

Transmittal

128 S. Tryon St., Suite 1400
Charlotte, NC 28202-5001
Telephone: (704) 338-1800



HDR Engineering, Inc.
of the Carolinas

Transmittal Number

Attention: **Mr. Tim Jewett** Date **9-27-99** HDR Job No. **162-026-018**

To: **NCDENR Division of Solid Waste Management**

585 Waughtown Street

Winston-Salem, NC 28107-2241

Regarding: **Old Salisbury Road C&D Landfill**

Winston-Salem, NC

RECEIVED
N.C. Dept. of EHNR
SEP 28 1999

Winston-Salem
Regional Office

We are sending you: Attached Under separate cover via _____

Shop Drawings Prints Plans Samples Specifications

Copy of Letter Change Order Other

Fac/Perm/Co ID #	Date	Doc ID#
<i>24-12</i>	<i>7/1/2012</i>	<i>DIN 4440</i>

Copies	Date	No.	Description
1	11-23-96	<input checked="" type="checkbox"/>	Erosion Control Permit for Phase II (SB# 4)
1	9-27-95	<input checked="" type="checkbox"/>	Letter to Curtis Welty, HDR, from Jim Bateson, NCDENR
1	9-27-95	<input checked="" type="checkbox"/>	Letter to Daniel Miles, Winston-Salem, from Jan McHargue, NCDENR
1	12-27-95	<input checked="" type="checkbox"/>	Boring Logs (MW-1R, 2, 2R, 4, 4R, 5R, 6, 7)
1	12-28-95	<input checked="" type="checkbox"/>	Well Construction Record (MW-1R, 2R, 4R, 5R, 6, 7)
1	1-4-96	<input checked="" type="checkbox"/>	Well Abandonment Record (MW-1, 2, 4, 5)

Site Plan Application Comment Letters

Copies	Date	No.	Description
1	3-8-99	<input checked="" type="checkbox"/>	Letter to Bobby Lufty, NCDENR, from John Isham, HDR
1	8-19-99	<input checked="" type="checkbox"/>	Letter to Bobby Lufty, NCDENR, from John Isham, HDR, with attachments
1	12-19-94	<input checked="" type="checkbox"/>	Memo to Jan McHargue, NCDENR from Jim Bateson, NCDENR
1	4-6-95	<input checked="" type="checkbox"/>	Letter to Jan McHargue, NCDENR, from Joe Readling, HDR
1	4-11-95	<input checked="" type="checkbox"/>	Estimate of Long Term Seasonal High Groundwater Level, S&ME
1	6-26-95	<input checked="" type="checkbox"/>	Letter to Jan McHargue, NCDENR, from Joe Readling, HDR, with attachments
1	5-24-95	<input checked="" type="checkbox"/>	Temporary Monitor Well Abandonment Report, S&ME
1	7-19-95	<input checked="" type="checkbox"/>	Letter to Jan McHargue, NCDENR, from Joe Readling, HDR, with attachments
1	6-5-95	<input checked="" type="checkbox"/>	Letter to Michael Wolfe, HDR, from Inge Smith, NCDENR, with attachments

These are transmitted as checked below:

For approval Approved as submitted Resubmit _____ copies for approval

For your use Approved as noted Submit _____ copies for distribution

As requested Returned for corrections Return _____ corrected prints

For review/comment Other _____

For bids due _____ 19 _____ Prints returned after loan to us

Remarks

Copy to **Ed Gibson, w/o attachments** Signed *Philip Washmore*

If enclosures are not as noted, please notify us at once.

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director



September 27, 1995

Mr. Curtis Welty
HDR Engineering, Inc.
Suite 1400
128 S. Tryon Street
Charlotte, NC 28202-5001

RE: Monitoring System at Proposed Winston Salem C&D Landfill

Dear Curt,

I have received your memorandum, faxed to me on September 21, 1995, in response to our telephone conversation of the previous day, concerning the need for revising the proposed monitoring system at the Winston-Salem C&D Landfill.

The revised locations of proposed wells MW-1R and MW-4R, as well as the proposed locations of MW-6 and the "new well", are acceptable to the Solid Waste Section as marked on your attached maps.

Your arguments concerning the effectiveness of existing detection well MW-5 are well taken. However, this well needs to be replaced with a new monitoring well in the draw just to the west. Because there is only one well proposed along the southern margin of the landfill, which is about 1500 feet long, the placement of this well is critical. The City of Winston-Salem may wish to follow a conservative approach in the design the monitoring system, in light of the concerns that neighbors already have about the impact of the landfill on the quality of their groundwater.

Seven of the 25 original exploratory borings on the site were dry to auger refusal. Three of these were located on the high ground in the center of the proposed footprint. Many of the other borings on the site showed stabilized water levels in partially weathered rock, near the top of bedrock. The post-metamorphic granite which underlies the site is known to be "tight" relative to much of the crystalline rock in the Piedmont, with few and widely-spaced fractures. Water flowing from the base of waste is likely to end up flowing in fractures in bedrock and partially weathered rock before much dispersion occurs (at least relative to a situation where base grades, and the water table, are in saprolite.)

Mr. Curt Welty
Winston-Salem C&D Application
September 26, 1995
Page 2

Granted, much of the groundwater flow beneath the site occurs in the "transition zone" between bedrock and saprolite (where there will be some lateral dispersion). However, the elevation of the transition zone mimics the surface topography at the site, and groundwater in this most permeable zone will tend to flow into the draws. This effect is enhanced by the likelihood that the depth, thickness, and permeability of the transition zone are all greater in the draws, especially if (and I will argue that this is likely) they coincide with fractures. Given the above, plus the considerable topographic relief at the site, the axes of draws are the obvious and necessary places to install monitoring wells, particularly if the number of wells is limited.

Visual inspection of the USGS topographic map for the area shows a striking preponderance of north-south orientations for secondary drainages. At this scale, the post-metamorphic granites are essentially isotropic. It is likely that the fractures are the result of tension during Mesozoic rifting. Triassic diabase dikes in that part of the state share the same north-south orientation.

The existing monitoring wells on the site were installed without prior authorization from the Solid Waste Section, before the proposed footprint for the landfill was finalized. In reviewing the proposed groundwater monitoring plan, the Section did take into consideration the expense of installing these wells, and is willing to allow the use of all but one of them in an approved monitoring system. However, given the fact that only one well is proposed to monitor the 1500 foot long southern margin of the landfill, the Section feels that its placement is critical.

Approval of the monitoring system by the Section is also dependent on the following conditions:

1. The monitoring wells are to be drilled to a depth, and the screens placed at vertical locations, that will ensure that future drought conditions, which may lower the water table, will not render the monitoring system ineffective.
2. Shallow monitoring wells are to be installed with a 15 foot screen with the top of the screen set just above the seasonal high water table, unless hydrogeologic conditions justify changes in this design. The reference to ten foot screens needs to be revised in the monitoring plan.
3. In addition to the water quality analytical data, the initial sampling report must include the following information for each new monitoring well: a well completion record, well schematic diagram, and the boring log.

Mr. Curt Welty
Winston-Salem C&D Application
September 26, 1995
Page 3

4. The monitoring plan needs to include the analytical methods and PQL's for each constituent to be analyzed. I have attached a copy of the Solid Waste Section's memorandum listing *Sampling and Analysis Requirements for Construction and Demolition and Closed Sanitary Landfills* for your reference.

Please feel free to call me at (919) 733-0692, ext.342, if you have any questions.

Sincerely



Jim Bateson
Hydrogeologist
Solid Waste Section

cc: Mr. Dan Miles City of Winston-Salem
Jan McHargue Solid Waste Section
Bobby Lutfy "

State of North Carolina
Department of Environment,
Health and Natural Resources
Winston-Salem Regional Office

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
Leesha Fuller, Regional Manager



September 27, 1995

Mr. Daniel D. Miles, PE
City of Winston-Salem Utilities Division
P.O. Box 2511
Winston-Salem, NC 27102

Subject: Review of the Proposed Winston-Salem Construction and Demolition Landfill

Dear Mr. Miles:

In confirmation of today's discussions on the referenced project, the following issues need to be addressed:

1. Adjustments need to be made to the locations of Monitoring Wells 1, 4, 5 and 6; with one additional well to be added in the draw off the northwest corner of Phase 1. Wells 1 and 4 are to be abandoned (this should be indicated on all drawings), while MW-5 can remain in place as an additional monitoring point. See attached letter from Jim Bateson to Curtis Welty of HDR Engineering, dated September 27, 1995.
2. Attached letter from Jim Bateson to Curt Welty also outlines four issues to be addressed through revisions to the monitoring plan.
3. It would be helpful to show the proposed limits of waste on the construction drawings. This would make it evident that buffer requirements are being met, as well as clearly defining the limits of the first five year phase.
4. There is an arrow labeled "buffer" shown on Sheets C-6, C-2, and C-3 on the west side that does not connect with the appropriate dashed line.
5. On at least one sheet, the private water supply wells that are being buffered on the west side should be shown. The preferred sheet for this purpose would be C-6. It would not be necessary to show the Tesh property on this sheet, if this would allow the scale to remain at 1:100.
6. There is an old bored water supply well near the southeast corner of the site that must be properly abandoned as this site is developed. Information indicating that this and the other well abandonments have been properly completed should be provided to the Section before approval to operate is issued.

Page Two of Two
Dan Miles
September 27, 1995

7. On cross-section A it appears that sediment basin 1 may be located at a slightly higher elevation than the grade break in the middle of the cell (804' as opposed to 800').
8. A comprehensive operations plan should be prepared for this facility prior to acceptance of waste. This should include information on:
 - a. Type, source, and quantity of waste to be accepted, weighing and recordkeeping procedures;
 - b. Progression of fill (phasing of operations), lift thickness, compaction measures, surface water diversion;
 - c. Borrow and stockpiling of soil for cover material, including measures for identifying less permeable soils that may be suitable for final cover;
 - d. Emergency contingency plans (to be implemented in case of fire or other emergencies);
 - d. Worker safety and training;
 - e. Waste screening (provisions to preclude the acceptance of unauthorized waste);
 - f. Any other issues pertinent to the operation of a landfill.

Note: Some of this information is found in various places in the submittals, but it would be helpful to consolidate this into an operations plan or manual that can be maintained at the site as a separate working document. This will allow for easy reference by the staff, as well as simplifying the process when modifications to this document are requested in the future.

Please call me at (910) 771-4600, or Jim Bateson at (919) 733-0692 if you have any questions about these comments.

