

Prepared for:

Coble Sandrock, Inc.
5833 Foster Store Road
Liberty, North Carolina 27298

JEI PROJECT NO. 419.00, TASK 19

COBLE'S SANDROCK, INC.
ALAMANCE COUNTY, NORTH CAROLINA
CONSTRUCTION AND DEMOLITION DEBRIS LANDFILL

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| Fac/Perm/Co ID # | Date | Doc ID# |
| BC | 1/04/11 | DIN |

VOLUME I SITE APPLICATION

SECTION 1 – SITE SUITABILITY REPORT
SECTION 2 – HYDROGEOLOGIC REPORT

MARCH 2006

Prepared by:



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Prepared for:

**Coble Sandrock, Inc.
5833 Foster Store Road
Liberty, North Carolina 27298**

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Winston-Salem
Regional Office

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**SITE APPLICATION
VOLUME ONE – SECTION II**

HYDROGEOLOGIC REPORT & GROUNDWATER MONITORING PLAN

**COBLE'S SANDROCK
CONSTRUCTION AND DEMOLITION LANDFILL EXPANSION**

Prepared by:



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Prepared by:

A circular professional seal for a geologist in North Carolina. The seal contains the text "NORTH CAROLINA LICENSED SEAL 1349 GEOLOGIST G. VAN NESS BURBACH". A handwritten signature in black ink is written over the seal.

G. Van Ness Burbach, P.G.

Reviewed by:

A handwritten signature in black ink, which appears to read "Joanne Linder".

Joanne Linder, PG

Certification Statement

We certify that the Water Quality Monitoring Plan included in this report, when implemented, will be effective in providing early detection of any release of hazardous constituents to the uppermost aquifer, so as to be protective of public health and the environment.

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1.0 INTRODUCTION AND OVERVIEW

In accordance with the NC Solid Waste Management Rules (NCSWMR) § .0504(1)(c and g), Coble's Sandrock is submitting this portion (Volume One, Section II) of the Site Application, which includes the Hydrogeologic Report and Groundwater Monitoring Plan, for a construction and demolition debris (C&D) landfill expansion at the Coble's Sandrock site in Alamance County, North Carolina. The purpose of this portion of the Site Application is to demonstrate general hydrogeologic site suitability for the facility acreage. A Construction Plan Application for the proposed landfill is being submitted as Volume Two of this report.

The total acreage included in this Site Plan Application consists of approximately 139 acres in Alamance County, one half mile east of Kimesville, North Carolina and approximately eight miles south of Burlington, North Carolina. The current C&D facility consists of 39.60 acres of site suitability and the current approved phase consists of 7 acres of C&D landfill that has been in operation since 1998. The 39.60 acre area lies adjacent to the proposed expansion on the northwest portion of the Coble-owned property. The details of the investigations conducted to characterize this facility are documented in this report. This report provides a detailed Hydrogeologic Report (Section 3.0) prepared in accordance with NCSWMR .0504(c), and a Groundwater Monitoring Plan (Section 4.0) prepared in accordance with NCSWMR .0504(g). For the reviewer's clarification, please note that the legend for the drawings referred to in the above documents is provided on Drawing DH-1. Use of the word "site" during the following discussions includes all acreage within the property boundaries of the proposed facility.

The results of this investigation show that this area meets all conditions for site suitability for a C&D Landfill. The bedrock elevations and seasonal high water table can be reasonably determined based on the available data. The groundwater monitoring network will be effective in monitoring for a potential release from the C&D disposal area in a manner that will be protective of current or potential groundwater users downgradient of the proposed facility.

2.0 SITE DESCRIPTION

This section describes the site location, its physical layout, and current land usage. Specific information regarding land usage in and around the site and geologic and hydrogeologic characteristics are discussed in subsequent sections of the report.

The site location, property boundaries, and surrounding topography are shown on Drawing DH-1. The site is located in the Piedmont physiographic province on a group of knolls and valleys. The northeast-flowing Poppaw Creek is located along the northern facility property line. Two primary drainages (small, intermittent creeks) transect the site and flow into Poppaw Creek. One of the drainages flows west-southwest across the southern half of the site and has a 2- to 4-acre man-made pond at its upstream limit in the southeastern corner proposed site property. The other drainage flows north-northwest roughly parallel to the eastern site boundary and is fed by outflow from a small pond located on the site property and by two smaller, spring-fed drainages which flow into it from off the site property to east. These streams and ponds are shown on Drawing DH-2.

