subject: North Carolina Solid Waste Groundwater Corrective Action Permit
Modification Application for Phase II of the White Street Landfill

Dear Ms. Drummond:

By letter dated June 9, 2007, the City of Greensboro selected our remedies for groundwater corrective action at Phase II of the White Street Landfill. In accordance with 15A NCAC 13B .1636, please find enclosed a groundwater corrective action permit modification application which is required to be submitted within 14 days of selecting a remedy.

If you should have any questions or need any additional information, please do not hesitate to contact me at (336) 373-2787.

Sincerely,

A handwritten signature in cursive script that reads 'Jeryl W. Covington'.

Jeryl W. Covington, P.E.
Director, Environmental Services Department

Enclosure



**North Carolina Department of Environment and Natural Resources
Division of Waste Management
Solid Waste Section**

North Carolina Solid Waste Groundwater Corrective Action Permit Modification Application

Pursuant to 15A NCAC 13B .1636, "Within 14 days of selecting a remedy, the permittee shall submit an application to modify the permit describing the selected remedy to the Division for evaluation and approval." The application shall include the demonstrations necessary to comply with the financial assurance requirements set forth in Paragraph (d) of Rule .1628.

Please attach the following: (1) a copy of the minutes from the public meeting discussing the Assessment of Corrective Measures, (2) a signed resolution/proclamation/document adopting the remedy, (3) a site map designating locations of groundwater monitoring wells and surface water monitoring locations that will be impacted by the remedy, (4) any draft conceptual schematics/figures/plans relating to the selected remedy, (5) a list of any required registrations, permits, and approvals, (6) a copy of most recent permit issued by the Solid Waste Section, and (7) an amendment to the Financial Assurance Mechanism, including a break-down of the cost estimates for closure, post-closure and corrective action.

Send the application and attachments to NCDENR-DWM, Solid Waste Section, Compliance Unit, 1646 Mail Service Center, Raleigh, NC 27699-1646. This application and any documents attached to this application are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Please type or print all information legibly.

I. Site Identification

Permit Number: 41-03
Solid Waste Rule Designation (.0500 or .1600): .1636 (a)
Facility Name: White Street Landfill
Facility Physical Address: 2503 White Street
City: Greensboro
Zip: 27405
County: Guilford
Waste Type: Construction and demolition on top of old sanitary landfill

II. Owner and Operator Information

Check box, if owner and operator are the same.

Owner

Name: The City of Greensboro
Address: PO Box 3136, Greensboro, NC 27402
Phone Number: (336) 373-2787

Operator

Name: _____
Address: _____
Phone Number: _____

III. Groundwater Corrective Action

Selected remedy (include addition lines if needed):

(1) Monitored Natural Attenuation (MNA)

(2) Phytoremediation

(3) Maintain Consistent Contours

Contingency Plan A: Pump and discharge to POTW

Contingency Plan B: Any of the other remedies identified in the ACM

IV. Financial Assurance

Financial Assurance Mechanism: Local Government Financial Test

Total Cost Estimate for 30 Years (based upon ACM): \$ 2,022,750

V. Project Schedule (upon Division approval)

Approximate Date of Remedy Construction Completion (if applicable): March 2010

Approximate Date of Implementation of Remedy: April 2009

Approximate Date of Baseline Sampling Completion (if applicable): Not applicable

Approximate Date of First Remedy Performance and Effectiveness Report Submittal: Year end 2010

VI. Environmental Consultant

Consulting Company: S & ME Engineering

Address: 3718 Old Battleground Road, Greensboro, NC 27410

Phone Number: (336) 288-7180

Attn: Mr. Connel Ware or Mr. Ed Henriques

VII. Signatures

To the best of my knowledge, the information reported and statements made in this North Carolina Solid Waste Groundwater Corrective Action Permit Modification Application are true and correct. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of fine and imprisonment.

If Owner and Operator are the same, please sign for Owner and type or write SAME for Operator.

Owner

Owner Name (Printed or Typed): Jeryl W. Courington

Owner Signature: Jeryl W. Courington

Date: 06-23-08

Operator

Operator Name (Printed or Typed): _____

Operator Signature: _____

Date: _____

NC Professional Geologist or NC Professional Engineer

Name (Printed or Typed): Gregory A. Thomassen

Signature: Gregory A. Thomassen

Date: 06/23/08

Affix NC Professional Geologist/Engineer Seal:



1. Public Meeting Minutes

Groundwater Findings and Corrective Measures
Public Meeting Minutes
City of Greensboro – Environmental Services Department

Attendees:

Jeryl W. Covington, Director, Environmental Services Department
Scott Boss, Acting Solid Waste Disposal Manager
Greg Thomasson, Technical & Planning Support Manager
Chris Marriott, Environmental Compliance Manager
Connel Ware, S&ME
Ed Henriques, S&ME

A copy of the sign-in sheet which identifies who attended from the public is attached.

Meeting Summary:

At 6:30 PM on December 20, 2007, the Environmental Services Department of the City of Greensboro held a public meeting to discuss the groundwater findings and potential corrective measures associated with the formerly operated Phase II municipal solid waste landfill at the White Street Landfill. The public meeting was located at the Peeler Recreation Facility located at 1300 Sykes Avenue.

Ms. Jeryl W. Covington opened the public meeting with an introduction of herself and the technical staff present from the City of Greensboro and S&ME. She also provided a brief statement as to the purpose of the meeting and introduced Mr. Ed Henriques of S&ME to give the formal presentation. Mr. Henriques' presentation included the attached slides and several exhibits. One exhibit was an aerial of the general area including Phase II waste boundaries, the approximate plume location, groundwater flow direction, groundwater monitoring wells, and surface water monitoring locations. Other exhibits included a typical well schematic and a cross section view of the waste boundary, groundwater table, and groundwater monitoring well.

At the end of that presentation, Mr. Henriques opened the meeting to questions. The following questions were asked by the public and answered by Ms. Covington and Mr. Henriques.

- Is this meeting a requirement of the regulations?
- One attendee wanted to discuss the potential corrective measure of building a wall to protect Buffalo Creek.
- Is Buffalo Creek in danger from the landfill?
- Once the corrective measure is chosen, will the corrective measure be an on-going process?
- If you install a barrier or wall, will it be designed for wet weather as well as dry weather?
- Would there be a barrier or wall on the southern end of Phase II?

Groundwater Findings and Corrective Measures
Public Meeting Minutes
City of Greensboro – Environmental Services Department

No written comments were received from the public before, during, or after the meeting.

At the end of the public meeting, Ms. Jeryl Covington proceeded to discuss some of the financial issues regarding the landfill and transfer station and future development of Phase IV for C&D disposal at the White Street Landfill.

White Street Landfill Public Meeting - June 9, 2008

The White Street Landfill's public meeting began at 6:35 p.m. Eighteen guests attended including one media representative. Attendees were requested to sign a registration sheet in order to document their attendance.

The meeting was conducted by Ms. Jeryl Covington, Environmental Services Director and began with the introduction of the attending staff, Mr. David Bost, Acting Waste Disposal Manager, and Mr. Greg Thomasson, Technical and Planning Support Manager (Waste Disposal Engineer). Following the introduction of staff, the purpose of the meeting was provided which stated that this meeting was being held in accordance with applicable waste disposal regulations associated with the proposed landfill activities.

As originally reported at the public meeting held on Thursday, December 20, 2007, the City of Greensboro is submitting information to the North Carolina Department of Environment and Natural Resources – Division of Waste Management regarding three activities at two of the operating units located at the White Street Landfill. These submissions include: re-permitting the construction and demolition landfill located above a formerly operated sanitary landfill; changing the municipal solid waste landfill's configuration by modifying the side slopes; thus, increasing the disposal capacity; and adding an additional remediation technology to the groundwater corrective action plan.

The City of Greensboro reported that the groundwater was consistently monitored in accordance with the regulatory requirements. One area adjacent to the formerly operated Phase II landfill continued to detect the occurrence of groundwater impact above the regulatory limits. The location of this impact was identified on an aerial photograph and a brief discussion educating the audience on the principals of groundwater flow was provided. The general direction of groundwater flow was described referencing the aerial photograph and identified as flowing from the southerly direction toward a northern-northeast direction. Residential neighborhoods were identified on the aerial photograph as being located uphill (up gradient) of the landfill's property. The groundwater flow direction was described as flowing from higher elevations (residential area) to lower elevations (North Buffalo Creek). In addition, it was reported that the recent groundwater sampling event (May 2008) revealed that the level of groundwater contamination was decreasing. In light of the recent sampling results, the City is proposing the planting of trees within the property boundaries and adjacent to North Buffalo Creek as an additional solution in remediating the groundwater. This form of remediation was referenced as phytoremediation. The process of phytoremediation was described as utilizing the root system of hybrid poplar trees to uptake existing contaminants in the groundwater. The poplars will require placement in a manner that will promote growth and reduce the opportunity for insect infestation and fungal diseases. The City hopes to obtain agronomy assistance from one of the local colleges or universities. The phytoremediation will be completed in conjunction with the monitored natural attenuation (MNA) that was originally discussed at the December 20, 2007 public meeting. A brief review of MNA was provided to the audience and described as being a natural breakdown in the contaminants due to the composition and make-up of subsurface media and oxygen levels in and around the subsurface groundwater.

The City of Greensboro reported that a permit modification has been submitted for the Phase III municipal solid waste landfill. This permit modification will request a change in the side slopes of the unit. A cross-sectional schematic was shown to the audience. The currently approved side slope configuration was identified and the proposed increase was depicted on the schematic. No change in the height of the landfill will result with the proposed side slope modification. The height of the landfill will remain at 872 feet above mean sea level. Approximately one (1) million cubic yards of disposal capacity will be gained with this modification. The audience was provided information regarding the current capacity of the Phase III unit. Mr. Jim Kee made inquiry about household waste returning to the site. If it were decided to return disposal activities to the site, the existing available landfill area would be consumed in less than five years. This is due to the fact that both construction and demolition waste and household waste will be utilizing the same landfill during the operational life of this unit during this period. Based upon current volumes, the construction and demolition landfill (phase II) will be full on or about 2011. As originally permitted in 1997, the Phase III landfill was designed for a ten-year capacity. The next landfill area could not be constructed and permitted during this timeframe.

The audience was provided a copy of the current waste generation volume being managed by the transfer station. The audience was recommended to participate in the City's recycling program and increase their recycling efforts. The transfer station operations were briefly described and photos of the operation were shown to the audience. The current hauling and disposal costs for the facility beginning June 2008 are \$36.08 per ton with a \$36.00 per ton rate being charged to the users. This increase results from the dramatic escalation in fuel costs. Mr. Harold Fields raised a question about the solid waste fee charges being increased due to this event. It was explained that the household solid waste fee was eliminated in 2004 and this fee was converted to the property tax. Mr. Fields further stated that the message being sent to the community is that the recent property tax increases are due to the closing of the landfill. A brief explanation was provided clarifying that a portion of the property tax increase was due to the opening of the transfer station. This portion was approximately \$0.25 of the total property tax amount; other portions of the increase included costs for public safety and other municipal activities. Currently, no property tax increase is being proposed in the upcoming budget.