Sincerely,



Janis D. McHargue, PE
Western Area Engineer
Solid Waste Section

cc: Julian Foscue
Jim Coffey
Joe Reading; HDR

Jim Bateson
Brent Rockett

BORING LOG

DATE: 12/27/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
	4'					REDDISH-BROWN TO TAN, FIRM SANDY CLAY (CL), SLIGHTLY PLASTIC, RELICT GRANITIC TEXTURE, QUARTZ, FELDSPAR, BIOTITE, IRON OXIDATION, DRY	GRANITIC SAPROLITE
SS-1		7	SS				
	8'						
SS-2		NA	SS				
	12'						
SS-3		NA	SS				
	16'						
SS-4		NA	SS				
	20'						
	24'						
SS-5		NA	SS			SIMILAR TO ABOVE, MOIST CLAYEY ZONES, LARGE QUARTZ/FELDSPAR FRAGMENTS, SOFT, GRANITIC TEXTURE	
	28'						
SS-6		NA	SS			LIGHT BROWN TO TAN CLAYEY SAND (SC), SLIGHTLY STICKY, MEDIUM TO COARSE GRAINED, IRON OXIDES, VERY MOIST, QUARTZ/FELDSPAR RICH	
	32'						
SS-7		NA	SS			LIGHT BROWN TO TAN SANDY SILTY CLAY, (CL), MOIST, SOFT, SLIGHTLY PLASTIC, LESS RELICT GRANITIC TEXTURE, FINER GRAINED	
	36'						
	40'						

 AT DRILLING
 24 HR

BOREHOLE COMPLETION: 60 FT. BELOW LAND SURFACE

WATER DEPTH: 38.77 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

KEY:
 SI - SCREEN
 SS - SPLITSPOON
 SPT - SOIL PENETRATION TEST-N NUMBER
 ST - SHELBY TUBE
 T - TYPE
 WL - WATER LEVEL



LOCATION: OLD SALISBURY ROAD

BORING NUMBER: MW-1R

PAGE: 2 OF 2

BORING LOG

DATE: 12/27/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
SS-8		NA	SS			SAME AS ABOVE, VERY MOIST, LAST 2" IS WHITE MOTTLED WEATHERED GRANITIC SAPROLITE WITH VERY PREDOMINANT TEXTURE	GRANITIC SAPROLITE
	44'						
	48'						
	52'						
	56'						
	60'					TD = 60 FT.	
	64'						
	68'						
	72'						
	76'						
	80'						

BOREHOLE COMPLETION: 60 FT. BELOW LAND SURFACE

WATER DEPTH: 38.77 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

KEY:

- SI - SCREEN
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- T - TYPE
- WL - WATER LEVEL



PROJECT: WINSTON-SALEM C & D LANDFILL

PROJECT NO: 00162-082-018

LOCATION: OLD SALISBURY ROAD

BORING NUMBER: MW-7

PAGE: 1 OF 2

BORING LOG

DATE: 12/28/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
	4'						
SS-1	8'	36	SS			LIGHT BROWN TO TAN, DENSE, CLAYEY SILTY SAND (SM), MEDIUM TO FINE GRAINED, BRITTLE, VERY DRY, QUARTZ, FELDSPAR, BIOTITE	GRANITIC SAPROLITE
	12'						
SS-2		34	SS			YELLOW-BROWN TO TAN, DENSE, CLAYEY SILTY SAND (SM), MEDIUM TO FINE GRAINED, MANGANESE OXIDE STAINING, VERY DRY, BRITTLE	
	16'						
SS-3	20'	34	SS			LIGHT TAN TO WHITE, DENSE, SILTY SAND (SM) AND PARTIALLY WEATHERED ROCK FRAGMENTS, ABUNDANT FELDSPAR, BRITTLE, SLIGHT MOISTURE, QUARTZ, BIOTITE ABUNDANT, IRON OXIDE STAINING	
	24'						
SS-4		31	SS			SAME AS ABOVE, WHITE, MEDIUM TO COARSE GRAINED, BRITTLE, DRY	
	28'						
SS-5		50+	SS			LIGHT GRAY TO WHITE, VERY DENSE, SILTY SAND (SM), WEATHERED GRANITE, BRITTLE, DRY, MEDIUM GRAINED, IRON OXIDE STAINING, QUARTZ, FELDSPAR, BIOTITE	
	32'						
SS-6		50+	SS			SAME AS ABOVE, MOIST, SOFT	
	36'						
	40'						

 AT DRILLING
 24 HR

BOREHOLE COMPLETION: 48 FT. BELOW LAND SURFACE

WATER DEPTH: 35.86 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

KEY:
 SI - SCREEN
 SS - SPLITSPOON
 SPT - SOIL PENETRATION TEST-N NUMBER
 ST - SHELBY TUBE
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PROJECT: WINSTON-SALEM C & D LANDFILL

PROJECT NO: 00162-082-018

LOCATION: OLD SALISBURY ROAD

BORING NUMBER: MW-7

PAGE: 2 OF 2

BORING LOG

DATE: 12/28/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
	44'					HARD, SLOW DRILLING	GRANITIC SAPROLITE
	48'						
	52'					TD = 48 FT.	
	56'						
	60'						
	64'						
	68'						
	72'						
	76'						
	80'						

BOREHOLE COMPLETION: 48 FT. BELOW LAND SURFACE

WATER DEPTH: 35.86 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

KEY:

- SI - SCREEN
- SS - SPLITSPOON
- SPT - SOIL PENETRATION TEST-N NUMBER
- ST - SHELBY TUBE
- T - TYPE
- WL - WATER LEVEL



PROJECT: WINSTON-SALEM C & D LANDFILL

PROJECT NO: 00162-082-018

LOCATION: OLD SALISBURY ROAD

BORING NUMBER: MW-6

PAGE: 1 OF 2

BORING LOG

DATE: 12/27/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
	4'					RED, MICACEOUS, FIRM CLAY (CL) WITH MINOR SAND, PLASTIC, MOIST, NO RELICT STRUCTURES	CLAY SOIL HORIZON
SS-1		9	SS				
	8'						
SS-2		11	SS			LIGHT YELLOW-BROWN TO WHITE SILTY SAND (SM), FINE TO COARSE GRAINED, DRY, GRANITIC TEXTURE	GRANITIC SAPROLITE
	12'						
SS-3		10	SS			SAME AS ABOVE, MANGANESE OXIDE STAINING, DRY, BRITTLE, QUARTZ, BIOTITE, FELDSPAR GRAINS, MEDIUM TO FINE GRAINED	
	20'						
SS-4		13	SS			LIGHT BROWN TO TAN, MEDIUM DENSE SILTY SAND (SM), SOFT, DRY, MICACEOUS, IRON OXIDE STAINING, MEDIUM TO FINE GRAINED	
	24'						
SS-5		15	SS			LIGHT BROWN TO MOTTLED WHITE, MEDIUM DENSE SILTY SAND (SM), ABUNDANT FELDSPAR, DRY, IRON AND MANGANESE OXIDE STAINING, MEDIUM TO FINE GRAINED	
	28'						
SS-6		13	SS			LIGHT BROWN TO TAN, MEDIUM DENSE SILTY SAND (SM), MICACEOUS, SOFT, BIOTITE, QUARTZ, FELDSPAR GRAINS, DRY	
	32'						
SS-7		12	SS			SAME AS ABOVE, DRY	
	36'						
	40'						



BOREHOLE COMPLETION: 60 FT. BELOW LAND SURFACE

WATER DEPTH: 49.90 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

- KEY:**
- SI - SCREEN
 - SS - SPLITSPOON
 - SPT - SOIL PENETRATION TEST-N NUMBER
 - ST - SHELBY TUBE
 - T - TYPE
 - WL - WATER LEVEL



BORING LOG

DATE: 12/27/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
SS-8	44'	10	SS			LIGHT BROWN TO TAN, LOOSE SILTY SAND (SM), MOIST, MEDIUM TO COARSE GRAINED, QUARTZ, BIOTITE, FELDSPAR ABUNDANT, STICKY, SOFT	GRANITIC SAPROLITE
SS-9	48'	8	SS			SAME AS ABOVE, WET, SOFT	
SS-10	52'	9	SS			SAME AS ABOVE, WET, SOFT	
SS-11	56'	9	SS			SAME AS ABOVE, WET, SOFT, PRONOUNCED GRANITIC (PHANERITIC) TEXTURE	
	60'					TD = 60 FT.	
	64'						
	68'						
	72'						
	76'						
	80'						

 AT
 DRILLING
 24 HR

BOREHOLE COMPLETION: 60 FT. BELOW LAND SURFACE

WATER DEPTH: 49.90 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

KEY:
 SI - SCREEN
 SS - SPLITSPOON
 SPT - SOIL PENETRATION TEST-N NUMBER
 ST - SHELBY TUBE
 T - TYPE
 WL - WATER LEVEL



PROJECT: WINSTON-SALEM C & D LANDFILL

PROJECT NO: 00162-082-018

LOCATION: OLD SALISBURY ROAD

BORING NUMBER: MW-4R

PAGE: 1 OF 1

BORING LOG

DATE: 12/28/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
							
SS-1	4'	9	SS			GRAY, LOOSE, CLAYEY SAND (SC), MEDIUM TO COARSE GRAINED, SOFT, PLASTIC, IRON OXIDE STAINING, TRACE OF ORGANIC MATTER, WET	ALLUVIAL DEPOSITS (?)
SS-2	8'	12	SS			LT. TAN, MEDIUM DENSE CLAYEY SAND (SC), WET, SOFT, MINOR IRON OXIDATION, MEDIUM TO COARSE QUARTZ SAND	
SS-3	12'						GRANITIC SAPROLITE
	16'	50+	SS			LIGHT GRAY TO WHITE, VERY DENSE CLAYEY SILTY SAND (SM), MEDIUM TO FINE GRAINED, QUARTZ, FELDSPAR, BIOTITE MICA, MOIST, BRITTLE, IRON OXIDATION	
	20'						
	24'					TD = 20 FT.	
	28'						
	32'						
	36'						
	40'						

 AT DRILLING
 24 HR

BOREHOLE COMPLETION: 20 FT. BELOW LAND SURFACE

WATER DEPTH: 10.06 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

KEY:
 SI - SCREEN
 SS - SPLITSPOON
 SPT - SOIL PENETRATION TEST-NUMBER
 ST - SHELBY TUBE
 T - TYPE
 WL - WATER LEVEL



PROJECT: Construction & Demolition Debris Landfill Forsyth County				WELL LOG		MW-4			
PROJECT NO. : 1584-93-143D		ELEVATION: 787.8		NOTES:					
LOGGED BY: Butler		BORING DEPTH: 37.0 FEET							
DATE DRILLED: 02/13/95		WATER LEVEL: 26.1							
DRILLING METHOD: 4 1/4" HSA		DRILL RIG: B-59 ATV							
DEPTH (ft)	GRAPHIC LOG	Description & Remarks	SAMPLE NUMBER	SAMPLE	OVN (ppm)	SPR	ELEV.	WELL DIAGRAM	
5		Residuum-very stiff orange tan micaceous medium to fine SANDY SILT					28.0	782.8	<p>2" PVC Schedule 40 Casing</p> <p>Cement Grout</p> <p>Bentonite Seal</p> <p>Fine Filter Sand</p> <p>2" PVC Schedule 40 Screen, 0.010" Slot</p>
10		PARTIALLY WEATHERED ROCK sampled as orange tan gray micaceous coarse to fine very sandy silt to silty coarse to fine sand				50/5	777.8		
15		PARTIALLY WEATHERED ROCK sampled as orange gray to gray brown silty coarse to fine sand				50/5	772.8		
20						50/3	787.8		
25						50/2	782.8		
30							757.8		
35							752.8		
40		Boring Terminated					747.8		

PROJECT: WINSTON-SALEM C & D LANDFILL

PROJECT NO: 00162-082-018

LOCATION: OLD SALISBURY ROAD

BORING NUMBER: MW-2R

PAGE: 1 OF 1

BORING LOG

DATE: 12/29/95

NUMBER	DEPTH	SPT	T	WL	SI	DESCRIPTION (USCS)	COMMENTS
						RED, VERY SOFT, MICACEOUS CLAY (CL) WITH SAND, PLASTIC, VERY MOIST	FILL MATERIAL
SS-1	4'	2	SS			LIGHT BROWN TO TAN, VERY LOOSE, SLIGHTLY CLAYEY SAND (SC), MEDIUM TO FINE GRAINED QUARTZ, STRUCTURELESS, VERY MOIST, ORGANIC MATTER	ALLUVIAL DEPOSITS (?)
	8'					LIGHT GRAY TO DARK BROWN/BLACK, VERY DENSE, SILTY SAND (SM) MEDIUM TO FINE GRAINED, HEAVY IRON AND MANGANESE OXIDE STAINING, MICACEOUS, QUARTZ, FELDSPAR, BRITTLE, DRY	GRANITIC SAPROLITE
SS-2		50+	SS			PARTIALLY WEATHERED ROCK AND SAPROLITE (SILTY SAND), QUARTZ, FELDSPAR, BIOTITE, BRITTLE, HARD, DRY	
	12'						
SS-3		50+	SS				
	16'						
	20'					PARTIALLY WEATHERED ROCK	AUGAR REFUSAL
	24'					TD = 23 FT.	
	28'						
	32'						
	36'						
	40'						