Agricultural fields comprise much of the proposed expansion area. Trees and heavy brush occupy the southwestern portion of the proposed area. A Land Clearing and Inert Debris (LCID) Landfill is located in the southeastern corner of the site. Another LCID Landfill is located adjacent to and southeast of the existing C&D Landfill.

3.0 HYDROGEOLOGIC REPORT

3.1 Previous Investigations

A site suitability study titled *Construction and Demolition Landfill Permit Application Siting Requirements* was performed by Trigon Engineering Consultants, Inc. and submitted to the Solid Waste Section on December 16, 1997, for the 39.60 acres where the current C&D Landfill operates. During the 1997 investigation, three monitoring wells (MW-1, -2, & -4) and eight piezometers (P-1, -2, -2A, -3, -4, -5, -6, & -7) were installed. Piezometer P-1 was converted to upgradient monitoring well MW-3. Eight soil borings and three borings which rock core samples were obtained were also advanced in 1997. Two additional borings in which rock core samples were obtained were advanced between June 16 and July 29, 1998 for additional site characterization. A summary of these borings is included as Table 1 and the available boring logs are located in Appendix DH-1. Trigon did not produce boring logs for the piezometers because the borings were advanced using air rotary drilling and no split-spoon samples were taken.

Bail-down tests were performed on selected wells in 1997 to determine the hydraulic conductivity of the surficial aquifer and the data were analyzed using the Bouwer and Rice Method. A summary of the aquifer tests is included as Table 2. Soil samples were also taken from selected borings as bag and undisturbed samples and laboratory tested for gradation, USCS classification, Atterberg Limits, permeability, and porosity. A summary of soil analyses are included as Table 3.

The initial waste disposal cell has a 5.85-acre footprint that is situated within a 39.6-acre area of site suitability. During the initial permitting process, the facility obtained a local government franchise agreement for 7.0 acres. A modification to the Coble's Sandrock C&D Landfill Permit was prepared and submitted by Joyce Engineering, Inc. in the document entitled *Request for Modification to Construction and Demolition Debris Landfill Permit No. 01-05*, dated June 2, 2001 for expansion of the active waste cell by 1.15 acres in order to maximize the franchised acreage. In a letter from the Solid Waste Section dated January 24, 2002, approval for the 1.15 acre expansion was granted, making the active waste disposal footprint 7 acres. On September 4, 2001, Coble's Sandrock C&D Landfill was granted a five-year franchise extension, allowing for additional development within the 39.6 acre area of site suitability. The limits of the 2001 expansion are shown on Drawing DH-2. Monitoring well MW-5 was installed and incorporated into the compliance groundwater monitoring network in January 2002. The boring log for MW-5 is located in Appendix DH-1.

A Construction Plan Application for Phase 2 of the Coble's Sandrock Construction and Demolition Landfill was prepared and submitted by Joyce Engineering, Inc. on June 18, 2002. The second phase of site development included two new C&D disposal cells (identified as Cell A and Cell B) and

filling within the existing C&D Disposal area to increase final grades from 3.5H:1V to 3H:1V on the side slopes. Phase 2 totals approximately 5.86 acres in size, with Cells A consisting of approximately 1.10 acres and Cell B consisting of approximately 4.76 acres. The limits of Phase 2 are shown on Drawing DH-2. Piezometers P-6 and P-7 were abandoned in order to construct Cell B. Background well MW-3 was replaced with MW-6 (formerly P-3) and downgradient well MW-5 was replaced with MW-7 (Drawing DH-2). The boring log and the well construction diagram for MW-7 are included in Appendix DH-1. Table 1 presents available well construction details for the wells discussed above.