The audience was reminded that the solid waste disposal tax of \$2.00 per ton will be in effect July 1, 2008. The solid waste legislation passed by the general assembly increased the regulatory requirements for the development of landfills within the state; thus, fewer landfills may be developed and the competition for disposal capacity may increase. The regulatory agency has provided information on the state's currently available solid waste disposal capacity to the legislature. They have stated that North Carolina will be facing a disposal capacity dilemma in future years. As a result, it is anticipated that the City will be facing competition for landfill disposal capacity as other cities consume their landfill space and resolve to find other disposal locations. Ms. Valeria Niles made inquiry about waste-to-energy (WTE) options. It was explained that currently one WTE facility operates in the state and is located in New Hanover County. This community decided to develop the WTE unit and preserve their lands for tourism and recreation. The cost associated with the operations of the WTE plant exceeds the cost of landfilling. The City of Greensboro's waste volume makes the development of a WTE plant in our community cost prohibitive. Ms. Niles referenced the St. Lucia, Florida WTE operation being developed. It was explained that the cost of land for landfill development makes the WTE development in Florida an equitable

solution for managing waste. North Carolina is currently considered a rural area, the cost of land is still relatively inexpensive; thus, landfill development remains relatively inexpensive in comparison to other alternatives. Other communities that have WTE or alternative waste disposal methods have landfill costs exceeding \$60.00 per ton; North Carolina's average is \$34.00 - \$38.00 per ton. If WTE is developed within this area, other communities will need to participate in order to acquire the volume necessary to make the operation profitable. Currently, the cities of Winston-Salem and High Point have secured land to manage their waste generation for 15-20± years. Reverend Samuel Connor asked if the landfill were to reopen, what are the risks to the closest residents? It was explained that the landfill currently conducts groundwater monitoring and has a landfill gas collection in-placed to manage emissions. Both of these operations are required by the state for environmental protection. An audience member made inquiry regarding the arrangements made with Cone Mills for the landfill gas. It was explained that Cone Mills receives this gas at no charge. Inquiry was made with respect to the City's arrangements and the reasoning that allowed Cone Mills to receive the landfill gas for free. It was explained that department staff were not involved with the agreement and Councilmember Wells is not present to provide the background on the City Council's actions. Ms. Valerie Niles stated that Cone Mills received the landfill gas as an incentive in order to remain open and keep jobs; but instead, they have laid-off employees. Ms. Niles asked whether the City could sell the landfill gas? The response provided stated that there are other interested parties willing to purchase the gas and acquire the system; however, all of the currently generated landfill gas is provided to Cone Mills; there are no other sources of landfill gas available to sell.

The City of Greensboro reported that a permit submission will be made in order to continue the construction and demolition landfill operations above the formerly utilized sanitary landfill (Phase II). New construction and demolition regulations were adopted and facilities wishing to continue their operations are required to re-submit an application and request permit renewal. The application submissions are due on June 30, 2008. The City is proposing to continue the construction and demolition disposal activities at the White Street landfill. The materials being disposed will originate from construction and demolition sites and include brick, shingles, concrete, wood, and sheetrock, etc. Waste is screened at the entrance gate and at the lift. The City does not accept asbestos containing material nor does the City recycle this waste stream. Currently, the generators of construction and demolition waste remove any marketable recyclable materials prior to delivery to the landfill.

The City of Greensboro discussed future development plans for the landfill. The proposed Phase IV region was identified on the aerial photograph. The City is proposing to acquire two additional tracts of land prior to the development of this portion of the landfill. Mr. Harold Fields asked whether the City would purchase land located south of Huffine Mill Road for future landfill development. It was explained that the City has no plans to expand the boundaries in this direction. If this option were to be considered, it would be an expensive proposition based upon the number of homes required to be purchased in order to satisfy the regulatory buffer requirements. Mr. Harold Fields further expressed concern regarding the lack of maintenance along the roadway. It was explained that the City of Greensboro does not maintain the right-of-ways on state maintained roadways. Mr. David Bost provided his contact information to Mr. Fields in order to assist in addressing this concern.

The meeting concluded at 8:10 p.m.

Public Meeting to Review Groundwater Findings and Corrective Measures for the White Street MSW Landfill
 December 20, 2007
 Peeler Recreation Center
 6:30 p.m.

Name <i>E. Paul M. Claunch</i>	Do you want a copy of the presentation?	
Address <i>15 Clitk Court</i>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
City <i>Greensboro</i>	State <i>N.C.</i>	Zip Code <i>27405-5546</i>

Name <i>Chris Marriott</i>	Do you want a copy of the presentation?	
Address <i>2503 White St.</i>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
City <i>Greensboro</i>	State <i>NC</i>	Zip Code <i>27405</i>

Name <i>Cornel D. Ware (SOME)</i>	Do you want a copy of the presentation?	
Address <i>378 Old Battleground Rd</i>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
City <i>Greensboro</i>	State <i>NC</i>	Zip Code <i>27410</i>

Name <i>Ed Henriquez (SOME)</i>	Do you want a copy of the presentation?	
Address <i>3718 Old Battleground Rd</i>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
City <i>Greensboro</i>	State <i>NC</i>	Zip Code <i>27410</i>

Name <i>Greg Thomas</i>	Do you want a copy of the presentation?	
Address <i>105 Truitt St.</i>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
City <i>Greensboro</i>	State <i>NC</i>	Zip Code <i>27455</i>

Public Meeting to Review Groundwater Findings and Corrective Measures for the White Street MSW Landfill
 December 20, 2007
 Peeler Recreation Center
 6:30 p.m.

Name	Tim Kew		Do you want a copy
Address	4302 Lord Jeff Dr.		of the presentation?
City	Greensboro	State	Yes <input type="checkbox"/> No <input type="checkbox"/>
		Zip Code	27405

Name	Goldie F. Wells		Do you want a copy
Address	4203 Belfield Drive		of the presentation?
City	Greensboro	State	Yes <input type="checkbox"/> No <input type="checkbox"/>
		Zip Code	27405

Name	Harold C. Fields		Do you want a copy
Address	1903 Belfield Dr.		of the presentation?
City	Greensboro	State	Yes <input type="checkbox"/> No <input type="checkbox"/>
		Zip Code	27405

Name	Samuel Vincent		Do you want a copy
Address	14115 Wanside Dr		of the presentation?
City	Greensboro	State	Yes <input type="checkbox"/> No <input type="checkbox"/>
		Zip Code	27405

Name	James H. Lippner		Do you want a copy
Address	1918 Belden St		of the presentation?
City	Greensboro	State	Yes <input type="checkbox"/> No <input type="checkbox"/>
		Zip Code	27405

Public Meeting to Review Groundwater Findings and Corrective Measures for the White Street MSW Landfill
 December 20, 2007
 Peeler Recreation Center
 6:30 p.m.

Name	Wesley Mc GURB		Do you want a copy of the presentation?
Address	4300/ Belfield DR		Yes <input type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	State NC	Zip Code 27405

Name	ROBERT DAVIS		Do you want a copy of the presentation?
Address	1407 LORD FOLEY DR		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	State NC	Zip Code 27405

Name	Carolyn S Allen		Do you want a copy of the presentation?
Address	2611 David Caldwell Dr		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	State NC	Zip Code 27408

Name	JAMES HAYS		Do you want a copy of the presentation?
Address	102-A WOODWINDS IND. CRT		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
City	CARY	State NC	Zip Code 27511

Name	Rachel Kirkman, P.E. Collier Associates Inc.		Do you want a copy of the presentation?
Address	4900 Koger Boulevard Suite 140		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
City	Greensboro	State NC	Zip Code 27402

Public Meeting to Review Groundwater Findings and Corrective Measures for the White Street MSW Landfill
 December 20, 2007
 Peeler Recreation Center
 6:30 p.m.

Name	Lila Planch	Do you want a copy of the presentation?
Address	1707 Woodburn Rd	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code
State	NC	27405

Name	Belinda Sellers	Do you want a copy of the presentation?
Address	3901 Hope Valley Lane	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code
State	NC	27401

Name	Sibyl M. Hicks	Do you want a copy of the presentation?
Address	1700 Gordon St	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code
State	NC	27405

Name	Billie Jean White	Do you want a copy of the presentation?
Address	1905 Rayston Dr	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code
State	NC	27405

Name	Paul Hickerson	Do you want a copy of the presentation?
Address	4118 Ashmore Dr	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code
State	NC	27405

Public Meeting to Review Groundwater Findings and Corrective Measures for the White Street MSW Landfill
 December 20, 2007
 Peeler Recreation Center
 6:30 p.m.

Name	Eileen Kink		Do you want a copy of the presentation?
Address	404 - Franklin Blvd		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Boro	State NC	Zip Code 27401

Name	Dolores McEachern		Do you want a copy of the presentation?
Address	2425 Burnwood Rd		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro, N.C.	State NC	Zip Code 27405

Name	Ralph Johnson		Do you want a copy of the presentation?
Address	2402 Bothwell St		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	State NC	Zip Code 27401

Name	Melde Rutledge		Do you want a copy of the presentation?
Address	400 Summit Ave		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
City	Greensboro	State NC	Zip Code 27401

Name	Jonah Smith, Sr.		Do you want a copy of the presentation?
Address	1605 Woodbridge Ave.		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	State N.C.	Zip Code 27405

Public Meeting to Review Groundwater Findings and Corrective Measures for the White Street MSW Landfill
 December 20, 2007
 Peeler Recreation Center
 6:30 p.m.

Name	DAWSBY	Do you want a copy of the presentation?
Address	1420 Larchmont Drive	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405
	State N.C.	

Name	Paris Johnson	Do you want a copy of the presentation?
Address	1908 Weiland Dr	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405
	State N.C.	

Name	Zenobia Dawsby	Do you want a copy of the presentation?
Address	4218 Kildare Dr	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405
	State NC	

Name	CYNTHIA PINNEX	Do you want a copy of the presentation?
Address	1302 HAWKTHILL DR	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	G' BORO	Zip Code 27405
	State N.C.	

Name	Jeryl K. Covington	Do you want a copy of the presentation?
Address	City of GSO Box 3136	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
City	GSO	Zip Code 27401-3136
	State NC	

Groundwater Findings and Corrective Measures for the White Street Landfill

Public Meeting Located at:

City of Greensboro
Peeler Recreation Facility
1300 Sykes Avenue
December 20, 2007 at 6:30 PM

1



About Us

- S&ME is an award-winning firm established in 1973
- We have 900 professionals and support staff in seven southeastern states and 22 offices.
- We have 50 professionals and support staff in Greensboro



2



Why Are We Here Tonight?