 AT DRILLING
 24 HR

BOREHOLE COMPLETION: 23 FT. BELOW LAND SURFACE

WATER DEPTH: 11.41 FT. BELOW TOC

DATE: 1/3/96

DRILLING METHOD: 4 1/4-INCH HOLLOW STEM AUGER

LOGGED BY: J. ISHAM

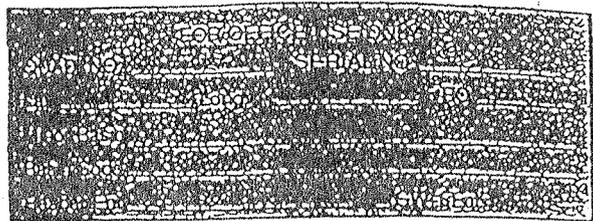
KEY:
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 SS - SPLITSPOON
 SPT - SOIL PENETRATION TEST-N NUMBER
 ST - SHELBY TUBE
 T - TYPE
 WL - WATER LEVEL



PROJECT NO. : 1584-93-143D	ELEVATION: 783.9	NOTES:
LOGGED BY: Best	BORING DEPTH: 16.0 FEET	
DATE DRILLED: 02/13/95	WATER LEVEL: 14.8 @ TOB	
DRILLING METHOD: 4 1/4" HSA/Air	DRILL RIG: B-59 ATV	

DEPTH (ft)	GRAPHIC LOG	Description & Remarks	SAMPLE NUMBER	SAMPLE	OVM (ppm)	SPR	ELEV.	WELL DIAGRAM
	[Symbol]	Residuum - tan and brown coarse to fine SANDY SILT						<p style="font-size: small;">2" PVC Schedule 40 Casing 2" PVC Schedule 40 Screen, 0.010" Slot Fine Filter Sand Bentonite Seal Cement Grout</p>
5	[Symbol]	PARTIALLY WEATHERED ROCK sampled as orange, tan and brown micaceous coarse to fine very SANDY SILT ; Auger Refusal at 7.0 feet				50/2	778.9	
10	[Symbol]	ROCK cuttings sampled as white to light gray very coarse sand					773.9	
15	[Symbol]	Boring Terminated					768.9	
20							763.9	
25							758.9	
30							753.9	
35							748.9	

Well # 7



WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GRAHAM E. CURRIE

STATE WELL CONSTRUCTION PERMIT NUMBER: _____

DRILLER REGISTRATION NUMBER: 537

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: _____ County: _____

(Road, Community, or Subdivision and Lot No.)

2. OWNER _____

ADDRESS _____

(Street or Route No.)

City or Town

State

Zip Code

3. DATE DRILLED 12/28 USE OF WELL Monitor

4. TOTAL DEPTH 48'

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: N/A FT.

(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 2' 6" FT. Above Land Surface*

* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type _____ Amount _____

12. CASING:

If additional space is needed use back of form

From	Depth	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	<u>2' 6"</u>		<u>33'</u>	<u>2"</u>	<u>sch 40</u>	<u>PVC</u>
From _____	To _____	Ft. _____	_____	_____	_____	_____
From _____	To _____	Ft. _____	_____	_____	_____	_____

13. GROUT:

From	Depth	To	Ft.	Material	Method
	<u>0</u>		<u>28'</u>	<u>Portland type I</u>	<u>Tremie</u>
From _____	To _____	Ft. _____	_____	_____	_____

14. SCREEN:

From	Depth	To	Ft.	Diameter	Slot Size	Material
	<u>33</u>		<u>48</u>	<u>2</u>	<u>.010^{max}</u>	<u>PVC</u>
From _____	To _____	Ft. _____	_____	_____	_____	_____
From _____	To _____	Ft. _____	_____	_____	_____	_____

15. SAND/GRAVEL PACK:

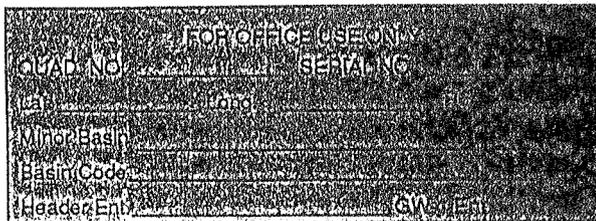
From	Depth	To	Ft.	Size	Material
	<u>38</u>		<u>48</u>	<u>#2</u>	<u>Silica</u>
From _____	To _____	Ft. _____	_____	_____	_____

16. REMARKS: _____

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.



WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Geologic Exploration, Inc.

STATE WELL CONSTRUCTION PERMIT NUMBER: _____

DRILLER REGISTRATION NUMBER: 1175

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Winston Salem County: Forsyth

Friedberg Lane

(Road, Community, or Subdivision and Lot No.)

2. OWNER City of Winston Salem Utilities Division

ADDRESS PO Box 2511

(Street or Route No.)

Winston Salem

NC

27102

City or Town

State

Zip Code

3. DATE DRILLED 12-27-95 USE OF WELL monitor

4. TOTAL DEPTH 60.0' ft

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: 3.0 FT.

(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 3.0 FT. Above Land Surface*

* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type N/A Amount N/A

If additional space is needed use back of form

12. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0.0</u> To <u>45.0</u> Ft.	<u>2 inch</u>	<u>Sch. 40</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

13. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>41.0</u> Ft.	<u>Portland Bentonite Slurry</u>	_____
From _____ To _____ Ft.	_____	_____

14. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>45.0</u> To <u>60.0</u> Ft.	<u>2</u> in.	<u>.010</u> in.	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

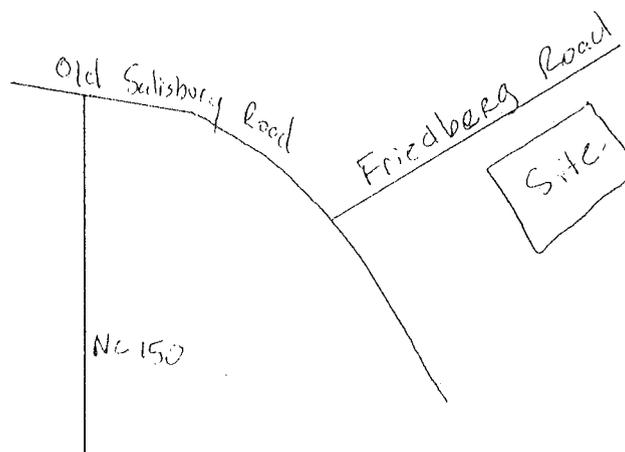
15. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>43.0</u> To <u>60.0</u> Ft.	<u>20-40</u>	<u>Fine Silica Sand</u>
From _____ To _____ Ft.	_____	_____

16. REMARKS: MW-6 Bentonite seal from 41.0 to 43.0 feet.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Steve Z...

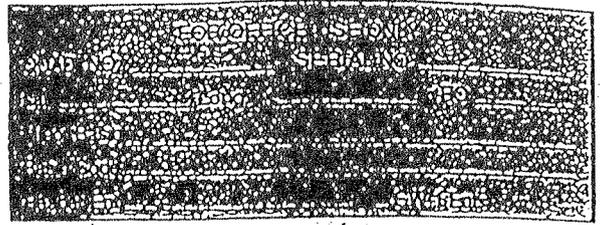
SIGNATURE OF CONTRACTOR OR AGENT

12-28-95

DATE

WELL # 4R

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221



WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GRAHAM E CURRIE

STATE WELL CONSTRUCTION PERMIT NUMBER: _____

DRILLER REGISTRATION NUMBER: 537

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: _____ County: _____

(Road, Community, or Subdivision and Lot No.)

2. OWNER _____

ADDRESS _____

(Street or Route No.)

City or Town

State

Zip Code

3. DATE DRILLED 12/28 USE OF WELL Monitor

4. TOTAL DEPTH 20'

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: N/A FT.

8. TOP OF CASING IS 2'6" FT. Above Land Surface*
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type _____ Amount _____

12. CASING:

From	Depth	To	Diameter	Wall Thickness or Weight/FL	Material
From <u>2'6"</u>	Depth	To <u>5'</u>	Ft. <u>2"</u>	<u>Sch 40</u>	<u>PVC</u>
From _____	To _____	Ft. _____	_____	_____	_____
From _____	To _____	Ft. _____	_____	_____	_____

13. GROUT:

From	Depth	To	Material	Method
From <u>0</u>	Depth	To <u>1</u>	Ft. <u>Portland</u>	<u>Tremie</u>
From _____	To _____	Ft. _____	_____	_____

14. SCREEN:

From	Depth	To	Diameter	Slot Size	Material
From <u>5</u>	Depth	To <u>20</u>	Ft. <u>2</u>	in. <u>.010</u>	in. <u>PVC</u>
From _____	To _____	Ft. _____	in. _____	in. _____	_____
From _____	To _____	Ft. _____	in. _____	in. _____	_____

15. SAND/GRAVEL PACK:

From	Depth	To	Size	Material
From <u>3'</u>	Depth	To <u>20'</u>	Ft. <u>#2</u>	<u>Silica</u>
From _____	To _____	Ft. _____	_____	_____

16. REMARKS: _____

DEPTH

From To

DRILLING LOG

Formation Description

If additional space is needed use back of form

LOCATION SKETCH

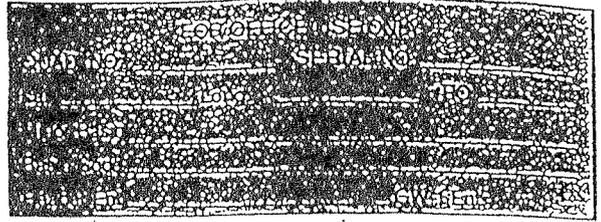
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

DATE

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221



WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GRAHAM E CURRIE

STATE WELL CONSTRUCTION PERMIT NUMBER: _____

DRILLER REGISTRATION NUMBER: 537

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Winston Salem County: Forsyth

(Road, Community, or Subdivision and Lot No.) _____

DEPTH
From To

DRILLING LOG
Formation Description

2. OWNER _____
ADDRESS _____
(Street or Route No.)

City or Town _____ State _____ Zip Code _____

3. DATE DRILLED 12/29 USE OF WELL Monitor

4. TOTAL DEPTH 23'

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: N/A FT.
(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 2' 6" FT. Above Land Surface*

* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST NA

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type _____ Amount _____

12. CASING:

If additional space is needed use back of form

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

Depth Diameter or Weight/Ft. Material
From 2' 6" To 5' Ft. 2" Sch 40 PVC

From _____ To _____ Ft. _____

From _____ To _____ Ft. _____

13. GROUT:

Depth Material Method
From 0 To 1 Ft. Portland tremie

From _____ To _____ Ft. _____

14. SCREEN:

Depth Diameter Slot Size Material
From 5' To 20 Ft. 2 in. .010 in. PVC

From _____ To _____ Ft. _____ in. _____ in. _____

From _____ To _____ Ft. _____ in. _____ in. _____

15. SAND/GRAVEL PACK:

Depth Size Material
From 3 To 20 Ft. #2 Silica

From _____ To _____ Ft. _____

16. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

DATE

FOR OFFICE USE ONLY

QUAD. NO. _____ SERIAL NO. _____

Lat. _____ Long. _____ RO _____

Minor Basin _____

Basin Code _____

Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Geologic Exploration, Inc.

