



## Macon County Department of Solid Waste Management

109 Sierra Drive, Franklin, North Carolina 28734

Phone: (828) 349-2100; Fax: (828) 349-2185

Email: [cstahl@maconnc.org](mailto:cstahl@maconnc.org)

July 7, 2008

Mr. Ervin Lane  
Hydrologist  
Environmental Compliance  
Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646



RE: Replacement of Monitoring Well (MW-6C) at the Old Franklin Landfill;  
Permit #57-01

Mr. Lane:

I spoke with you in October of 2007 regarding a blockage in groundwater monitoring well MW-6C at the Old Franklin Landfill. This blockage was discovered by REI Consultants during the October 2007 sampling event. At that time, we discussed replacement of the well prior to the April 2008 sampling event. Macon County contracted with Brooks Engineering Associates to perform the construction of the new monitoring well and the abandonment of the existing damaged well. Attached to this letter you will find a summary of BEA's activities regarding this project as well as well construction logs and well abandonment record.

This new well was sampled in April 2008 by REI Consultants, and a copy of this report is being forwarded to them so that the well construction and coordinate information can be entered into our groundwater monitoring site-sampling plan. Should you have any questions or require additional information, please contact me at your convenience.

Sincerely,

Michael Chris Stahl  
Director of Solid Waste Management

CC: Jack Horton, County Manager  
Mike Hofe, REI Consultants



June 25, 2008

Macon County Solid Waste Department  
109 Sierra Drive  
Franklin, North Carolina 28734

Attention:    Mr. Chris Stahl

Regarding:    Report of Groundwater Monitoring Well MW-6C Replacement  
Old Franklin Landfill Site – Lake Emory Road, Franklin, NC  
BEA Project #307308 – Revision #1

Dear Mr. Stahl:

Brooks Engineering Associates (BEA) has completed the tasks associated with installing a new groundwater monitoring well (MW-6C) to replace the previously existing MW-6C at the old Franklin landfill site located on Lake Emory Road in Franklin, Macon County, North Carolina. BEA has also properly abandoned the previously existing MW-6C according to North Carolina Department of Environment and Natural Resources (NCDENR) protocol. This letter is to serve as the Report of Proceedings.

## **BACKGROUND**

Macon County contracted with BEA to provide professional environmental services based on the Scope of Work presented in your Request for Bids, dated December 14, 2007. The following tasks were performed by BEA based on the Scope of Services presented in our Proposal for Professional Services dated January 7, 2008:

1. Installation of a new groundwater monitoring well in close proximity to the existing damaged monitoring well on the site.
2. Oversee the abandonment of the damaged well. This existing well was to be closed in accordance with applicable NCDENR well closure protocol.
3. Survey the new well installed and prepare a map of the area to include latitude and longitude of the well location, well elevation and surrounding area features.
4. Preparing a report of the project activities to include the well installation report for the new well and the well closure report for the abandoned well.

## **FIELD ACTIVITIES**

On March 31, 2008, a BEA environmental professional met onsite with personnel from Hedden Brothers Well Drilling (a NC licensed water well driller) and installation of the new monitoring well was begun under his oversight.

The well boring was advanced to a total depth of 105 feet below ground surface (bgs) using an air rotary drill rig. Perched groundwater was encountered at 65' bgs and a saprolite and rock zone was encountered at 100' bgs. A soil boring log showing soil lithology is presented as the attached Figure 1.

BEA conducted continuous soil sampling and field screening using visual and olfactory methods during the installation of the borings potentially contaminated areas. Soil samples were also collected every 15' bgs and screened for volatile organic compounds (VOCs) using a field testing instrument equipped with a Photoionization Detector (PID). The field screening results are presented in the following Table 1.