The NCDENR has a vision of a healthy and
thriving NES. The NES is a natural resource
that we are here to protect.

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Phase II Background

Phase II was a continuation of the work
that was done in Phase I. It was a continuation
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4



Helpful Groundwater Basics

What is the source of groundwater?

5



Hydrologic Cycle

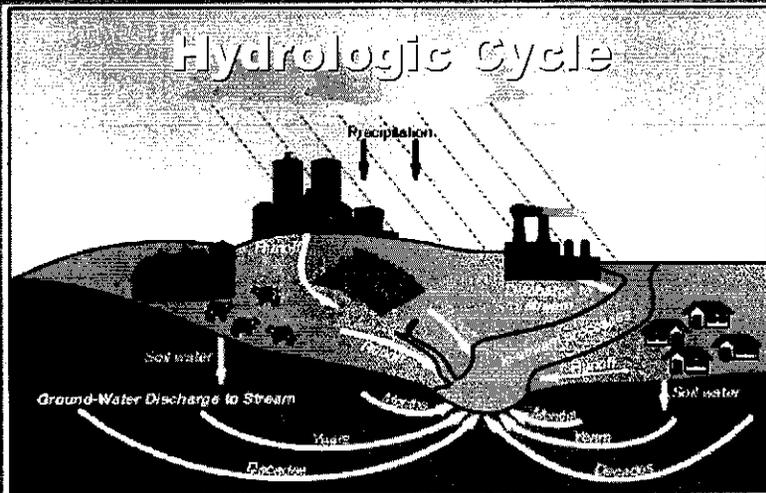


Figure 2. Nutrient movement in the ground-water flow system.

6



Groundwater Flow

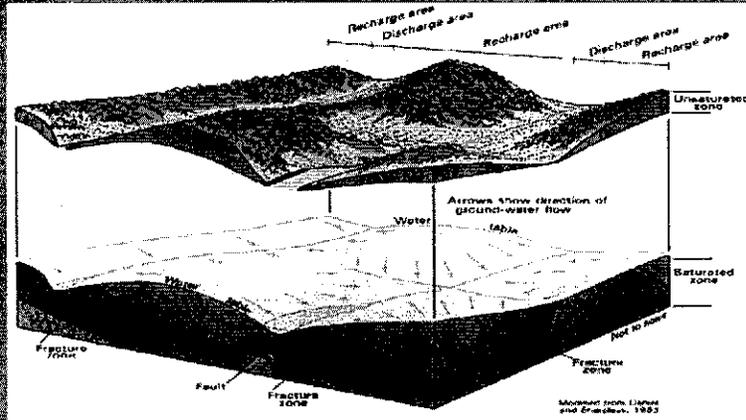


Figure 92. Ground water percolates downward through the unsaturated zone (shown lifted up to the water table), then moves laterally to discharge points. In the bedrock, the water is channeled through fractures.



Phase II Compliance Monitoring

Groundwater Monitoring
1991

Groundwater Monitoring
2000

Groundwater Monitoring
2001

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2016

Groundwater Monitoring
2017

Groundwater Monitoring
2018

Groundwater Monitoring
2019

Groundwater Monitoring
2020



1998 Corrective Measures

- Phase II closed to Municipalities in 1997
- Phase II of Landfill in 2000
- Landfill closed in 1998

9



Nature & Extent Study (1992)

10



Constituents of Concern

Groundwater constituents of concern include:

- Organic Compounds
- Inorganic Compounds

Organic Compounds include:

Inorganic Compounds include:



Nature & Extent Study Findings

The study findings indicate that groundwater quality is generally good, with most constituents within acceptable limits. However, there are some areas of concern, particularly in the vicinity of the industrial site. The study also identified several potential sources of contamination, including the industrial site and nearby agricultural activities. The findings suggest that further monitoring and investigation are needed to better understand the extent and nature of the contamination.



Assessment of Corrective Measures

- The assessment of corrective measures should include:
 - the identification of the use of the measure
 - the identification of the measure with the practice
 - the identification of the measure with the practice
 - the identification of the measure with the practice
 - the identification of the measure with the practice

13



Potential Corrective Measure

Overview

14



Potential Corrective Measure	Overview
[Content obscured by heavy noise]	

15



Selection of Corrective Measure(s)

[Content obscured by heavy noise]

16



Comments?

If you have any comments or questions, please contact the project manager at (703) 261-1000. Comments are welcome and encouraged.

For more information, visit the project website at www.nw.com. The website contains information about the project, including a list of project partners and a list of project goals. The website also contains information about the project's progress and a list of project milestones.



Public Meeting
City of Greensboro - White Street Landfill
North Carolina Department of Environment and Natural Resources
Division of Waste Management
June 9, 2008
Peeler Recreation Center

Name	Phillip WARD	Do you want a copy of the presentation?
Address	1206 NEAL TOWN ROAD	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	GREENSBORO State NC	Zip Code 27405

Name	Virginia Wade	Do you want a copy of the presentation?
Address	1206 Nealtown Rd	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro State N.C.	Zip Code 27405

Name	Robert S. Neal	Do you want a copy of the presentation?
Address	1202 Nealtown Rd.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro State N.C.	Zip Code 27405

Name	HAROLD C. FIELD	Do you want a copy of the presentation?
Address	1903 BELDEN DR.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	GREENSBORO State N.C.	Zip Code 27405

Name	JAMES E. BRAME	Do you want a copy of the presentation?
Address	1614 WOODBRIAR AVE.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	GREENSBORO State N.C.	Zip Code 27405

Public Meeting
City of Greensboro - White Street Landfill
North Carolina Department of Environment and Natural Resources
Division of Waste Management
June 9, 2008
Peeler Recreation Center

Name	<i>Shirley Donnell</i>	Do you want a copy
Address	<i>1711 Huggins Mill Rd</i>	of the presentation?
City	<i>Greensboro</i>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
	State <i>NC</i>	
	Zip Code <i>27405</i>	

Name		Do you want a copy
Address		of the presentation?
City		Yes <input type="checkbox"/> No <input type="checkbox"/>
	State	
	Zip Code	

Name		Do you want a copy
Address		of the presentation?
City		Yes <input type="checkbox"/> No <input type="checkbox"/>
	State	
	Zip Code	

Name		Do you want a copy
Address		of the presentation?
City		Yes <input type="checkbox"/> No <input type="checkbox"/>
	State	
	Zip Code	

Name		Do you want a copy
Address		of the presentation?
City		Yes <input type="checkbox"/> No <input type="checkbox"/>
	State	
	Zip Code	

Public Meeting
City of Greensboro - White Street Landfill
North Carolina Department of Environment and Natural Resources
Division of Waste Management
June 9, 2008
Peeler Recreation Center

Name	REV Samuel Connor	Do you want a copy of the presentation?
Address	2907 Peninsula Dr.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Jamestown	Zip Code 27282

Name	Charlie & M Skoy	Do you want a copy of the presentation?
Address	1400 Woodbriar Ave	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405

Name	Tim Kee	Do you want a copy of the presentation?
Address	4302 Cord Jeff Dr.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405

Name	Bob Davis	Do you want a copy of the presentation?
Address	1407 Lord Foxley Dr	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405

Name	Dorothea Carter	Do you want a copy of the presentation?
Address	1405 Lord Foxley Drive	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	Zip Code 27405

Public Meeting
City of Greensboro - White Street Landfill
North Carolina Department of Environment and Natural Resources
Division of Waste Management
June 9, 2008
Peeler Recreation Center

Name	Eric Bishop (News 14 Carolina)		Do you want a copy of the presentation?
Address			Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
City	GSO	State	NC
		Zip Code	

Name	Mickie Ann Bishop		Do you want a copy of the presentation?
Address	2002 E. 11th St.		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
City	Greensboro	State	NC
		Zip Code	27405

Name			Do you want a copy of the presentation?
Address			Yes <input type="checkbox"/> No <input type="checkbox"/>
City		State	
		Zip Code	

Name			Do you want a copy of the presentation?
Address			Yes <input type="checkbox"/> No <input type="checkbox"/>
City		State	
		Zip Code	

Name			Do you want a copy of the presentation?
Address			Yes <input type="checkbox"/> No <input type="checkbox"/>
City		State	
		Zip Code	

Public Meeting
City of Greensboro - White Street Landfill
North Carolina Department of Environment and Natural Resources
Division of Waste Management
June 9, 2008
Peeler Recreation Center

Name	Lottie Neal		Do you want a copy
Address	1202 Newtown Rd.		of the presentation?
City	Greensboro	State NC	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
		Zip Code 27405	

Name	MARIKAY FEUZUGITER		Do you want a copy
Address	% 2321 Randleman Rd		of the presentation?
City	650	State NC	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
		Zip Code 27406	

Name	Ralph Johnson		Do you want a copy
Address	2402 Bottwell St		of the presentation?
City	Greensboro	State NC	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
		Zip Code 27401	

Name	C. Moore Carter		Do you want a copy
Address	1311 Old Moore Drive		of the presentation?
City	W.boro	State N.C.	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
		Zip Code 27401	

Name	ANN WALLINGTON		Do you want a copy
Address	2312 Forest Pk		of the presentation?
City	Greensboro	State NC	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
		Zip Code 27406	

2. Document Adopting the Remedy



City of Greensboro
North Carolina

June 10, 2008

Ms. Jaclynne Drummond
Hydrogeologist – Environmental Compliance
NCDENR – Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699

Subject: Selection of Remedies for the White Street Landfill Phase II
Permit No. 41-03

Dear Ms. Drummond:

S&ME, Inc. prepared a Nature and Extent Study (NES) dated August 28, 2007 and an Assessment of Corrective Measures (ACM) dated August 31, 2007 for Phase II of the White Street Landfill. The ACM was later amended by letter dated March 27, 2008. In accordance with Title 15A NCAC 13B .1635(d), the City of Greensboro held two public meetings with interested and affected parties on December 20, 2007 and June 9, 2008 to discuss the results of the corrective measures assessment.

The potential corrective measures that were identified in the ACM include in situ air sparging / soil vapor extraction, subterranean physical barriers, in situ enhanced bioremediation, groundwater pump and treatment, monitored natural attenuation, phytoremediation, and maintaining a consistent contour with the pre-1988 waste area.

Based on the low risk to human health and the environment and the comments received from the public hearings, the City of Greensboro proposes to select monitored natural attenuation (MNA), phytoremediation, and maintaining a consistent contour within the pre-1988 waste unit (e.g. Phase II) for the selection of remedies for contamination in shallow groundwater. The City of Greensboro has placed a regulatory cap over all MSW which minimizes rain water infiltration and operates an active landfill gas extraction system which typically reduces groundwater contaminants over time. Maintaining consistent contours will further reduce vertical percolation of rain water into the waste mass and minimize the generation of leachate from the landfill.

