



December 3, 2009

Mr. Zinith Barbee
NCDENR DWM Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

**RE: Methane Monitoring Well Installation and
Replacement of Groundwater Monitoring Well MW-1s
Avery County C&D Landfill
Spruce Pine, North Carolina**

Dear Mr. Barbee:

As a part of the Phase 3 construction at the Avery County C&D landfill, Richardson Smith Gardner and Associates, Inc (RSG) has installed a total of four (4) methane monitoring probes. Additionally, groundwater monitoring well MW-1s was replaced with a new monitoring well located further from the waste. The probes and replacement well are shown on the attached **Figure 1**.

Methane Well Installation

RSG personnel mobilized to the site on October 26, 2009 with Tom Whitehead of Mad Dawg Drilling, Inc. (license # 2907) for the probe installation. A track-mounted Geoprobe drill rig with hollow stem auger capabilities was used to install the wells. In each instance, the Geoprobe sampler was used to collect continuous soil samples to the depth of well installation. Upon completion of sampling, the hollow stem augers were advanced to the approximate depth of groundwater for the well installation.

Each well (except GP-2) consists of a 2-inch diameter PVC screened interval and solid riser pipe with appropriate sand pack and bentonite plug in the annular space. Each well was completed with a locking well cap and outer steel casing.

In the case of methane probe GP-2, the augers could not be advanced to the approximate depth of groundwater (as sampled by the Geoprobe sampler) due to rocky conditions in the area. In this instance, a 1-inch diameter well was installed within the Geoprobe rod. The well consisted of five (5) feet of screened interval with 4 feet of solid PVC riser pipe. The annular space was filled with sand pack to a height of 1 foot above the screened interval. A two foot thick bentonite seal was installed in the annular space above the sand pack, and the well was completed to the surface with grout and an expansion well cap and locking steel casing. The boring logs for the wells are included in **Attachment A**.

Replacement of Groundwater Monitoring Well

RSG's Waste Relocation Plan¹ that was approved by NCDENR, included the requirement to abandon the previously existing MW-1s due to its proximal location to the final edge of waste at the landfill. Due to the location of a gas pipeline easement and a power line easement in this immediate vicinity, few places were appropriate for well installation in this area. A replacement well, MW-1a, was installed approximately 150 feet from the final edge of waste in a location that avoided the underground and overhead hazards. This well was installed by hollow stem auger after collection of soil samples by Geoprobe sampler to a depth of 13 feet. Auger refusal was encountered in three attempted locations in this area at or above this depth. The well is constructed with nine (9) feet of 2-inch diameter 10-slot screen and four (4) feet of solid PVC riser pipe. The well is completed with an expansion cap and locking steel casing. The location of the new monitoring well is included on **Figure 1** and the boring log for this well is included in **Attachment A**.

Additionally, the original monitoring well MW-1s and the piezometer adjacent to it, MW-1d were abandoned by tremie-grouting from the bottom of the well to the top. All surface appurtenances (outer steel casing and PVC pipe) of these former wells were removed upon completion of grouting.

If you have any questions, or require additional information, please contact me at your earliest convenience at 919-828-0577 x122 or my e-mail address below.

Sincerely,
Richardson Smith Gardner and Associates, Inc.