Sample #	Depth (ft. bgs)	Odors/Discoloration	PID Reading
1	0	None	0.0
2	15	None	0.1
3	30	None	0.2
4	45	None	0.3
5	60	None	0.7
6	90	None	0.4
7	105	None	0.2

Based on the subsurface geology observed at the well depth presented in the Request for Bids (a mixture of rock and saprolite at 105' bgs), it was determined that a potential exists that groundwater collected at this depth could potentially be impacted by contaminants that have been identified to be present in the upper perched groundwater zones. Based our discussions with you onsite, a decision was made to reinstall the new two-inch monitor well with a six-inch exterior casing down to a depth of 100' bgs to ensure that contaminated perched groundwater did not migrate downward into the aquifer groundwater.

On April 1, 2008, Hedden Brothers Well Drilling installed the six-inch outer casing to a depth of 100' bgs. The two-inch well was advanced inside the 6-inch casing until bedrock was encountered at 105' bgs. Portland cement was placed in the opening between the 6" and 2" wells from the bottom of the 6" casing to ground surface to ensure that no perched groundwater from upper zones would migrate into the aquifer. The two-inch well was advanced into the bedrock to 134' bgs where aquifer groundwater was encountered. The two-inch boring was completed at a total depth of 140' bgs. The water yield at this depth was determined to be 1.50 to 1.75 gallons per minute. A 10-foot section of 0.10-inch slotted well screen was placed across the water table at the bottom of the well and a sand pack was installed into the well annulus to a depth of one to two feet above the well screen. A two-foot bentonite seal was placed above the sand pack and allowed to cure for 48 hours prior to completion of sealing the boring to ground surface with Portland cement. A three foot by three foot concrete well pad was installed and the new well was encased in an aboveground well vault. The vault was installed so as to rise two to three feet above ground surface. The well vault was equipped with a lockable metal casing. The well installation report from Hedden Brothers Well Drilling is presented as Attachment A.

On April 4, 2008, BEA personnel returned to the site and developed the newly installed monitor well. Water was purged from the well until all visible fines had been removed and the field analytical

parameters stabilized. Field analysis data for groundwater development water purged from the monitor well are presented in the following Table 2.

Sample #	Time	Temp.(°C)	pH	Turb.(ntu)	Cond.(µs/cm)	DO (mg/l)
1	10:45	16.0	6.09	88	0.323	10.83
2	11.15	15.3	5.73	88	0.270	11.04
3	11.45	15.4	5.67	39	0.264	10.96
4	12.15	15.4	5.66	18	0.261	11.00
5	12.45	15.5	5.65	10	0.262	11.05
6	13.15	15.4	5.65	8.9	0.260	11.00
7	14.00	15.5	5.67	8.8	0.262	11.01

Well development water was stored in a polyethylene drum onsite. Disposal of the well development water is the responsibility of Macon County.

### **ABANDONMENT OF DAMAGED WELL #6C**

The damaged #6C well was closed using NCDENR protocols. The well was filled with a mixture of grout and lean Portland cement from the bottom of the well to ground surface. The well closure report was prepared by Hedden Brothers Well Drilling, a State of NC licensed water well driller, and is presented as Attachment B.

### **WELL SURVEYING**

A BEA licensed land surveyor surveyed the newly installed monitor well on May 2, 2008. The new well is located at latitude 35°12'38.562" and longitude 83°21'57.563" based upon NAD 83 coordinate system. The elevation of the newly installed MW-6C was determined to be 2134.22' based upon adjacent well relative elevations. A map showing the well location, elevation and surrounding features is presented as Figure 2.

If you have any questions regarding this project, please contact us at (828) 232-4700. We appreciate the opportunity to provide our professional services to you and Macon County.