If the City of Greensboro discovers during continued monitoring activities that MNA and phytoremediation are no longer predicted to reduce the constituents of concern in shallow groundwater to below the 2L standards, then the backup selection of remedy will be used to supplement or replace MNA with groundwater pumping and discharge to the publicly owned treatment works. The effectiveness of MNA will be determined through regular

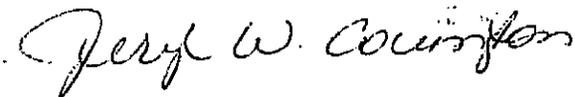
Ms. Jaclynne Drummond
June 10, 2008
Page 2

monitoring of the concentrations of the constituents of concern plus selected indicator parameters which are known to be indicative that MNA is successfully reducing the levels of the constituents of concern discussed in the NES and ACM reports. The MNA indicator parameters, sampling schedule, and timeframe for achieving the 2L remedial goals will be discussed in detail in the upcoming Corrective Action Plan (CAP).

The proposed selection of remedies will be protective of human health and the environment, will return the monitored constituents to below 2L standard levels, and will control the further release of Appendix II constituents from Phase II. Pending the approval of this selection of remedies by NCDENR, the City of Greensboro will submit a corrective action plan (CAP) prior to July 1, 2008.

We appreciate your assistance in this matter. If you should have any questions, please do not hesitate to contact me at (336) 373-2787.

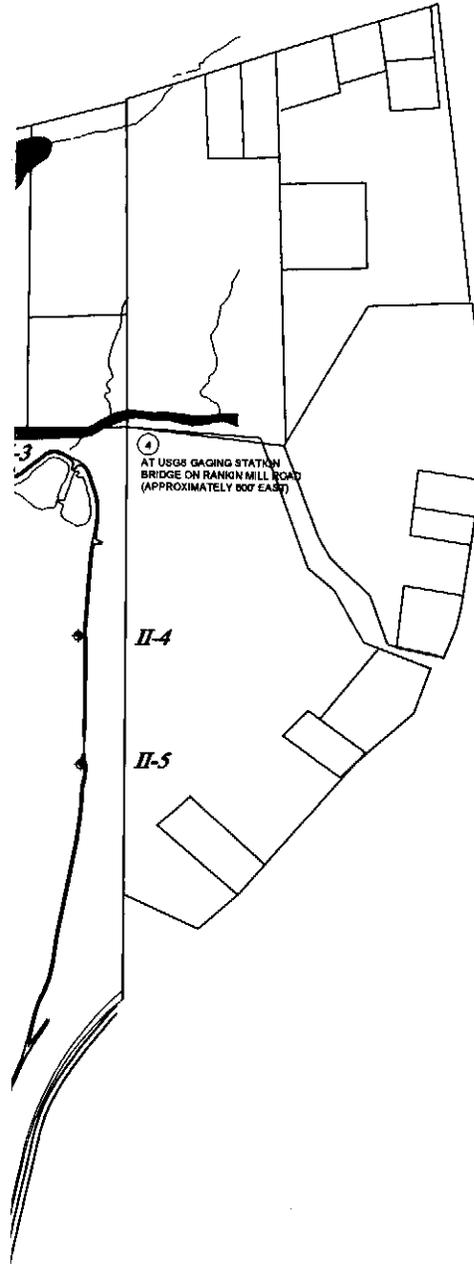
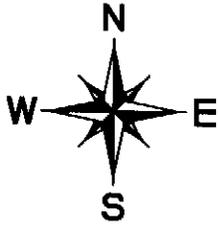
Sincerely,



Jeryl W. Covington, P.E.
Director, Environmental Services Department

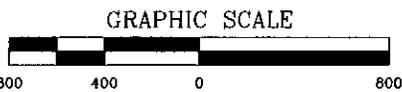
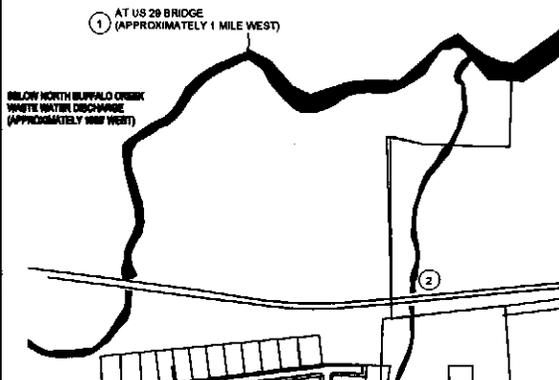
cc: S&ME Consultants, Inc.

3. Site Map



LEGEND:

- ⊕ MONITORING WELL LOCATION
- ▨ OFF-SITE PROPERTY OWNED BY THE CITY OF GREENSBORO
- ⊕ AUGER REFUSAL AT 8.5 FT. TO 10 FT. BELOW GRADE



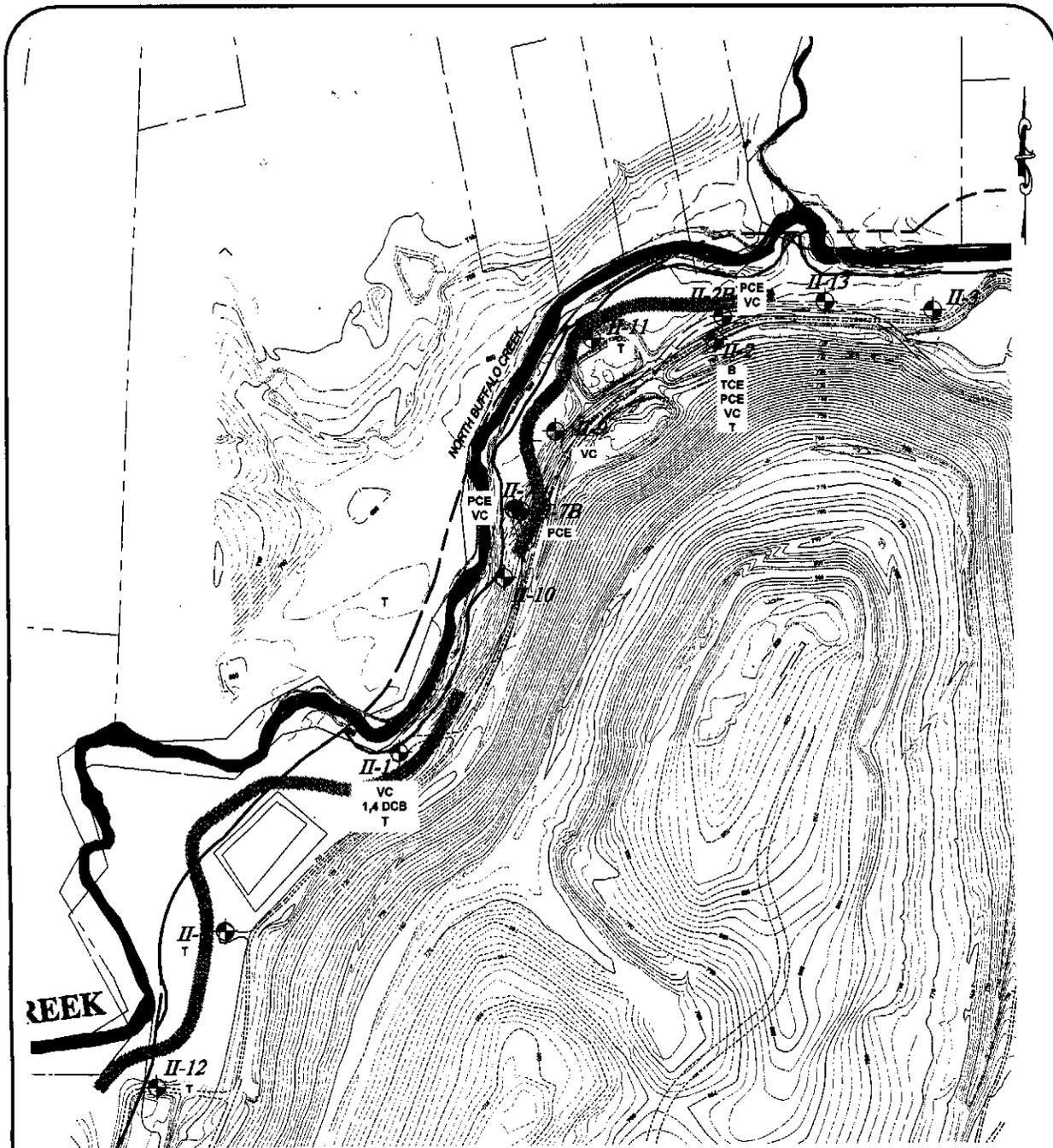
**DETAILED SITE BASE MAP
PHASE II**

**WHITE STREET LANDFILL
GREENSBORO, NORTH CAROLINA**

SCALE: AS SHOWN	DRAWN BY: DSB/RDM	CHECKED BY: CDW
JOB NO. 1584-98-081	DATE: JUNE 2008	FIGURE NO. 2

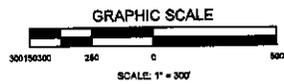


4. Draft Conceptual Schematics



CONSTITUENT ACRONYMS LIST	
ACRONYM	CONSTITUENT
B	BENZENE
TCE	TRICHLOROETHENE
PCE	TETRACHLOROETHENE
VC	VINYL CHLORIDE
1,4 DCB	1,4 DICHLOROBENZENE
T	THALLIUM