3.1.1 Available Data from Monitoring Wells

As stated above, three monitoring wells (MW-1, -2, and -4) and eight piezometers (P-1, -2, -2A, -3, -4, -5, -6, and -7) were installed during the site suitability study to characterize the uppermost aquifer. A letter dated September 18, 1998 from Trigon Engineering Consultants, Inc. to the Solid Waste Section stated that piezometer P-1 was converted to an upgradient monitoring well now known as MW-3. The sampling of the four monitoring wells began in September 1998 and has continued semiannually through the April 2003 event. After April 2003, MW-3 was replaced with MW-6 (formerly P-3) as the upgradient background well. Well MW-5 was added to the compliance network before the April 2002 sampling event, but was replaced with MW-7 before the November 2003 sampling event at the request of the Solid Waste Section. Piezometers P-2 and -2A were abandoned in order to construct Phase 1 and piezometers P-6 and -7 were abandoned in order to construct Cell B of Phase 2. The available boring logs associated with the previous drilling programs have been included in Appendix DH-1.

3.1.2 Conclusions from Previous Investigations

The groundwater analytical results since September 1998 have not indicated any statistically significant increases of any constituents. This supports the assertion that the surrounding proposed expansion would be suitable for a C&D Landfill.

3.2 Scope of Current Investigation

The original field activities for this investigation were performed in January and February 2002. The fieldwork consisted of installing ten piezometers and one monitoring well, a field survey of the new piezometers, development of selected piezometers, aquifer testing of piezometers, measurement of static groundwater elevations, and general site reconnaissance to locate outcrops. A second phase of field activities for this investigation was performed between March and September 2005. The fieldwork consisted of installing three piezometers, four hand-augered piezometers, and four monitoring wells. Field activities in 2005 also included development of select piezometers and monitoring wells, aquifer testing of select piezometers and monitoring wells, a magnetometer survey for dikes, and measurement of static groundwater elevations. The field activities are described in detail below. Interpretation of the data collected during these activities is provided in subsequent sections of this report.

3.2.1 Subsurface Investigations

Ten piezometers (P-15, -16, -17, -18, -19S, -19D, -20, -21, -22, and -23) and one monitoring well (MW-5) were installed in and around the proposed C&D facility boundary between January 16 and 31, 2002. Bedford Well Drilling, Inc. of Bedford, Virginia, performed drilling and well installation activities. The drilling equipment consisted of an Ingersoll-Rand A-300 drilling rig equipped with 2.25 and 4.25-inch inner diameter (ID) hollow stem augers and an NQ rock core barrel, and an Ingersoll-Rand T3W drilling rig equipped with 6.0 and 10-inch outer diameter (OD) downhole hammers.

Three piezometers (P-24, -25, & -26) and four monitoring wells (MW-8, -9, -10S, & -10D) were installed in and around the proposed Phase 3 waste cell limits between March 21 and 28, 2005. South Atlantic Environmental Drilling and Construction Company (SAEDACCO) of Fort Mill, South Carolina, performed drilling and well installation activities. The drilling equipment consisted of a Gus Pech GP1100E drilling rig equipped with 4.25 to 8.25-inch ID hollow stem augers, 5.75 to 8.25-inch OD downhole hammers and an NQ rock core barrel. Four hand-augered piezometers (P-27, -28, -29, & -30) were installed in and around the proposed C&D facility boundary using a 2.5-inch OD hand auger on April 4, 2005.

An experienced JEI geologist was present to observe the drilling and rock coring, log the boreholes, and supervise the piezometer and well construction during both the 2002 and 2005 investigations. The locations of these piezometers and monitoring wells are provided on Drawing DH-2. An experienced JEI technician developed selected piezometers. The drilling and well construction data are summarized in Table 1.

In addition to the rock core obtained during previous investigations, two boreholes (P-21 and P-26) were chosen for rock coring. Approximately six feet of rock core was obtained from the P-21 borehole using an Ingersoll-Rand A-300 drilling rig equipped with an NQ wire-line rock coring device. A tricone roller bit was advanced approximately 21 feet beyond auger refusal in order to improve recovery during coring. Approximately 23.5 feet of rock core was obtained from the P-26 borehole using a Gus Pech GP1100E drilling rig equipped with an NQ rock coring device. The rock core data are summarized in Table 4. The boring logs for these borings and core locations are included in Appendix DH-2.