STATE WELL CONSTRUCTION PERMIT NUMBER: _____

DRILLER REGISTRATION NUMBER: 1175

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Winston Salem County: Forsyth

Friedberg Lane

(Road, Community, or Subdivision and Lot No.)

2. OWNER City of Winston Salem Utilities Division

ADDRESS PO Box 2511

(Street or Route No.)

Winston Salem NC 27102

City or Town State Zip Code

3. DATE DRILLED 12-27-95 USE OF WELL monitor

4. TOTAL DEPTH 60.0' ft

5. CUTTINGS COLLECTED YES NO

6. DOES WELL REPLACE EXISTING WELL? YES NO

7. STATIC WATER LEVEL Below Top of Casing: 3.0 FT.

(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 3.0 FT. Above Land Surface*

* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

11. CHLORINATION: Type N/A Amount N/A

If additional space is needed use back of form

12. CASING:

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>0.0</u> To <u>45.0</u> Ft.	<u>2 inch</u>	<u>Sch. 40</u>	<u>PVC</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

13. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>41.0</u> Ft.	<u>Portland Bentonite Slurry</u>	
From _____ To _____ Ft.	_____	_____

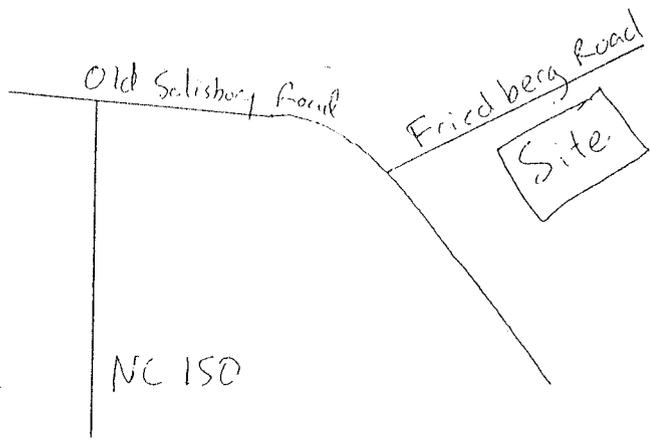
14. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>45.0</u> To <u>60.0</u> Ft.	<u>2 in.</u>	<u>.010 in.</u>	<u>PVC</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

15. SAND/GRAVEL PACK:

Depth	Size	Material
From <u>43.0</u> To <u>60.0</u> Ft.	<u>20-40</u>	<u>Fine Silica Sand</u>
From _____ To _____ Ft.	_____	_____

16. REMARKS: MW-1R Bentonite seal from 41.0 to 43.0 feet.



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

North Carolina
 Department of Natural Resources and Community Development
 Division of Environmental Management
 Groundwater Section
 P.O. Box 27687 - Raleigh, N.C. 27611

WELL ABANDONMENT RECORD

CONTRACTOR Geologic Exploration

REG. NO. 1175

1. WELL LOCATION: (Show a sketch of the location on back of form.)

Nearest Town: Winston Salem County Forsyth

Friedberg Lane

(Road, Community, Subdivision, Lot No.)

Quadrangle No. _____

2. OWNER: City of Winston Salem Utilities Div.

3. ADDRESS: PO Box 2511 Winston Salem, NC

4. TOPOGRAPHY: draw, slope, hilltop, valley, flat

5. USE OF WELL: monitor DATE: 12/28/95

6. TOTAL DEPTH: 35.0 ft DIAMETER: 2 inch

7. CASING REMOVED:

feet	diameter
N/A	N/A
_____	_____
_____	_____

8. SEALING MATERIAL:

<u>Neat cement</u> bags of cement _____	<u>Sand cement</u> bags of cement _____
gals. of water _____	yds. of sand _____
	gals. of water _____

Other

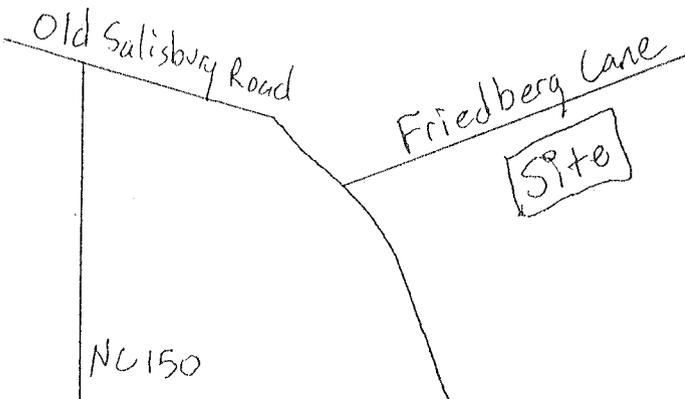
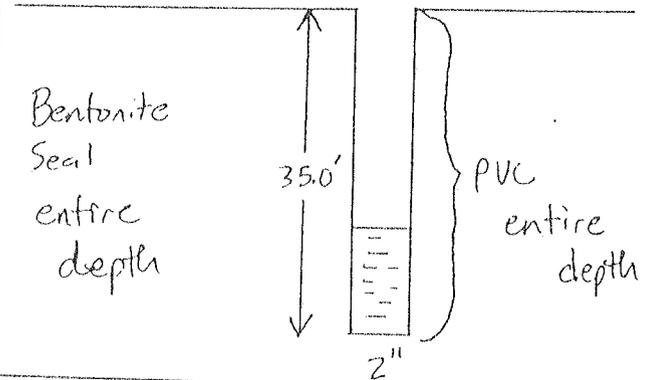
Type material Bentonite Holeplug
 Amount 5.5 gallons

9. EXPLAIN METHOD EMPLACEMENT OF MATERIAL.

pour/wet

MW-5

WELL DIAGRAM: Draw a detailed sketch of the well showing total depth, depth and diameter of screens remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.



I do hereby certify that this well abandonment record is true and exact.

Signature of Contractor or Agent Steve Taylor

Date 1-4-96

WELL LOCATION: Draw a location sketch on the reverse of this sheet, showing the direction and distance of the well to at least two (2) nearby reference points such as roads, intersections and streams. Identify roads with State High road identification numbers.

Submit original to the Division of Environmental Management, one copy to the Driller, and one copy to the owner.

North Carolina
 Department of Natural Resources and Community Development
 Division of Environmental Management
 Groundwater Section
 P.O. Box 27687 - Raleigh, N.C. 27611

WELL ABANDONMENT RECORD

CONTRACTOR Geologic Exploration

REG. NO. 1175

1. WELL LOCATION: (Show a sketch of the location on back of form.)

Nearest Town: Winston Salem

County Forysth

Friedburg Lane

(Road, Community, Subdivision, Lot No.)

Quadrangle No. _____

2. OWNER: City of Winston Salem Utilities Div.

3. ADDRESS: PO Box 2511 Winston Salem, NC

4. TOPOGRAPHY: draw, slope, hilltop, valley, flat

5. USE OF WELL: monitor DATE: 12/28/95

6. TOTAL DEPTH: 25.0 ft DIAMETER: 2 inch

7. CASING REMOVED:

feet	diameter
<u>N/A</u>	<u>N/A</u>
_____	_____
_____	_____

8. SEALING MATERIAL:

<u>Neat cement</u>	<u>Sand cement</u>
bags of cement _____	bags of cement _____
gals. of water _____	yds. of sand _____
	gals. of water _____

Other

Type material Bentonite Holeplug

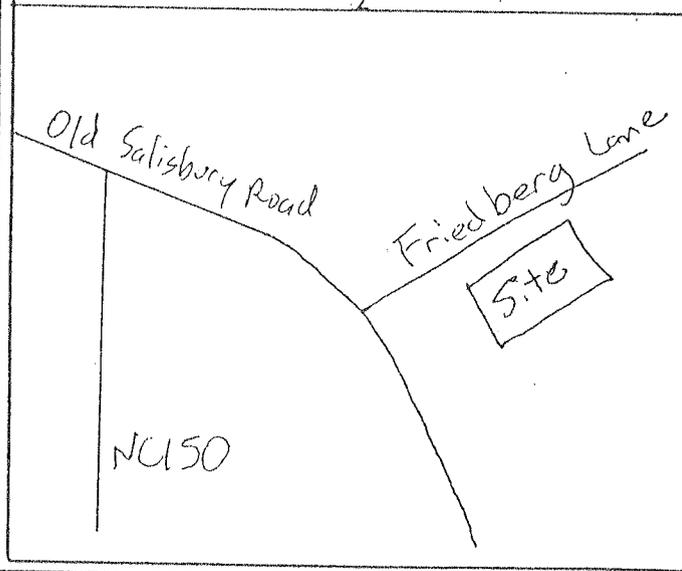
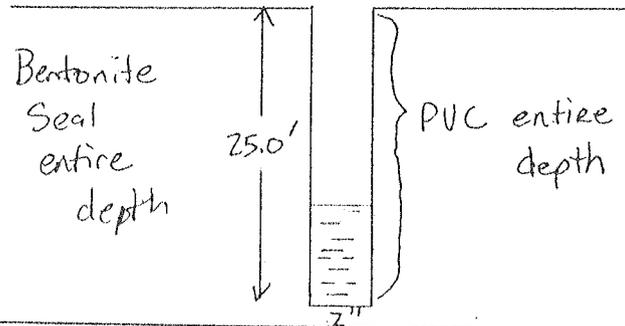
Amount 4 gallons

9. EXPLAIN METHOD EMPLACEMENT OF MATERIAL.

pour/wet

MW-4

WELL DIAGRAM: Draw a detailed sketch of the well showing total depth, depth and diameter of screens remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.



I do hereby certify that this well abandonment record is true and exact.

Signature of Contractor or Agent Steve Zyl

Date 1-4-96

WELL LOCATION: Draw a location sketch on the reverse of this sheet, showing the direction and distance of the well to at least two (2) nearby reference points such as roads, intersections and streams. Identify roads with State Highway road identification numbers.

Submit original to the Division of Environmental Management, one copy to the Driller, and one copy to the owner.

North Carolina
 Department of Natural Resources and Community Development
 Division of Environmental Management
 Groundwater Section
 P.O. Box 27687 - Raleigh, N.C. 27611

WELL ABANDONMENT RECORD

CONTRACTOR Geologic Exploration REG. NO. 1175

1. WELL LOCATION: (Show a sketch of the location on back of form.)
 Nearest Town: Winston Salem County Forsyth
Friedburg Lane
 (Road, Community, Subdivision, Lot No.) Quadrangle No.