Sincerely

**Brooks Engineering Associates, P.A.**



Mark Brooks, P.E.  
Environmental Engineer



Richard Beale, C.E.P  
Project Manager

Figures: Figure 1 – Soil Boring Log  
Figure 2 – Map of New Well

Attachments: Attachment A – New Well Construction Record  
Attachment B – Old Well Abandonment Record

**Figure 1**  
**BEA Well Boring Log**



PROJECT: REPLACEMENT OF MW-6B  
OLD MACON COUNTY LAND FILL

LOCATION: MACON COUNTY, NC

BOREHOLE ID: #6B

DATE: 3/31/08

**FIGURE 1: SOIL BORING LOG**

DEPTH (BGS)	LITHOLOGY	COMMENTS
0' 5' 10' 15' 20' 25' 30' 35' 40' 45' 50' 55' 60'	BROWN, SANDY LOAM	
	PERCHED GROUNDWATER BEGINNING AT 60' BGS	
65' 70' 75' 80' 85' 90'	BROWN, SANDY LOAM ROCK AND SAPROLITE	
95' 100' 105'	ROCK AND SAPROLITE	
110' 115' 120' 125' 130'	BEDROCK	
135' 140'	∇ AQUIFER WATER LEVEL AT 134' BGS WELL COMPLETED AT 140' BGS	WATER YIELD OF 1.5-1.75 GPM
145' 150'		

**Figure 2**  
**Well Location Map**

**Attachment A**  
**New Well Construction Record**



# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2044

### 1. WELL CONTRACTOR:

Christopher D. Hedden  
 Well Contractor (Individual) Name  
Hedden Bros. Well Drilling, Inc.  
 Well Contractor Company Name  
73 Holly Hills Vista Rd  
Franklin, NC 28734  
 City or Town State Zip Code  
828-369-9591  
 Area code - Phone number

### 2. WELL INFORMATION:

SITE WELL ID # (if applicable) \_\_\_\_\_  
 WELL CONSTRUCTION PERMIT # (if applicable) \_\_\_\_\_  
 OTHER ASSOCIATED PERMIT # (if applicable) \_\_\_\_\_

### 3. WELL USE (Check Applicable Box) Monitoring Municipal/Public Industrial/Commercial Agricultural Recovery Injection Irrigation Other (list use) \_\_\_\_\_

DATE DRILLED 4-16-08  
 TIME COMPLETED 3:00 AM  PM

### 4. WELL LOCATION:

CITY: Franklin COUNTY Macon  
Macon Co. Landfill  
 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

### TOPOGRAPHIC / LAND SETTING:

Slope  Valley  Flat  Ridge  Other \_\_\_\_\_  
 (check appropriate box)

LATITUDE 33 21 57.4 W  
 LONGITUDE 83 12 38.6 N

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source:  GPS  Topographic map  
 (location of well must be shown on a USGS topo map and attached to this form if not using GPS)

### 5. FACILITY - Is the name of the business where the well is located.

FACILITY ID # (if applicable) \_\_\_\_\_  
 NAME OF FACILITY Macon Co Landfill  
 STREET ADDRESS 109 Sierra Drive  
Franklin, NC 28734  
 City or Town State Zip Code  
 CONTACT PERSON Richie Beale  
 MAILING ADDRESS 17 Arlington Street  
Shelby, NC 28801  
 City or Town State Zip Code  
828-349-2100  
 Area code - Phone number

### 6. WELL DETAILS:

a. TOTAL DEPTH: 140'  
 b. DOES WELL REPLACE EXISTING WELL? YES  NO   
 c. WATER LEVEL Below Top of Casing: \_\_\_\_\_ FT.  
 (Use "\*" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface\*  
 \*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type \_\_\_\_\_ Amount \_\_\_\_\_

g. WATER ZONES (depth):  
 From \_\_\_\_\_ To \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
 From \_\_\_\_\_ To \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_  
 From \_\_\_\_\_ To \_\_\_\_\_ From \_\_\_\_\_ To \_\_\_\_\_

7. CASING: Depth Diameter Thickness/Weight Material  
 From 2 To 140 Ft. 2" \_\_\_\_\_ PVC  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_

8. GROUT: Depth Material Method  
 From 0 To 127 Ft. Cement pumped  
 From 127 To 199 Ft. kenoxite pumped  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_

9. SCREEN: Depth Diameter Slot Size Material  
 From 130 To 140 Ft. 2" in. \_\_\_\_\_ in. PVC  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_ in. \_\_\_\_\_ in. \_\_\_\_\_