Well/piezometer construction was performed in accordance with the standards described in the *RCRA Technical Enforcement Guidance Document* (1986) and the *Draft North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities* (1995). Split-spoon samples were obtained at five-foot intervals and logged by the geologist for all of boreholes except P-19S and MW-10D. Split-spoon samples were not collected from P-19S and MW-10D because split-spoon samples were obtained from adjacent borings P-19D and MW-10S.

Piezometer P-19S and hand-augered piezometers P-27, -28, -29, and -30 were installed in the saprolite unit and range in depth from 4 to 10 feet with screens that range from 2 to 6 feet in length. Monitoring Well MW-5 and piezometers P-20 and P-22 were installed at the saprolite/partially

weathered rock (PWR) transition zone and range in depth from 10 to 30 feet with screens that range from 6 to 15 feet in length. Piezometer P-18 was installed in the PWR unit and has a depth of 34 feet with screened interval of 15 feet in length. Piezometer P-17 was installed at the saprolite/bedrock transition zone with a depth of 36 feet with a 15-foot screen. Piezometers P-15, -16, -19D, -21, -23, -24, -25, and -26 were installed in bedrock and range in depth from 38 to 62.5 feet with screened intervals that range from 10 to 15 feet in length.

Lockable expansion caps were installed into the top of each well casing. Monitoring Wells MW-5, -8, -9, -10S, -10D and piezometers P-15, -16, -17, -19S, -19D, and -23 were covered by lockable aluminum standpipes installed into 3 x 3 x 0.5-foot concrete aprons to protect their integrity. Piezometer P-18 was installed with a 6-inch flush mount well cover in a 2 x 2 x 0.5-foot concrete apron. All other piezometers that will be converted into permanent monitoring wells will have lockable aluminum standpipes and pads installed prior to the first sampling event. Piezometers P-20, -21, -24, -25, and -26 were grouted to the surface and lockable expansion caps installed into the top of each casing. Piezometer P-22 and hand-augered piezometers P-27, -28, -29, and -30 were finished with bentonite placed to the surface and a lockable expansion cap installed into the top of the casing. The well construction information and boring logs for the groundwater monitoring wells and piezometers are contained in Appendices DH-1 and DH-2.

Following construction, monitoring wells MW-5 and MW-9 and piezometers P-16, -17, -18, -19S, -19D, -21, -22, and -25 were developed with a submersible pump and surge block, bailer, or a combination to remove accumulated sediments resulting from the drilling and well construction process, and to hydraulically connect the wells with the surrounding soils. The surge block was used to loosen the disturbed sediments. Once the wells were thoroughly surged, the water-sediment mixture was removed and the wells were allowed to recharge. This process was repeated until sediment-free water could be obtained from the wells. Approximately 10 to 52.5 gallons (or up to 21 casing volumes) of water, depending on recharge rates, were removed from each well during the development process. All other piezometers that will be converted into permanent monitoring wells will be developed using these procedures prior to the first sampling event.

Monitoring wells MW-5 and piezometers P-15, -16, -17, -18, -19S, -19D, -20, -21, -22, and -23 were surveyed in January and February 2002 by Trittech Civil Environmental, P.C. (Trittech), of Asheboro, North Carolina. Monitoring wells MW-8, -9, -10S, and -10D, water supply well WW-1, piezometers P-24, -25, and -26, and hand-augered piezometers P-27, -28, -29, and -30 were surveyed in April 2005 by Trittech. The survey data prepared by Trittech is provided as Appendix DH-3.

Groundwater levels were measured for all existing site monitoring wells and piezometers during periodic site visits. The measurements were collected using a decontaminated electric water level meter. The surveyed point on the top of the well casing was used as reference, and the measurements were recorded to within 0.01 foot. The groundwater elevation data were used to construct a groundwater potentiometric surface map, and to infer groundwater flow directions in the area. A historic summary of the static groundwater elevations for all wells and piezometers is included in Table 5. Water levels measured on August 2, 2005, were used to prepare a groundwater surface contour map for the site (Drawing DH-3).

3.2.2 Hydrogeologic Testing

Following rigorous well development, monitoring wells MW-5 and MW-9 and piezometers P-16, -17, -18, -19S, -19D, -21, -22, and -25 were chosen for aquifer testing. The purpose of the testing was to assess the values of horizontal hydraulic conductivity at various locations within the water table and bedrock aquifers at the site. In situ rising and falling-head tests (slug tests) were chosen for the assessment due to the relatively low well yields noted during well installation and development. The slug tests were performed between February 5 and March 6, 2002, and on September 16, 2005.