2. OWNER: City of Winston Salem Utilities Div.

3. ADDRESS: PO Box 2511 Winston Salem, NC

4. TOPOGRAPHY: draw, slope, hilltop, valley, flat

5. USE OF WELL: monitor DATE: 12/28/95

6. TOTAL DEPTH: 16.0 ft DIAMETER: 2 inch

7. CASING REMOVED:

feet	diameter
N/A	N/A
_____	_____
_____	_____

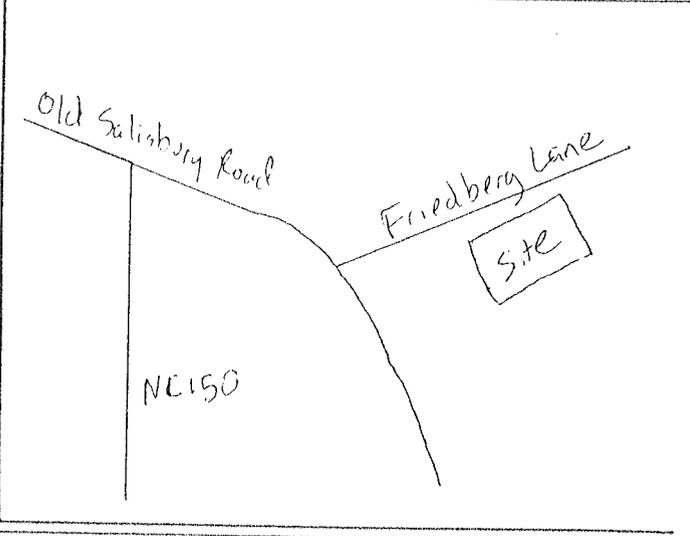
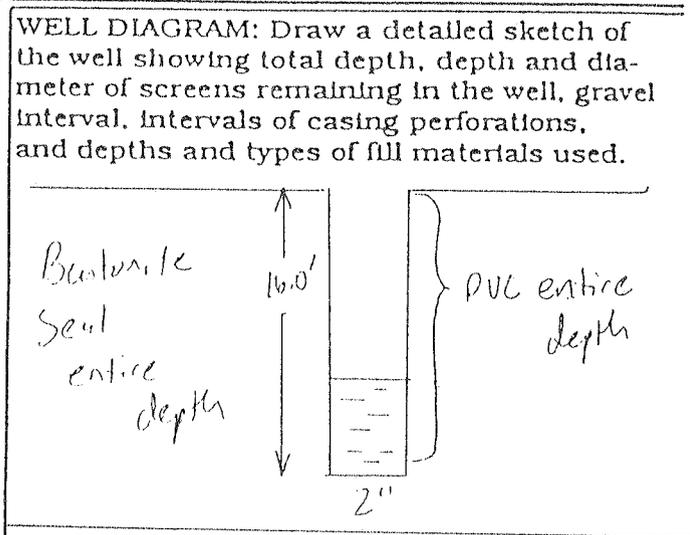
8. SEALING MATERIAL:

<u>Neat cement</u> bags of cement _____ gals. of water _____	<u>Sand cement</u> bags of cement _____ yds. of sand _____ gals. of water _____
--	--

Other
 Type material Bentonite Holeplug
 Amount 3 gallon

9. EXPLAIN METHOD EMPLACEMENT OF MATERIAL.
pour/wet

MW-2



I do hereby certify that this well abandonment record is true and exact.

Signature of Contractor or Agent *Steve Z...* Date 1-4-96

WELL LOCATION: Draw a location sketch on the reverse of this sheet, showing the direction and distance of the well to at least two (2) nearby reference points such as roads, intersections and streams. Identify roads with State Highway road identification numbers.

Submit original to the Division of Environmental Management, one copy to the Driller, and one copy to the owner.

North Carolina
 Department of Natural Resources and Community Development
 Division of Environmental Management
 Groundwater Section
 P.O. Box 27687 - Raleigh, N.C. 27611

WELL ABANDONMENT RECORD

CONTRACTOR Geologic Exploration REG. NO. 1175

1. WELL LOCATION: (Show a sketch of the location on back of form.)
 Nearest Town: Winston Salem County Forsyth
Friedburg Lane
 (Road, Community, Subdivision, Lot No.) Quadrangle No. _____

2. OWNER: City of Winston Salem Utilities Div.

3. ADDRESS: PO Box 2511 Winston Salem, NC

4. TOPOGRAPHY : draw, slope, hilltop, valley, flat

5. USE OF WELL: monitor DATE: 12/28/95

6. TOTAL DEPTH: 50.0 ft DIAMETER: 2 inch

7. CASING REMOVED:

feet	diameter
N/A	N/A
_____	_____
_____	_____

8. SEALING MATERIAL:

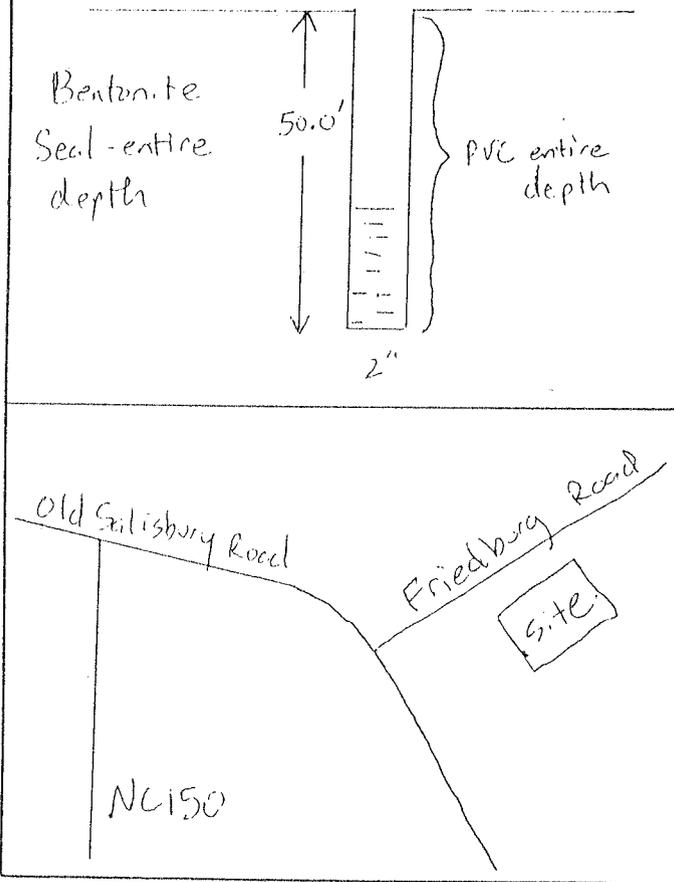
<u>Neat cement</u>	<u>Sand cement</u>
bags of cement _____	bags of cement _____
gals. of water _____	yds. of sand _____
	gals. of water _____

Other
 Type material Bentonite Holeplug
 Amount 8 gallons

9. EXPLAIN METHOD EMPLACEMENT OF MATERIAL.
pour/wet

 MW-1

WELL DIAGRAM: Draw a detailed sketch of the well showing total depth, depth and diameter of screens remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.



I do hereby certify that this well abandonment record is true and exact.

Signature of Contractor or Agent Steve Zyl Date 1-4-96

WELL LOCATION: Draw a location sketch on the reverse of this sheet, showing the direction and distance of the well to at least two (2) nearby reference points such as roads, intersections and streams. Identify roads with State Highway road identification numbers.

Submit original to the Division of Environmental Management, one copy to the Driller, and one copy to the owner.

March 8, 1999



Mr. Bobby Lutfy
North Carolina Department of Environment
and Natural Resources
Division of Solid Waste Management
Solid Waste Section
P. O. Box 27687
Raleigh, North Carolina 27611-7687

Re: Modifications to Ground-Water Monitoring Well Network
Winston-Salem Construction and Demolition Landfill (#34-12)
Forsyth County, North Carolina
HDR Project No. 00162-090-018



Dear Mr. Lutfy:

HDR Engineering, Inc. of the Carolinas (HDR) is hereby submitting, on behalf of the City of Winston-Salem Utilities Division, a request to modify the existing ground-water monitoring well network at the C&D Landfill located in Forsyth County, North Carolina. This request is being submitted for the following reasons:

- 1) The current location of existing ground-water monitoring wells MW-3 and MW-6 (see attached site drawing) are within the footprints of Phase II and III of the proposed landfill expansion plan. Therefore, these wells must be abandoned and replaced.
- 2) The permitting of Phase III requires the installation of a new ground-water monitoring well to monitor the quality of the ground water downgradient of this phase. The permitting of Phases II and III is ongoing at this time

At this time, there are seven wells in the C&D Landfill monitoring network. Please see attached Drawing D-1. During the most recent semiannual ground-water sampling event performed at the landfill in November 1998, earthwork had begun in the vicinity of monitoring well MW-3 for the preparation of base grades for Phase II. At present, stockpiled soil from the excavation of Phase II is located within the limits of Phase III. However, HDR is currently working on the permit application for both Phase II and Phase III. In addition, HDR has estimated that the life expectancy of Phase II would be 3.2 years and the life expectancy of Phase III would be 4.8 years.

HDR is proposing the following modifications to the existing ground-water monitoring well network at the C&D Landfill:

- 1) Abandon existing ground-water monitoring well MW-3 and install ground-water monitoring well MW-3R outside the limits of construction, just to the south of sedimentation basin No. 4 (approximately 75 feet from the edge of Phase II).

HDR Engineering, Inc.
of the Carolinas

Employee-owned

Suite 1400
128 S. Tryon Street
Charlotte, North Carolina
28202-5001

Telephone
704 338-6700
Fax
704 338-6760

Mr. Bobby Lutfy

March 8, 1999

Page 2

- 2) Abandon existing ground-water monitoring well MW-6 and install ground-water monitoring well MW-6R east of its present location at a distance of approximately 75 feet from the edge of Phase II.
- 3) Install ground-water monitoring well MW-8 outside the limits of construction, just west of sedimentation basin No. 5 at a distance of approximately 75 feet from the edge of Phase III.
- 4) Modify the existing Ground-Water Monitoring Plan to reflect these changes to the monitoring well network.

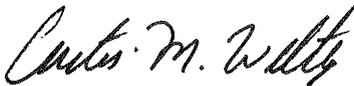
All wells installed would be constructed with 15-foot well screens and in accordance with the North Carolina Well Construction Standards, Subchapter 2C, Section .0100 utilizing a North Carolina-certified well driller. Well installation diagrams, abandonment records, soil boring, and survey coordinate data will be submitted to the Solid Waste Section upon completion of the work.

The sampling of the proposed ground-water monitoring well MW-8 would not be implemented until approximately 3 years after initiation of landfilling activities in Phase II. Water level measurements would be collected from this well on a semiannual basis until sampling is initiated. Adjustments to this implementation schedule may be made as airspace monitoring of Phase II is performed.

Please review this submittal and offer any comments you may have. If you have any questions or comments concerning the information summarized in this request, please do not hesitate to contact me at (704) 338-6832.

Sincerely,

HDR Engineering, Inc. of the Carolinas



for John R. Isham, P.G.
Project Hydrogeologist

JRI/nt

Attachments: Existing and Proposed Ground-Water Monitoring Well Locations

cc: Ed Gibson, Winston-Salem Solid Waste Administrator

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director



MEMORANDUM

To: Jan McHargue

Date: December 19, 1994

From: Jim Bateson *JMB*

cc: Bobby Lutfy

RE: Proposed Winston-Salem C&D Landfill; Hydrogeological Considerations.

I have reviewed the Geologic and Hydrogeological Report and the Groundwater Monitoring Plan for the above referenced permit application, submitted by S&ME, Inc. on June 10, 1994 and December, 1994, respectively. Before a complete technical review of the application can be completed, several items need to be addressed:

1. The quarter-mile radius maps (photographic and topographic blue-line versions) and the two-mile radius map need to be provided.
2. Estimates of volume percent water and porosity need to be provided for each major hydrological unit, as required by 15 NCAC 13B (.0504)(1)(c)(i)(E)(II and III). Total porosity needs to be provided for remolded cover soil samples as required by (F)(II).
3. Although a construction plan for the facility is yet to be submitted, Figure 3 of the Groundwater Monitoring Plan suggests that bottom grades in the footprint will be at 790 feet or lower. If this is the case, additional soil borings in the vicinity of B-1 and B-2, deep enough to intercept and measure groundwater levels, will be needed to assess vertical separation of seasonal high groundwater levels and waste. An amended piezometric map, based on a single sampling event of all existing piezometers on the site plus the new piezometers, needs to be prepared.
4. An estimate of long term variation of seasonal high groundwater level needs to be provided.
5. After the hydrogeological investigation is complete, temporary piezometers on the site need to be properly abandoned according to 2L rules by being drilled out and backfilled with cement-bentonite grout.