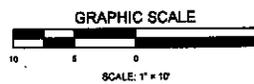
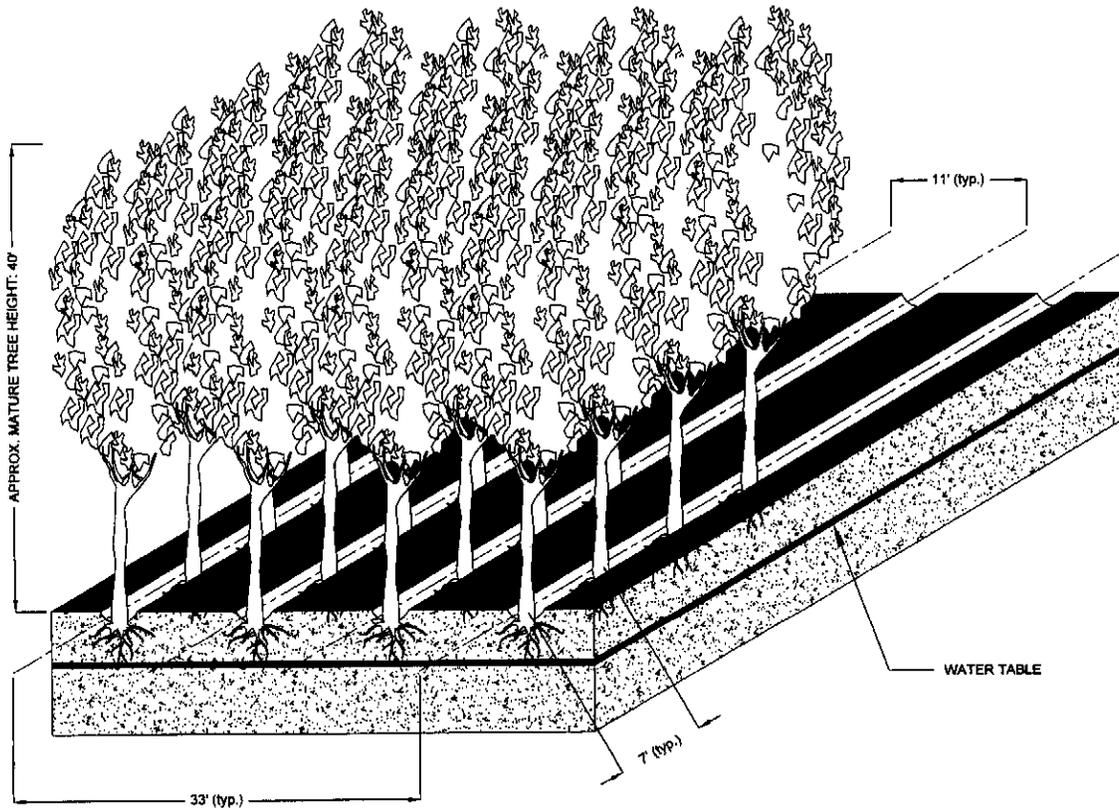
- LEGEND**
-  - PROPOSED PHYTOREMEDIATION BED
 -  - GROUNDWATER MONITORING WELL
 -  - CONSTITUENTS DETECTED IN THE DESIGNATED MONITORING WELL
 -  - FORMER COMPLIANCE BOUNDARY



PROPOSED PHYTOREMEDIATION AREAS
 WHITE STREET LANDFILL
 GREENSBORO, NORTH CAROLINA

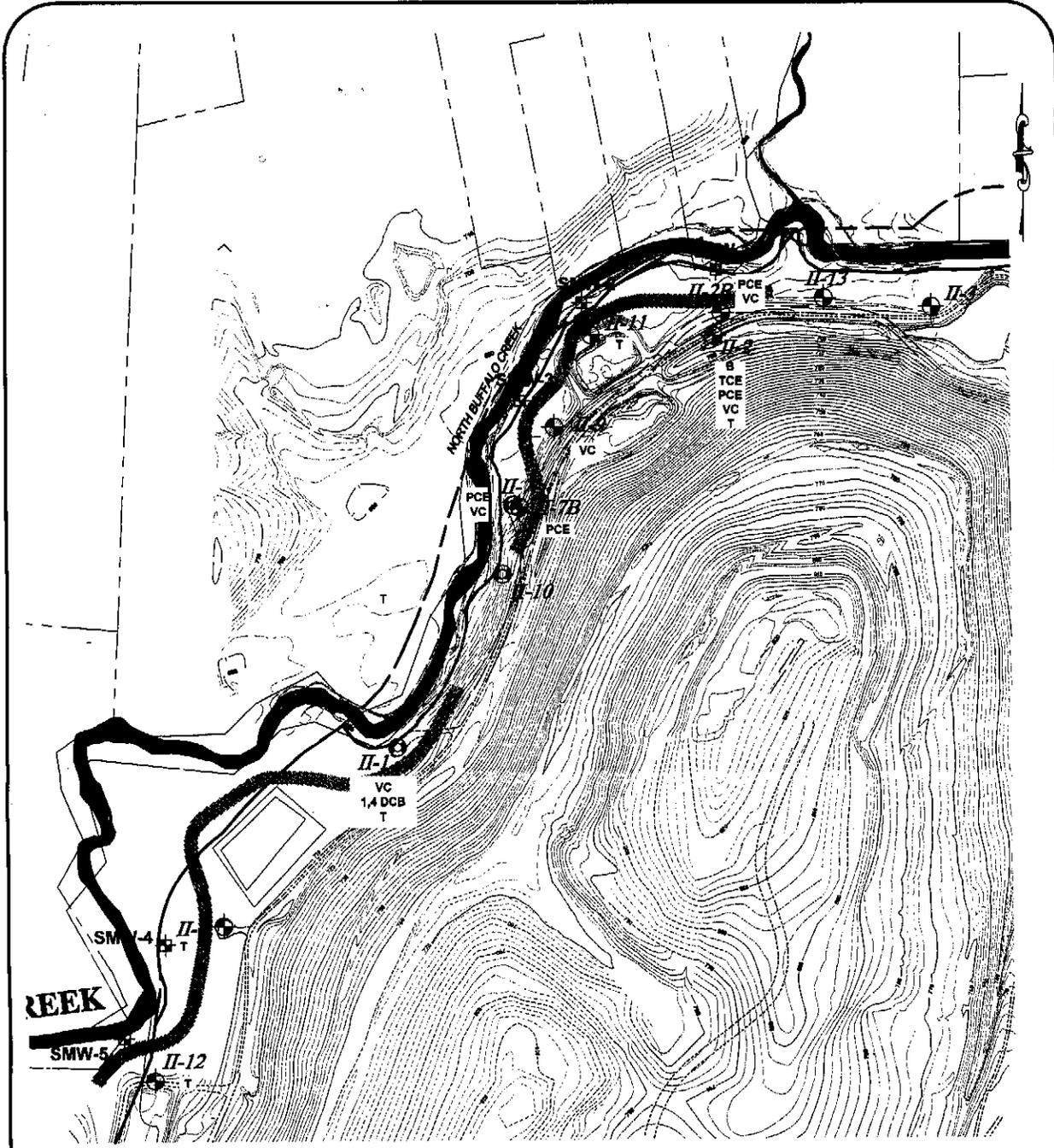


SCALE: AS SHOWN	DRAWN BY: RDM	CHECKED BY: GOW
JOB NO. 1584-98-081	DATE: MAY 2008	FIGURE NO. 7



PROPOSED PHYTOREMEDIATION DESIGN SCHEMATIC
 WHITE STREET LANDFILL
 GREENSBORO, NORTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: RDM	CHECKED BY: CDW
JOB NO. 1584-06-081	DATE: JUNE 2008	FIGURE NO. 8



CONSTITUENT ACRONYMS LIST	
ACRONYM	CONSTITUENT
B	BENZENE
TCE	TRICHLOROETHENE
PCE	TETRACHLOROETHENE
VC	VINYL CHLORIDE
1,4 DCB	1,4 DICHLOROBENZENE
T	THALLIUM

- LEGEND**
- PROPOSED SENTINEL WELL
 - EXISTING SENTINEL WELL
 - PROPOSED PHYTOREMEDIATION BED
 - GROUNDWATER MONITORING WELL
 - CONSTITUENTS DETECTED IN THE DESIGNATED MONITORING WELL
 - FORMER COMPLIANCE BOUNDARY
 - NEW COMPLIANCE BOUNDARY



PROPOSED SENTINEL WELL LOCATION MAP
 WHITE STREET LANDFILL
 GREENSBORO, NORTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: RDM	CHECKED BY: CDW
JOB NO. 1584-08-081	DATE: JUNE 2008	FIGURE NO. 9

5. List of Registration, Permits, and Approvals



North Carolina Department of Environment and Natural Resources

Dexter R. Matthews, Director

Division of Waste Management

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

September 20, 2007

Mr. Greg Dingman
City of Greensboro
Environmental Services Department
2503 White Street
Greensboro, NC 27405

Re: Assessment of Corrective Measures
White Street Landfill Phase II, Permit #41-03

Dear Mr. Dingman:

The Solid Waste Section has reviewed the *August 31, 2007 Phase II Nature and Extent Study Report and the August 31, 2007 Phase II Assessment of Corrective Measures Report* submitted on behalf of the City of Greensboro by S&ME, Inc. for the White Street Phase II Landfill. Contaminants in concentrations exceeding North Carolina Groundwater Standards have been detected at the White Street Phase II Landfill, and as a result, corrective action is required. The City of Greensboro should now proceed with the selection of a remedy to restore groundwater quality and effectively reduce the contamination at the site.

The remedy(ies) selected must meet the requirements listed in the North Carolina Solid Waste Management Rules and Laws 15A NCAC 13B Sections .1635 through .1636 and Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina 15A NCAC Subchapter 2L.

Solid Waste Management Rules governing the White Street Phase II Landfill require a public meeting to discuss the results of the assessment of corrective measures. The City of Greensboro then shall select a remedy(ies) in accordance of the requirements of 15A NCAC 13B .1636. After the Solid Waste Section has approved the selected remedy(ies), please submit the corrective measure(s) and contingencies in a Corrective Action Plan (CAP) for approval by the Solid Waste Section. Implementation of the approved corrective measure(s) shall then take place in accordance with 15A NCAC 13B .1637.

The intention of this letter is to clarify what has been accomplished thus far and what will be needed in the near future to complete this stage of the environmental investigation and the effective remediation of this site. Please call me at (919) 508-8500 if you have any questions or concerns regarding this letter.

Sincerely,

Jaclynne Drummond
Hydrogeologist
Environmental Compliance
Solid Waste Section

cc: **Connel Ware, S&ME**
Ed Henriques, S&ME
Mark Poindexter, Field Operations Supervisor
Deb Aja, Western District Supervisor
Hugh Jernigan, Waste Management Specialist
Solid Waste Central Files

6. C&D Permit

ATTACHMENT 1

Part A Permitting History

Permit Type	Date Issued
Original Issue Date (C&D over MSW Unit-Stage I)	January 7, 1998
Modification No. 1 (C&D over MSW Unit-Stage II)	October 7, 1998
Modification No. 2 (C&D over MSW Unit-Stage III)	April 15, 2000
Modification No. 3 (C&D over MSW Unit-Extension)	May 25, 2006

Part B List of Documents for the Approved Plan

1. Site and Construction Transition Plan modification application for the City of Greensboro White Street Landfill, Permit #41-03. Document titled "*City of Greensboro Environmental Services Department Solid Waste Management Division White Street Landfill Construction/Demolition Permit Application*" for the City of Greensboro dated 16 December 1997.
2. Partial closure certification letter dated 5 January 1998 from Olver, Inc. for Stage I of the Phase II area.
3. Certification Drawing from Olver Inc. and the City of Greensboro. January 7, 1998.
4. Partial closure certification from Olver, Inc. for the Stage II Area of Phase II. July 23, 1998.
5. Document titled "White Street Sanitary Landfill Phase II Closure" submitted by Olver, Inc., dated March 1999.
6. Document titled "*City of Greensboro Environmental Services Department Solid Waste Management Division White Street Landfill Construction/Demolition Permit Application*" for the City of Greensboro dated 27 September 2002 requesting an extension to operate the C&D over MSW Unit in the Phase II area of the White Street Landfill.
7. Letter dated October 3, 2003 from the City of Greensboro Environmental Services Department providing an update on the existing conditions of the C&D over MSW Unit and submitting adjusted proposed final fill contours through 2009 (Drawings CD-79, CD-80, and CD-81 included).
8. Letter dated February 22, 2005 from the City of Greensboro Environmental Services Department providing an update on the existing conditions of the C&D over MSW Unit and submitting proposed fill contours for an additional six years of capacity through 2011 by maximizing side slopes at 4:1 (Drawings CD-79A (1 of 7) to CD-85A (7of 7) included).