10. SAND/GRAVEL PACK:  
 Depth Size Material  
 From 129 To 140 Ft. \_\_\_\_\_ sand  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_  
 From \_\_\_\_\_ To \_\_\_\_\_ Ft. \_\_\_\_\_

11. DRILLING LOG  
 From To Formation Description  
0 90 mixed clay & sand  
90 140 granite

### 12. 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.

Chris Hedden 4-16-08  
 SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

Chris Hedden  
 PRINTED NAME OF PERSON CONSTRUCTING THE WELL

**Attachment B**  
**Old Well Abandonment Record**



# WELL ABANDONMENT RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2046

### 1. WELL CONTRACTOR:

Jerry E. Tallent  
 Well Contractor (Individual) Name  
Hedden Bros. Well Drilling, Inc.  
 Well Contractor Company Name  
23 Holly Hills Vista Rd  
Franklin NC 28734  
 City or Town State Zip Code  
828-369-9591  
 Area code - Phone number

### 2. WELL INFORMATION:

SITE WELL ID # (if applicable) \_\_\_\_\_  
 STATE WELL PERMIT # (if applicable) \_\_\_\_\_  
 COUNTY WELL PERMIT # (if applicable) \_\_\_\_\_  
 DWQ / OTHER PERMIT # (if applicable) \_\_\_\_\_  
 WELL USE (Circle applicable use):  Monitoring  Residential  
 Municipal/Public  Industrial/Commercial  Agricultural  
 Recovery  Injection  Irrigation  
 Other (list use) \_\_\_\_\_

### 3. WELL LOCATION:

COUNTY MACON QUADRANGLE NAME \_\_\_\_\_  
 NEAREST TOWN: FRANKLIN  
Macon County Landfill  
 (Street/Road Name, Number, Community, Subdivision, Lot No., Parcel, Zip Code)  
 TOPOGRAPHIC / LAND SETTING:  
 Slope: Valley Flat Ridge Other \_\_\_\_\_  
 (Circle appropriate setting)

LATITUDE 83 21 \_\_\_\_\_  
 LONGITUDE 35 12 \_\_\_\_\_  
 May be in degrees, minutes, seconds, or in a decimal format

Latitude/longitude source:  GPS  Topographic map  
 (Location of well must be shown on a USGS topo map and attached to this form if not using GPS.)

### 4a. FACILITY: The name of the business where the well is located. Complete 4a and 4b. (If a residential well, skip 4a; complete 4b, well owner information only.)

FACILITY ID # (if applicable) \_\_\_\_\_  
 NAME OF FACILITY Macon Co. Landfill  
 STREET ADDRESS 109 Sierra Drive  
Franklin NC 28734  
 City or Town State Zip Code

### 4b. CONTACT PERSON/WELL OWNER:

NAME Richie Peale  
 STREET ADDRESS 17 Arlington Street  
Asheville, NC 28801  
 City or Town State Zip Code  
828-349-2100  
 Area code - Phone number

### 5. WELL DETAILS:

a. Total Depth: \_\_\_\_\_ ft. Diameter: \_\_\_\_\_ in.  
 b. Water Level (Below Measuring Point): \_\_\_\_\_ ft.  
 Measuring point is \_\_\_\_\_ ft. above land surface.

6. CASING: Length Diameter  
 a. Casing Depth (if known): \_\_\_\_\_ ft. \_\_\_\_\_ in.  
 b. Casing Removed: \_\_\_\_\_ ft. \_\_\_\_\_ in.

7. DISINFECTION: \_\_\_\_\_  
 (Amount of 65%-75% calcium hypochlorite used)

8. SEALING MATERIAL:  
Neat Cement Sand Cement  
 Cement 235 lb. Cement \_\_\_\_\_ lb.  
 Water \_\_\_\_\_ gal. Water \_\_\_\_\_ gal.

Bentonite  
 Bentonite \_\_\_\_\_ lb.  
 Type: Slurry Pellets \_\_\_\_\_  
 Water \_\_\_\_\_ gal.