WINSTON
SALEM

including waste determination procedures where appropriate. Five sets of plans shall be required with each application.

(1) The following information shall be required for reviewing a site application for a proposed sanitary landfill:

NEED

(a) An aerial photograph on a scale of at least 1 inch equals 400 feet and a blueprint of the photograph accurately showing the area within one-fourth mile of the proposed site's boundaries with the following specifically identified:

- (i) Entire property owned or leased by the person proposing the disposal site;
- (ii) Land use and zoning;
- (iii) Location of all homes, industrial buildings, public or private utilities, and roads;
- (iv) Location of wells, watercourses, dry runs, and other applicable details regarding the general topography; and
- (v) Flood plains.

NEED

(b) A map on a scale of at least 1 inch equals 1000 feet showing the area within two miles of the proposed site's boundaries with the following specifically identified:

- (i) Significant ground-water users;
- (ii) Potential or existing sources of ground-water and surface water pollution;
- (iii) Water intakes;
- (iv) Airport and runways; and
- (v) Subdivisions.

(c) A geological and hydrological study of the site which provides:

- ✓ (i) Soil borings for which the numbers and depths have been confirmed by the Division and lab testing of selected soil samples that provide:
 - ✓ (A) standard penetration - resistance;
 - ✓ (B) particle size analysis;
 - ✓ (C) soil classification - USCS;
 - ✓ (D) geologic considerations (slopes, solution features, etc.);
 - ✓ (E) undisturbed representative geologic samples of the unconfined or confined or semiconfined hydrological units within a depth of 50 feet that provide the following information for each major lithologic units:
 - ✓ (I) saturated hydraulic conductivity (or by in-situ);
 - ✓ (II) volume percent water; and
 - ✓ (III) porosity;
 - ✓ (F) remolded sample of cover soils that provide:
 - ✓ (I) saturated hydraulic conductivity,
 - ✓ (II) total porosity,
 - ✓ (III) atterberg limits;
 - ✓ (G) stratigraphic cross-sections identifying hydrogeological units including lithology;

NEED
ON SAME

NEED

EHNH - SOLID WASTE MANAGEMENT 01/04/94

T15A: 13B .0500

(H) tabulation of water table elevations at time of boring, 24 hours, and seven days (The number of cased borings to provide this information shall be confirmed by the Division.); and

(I) boring logs;

(ii) A boundary plat locating soil borings with accurate horizontal and vertical control which are tied to a permanent onsite bench mark;

(iii) A potentiometric map of the surficial aquifer based on stabilized water table elevations; and

(iv) A report summarizing the geological and hydrological evaluation.

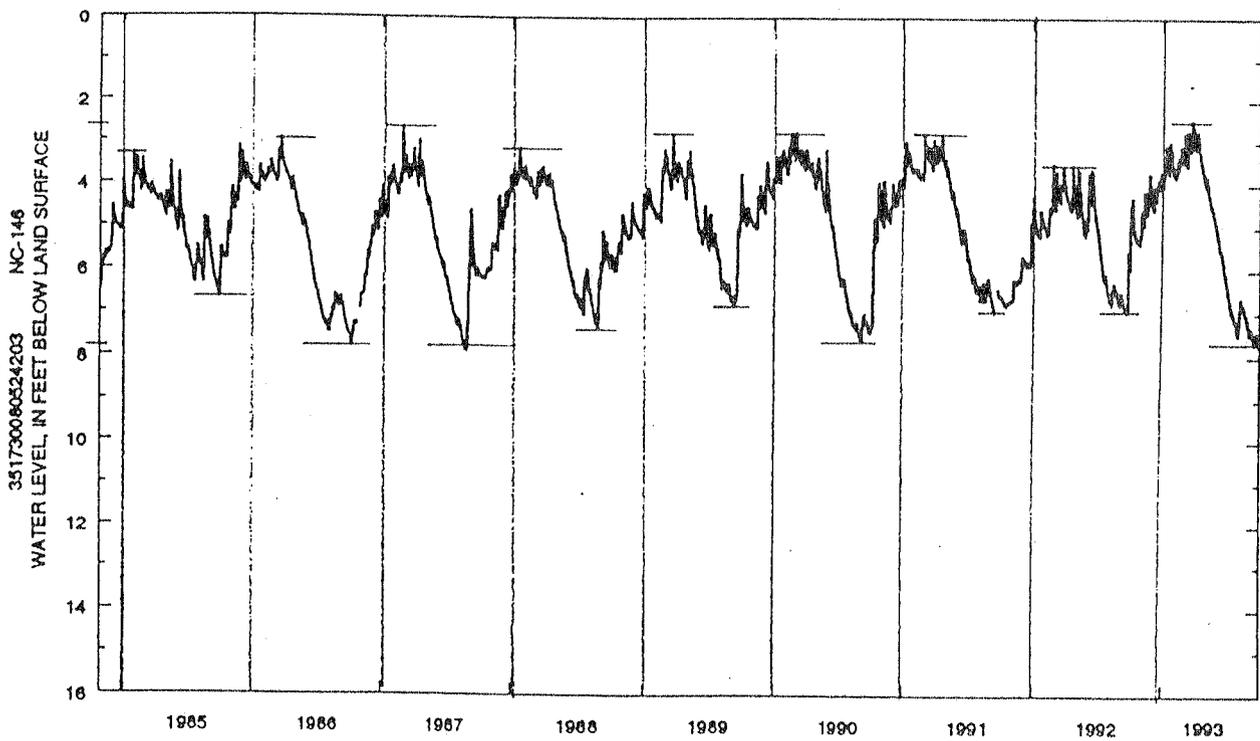
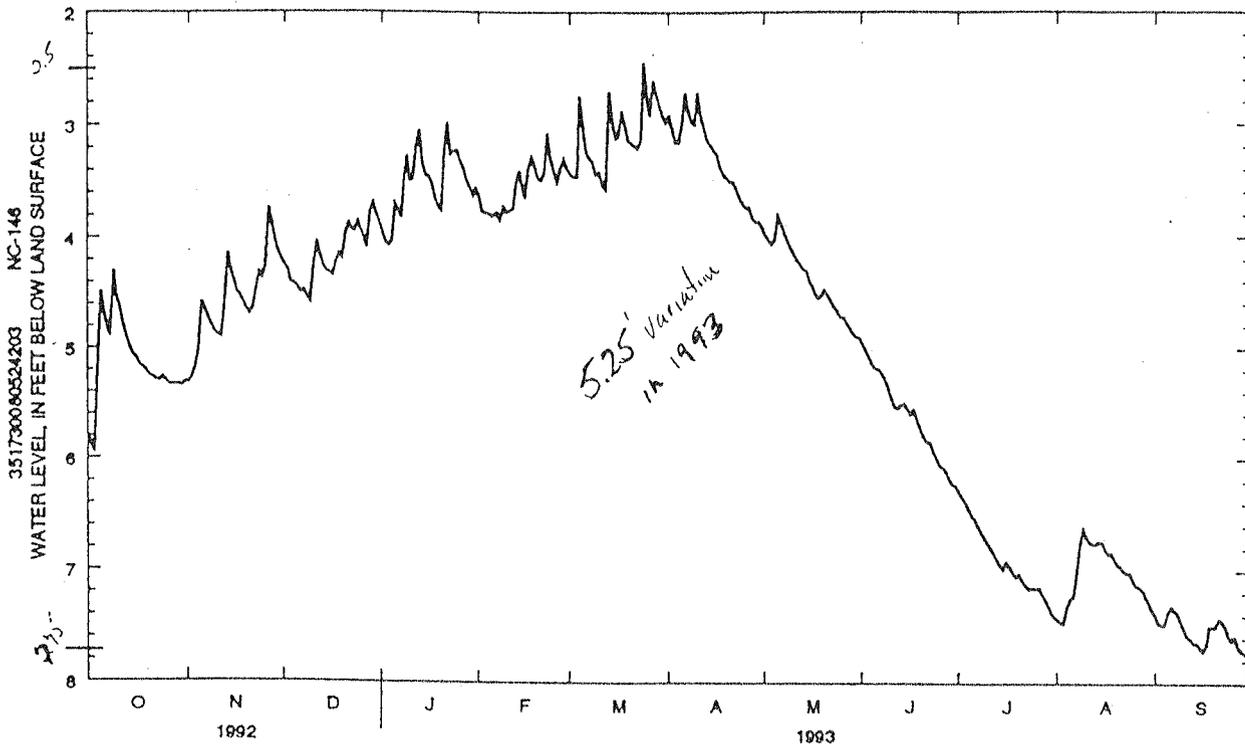
(d) A conceptual design plan presenting special engineering features or considerations which must be included or maintained in site construction, operation, maintenance and closure.

(e) Local government approvals:

(i) If the site is located within an incorporated city or town, or within the extra-territorial jurisdiction of an incorporated city or town, the approval of the governing board of the city or town shall be required. Otherwise, the approval of the Board of Commissioners of the county in which the site is located shall be required. Approval may be in the form of either a resolution or a vote on a motion. A copy of the resolution, or the minutes of the meeting where the vote was taken, shall be forwarded to the Division.

(ii) A letter from the unit of government having zoning jurisdiction over the site which states that the proposal meets all of the requirements of the local zoning ordinance, or that the site is

Mecklenburg County



WELL DESCRIPTIONS AND WATER-LEVEL MEASUREMENTS

MECKLENBURG COUNTY

351730080524203. Local number, NC-146.

LOCATION.--Lat 35°19'16", long 80°52'39", Hydrologic Unit 03050101, 6 mi south of Huntersville in Hornets Nest Park.

Owner: U.S. Geological Survey.

AQUIFER.--Unconfined saprolite derived from metamorphosed quartz diorite.

WELL CHARACTERISTICS.--Drilled observation well, depth 17.1 ft, diameter 4 in., cased to 12.1 ft, screened interval from 12.1 to 17.1 ft, sand filter packed from 12.1 to 17.1 ft.

INSTRUMENTATION.--Digital recorder with a 60-minute punch interval.

DATUM.--Land-surface datum is 730 ft above sea level, from topographic map. Measuring point: Top of casing, 1.90 ft above land-surface datum.

REMARKS.--Well is part of climatic-effects network.

PERIOD OF RECORD.--November 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.28 ft below land-surface datum, Mar. 24, 1993; lowest water level recorded, 7.91 ft below land-surface datum, Sept. 2 and 3, 1987.