SOLID WASTE PERMIT
Permit to Operate
City of Greensboro White Street Landfill
Construction and Demolition Debris Landfill Unit

CONDITIONS OF PERMIT:

GENERAL

1. When this property is sold, leased, conveyed or transferred, the deed or other instrument of transfer shall contain in the description section in no smaller type than that used in the body of the deed or instrument, a statement that the property has been used as a sanitary landfill.
2. This permit will be subject to review at any time. This **permit is valid only until 1 July 2008**. Renewal and/or modifications to the permit shall be required in accordance with rules in effect at the time of review.
3. The approved plan is described by Attachment 1, "List of Documents for Approved Plan". Where discrepancies may exist, the most recent submittal and the Conditions of Permit shall govern. Some components of the approved plan are reiterated in the Conditions of Permit.
4. This permit is not transferable.
5. In accordance with 15A NCAC 13B, Rule .1628, the Financial Assurance Instrument shall accurately reflect the revised closure/post-closure costs for this facility and be reviewed and updated annually
6. If during the operational life of the C&D unit it becomes apparent that the operations at the facility are impacting ground water adversely; the Solid Waste Section will require landfilling activities to cease and closure of the operating unit.

CONSTRUCTION AND OPERATION

7. This permit is for development of the White Street Landfill Construction and Demolition Unit over the Phase II MSW area, in accordance with the approved plan submitted by the City of Greensboro Environmental Services Department revised through 22 February 2005. Final proposed fill contours may not be achieved based on pending C&D Landfill Rules under review.
8. This solid waste management facility is permitted to receive the following waste types:
 - a. Land-clearing debris as defined in G.S. 130A-290, specifically, solid waste which is generated solely from land-clearing activities, such as stumps, trees, etc.;
 - b. Inert debris defined as solid waste which consists solely of material that is virtually inert, such as brick, concrete, rock and clean soil; and

- c. Asphalt in accordance with G.S. 130-294(m).
- d. Construction and demolition debris defined as solid waste resulting solely from construction, remodeling, repair or demolition operations on pavement, buildings, or other structures.
- e. C&D like waste that are similar to wastes typically found in the land clearing-inert debris and C&D waste streams consisting of wastes at this time: roofing shingle waste from the manufacturer, waste building materials from mobile home/modular home manufacturer and wooden pallets. Other wastes **MAY** be approved by the Division upon receipt of a written request with the specific waste type, how its generated, how much is generated; along with any additional information the Division may request to render a final decision on the disposal options for the waste.

Yard trash as defined in G.S. 130A-290, shall not be disposed in the landfill area. However, yard trash, along with land-clearing debris, may be accepted for processing in the Yard Waste Composting Area.

- 9. All sedimentation/erosion control activities will be conducted in accordance with the Sedimentation Control Act codified at 15 NCAC 4. Native vegetation shall be established on the completed landfill.
- 10. The following requirements shall be met prior to C&D operations at this facility:
 - a. Site preparation and or closure of that area of the MSW unit shall be in accordance with the construction closure plans.
 - b. Signs shall be posted at the facility in accordance with the Access and Safety Requirements under Operation Condition No. 11 listed below and permanent boundary markers shall be installed to identify the limits of waste placement.
 - c. The existing groundwater monitoring system will be utilized for ground water monitoring for the C&D unit(s) in accordance with .1630 thru .1633. Assessment monitoring shall continue in accordance with Solid Waste Management Rules and any additional requirements set forth by Solid Waste Section Hydrogeologist.
 - d. Closure certification and documentation shall be submitted to the Solid Waste Section and approved by the Section prior to receiving C&D waste in the proposed unit(s). Partial closure of units will be accepted with certification and documentation of partial unit closure submitted for approval. Seeding and stabilization of cover soils shall be performed prior to receiving C&D waste.
 - e. A pre-operational meeting shall be held with the Solid Waste Section prior to waste placement.
- 11. Operation of the C&D landfill units shall conform to the operating procedures described in the approved plan, in accordance with Section .1626 of the Solid Waste Management Rules, and in accordance with the following requirements:

Waste Acceptance and Disposal

- a. The facility shall accept only those solid wastes that it is permitted to receive.

- b. No municipal solid waste, hazardous waste, industrial waste, liquid waste or waste not characterized as LCID or C&D shall be accepted for disposal.
- c. The permittee shall implement a program at the facility for detecting and preventing the disposal wastes listed in item "b" of this section. The program shall include, at a minimum:
 - (i) Random inspections of incoming loads or other comparable procedures;
 - (ii) Records of any inspections;
 - (iii) Training of personnel to recognize hazardous and liquid wastes;
 - (iv) Development of a contingency plan to properly manage any identified wastes listed in item "b" of this section; the plan must address identification, removal, storage, and final disposition of waste.

Cover Material Requirements

- d. Operational soil cover of at least six inches shall be placed at least once per week or when the active area reaches 1/4 acre in size or more often as necessitated by the nature of the waste so as to prevent the site from becoming a visual nuisance and to prevent fire, windblown materials, vectors or water infiltration.
- e. Areas that will not have additional waste placed on them for 12 months or more, but where final termination of operations has not occurred, shall be covered with a minimum of one foot of soil cover.
- f. After final termination of disposal operations at the site or major part thereof, or upon revocation of a permit, the fill areas shall be covered with a cap in accordance with .1627(C) or in accordance with the rules at the time of closure.

Access and Safety

- g. The facility shall be adequately secured by means of gates, chains, berms, fences, or other security measures approved by the DWM to prevent unauthorized entry.
- h. An attendant shall be on duty at the site at all times while it is open for public use to ensure compliance with operational requirements.
- i. The access road to the site shall be of all-weather construction and maintained in good condition.
- j. Dust control measures shall be implemented when necessary.
- k. Signs providing information on dumping procedures, the hours of operation, the permit number, and other pertinent information shall be posted at the site entrance.
- l. Signs shall be posted stating that no MSW, hazardous waste or liquid waste can be received.
- m. Traffic signs or markers shall be provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.
- n. The removal of solid waste from the facility is prohibited unless the owner/operator approves and the removal is not performed on the working face.
- o. Barrels and drums shall not be disposed of unless they are empty and perforated sufficiently to ensure that no liquid or hazardous waste is contained therein, except fiber drums containing asbestos.
- p. Open burning of solid waste is prohibited.

- q. The concentration of explosive gases generated at the facility shall not exceed:
 - i. twenty-five percent of the limit for gases in site structures (excluding gas control or recovery system components; and
 - ii. the lower explosive limit for gases at the facility boundary.

Erosion and Sedimentation Control

- r. Adequate sedimentation and erosion control measures shall be practiced to prevent silt from leaving the site.
- s. Adequate sedimentation and erosion control measures shall be practiced to prevent excessive on-site erosion.
- t. Provisions for a vegetative ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days upon completion of any phase of C&D landfill development.

Drainage Control and Water Protection Requirements

- u. Surface water shall be diverted from the operational area.
 - v. Surface water shall not be impounded over or in waste.
 - w. A separation distance of at least four feet shall be maintained between waste and the ground-water table.
 - x. Solid waste shall not be disposed of in water.
 - y. Leachate shall be contained on site or properly treated prior to discharge. An NPDES permit may be required prior to discharge of leachate to surface waters.
12. All pertinent landfill operating personnel will receive training and supervision necessary to properly operate this C&D landfill unit in accordance with G.S. 130A-309.25 and addressed by memorandum dated 29 November 2000.
13. Ground water quality at this facility is subject to the classification and remedial action provisions referenced in Rule .1634 thru .1637 of 15A NCAC 13B.
14. A closure and post-closure plan must be submitted for approval at least 90 days prior to closure or partial closure of any landfill unit. The plan must include all steps and measures necessary to close and maintain the facility in accordance with all rules in effect at that time. At a minimum, the plan shall address the following:
- a. Design of a final cover system; using the cap requirements outlined in Rule .1627
 - b. Construction and maintenance/operation of the final cover system and erosion control structures;
 - c. Surface water, ground water, and explosive gas monitoring.

MONITORING AND REPORTING REQUIREMENTS

15. Ground-water monitoring wells and monitoring requirements for the C&D landfill units shall be in accordance with the monitoring system approved in the TRANSITION PLAN for the facility and these additional conditions:
 - a. Monitoring well design and construction shall conform to the specifications outlined in Attachment 2, "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities".
 - b. A geologist shall be in the field to supervise well installation, if necessary. The exact locations, screened intervals, and nesting of the wells shall be established after consultation with the SWS Hydrogeologist at the time of well installation for new monitoring wells.
 - c. For each new monitoring well constructed, a well completion record shall be submitted to DWM within 30 days upon completion.
 - d. Sampling equipment, procedures, and parameters shall conform to specifications outlined in the above-referenced guidance document, (Attachment 2), or the current guidelines established by DWM at the time of sampling and in accordance with the approved TRANSITION PLAN OR ASSESSMENT AND REMEDIATION PLAN.
 - e. In order to determine ground-water flow directions and rates, each monitoring well shall be surveyed, and hydraulic conductivity values and effective porosity values shall be established for the screened intervals for each new monitoring well.
 - f. The permittee shall sample the monitoring wells semi-annually or as directed by the DWM Hydrogeologist.
 - g. A readily accessible unobstructed path shall be initially cleared and maintained so that four-wheel drive vehicles may access the monitoring wells at all times.
16. The permittee shall maintain a record of all monitoring events and analytical data. Reports of the analytical data for each water quality monitoring sampling event shall be submitted to DWM in a timely manner.
17. The permittee shall maintain a record of the amount of solid waste received at the facility, compiled on a monthly basis. Scales shall be used to weigh the amount of waste received.
18. On or before 01 August (or an earlier date as requested by the Solid Waste Section), and each year thereafter, the permittee shall report the amount of waste received (in tons) at this facility and disposed of in the landfill to the Solid Waste Section (SWS) and to all counties from which waste was accepted, on forms prescribed by the Section. This report shall include the following information:
 - a. The reporting period shall be for the previous year, beginning 01 July and ending on 30 June;
 - b. The amount of waste received and landfilled in tons, compiled on a monthly basis, according to Condition 17 described above; and
 - c. Documentation that a copy of the report has been forwarded to all counties from which waste was accepted.
19. All records shall be maintained on-site and made available to the SWS upon request.