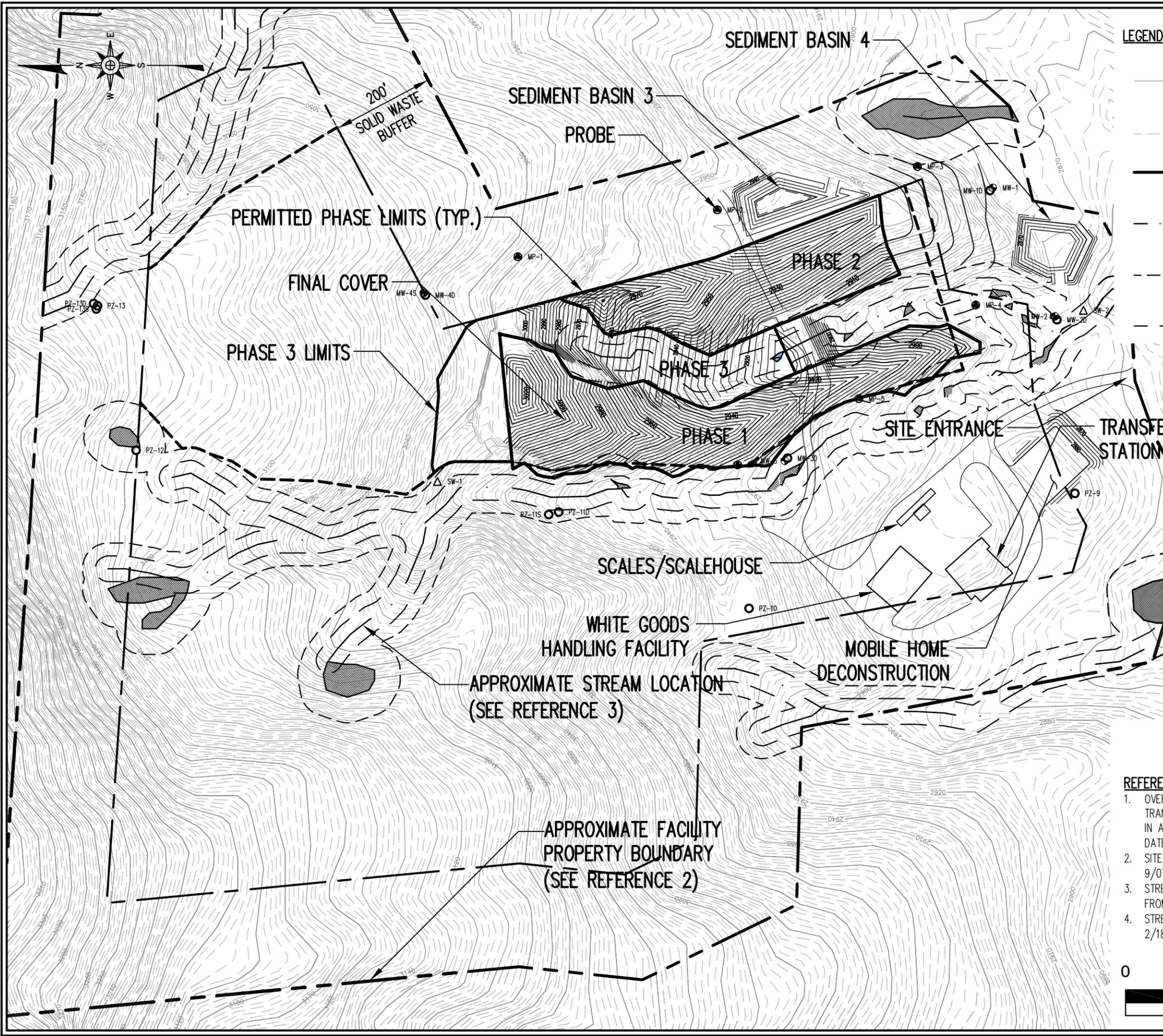
Joan A. Smyth, P.G.
Senior Hydrogeologist
joan@rsgengineers.com

Attachments

CC: Buddy Norris – Avery County
Jaclynne Drummond, NCDENR
Bill Wagner – NCDENR- ARO

¹ Waste Relocation and Mitigation Plan Avery County C&D Landfill, Richardson Smith Gardner and Associates, Inc., October 2008

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LEGEND

	EXISTING 10' CONTOUR (SEE REFERENCE 1)
	EXISTING 2' CONTOUR
	PROPERTY LINE (SEE REFERENCE 2)
	APPROX. STREAM LOCATION (SEE REFERENCES 3, 4)
	50-FOOT STREAM AND WETLAND BUFFER
	25-FOOT TROUT STREAM BUFFER
	WETLANDS (SEE REFERENCES 3, 4)
	MONITORING WELL
	PIEZOMETER
	METHANE GAS MONITORING PROBE

PRELIMINARY
NOT FOR CONSTRUCTION

- REFERENCES**
- OVERALL SITE TOPOGRAPHY FROM NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DATA GENERATED FROM LIDAR DATED MARCH 2005, TOPO IN AREAS IN AND SURROUNDING PHASES 1 AND 2 FROM FIELD SURVEY DATED 9/07, BY SURVEYING SOLUTIONS, P.C.
 - SITE PROPERTY LINE AND MONITORING WELLS FROM FIELD SURVEYS DATED 9/07 AND 1/14/08, BY SURVEYING SOLUTIONS, P.C.
 - STREAM AND WETLAND LOCATIONS IN NORTHERN SECTOR OF SITE OBTAINED FROM GPS FIELD SURVEY DATED 4/07, BY CAROLINA ECOSYSTEMS, INC.
 - STREAMS AND WETLANDS NEAR PHASE 1 AND 2 FROM FIELD SURVEY DATED 2/18/08 BY SURVEYING SOLUTIONS, P.C.