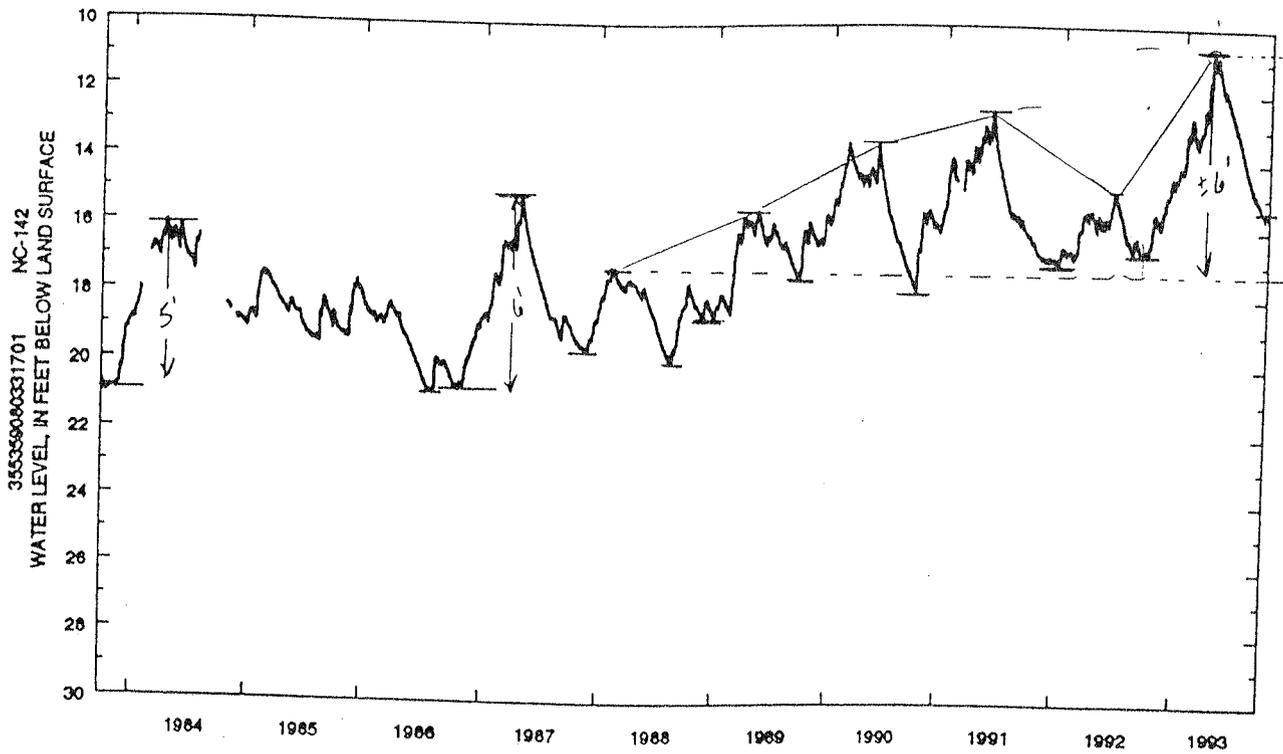
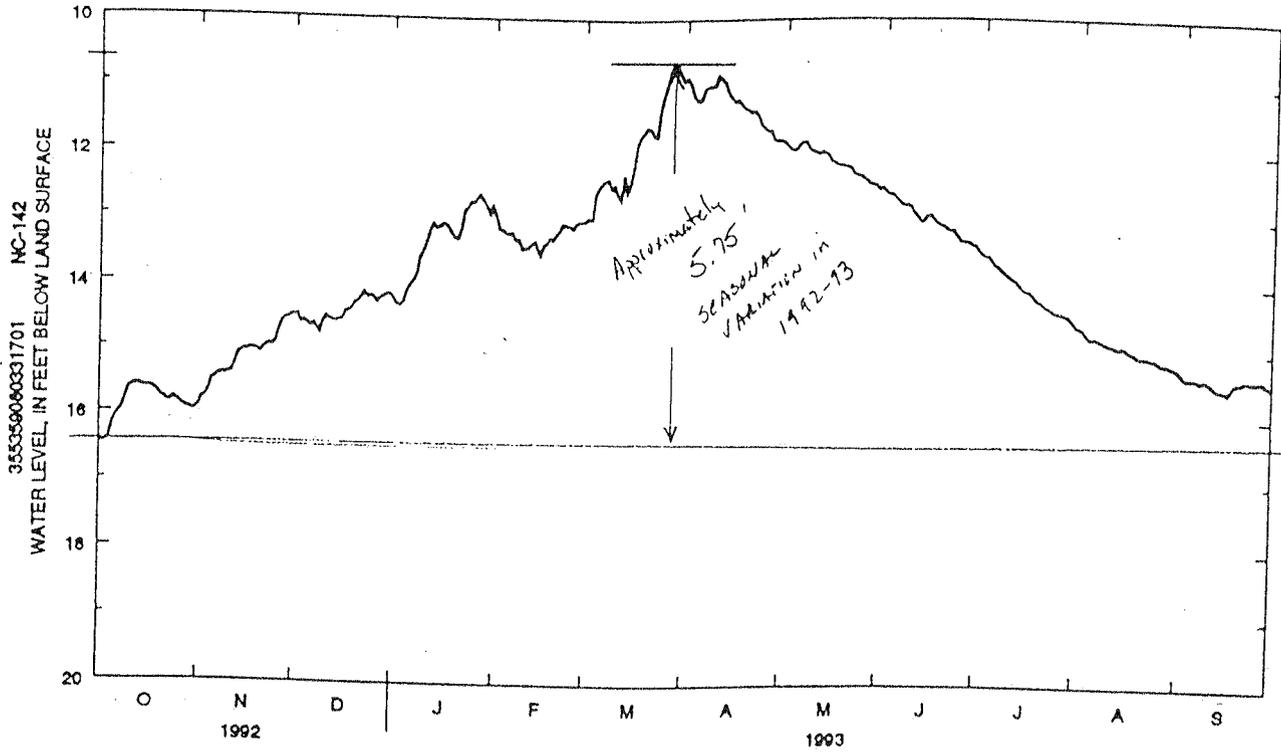
WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.79	5.32	4.25	3.95	3.63	3.44	2.93	3.97	4.96	6.30	7.43	7.40
2	5.87	5.27	4.30	4.04	3.77	3.46	3.04	4.02	5.03	6.34	7.46	7.46
3	5.95	5.19	4.41	4.07	3.78	3.46	3.16	4.06	5.08	6.39	7.47	7.48
4	5.19	5.03	4.41	4.04	3.79	2.75	3.16	4.03	5.14	6.45	7.32	7.48
5	4.49	4.59	4.45	3.71	3.81	3.04	3.00	3.81	5.19	6.50	7.25	7.37
6	4.66	4.65	4.50	3.76	3.78	3.24	2.72	3.88	5.19	6.54	7.22	7.32
7	4.83	4.73	4.48	3.82	3.84	3.30	2.88	3.96	5.23	6.60	6.99	7.35
8	4.89	4.80	4.54	3.45	3.73	3.33	2.98	4.04	5.28	6.65	6.74	7.38
9	4.30	4.86	4.58	3.28	3.78	3.44	3.00	4.10	5.36	6.70	6.63	7.45
10	4.52	4.89	4.25	3.49	3.76	3.43	2.72	4.16	5.45	6.74	6.70	7.52
11	4.66	4.90	4.04	3.48	3.74	3.54	2.94	4.21	5.53	6.80	6.74	7.58
12	4.79	4.59	4.17	3.17	3.50	3.57	3.03	4.25	5.55	6.84	6.76	7.60
13	4.90	4.15	4.26	3.06	3.41	2.71	3.14	4.29	5.52	6.89	6.76	7.64
14	5.00	4.30	4.30	3.35	3.56	2.96	3.18	4.31	5.50	6.95	6.73	7.64
15	5.07	4.40	4.32	3.45	3.65	3.12	3.23	4.39	5.55	6.98	6.75	7.68
16	5.10	4.50	4.34	3.46	3.39	3.10	3.26	4.45	5.60	6.92	6.80	7.71
17	5.16	4.53	4.22	3.54	3.29	2.88	3.37	4.51	5.56	6.96	6.85	7.67
18	5.18	4.59	4.15	3.66	3.37	2.99	3.44	4.55	5.64	7.02	6.84	7.50
19	5.21	4.65	4.18	3.73	3.48	3.14	3.47	4.53	5.73	7.05	6.89	7.49
20	5.25	4.69	3.96	3.76	3.49	3.16	3.50	4.48	5.80	7.03	6.94	7.50
21	5.27	4.65	3.88	3.23	3.43	3.19	3.51	4.52	5.85	7.09	6.96	7.43
22	5.29	4.48	3.93	2.99	3.08	3.21	3.57	4.57	5.85	7.13	7.00	7.44
23	5.30	4.32	3.94	3.26	3.29	3.13	3.65	4.63	5.92	7.16	7.02	7.50
24	5.27	4.36	3.86	3.24	3.42	2.45	3.70	4.67	6.00	7.15	7.02	7.57
25	5.30	4.26	3.93	3.23	3.51	2.78	3.74	4.72	6.05	7.16	7.09	7.62
26	5.34	3.75	4.00	3.32	3.39	2.92	3.73	4.72	6.08	7.15	7.13	7.59
27	5.34	3.87	4.09	3.37	3.31	2.61	3.82	4.77	6.11	7.21	7.15	7.68
28	5.34	4.03	3.78	3.49	3.39	2.72	3.86	4.82	6.18	7.26	7.17	7.71
29	5.34	4.14	3.70	3.55	---	2.83	3.86	4.87	6.22	7.32	7.24	7.73
30	5.35	4.20	3.79	3.63	---	2.92	3.90	4.90	6.24	7.37	7.29	7.76
31	5.31	---	3.86	3.57	---	2.98	---	4.91	---	7.41	7.35	---

WTR YR 1993 MEAN 4.91 HIGH 2.45 LOW 7.76

DAVIE COUNTY



WELL DESCRIPTIONS AND WATER-LEVEL MEASUREMENTS

DAVIE COUNTY

355359080331701. Local number, NC-142.

LOCATION.--Lat 35°53'59", long 80°33'17", Hydrologic Unit 03040102, 0.5 mi northeast of Mocksville on U.S. Highway 158 at B. C. Brocks Community Center. Owner: U.S. Geological Survey.

AQUIFER.--Unconfined weathered granite of Paleozoic age.

WELL CHARACTERISTICS.--Drilled observation well, drilled to 30.8 ft, diameter 6 in., cased to 30.8 ft, open end, backfilled with gravel from 20 to 30.8 ft.

INSTRUMENTATION.--Digital recorder with a 60-minute punch interval.

DATUM.--Land-surface datum is 835 ft above sea level (from topographic map). Measuring point: Top of casing, 1.0 ft above land-surface datum.

REMARKS.--In October 1982, well replaced nearby NC-110. Well is part of terrane-effects network.