20. The Post-Closure plan approved in the TRANSITION PLAN shall be implemented and followed upon capping and closing the operating unit(s).

- End of Permit Conditions -

7. Financial Assurance Mechanism

City of Greensboro North Carolina

CITY OF GREENSBORO

LETTER FROM CHIEF FINANCIAL OFFICER

June 23, 2008

Ms. Amy Kadrie
Compliance Officer
North Carolina Department of Environment
and Natural Resources – Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

Dear Ms. Kadrie:

I am the chief financial officer of the City of Greensboro, North Carolina. This letter is in support of this unit of local government's use of the financial test to demonstrate financial assurance, as specified in 15A NCAC 13B Rule.1628 (e)(1)(F) for the fiscal year ending June 30, 2007, as amended for the addition of estimated closure and post-closure costs of the City's C & D Landfill, as well as certain estimated remediation costs associated with the Phase II Landfill groundwater.

This unit of local government is the owner and operator of the following facilities for which financial assurance for closure, post-closure, or corrective action is demonstrated through the financial test specified in 15A NCAC 13B Rule.1628 (e)(1)(F). The current closure and post-closure cost estimate covered by the test are shown for Permit No. 41-03, White Street Sanitary Landfill, Phase II, located at 2503 White Street, Greensboro, North Carolina, 27405. Of the 135 acres of the Phase II footprint, 101 are owned by Guilford County and leased to the City of Greensboro. We believe, however, that actually only 98 acres of the 101 acres owned by Guilford County is actually utilized as part of the landfill footprint area. The City completed final closure of Phase II during fiscal year 1998-99. Upon closure, the MSW Landfill was re-permitted for construction and demolition debris disposal above the regulatory closure cap, consisting of approximately 38 acres. As of June 30, 2007, the City of Greensboro had expended \$3,876,035 to complete the closure of Phase II MSW Landfill. Future closure costs of the C&D unit are estimated at \$4,559,000. It is estimated that total Phase II post-closure care costs,

including the C&D unit will amount to \$7,466,400 (\$248,880 per year) over 30 years following closure, of which \$2,090,383 has been paid as of June 30, 2007 for the MSW Landfill.

The current closure and post-closure cost estimate covered by the test are also shown for Phase III, Cells 1, 2 and 3, White Street Sanitary Landfill, located at 2503 White Street, Greensboro, North Carolina, 27405. The permit number for Phase III is 41-12. Phase III opened on January 1, 1998 and Cell 1 completed filling as of June 30, 2001. It is estimated that \$4,220,461 will be required in total for closure activities at the White Street Sanitary Landfill Phase III, Cell 1, and post-closure activities will require \$60,935 annually for 30 years after closure or \$1,828,060. The City's recorded liability for closure and post-closure care costs of Phase III Cell 1 as of June 30, 2007 was \$6,048,521 based on full capacity used.

Phase III, Cell 2 opened on July 1, 2001. It is estimated that \$2,194,640 will be required in total for closure activities at the White Street Sanitary Landfill Phase III, Cell 2, and post-closure activities will require \$31,686 annually for 30 years after closure or \$950,591. The City's recorded liability for closure and post-closure care costs of Phase III Cell 2 as of June 30, 2007 was \$3,145,231 based on 100% capacity used.

Phase III, Cell 3 began filling in 2005. It is estimated that \$2,194,640 will be required in total for closure activities at the White Street Sanitary Landfill Phase III, Cell 3, and post-closure activities will require \$31,686 annually for 30 years after closure or \$950,591. The City's recorded liability for closure and post-closure care costs of Phase III Cell 3 as of June 30, 2007 was \$1,383,117 based on 44% capacity used.

Inflation-adjusted costs are based on estimates provided by an independent engineering firm contracted by the City in FY2005 and were increased by 2.9% for FY 2007 along with the recommended inflation adjustments for each of the intervening years. Recent (2008) independent engineering cost estimates were provided for C&D closure and post-closure, as attached. Resources totaling \$1,745,962 to fund landfill expansion, closure and post-closure care costs have been set aside in a Solid Waste Capital Reserve Fund as of June 30, 2007. In addition, available operating funds totaled \$5,342,771 as of June 30, 2007 for solid waste collection and disposal purposes, including \$1,444,951 appropriated for FY 2008 activities.

Should any corrective actions be deemed necessary, a detailed written estimate of current costs associated with the required corrective action remedies shall be submitted to the Division of Solid Waste Management. Groundwater remediation costs, as provided to us by our groundwater consultants, S&ME, Inc., were included in the information submitted to NC DENR on August 31, 2007. See attached cost estimates and background information.

The current fiscal year of this unit of local government ended on June 30, 2007. The figures for the following items marked with an asterisk are derived from this local government's Annual Financial Information Report (AFIR) for the latest completed fiscal year ended June 30, 2007.

I hereby certify that the wording of this letter is identical to the wording specified in 15A NCAC 13B.1628 (e) (2) (G) as such rules were constituted on the date shown immediately below. I further certify the following: (1) that the unit of local government has not operated at a total

operation fund deficit equal to five percent or more of total annual revenue in either of the past two fiscal years, (2) that the unit of local government is not in default on any outstanding general obligation bonds or long-term obligations, and (3) does not have any outstanding general obligation bonds rated lower than Baa as issued by Moody's, BBB as issued by Standard & Poor's, BBB as issued by Fitch's, or 75 as issued by the Municipal Council.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. L. Lusk".

Richard L. Lusk
Finance Director
City of Greensboro
June 23, 2008

Attachments

CITY OF GREENSBORO, NORTH CAROLINA
BOND RATING INDICATOR OF FINANCIAL STRENGTH - FY 2007 (AS REVISED)

1. Sum of current closure and post-closure cost estimates:	
(a) Phase III, Cell 1 closure	\$4,220,461
(a) Phase III, Cell 1 post-closure	1,828,060
(a) Phase III, Cell 2 closure	2,194,640
(a) Phase III, Cell 2 post-closure	950,591
(a) Phase III, Cell 3 closure	2,194,640
(a) Phase III, Cell 3 post-closure	950,591
(b) Phase II, Closure (C&D)	4,559,000
(b) Phase II, Post-closure	5,376,017

Total closure and post-closure costs	\$22,274,000
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2. Current bond rating of most recent issuance and name of rating service:	Enterprise System Revenue	Certificates of	General Obligation
	<u>Bonds</u>	<u>Participation</u>	<u>Bonds</u>
Standard & Poor's Corp.	AAA	AA+	AAA
Moody's Investors Service	Aa2	Aa1	Aaa
Fitch	AA+	AA+	AAA

3. Date of issuance bond:	June, 2007	June, 2005	February, 2008
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4. Date of maturity bond:	June, 2029	June, 2009	February, 2028
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5. Assured environmental cost to demonstrate financial responsibility in the following amounts under Division rules:

MSWLF under 15A NCAC 13B Section.1600:	\$22,274,000
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Hazardous waste treatment, storage and disposal facilities under 15A NCAC 13B Rules .0009 and .0010:	\$0
------------------------------------------------------------------------------------------------------	-----

Petroleum underground storage tanks under 15A NCAC 2N Sections .0100 - 0800:	\$130,200
------------------------------------------------------------------------------	-----------

Underground injection Control System facilities under 15A NCAC 2D Section .0400 and 15A NCAC 2C Section .0200:	\$0
----------------------------------------------------------------------------------------------------------------	-----

PCB commercial storage facilities under 15A NCAC 20 Section .0100 and 15A NCAC 2N Section .0100:	\$0
--------------------------------------------------------------------------------------------------	-----

Other: Groundwater remediation Phase II	2,022,750
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Total assured environmental costs:	24,426,950
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6. Total Annual Revenue (AFIR Part 2):	(2007 Report)	\$447,942,298
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7. Is line 5 divided by line 6 less than or equal to 0.43? Yes/No?	Yes
--------------------------------------------------------------------	-----

- (a) Based on 2007 inflation adjusted cost estimates
- (b) Based on 2008 engineering cost estimates

From: Covington, Jeryl (Jeri)
Sent: Friday, June 20, 2008 10:32 AM
To: Lusk, Rick; Druga, Marlene
Subject: FW: FY 2008-09 CIP Phase II Groundwater.doc
Importance: High

I have a correction and some clarification for the highlighted estimate for the pump and treatment statement listed below. The groundwater pump and treat system will not operate for a 30-year term. We believe that improvements in the groundwater condition will occur before 30 years. According to the documentation provided by S&ME, the system should be in place for a period of 3-5 years. The correction in the estimate does not include the \$30,000.00 annual maintenance and upkeep costs.

The design, equipment, and construction costs will range from \$345,000.00 - \$552,000.00. The annual costs is \$30,000 for 3-5 years (\$90,000.00 - \$150,000.00); thus, the pump and treatment system will cost \$435,000.00 - \$702,000.00 (2008 dollars).

The cost estimate for the monitored natural attenuation will remain the same from \$669,000.00 to \$1,320,750.00 (2008 dollars).

The combined costs estimates corrective action system (MNA and pump and treatment) for which financial assurance must be made is: \$1,104,000.00 - \$2,022,750.00.

Again, I am hoping that the facility will not need to expend these costs for full implementation. We are continuing our monitoring and evaluation of the groundwater conditions.

Capital Improvement Project FY 2008-2009
White Street Landfill Phase II Groundwater Remediation - Regulatory Compliance

Capital Project Background

The White Street Phase II landfill currently operates under a municipal solid waste disposal permit number 41-03. Historically, the Phase II landfill was owned and operated as an unlined sanitary landfill by Guilford County. Ownership of the landfill was transferred to the City of Greensboro. Disposal activities continued until State regulations required the closure of all unlined sanitary landfills. The City complied with the closure requirements and the Phase II landfill was later approved to be re-permitted for construction and demolition debris disposal above the regulatory closure cap. Since 1998, the Phase II landfill has been utilized for construction and demolition disposal.

Modifications in the State's waste disposal regulations required an assessment of groundwater quality with respect to the established State's groundwater standards. Groundwater monitoring wells were installed around the perimeter of the Phase II landfill. Topographically, upgradient groundwater monitoring wells were additionally constructed to establish the background groundwater quality conditions prior to the groundwater intercepting in-situ waste.