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ph: 919-826-0577 fax: 919-826-3899

FIGURE NO.	2
SCALE:	AS SHOWN
CHECKED BY:	
DRAWN BY:	J.A.L.
FILE NAME	AVERY-B0076
PROJECT NO.	AVERY 08-7
DATE:	Feb. 2009

TITLE:
AVERY COUNTY FACILITY PLAN

Attachment 1



FIELD BOREHOLE LOG

BOREHOLE NUMBER **GP-1**

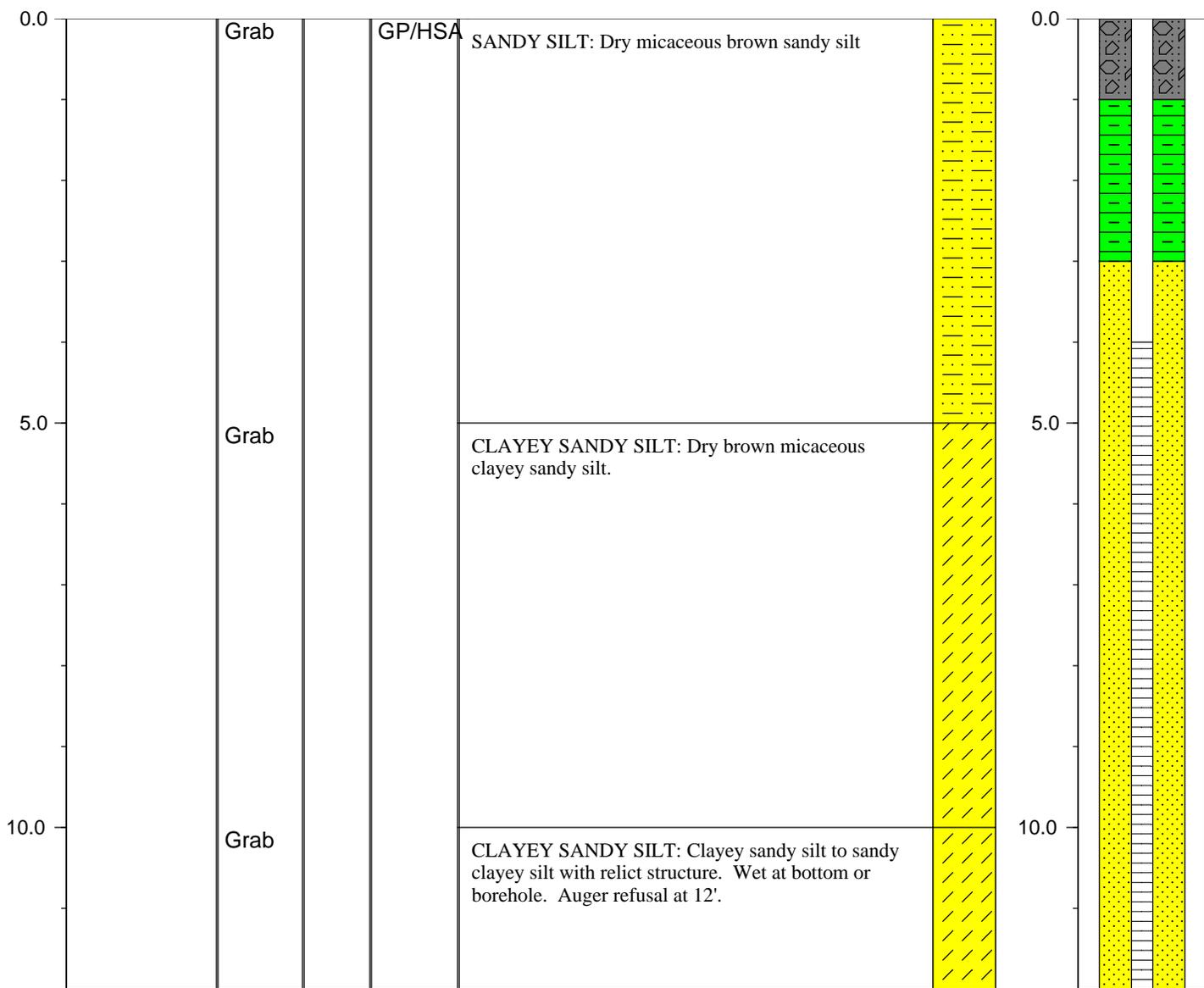
Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**
 LOCATION: **Ingalls, NC**
 DRILLING CO: **Mad Dawg Drilling Inc**
 DRILLING METHOD: **Geoprobe/HSA**
 FIELD PARTY: **Tom Whitehead**
 GEOLOGIST: **Don Misenheimer**
 DATE BEGUN: **10/26/09** COMPLETED: **10/26/09**