PERIOD OF RECORD.--October 1981 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 10.64 ft below land-surface datum, Mar. 28, 1993; lowest water level recorded, 20.98 ft below land-surface datum, Oct. 24, 25, and 26, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.46	15.89	14.50	14.25	12.96	13.04	10.89	11.88	12.59	13.54	14.66	15.30
2	16.46	15.78	14.51	14.32	13.17	13.00	10.98	11.94	12.64	13.57	14.68	15.36
3	16.45	15.75	14.62	14.33	13.18	13.01	11.16	11.97	12.64	13.58	14.74	15.38
4	16.38	15.68	14.59	14.28	13.23	12.64	11.22	11.96	12.68	13.64	14.80	15.38
5	16.17	15.50	14.63	14.11	13.25	12.52	11.21	11.87	12.73	13.70	14.81	15.38
6	16.07	15.47	14.67	14.02	13.23	12.48	11.05	11.84	12.79	13.73	14.80	15.39
7	16.01	15.44	14.64	13.96	13.34	12.43	11.01	11.85	12.80	13.78	14.83	15.42
8	15.95	15.42	14.70	13.85	13.32	12.41	11.00	11.95	12.80	13.83	14.85	15.40
9	15.77	15.42	14.77	13.62	13.47	12.55	11.00	11.98	12.83	13.87	14.87	15.41
10	15.65	15.41	14.60	13.52	13.46	12.51	10.85	12.00	12.92	13.91	14.89	15.43
11	15.61	15.39	14.52	13.38	13.45	12.66	10.91	12.03	12.97	13.93	14.91	15.48
12	15.60	15.27	14.56	13.20	13.39	12.72	10.95	11.99	13.05	13.96	14.93	15.51
13	15.59	15.13	14.58	13.10	13.36	12.35	11.10	12.02	13.05	14.02	14.95	15.53
14	15.62	15.09	14.59	13.16	13.49	12.60	11.17	12.06	12.97	14.07	14.93	15.54
15	15.63	15.05	14.57	13.14	13.56	12.48	11.24	12.13	12.95	14.09	14.94	15.55
16	15.63	15.06	14.55	13.09	13.42	12.21	11.21	12.16	13.02	14.11	14.98	15.58
17	15.64	15.03	14.45	13.12	13.39	11.88	11.28	12.19	13.08	14.15	15.01	15.50
18	15.67	15.03	14.43	13.22	13.31	11.75	11.33	12.20	13.10	14.22	15.03	15.44
19	15.70	15.05	14.39	13.31	13.33	11.69	11.36	12.21	13.12	14.26	15.07	15.43
20	15.78	15.09	14.30	13.32	13.26	11.62	11.40	12.22	13.16	14.28	15.08	15.43
21	15.79	15.04	14.28	13.18	13.19	11.64	11.38	12.25	13.18	14.33	15.08	15.39
22	15.84	14.98	14.20	12.89	13.09	11.74	11.45	12.32	13.18	14.35	15.09	15.39
23	15.84	14.96	14.14	12.85	13.11	11.76	11.58	12.35	13.25	14.38	15.10	15.40
24	15.79	14.97	14.22	12.76	13.13	11.36	11.64	12.36	13.33	14.42	15.11	15.40
25	15.82	14.92	14.19	12.77	13.16	11.11	11.68	12.40	13.35	14.43	15.14	15.41
26	15.88	14.74	14.22	12.70	13.07	10.98	11.68	12.44	13.35	14.44	15.17	15.39
27	15.90	14.61	14.29	12.66	13.06	10.78	11.81	12.48	13.37	14.46	15.18	15.39
28	15.93	14.55	14.23	12.75	13.06	10.66	11.83	12.49	13.41	14.48	15.18	15.44
29	15.95	14.54	14.20	12.83	---	10.68	11.82	12.51	13.42	14.52	15.21	15.46
30	15.97	14.51	14.16	12.95	---	10.82	11.83	12.57	13.50	14.57	15.23	15.49
31	15.94	---	14.17	12.84	---	10.92	---	12.54	---	14.64	15.25	---

WTR YR 1993 MEAN 13.76 HIGH 10.66 LOW 16.46

June 26, 1995



Ms. Jan McHargue, P.E.
NCDEHNR
Solid Waste Section
585 Waughtown Street
Winston-Salem, NC 27107-2241

Re: Proposed Construction and Demolition Landfill
Winston-Salem, North Carolina
Response to Comments from Jim Bateson, dated April 27, 1995
HDR Project No. 00162-082-018

Dear Ms. McHargue:

This letter is provided in response to the memorandum to you from Jim Bateson, dated April 27, 1995. The comments have been retyped in *italics*, with the responses following. Per our previous discussions, please insert this response letter behind the tab entitled "Exhibit 4 - Review Comments and Responses." Some of the information attached herewith should replace previously submitted material. These items are referenced in the responses below.

NCDEHNR April 27, 1995, Comments

1. *Section .0504(1)(a) of 15A NCAC 13B requires two versions of the quarter-mile map: one, a photographic version similar to the one already submitted, and another blueline version with topographic contours. The current photographic version was printed with the mylar reversed left to right. On both versions, the following need to be specifically marked:*

A corrected and updated aerial photograph is included herewith. Take out the existing aerial photograph and replace with the attached aerial photograph. Also, a topographic version of the quarter-mile map has been prepared and is included herewith.

- ii) *land use and zoning*

Land use and zoning classifications have been shown or noted on both versions of the quarter-mile map.

- iii) *utilities; power lines and the public water supply lines need to be shown and labeled.*

Utilities, power lines, and public water lines have been located and shown or noted on both versions.

- iv) *Location of all wells within the quarter-mile radius. For those areas substantially further than 500 feet away from the proposed waste boundaries, a note in the margin of the map, stating that residences may have private wells, will suffice. For those lots adjacent to the site, the exact location of all wells needs to be shown on the map. If private wells are located on the back parts of any of those lots, the 500-foot buffer needs to be measured from the wells, and not the residences. The waste boundaries may then require adjustment. If the operators or their consultants do not wish to locate all of the nearby wells, they have the option of locating the waste boundaries 500 feet from the edges of the adjacent residential properties.*

The City has recently sent letters to all area residences requesting that information regarding private drinking water wells be returned to the Utility Department. While all responses have not been received, two residents located on June Lane (Little, 5635 June Lane; and Bertini, 5665 June Lane) have indicated that they do have residential wells. Both residents are connected to public water supply, and city staff has verified that the well at 5665 June Lane is inactive. City staff will follow up as other responses are received from the area residents.

The 500-foot buffer line adjacent to June Lane has been relocated based on the location of the two known drinking water wells. This shift was approximately 40 feet. Based on the minimal number of homes which could influence the 500-foot buffer line by the existence of a drinking water well, it is anticipated that no future adjustment to the buffer line will be required. When all responses have been received from the area residents, further correspondence will be transmitted to the section.

- v) *margins of flood plains.*

From an obtained flood insurance map, pertinent floodplains are shown on both versions of the quarter-mile map.

2. *On the two-mile map, if none of the items (i) through (iv) occur within the radius, then this needs to be noted specifically for each in the margin of the map.*

The two-mile radius map has been updated and is included herewith. Remove the existing two-mile map and replace it with the conformed two-mile map attached.

Items (i) through (iv) have been researched and noted on the conformed two-mile map.

3. *In section 8.8 of the Site Plan Report, the reference to a 100-foot buffer between disposal areas and property lines needs to be changed to 200 feet.*

Remove pages eleven and twelve which include section 8.8 and replace with the revised pages attached.

The 100-foot buffer was modified in the text.

4. *Grading limits will need to be raised in the easternmost part of the proposed footprint, near soil boring B-3. Base grades needs to be at least four feet above long-term seasonable high ground water levels, estimated by S&ME to be six feet above the February 1995 levels contoured in the recently submitted potentiometric surface map. Although the February 1995 readings were lower, in some cases, than previous readings; and therefore, do not represent the seasonable high, the Section feels that the six feet of additional vertical separation meant to account for long-term variation of the seasonable high is generous enough to account, as well, for some uncertainty in the seasonal high for this year.*

Base grade changes will be redesigned, as necessary, and the updated design will be submitted in the Construction Plan Application.

5. *In the monitoring plan, the list of constituents to be analyzed needs to be changed. Sampling and Analysis Requirements for Construction and Demolition Landfills, recently revised by the Solid Waste Section, is attached.*

Remove Table 2 in the monitoring plan of Exhibit 3 and replace with revised list of constituents attached.

Table 2 - list of constituents was revised with the new list obtained from the Solid Waste Section.

6. *The Solid Waste Section issues permits for landfill units designed to contain a maximum of five years of projected fill. The monitoring system needs to be designed to monitor the first five-year cell. If Phase I of the proposed landfill is intended to accommodate five years of fill, then volume estimates for that period need to be included in the application.*

Phase I is intended to accommodate approximately five years of fill. Two of the groundwater monitoring wells currently in place may conflict with the revised base grade

Ms. Jan McHargue, P.E.

June 26, 1995

Page 4

plan prepared for the Construction Plan Application. The revisions proposed for the groundwater monitoring plan will be further addressed in the Construction Plan.

7. *The proposed monitoring plan needs to be revised to reflect the currently proposed footprint, rather than the rectangular conceptual footprint shown on S&ME's plan sheets. Proposed waste boundaries need to be clearly marked on the monitoring plan. The revised version of the monitoring plan may be submitted with the construction plan application.*

The revised groundwater monitoring plan will be submitted with the Construction Plan Application.

Other Attached Information

1. The City of Winston-Salem has created a response to all C & D written comments received as of June 8, 1995. The attached response should be placed in Exhibit 4 of the Site Plan Application.
2. S & ME of Greensboro has compiled a temporary monitor well abandonment report for the C & D Site (per comment No. 5 by Jim Bateson in December 19, 1994, memorandum to Jan McHargue). The attached report should be placed in Exhibit 4 of the Site Plan Application.

Sincerely,

HDR Engineering, Inc. of North Carolina

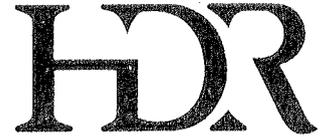
Joseph C. Readling, P.E.

Project Manager

JCR/nct

List of Attachments: Revised 1/4-Mile Aerial Photograph
New 1/4-Mile Topographic Map
Revised 2-Mile Regional Map
Revised Pages 11 and 12 of Site Plan Report
Revised List of Monitoring Plan Constituents
New City of Winston-Salem Response
New Temporary Well Abandonment Report

July 19, 1995



Ms. Jan McHargue, P.E.
NCDEHNR Solid Waste Section
585 Waughtown Street
Winston-Salem, NC 27107-2241

Re: Proposed Construction and Demolition Landfill
Winston-Salem, North Carolina
Response to Comments from Jan McHargue, dated July 11, 1995
HDR Project No. 00162-082-018

Dear Ms. McHargue:

This letter is provided in response to your letter dated July 11, 1995. The comments have been retyped in *italics*, with the responses following. Per our previous discussions, please insert this response letter behind the tab entitled "Exhibit 4 - Review Comments and Responses." Some of the information attached herewith should replace previously submitted material. These items are referenced in the responses below.

NCDEHNR July 11, 1995, Comments

1. *The locations of wells within the 1/4-mile radius must be shown on the aerial photo, as per 15A NCAC 13B .504(1)(a)(iv)*

Corrected and updated 1/4-mile radius maps are included within. Take out the existing aerial photograph and the existing topographic version and replace with the attached maps. The locations of wells within the 1/4-mile radius have been noted on both maps. Only two wells are adjacent to the 500-foot buffer (5635 and 5665 June Lane); and they are depicted on both the photograph and the topographic map. The addresses of other residences with wells within the one-fourth mile radius are shown on the topographic map. The 500-foot buffer on the Construction Plan drawings is accurate as submitted, because the existence of the two wells on June Lane was discovered prior to submittal of the Construction Plan application.

2. *The groundwater monitoring plan must indicate that wells will be screened at a maximum of 15 feet.*

Remove page 8 of Exhibit 3, Chapter 4, and replace with the revised page 8. Also, the Construction Plan Application references additional wells which will be installed. These future wells will also have a screened interval not to exceed 15 feet.

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Ms. Jan McHargue, P.E.
July 19, 1995
Page 2

3. *The written documentation indicating compliance with Siting Criteria .503(1)(b)(i)(ii) and (iv) must be submitted.*

HDR contacted the National Heritage Program of the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR) and the U.S. Fish and Wildlife Service, and received their input regarding any potential endangered or threatened species of plants, fish, or wildlife. Both Inge Smith, Information Specialist for NCDEHNR, and Brian Cole, field supervisor for the U.S. Fish and Wildlife Service, concluded that there are no known endangered or threatened species of plants, fish, or wildlife at the proposed site. An HDR staff environmental scientist investigated the site on May 8, 1995. No evidence of threatened and endangered species or habitat was found.

After conducting several phone calls to the Parks and Recreation Departments of Forsyth County, Davidson County, City of Winston-Salem, and NCDEHNR, it was determined that there are not any state parks or recreational/scenic areas that will be impacted by the proposed landfill site. For lands included in the state nature and historic preserve, please refer to the archaeological and historical sites survey in Exhibit 2, Section C of the Site Plan Application. Again, the findings of the archaeological survey concluded that no future investigation is required.

Very truly yours,

HDR Engineering, Inc. of North Carolina



Joseph C. Readling, P.E.
Project Manager

JCR/det

Attachment

cc: Dan Miles