Groundwater sampling events were completed on a semi-annual basis. Results of this analysis detected groundwater quality exceedances for the following compounds: tetrachloroethene, vinyl chloride, 2-butanone, and vanadium. These compounds were repeatedly documented above the established North Carolina Administrative Code 2L groundwater standard and the groundwater protection standards. However, the detection level of vanadium was determined to be influence by its presence of in-situ soils. Per 15A NCAC 13B.1635 of the North Carolina Department of Environment and Natural Resources (NC DENR) – Division of Waste Management, whenever it is documented that one or more constituents listed in the Appendix II groundwater standard has been detected at a statistically significant level exceeding the groundwater standards, an assessment of corrective actions measures must be completed. A corrective actions assessment evaluated potential remedies to control and remediate impacted groundwater. A Nature and Extent report documenting the groundwater exceedances was submitted to NC DENR in August 2007 and a public meeting was held in December 2007 to discuss the groundwater impact within Phase II of the landfill and possible remediation solutions.

The Environmental Services Department has contracted with environmental consultants to develop possible groundwater remediations solutions. To date, NC DENR has not approved any recommended options for this property. The Environmental Services Department will recommend the implementation of a conventional groundwater pump and treatment remediation system in conjunction with monitored natural attenuation.

The proposed groundwater pump and treatment system removes contaminants that are dissolved in groundwater for treatment at the surface. The system's implementation involves the installation of subsurface, extraction wells. The extracted groundwater is discharged to a publicly owned treatment works. The remediation timeframe for a pump

and treatment system is dependent on the placement of the extraction wells. The remediation goal at the compliance boundary may be achieved as soon as three to five years. The natural attenuation process reduces the mass concentration of the contaminate by physical, biological, and chemical degradation.

Capital Improvement Expenditure Estimates

Engineering estimates for the implementation of the groundwater remediation systems are as follows:

Pump and Treatment System with Discharge to POTW

Design costs:	
Pilot test.....	\$15,000 - \$20,000
Engineering costs.....	\$20,000 - \$40,000
Permitting costs.....	\$5,000 - \$10,000
Equipment Costs:	
Collection system, pumps, piping, control, etc.....	\$50,000 - \$100,000
Transfer piping and lift station.....	\$135,000 - \$160,000
Construction costs	
Extraction well and system installation.....	\$40,000 - \$80,000
Construction oversight and documentation.....	\$30,000 - \$60,000
Power supply to the site.....	\$5,000 - \$10,000
Contingencies.....	\$45,000 - \$72,000
Total estimated Implementation costs.....	\$345,000 - \$552,000

Annual maintenance and upkeep costs associated with the pump and treatment system is approximately \$30,000.

Monitored Natural Attenuation

Initial start-up costs:	
Pilot study and baseline data collection.....	\$20,000 - \$40,000
Design Costs	
Engineering costs.....	\$10,000 - \$20,000
Permitting costs.....	\$0 - \$5,000
Construction costs:	
Additional wells as needed.....	\$30,000 - \$40,000
Contingencies.....	\$9,000 - \$15,750
Total estimated natural attenuation costs.....	\$69,000 - \$120,750

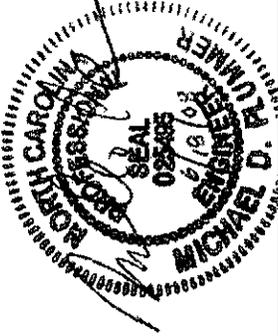
Annual monitoring and reporting costs associated with monitored natural attenuation are estimated as \$20,000 to \$40,000.

WHITE STREET LANDFILL
ESTIMATED CLOSURE AND POST-CLOSURE COSTS ⁽⁴⁾

Year	1 FY 07/08	2 FY 08/09	3 FY 09/10	4 FY 10/11	5 FY 11/12
CAPITAL COSTS					
Phase 3 Partial Closure Costs (21 Acres) ⁽¹⁾	\$ 5,535,000	0	0	0	0
Phase 2 C&D Closure Costs (38 Acres)	\$ 4,559,000	0	0	0	0
Post Closure Costs (Phase 1, and 2) ⁽²⁾	\$ 248,880	\$ 261,324	\$ 274,390	\$ 288,110	\$ 302,515
Post Closure Costs (Phase 3) ⁽³⁾	\$ 143,520	\$ 150,696	\$ 158,231	\$ 166,142	\$ 174,449
TOTAL COST	\$ 10,486,400	\$ 412,020	\$ 432,621	\$ 454,252	\$ 476,965

- (1) Assumes partial closure of Phase 3 area.
- (2) Post Closure costs based in current costs incurred by the City.
- (3) Post Closure costs are escalated at 5% inflation
- (4) Costs were estimated in conjunction with City staff.

ENGINEER'S COST ESTIMATE



Michael D. Plummer, PE

REVISED FOR 2008
CITY OF GREENSBORO, WHITE STREET LANDFILL, PHASE II C&D
COST ESTIMATE FOR CLOSURE OF THE UNIT
 (BASED ON 38 ACRE C&D CLOSURE)

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
Construction:	38	AC		
Mobilization, CQC, Project Admin., Bonds	1	LS	4.00%	\$141,700
Surveying and Control	38	AC	\$3,000	\$114,000
1 x 10 ⁵ Infiltration Layer (18 inches):				
Transportation (20 miles @ \$3.00/mile/load)	9,196	Load	\$60	\$551,760
Material	91,960	CY	\$6.00	\$551,760
Placing/Grading/Compaction	91,960	CY	\$6.00	\$551,760
Vegetative Support Layer (18 inches):				
Transportation (20 miles @ \$3.00/mile/load)	9,196	Load	\$60	\$551,760
Material	91,960	CY	\$3.50	\$321,860
Placing/Grading/Compaction	91,960	CY	\$3.50	\$321,860
Seeding and Mulching	38	AC	\$1,700	\$64,600
Backfill/Grading/Stormwater Drainage	1	LS	\$400,000	\$400,000
Methane Gas Control (passive extraction)	38	AC	\$6,000	\$228,000
Subtotal				\$3,799,060
Contingency (15%)				\$569,859
CQA	5	%	\$189,953	\$189,953
TOTAL CONSTRUCTION				\$4,559,000

Note:

1. These estimates are based on costs bid for similar work at a nearby landfill.
2. This estimate assumes soil material will come from offsite sources.

REVISED FOR 2008
CITY OF GREENSBORO, WHITE STREET LANDFILL, PHASE I & II
ESTIMATED AVERAGE ANNUAL POST-CLOSURE COST
(BASED ON 205 ACRES)

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
Engineering Certificate	1	LS	\$17,400	\$17,400
Site Inspection and Recordkeeping:	160	HR	\$100	\$16,000
Cap Maintenance:				
Mowing	205	AC	\$100	\$20,500
Gates/Fences and Access Control	1	LS	\$2,300	\$2,300
Erosion Control	1	LS	\$5,800	\$5,800
Surface Water Control	1	LS	\$3,500	\$3,500
Seeding	16	AC	\$1,400	\$22,400
Monitoring:				
Methane Gas Monitoring and Report (quarterly)	4	3 mo.	\$5,800	\$23,200
Groundwater Sampling/Lab and Report (semiannual)	1	LS	\$46,800	\$46,800
Monitor well Maintenance	1	LS	\$1,500	\$1,500
Methane Gas System Repairs	1	LS	\$48,000	\$48,000
Subtotal				\$207,400
Contingency (20%)				\$41,480
AVERAGE ANNUAL COST				\$248,880
Note: These estimates are for a third party and include labor.				

Unit Costs were originally in 2005 dollars and have been inflated to 2008 dollars.
inflation rate: 5%

TABLE 8-1a
REVISED FOR 2003
CITY OF GREENSBORO, WHITE STREET LANDFILL, PHASE III
COST ESTIMATE FOR CLOSURE OF THE UNIT
(BASED ON 51 ACRES)

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
Construction:				
Geomembrane (60 mil HDPE)	2,270,000	SF	\$0.50	\$1,135,000
Geonet Drainage Layer	2,270,000	SF	\$0.55	\$1,248,500
Infiltration Layer (18 inches):				
Transportation (20 miles @ \$2.00/mile/load)	12,600	Load	\$40	\$504,000
Material	126,000	CY	\$3.50	\$441,000
Placing/Grading/Compaction	126,000	CY	\$4.50	\$567,000
Vegetative Support Layer (24 inches):				
Transportation (20 miles @ \$2.00/mile/load)	16,800	Load	\$40	\$672,000
Material	168,000	CY	\$3.50	\$588,000
Placing/Grading/Compaction	168,000	CY	\$4.50	\$756,000
Seeding and Mulching	51	AC	\$1,600	\$81,600
Backfill/Grading/Drainage	1	LS	\$250,000	\$250,000
Methane Gas Control (active extraction)	51	AC	\$8,000	\$408,000
Subtotal				\$6,651,100
Contingency (20%)				\$1,330,220
CQA	51	AC	\$5,500	\$280,500
TOTAL CONSTRUCTION				\$8,262,000

Note: These estimates are for a third party and include labor and installation.

ESTIMATE FOR 38 ACRE CLOSURE

Acres to close	38
Total acres of Phase III	51
Percent closing	0.75
Estimated cost for closure (05/06 Budget year)	<u>\$6,156,000</u>

Total estimated cost for Closure of Phase III in FY 05/06 \$6,156,000

REVISED FOR 2008
CITY OF GREENSBORO, WHITE STREET LANDFILL, PHASE III
COST ESTIMATE FOR CLOSURE OF THE UNIT
(BASED ON 21 ACRE PARTIAL CLOSURE) *

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL
Construction:				
Geomembrane (40 mil LLDPE)	943,000	SF	\$0.50	\$471,500
Geonet Drainage Layer	943,000	SF	\$0.61	\$575,230
1 x 10⁻⁵ Infiltration Layer (18 inches):				
Transportation (20 miles @ \$3.00/mile/load)	5,240	Load	\$60	\$314,400
Material	52,400	CY	\$6.00	\$314,400
Placing/Grading/Compaction	52,400	CY	\$6.00	\$314,400
Vegetative Support Layer (24 inches):				
Transportation (20 miles @ \$3.00/mile/load)	16,800	Load	\$60	\$1,008,000
Material	168,000	CY	\$3.50	\$588,000
Placing/Grading/Compaction	168,000	CY	\$3.50	\$588,000
Seeding and Mulching	21	AC	\$1,700	\$35,700
Backfill/Grading/Drainage	1	LS	\$350,000	\$350,000
Methane Gas Control (active extraction) ⁽¹⁾	21	AC	\$2,500	\$52,500
Subtotal				\$4,612,130
Contingency (15%)				\$691,820
CQA	5	%	\$230,607	\$230,607
TOTAL CONSTRUCTION				\$5,535,000

Note:

1. The majority of the methane gas extraction system in the Phase III closure area has been completed. This item is to finalize the gas collection system.
2. These estimates are based on average costs bid for similar work at a nearby landfill.
3. This estimate assumes soil material will come from offsite sources.
4. The quantities include an increase in area based on the 3:1 slope factor.

** Considered "full closure", as previously reported for Financial Assurance test.*