TOTAL DEPTH: **12**
 TOP OF CASING ELEV.: **GROUND ELEV.:**
 NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (BLS)		
Depth (ft)	--	--
Time	--	--
Date	--	--

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
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FIELD BOREHOLE LOG

BOREHOLE NUMBER **GP-2**

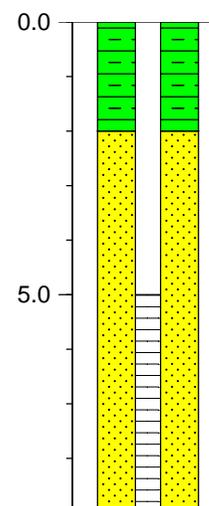
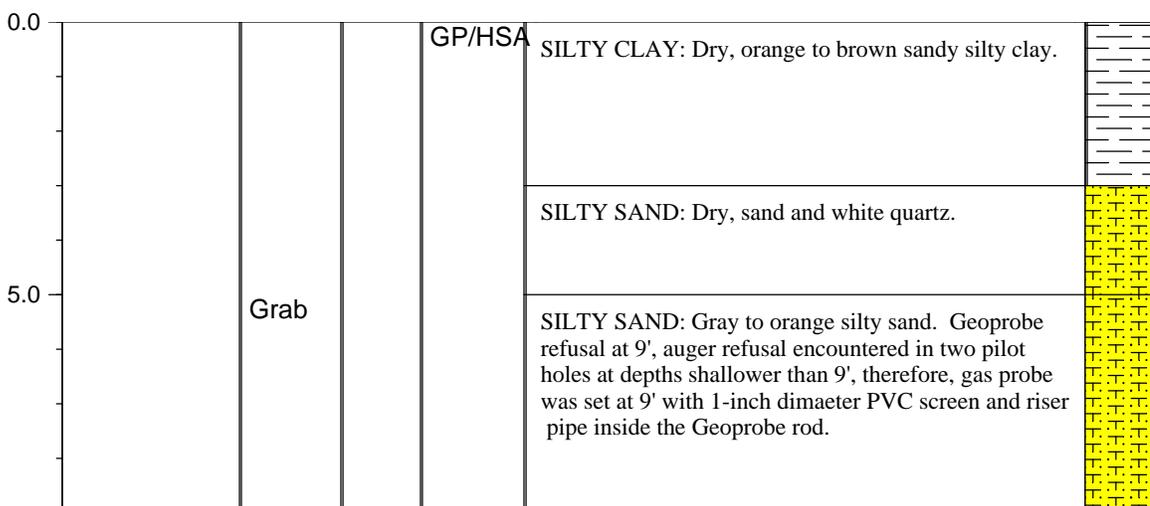
Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**
 LOCATION: **Ingalls, NC**
 DRILLING CO: **Mad Dawg Drilling Inc**
 DRILLING METHOD: **Geoprobe/HSA**
 FIELD PARTY: **Tom Whitehead**
 GEOLOGIST: **Don Misenheimer**
 DATE BEGUN: **10/29/09** COMPLETED: **10/29/09**

TOTAL DEPTH: **9**
 TOP OF CASING ELEV.: **GROUND ELEV.:**
 NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (BLS)		
Depth (ft)		
Time		
Date		

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
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FIELD BOREHOLE LOG