Other  
 Type material \_\_\_\_\_  
 Amount \_\_\_\_\_

### 9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL:

pumped portland from bottom to top

### 10. WELL DIAGRAM: Draw a detailed sketch of the well on the back of this form showing total depth, depth and diameter of screens (if any) remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.

### 11. DATE WELL ABANDONED April 16, 2008

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

Jerry E. Tallent 4/16/08  
 SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE

SIGNATURE OF PRIVATE WELL OWNER ABANDONING THE WELL DATE  
 (The private well owner must be an individual who personally abandons his/her residential well in accordance with 15A NCAC 2C.0113.)

Jerry E. Tallent  
 PRINTED NAME OF PERSON ABANDONING THE WELL



## Macon County Department of Solid Waste Management

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Phone: (828) 349-2100; Fax: (828) 349-2185

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July 7, 2008

Mr. Ervin Lane  
Hydrologist  
Environmental Compliance  
Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646

RE: Replacement of Monitoring Well (MW-6C) at the Old Franklin Landfill;  
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Mr. Lane:

I spoke with you in October of 2007 regarding a blockage in groundwater monitoring well MW-6C at the Old Franklin Landfill. This blockage was discovered by REI Consultants during the October 2007 sampling event. At that time, we discussed replacement of the well prior to the April 2008 sampling event. Macon County contracted with Brooks Engineering Associates to perform the construction of the new monitoring well and the abandonment of the existing damaged well. Attached to this letter you will find a summary of BEA's activities regarding this project as well as well construction logs and well abandonment record.

This new well was sampled in April 2008 by REI Consultants, and a copy of this report is being forwarded to them so that the well construction and coordinate information can be entered into our groundwater monitoring site-sampling plan. Should you have any questions or require additional information, please contact me at your convenience.

Sincerely,

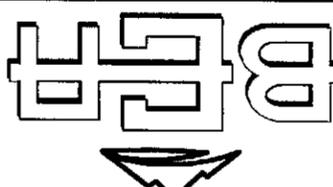
A handwritten signature in black ink, appearing to read 'Michael C. Stahl'.

Michael Chris Stahl  
Director of Solid Waste Management

CC: Jack Horton, County Manager  
Mike Hofe, REI Consultants

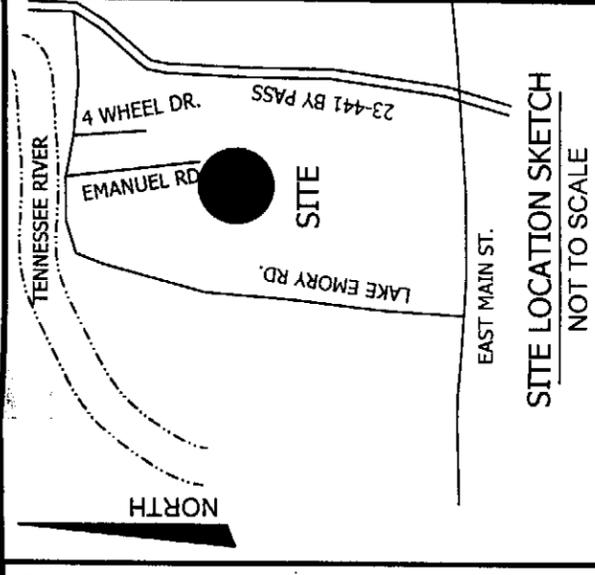
MACON COUNTY  
 PROPERTY PIN: 6596-04-60-3276  
 MONITOR WELL LOCATION  
 MACON COUNTY  
 Drawing Title: MONITOR WELL LOCATION

Brooks Engineering Associates  
 Planning · Engineering · Surveying  
 Environmental Services



Date: MAY 2, 2008  
 Scale: 1" = 60'  
 Proj. #: 307308  
 Designed: M.B.  
 Drawn: JSP  
 Checked: M.B.  
 Reviewed: M.B.

SHEET 1 OF 1



LEGEND  
 MONITOR WELL