BOREHOLE NUMBER **GP-3**

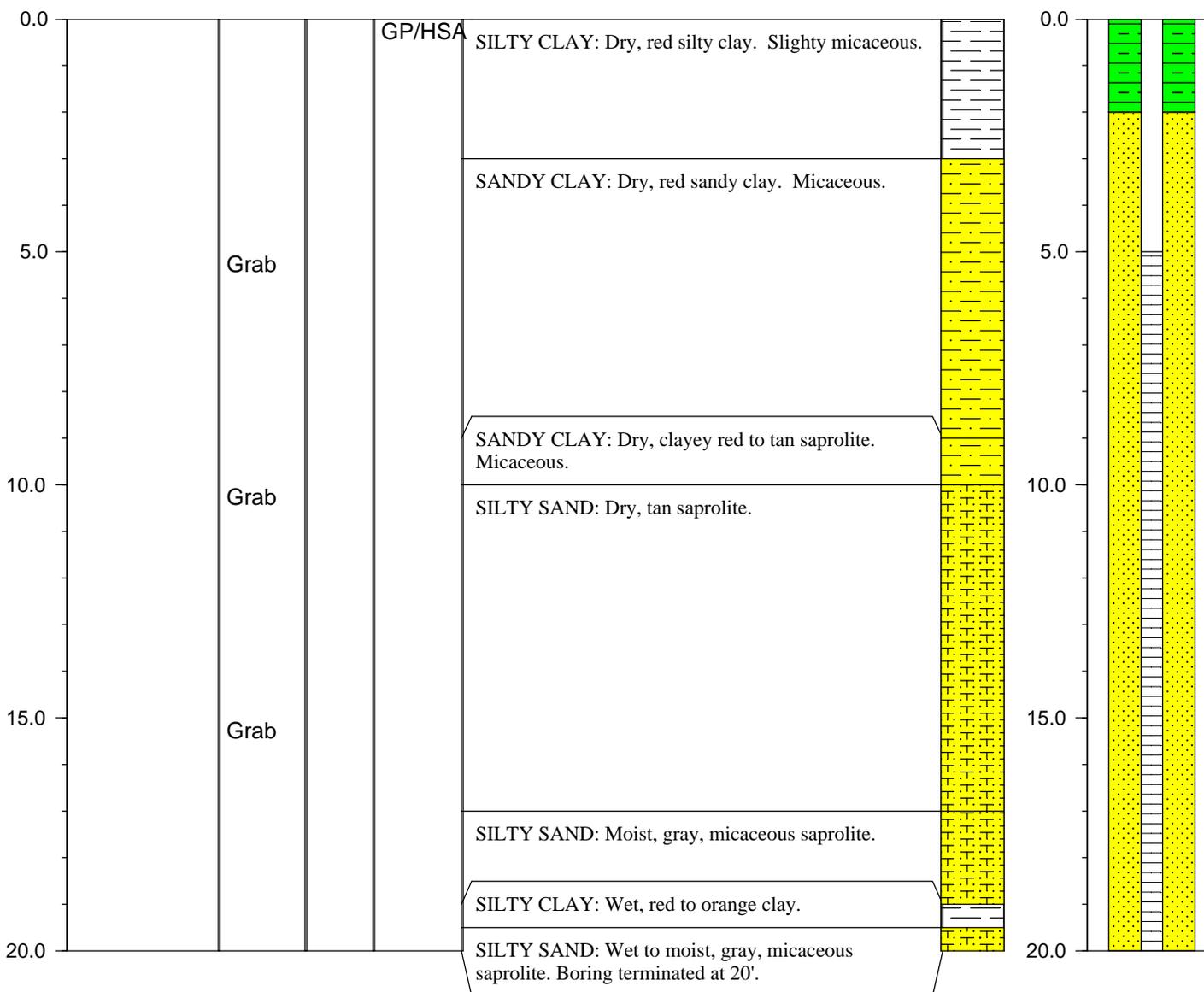
Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**
 LOCATION: **Ingalls, NC**
 DRILLING CO: **Mad Dawg Drilling Inc**
 DRILLING METHOD: **Geoprobe/HSA**
 FIELD PARTY: **Tom Whitehead**
 GEOLOGIST: **Don Misenheimer**
 DATE BEGUN: **10/26/09** COMPLETED: **10/26/09**

TOTAL DEPTH: **20**
 TOP OF CASING ELEV.: **GROUND ELEV.:**
 NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (BLS)		
Depth (ft)	--	--
Time	--	--
Date	--	--

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
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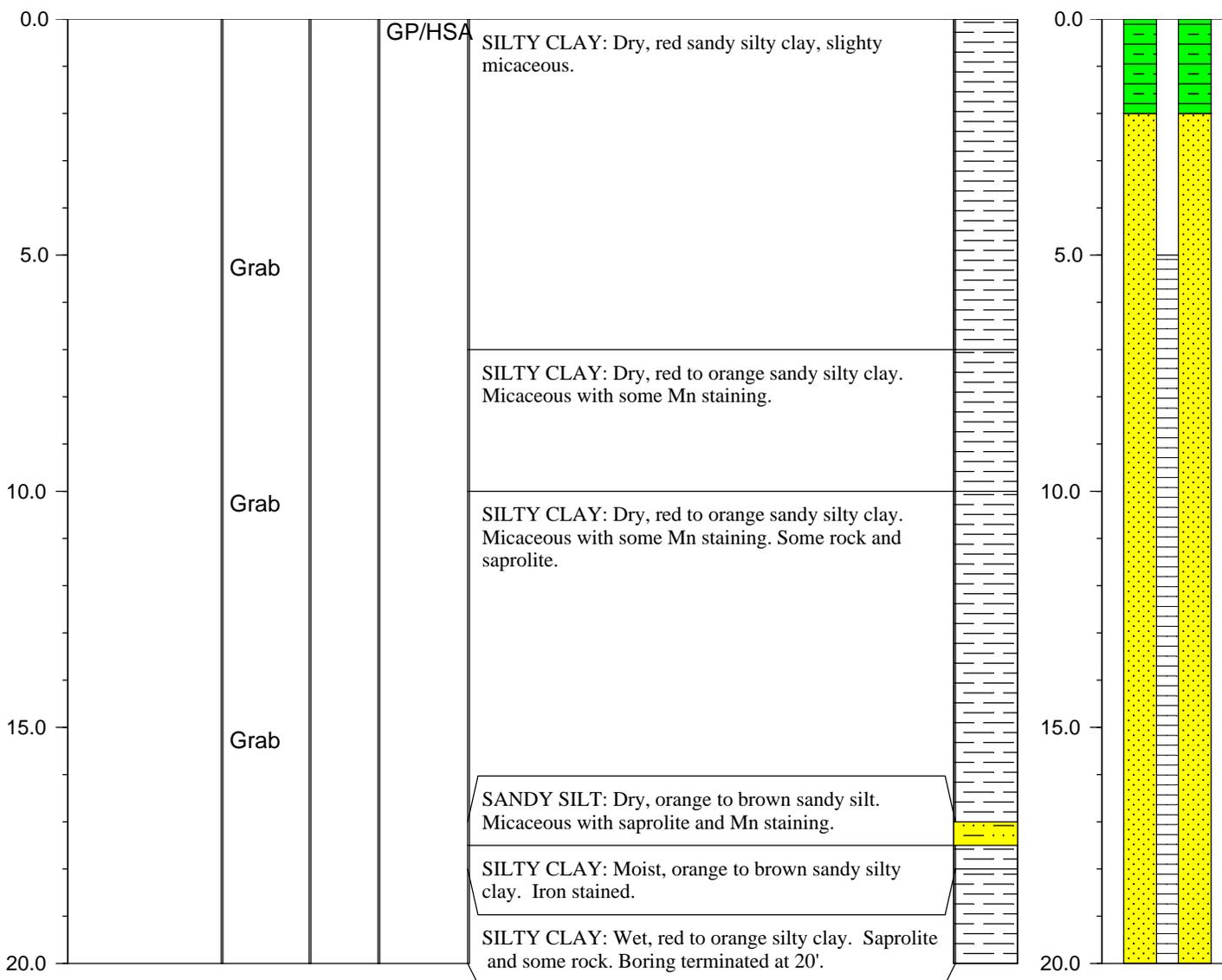


PROJECT NAME: **Avery County C&D Landfill**
LOCATION: **Ingalls, NC**
DRILLING CO: **Mad Dawg Drilling Inc**
DRILLING METHOD: **Geoprobe/HSA**
FIELD PARTY: **Tom Whitehead**
GEOLOGIST: **Don Misenheimer**
DATE BEGUN: **10/29/09** COMPLETED: **10/29/09**

TOTAL DEPTH: **20**
TOP OF CASING ELEV.: **GROUND ELEV.:**
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (BLS)		
Depth (ft)		
Time		
Date		

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
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FIELD BOREHOLE LOG

BOREHOLE NUMBER **MW-1a**

Page 1 of 1

PROJECT NAME: **Avery County C&D Landfill**
 LOCATION: **Ingalls, NC**
 DRILLING CO: **Mad Dawg Drilling Inc**
 DRILLING METHOD: **Geoprobe/HSA**
 FIELD PARTY: **Tom Whitehead**
 GEOLOGIST: **Joan Smyth**
 DATE BEGUN: **10/26/09** COMPLETED: **10/26/09**

TOTAL DEPTH: **13**
 TOP OF CASING ELEV.: **GROUND ELEV.:**
 NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (BLS)		
Depth (ft)	--	--
Time	--	--
Date	--	--

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
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