Prior to slug testing, the monitoring wells were opened and groundwater levels were allowed to equilibrate. Water level measurements were then collected using an electric water level probe referenced to a point on the top of casing. A 15 pounds per square inch (psi) pressure transducer was then lowered inside the well casing and placed approximately one foot from the bottom of the well. The pressure transducer was then attached to an In-Situ SE 1000C electronic data logger. A polyvinyl chloride (PVC) slug measuring five feet in length was then used to displace water inside the wells.

The first portion of the test was a falling-head test that measured the rate water levels fell back to static after the injection of the PVC slug. The data logger recorded water level data from the transducer at logarithmic time intervals. Data from the transducer/data logger were verified with hand held water level readings. Falling-head tests were terminated after water levels had recovered to within 95% of their pre-test level. A rising-head test was performed on each well after the falling-head test was completed, or after the water level had equilibrated for those piezometers that only had rising-head tests performed. The rising-head test was conducted by initiating a new logarithmic recording step on the data logger simultaneous with the removal of the PVC slug. The data were checked with hand held readings, and the test was terminated after water levels had recovered to within 95% of the pre-test level.

In situ rising- and falling-head tests provide a quantitative estimate of horizontal hydraulic conductivity (K) and a qualitative estimate of aquifer anisotropy in water-bearing units. The slug test data were analyzed using the Bouwer and Rice (1976 and 1989) equation, which is applicable to fully or partially penetrating wells in unconfined or confined aquifers. Aquifer thicknesses of 7.6-50.0 feet were assumed for all aquifers based upon information supplied on the boring logs. A packing porosity of 25% was assumed for the well filter pack. Computer software produced by Starpoint Software, Inc. was utilized to assist in the analysis and plotting of data. The individual data points and computer plots of time versus water level change are presented in Appendix DH-4. A summary of all aquifer testing performed at the site is included in Table 2.

3.3 Regional and Local Geology

This section of the report describes the geology of the site. The geology is evaluated with respect to the performance of engineered features upon the land surface in the proposed cell areas, the groundwater flow regime, and the ability to effectively monitor water quality at the site.

3.3.1 Bedrock Geology

The study site is located within the Carolina Slate Belt in the central Piedmont physiographic and geological province. The relevant geological features are shown on the 1:250,000-scale *Geologic Map of Region G* (Carpenter, P. A., 1982) included as Appendix DH-5. Geologic unit designations and descriptions used in this report are defined in *The Central Piedmont* (Butler and Secor, 1991).

The Carolina Slate Belt is made up of metamorphosed sediments, volcanics, and intrusive igneous rocks. The *Geologic Map of Region G* shows the site is underlain by a felsic intrusive complex. The map legend describes the complex as white to gray, fine- to coarse-grained, massive to foliated, metamorphosed bodies of assemblages of intimately associated felsic intrusive rock types. The rock types vary from granite, granodiorite, quartz diorite, to quartz monzonite. Narrow mafic dikes are common within the felsic intrusive units. This region is also characterized by regional- and small-scale Mesozoic diabase dikes. Most of the dikes are near-vertical in dip and trend north-south to northwest-southeast and are characterized by plagioclase, augite and olivine (Ragland, 1991).

The rock seen in float and/or large outcrop, as well as rock core from this site was predominantly medium-grained biotite-muscovite granite (Photographs 1-2 in Appendix DH-6). Foliation has been observed locally at an outcrop near P-5 (Photograph 3). Otherwise, site outcrops of granite were massive, with very little to no observed structure or foliation. No diabase dikes have been observed at the site, but numerous mafic (meta-volcanic) dikes do exist, most of which have been detected near the current C&D Landfill. During the original site plan investigation, Trigon located one such dike in that area that strikes N 125° W. Two similar features with a similar strike may exist under the site's Land Clearing and Inert Debris (LCID) Landfill, as noted by Trigon.

Other mafic dikes have been detected in recent field investigations. One such dike is located eighteen feet due west of monitoring well MW-1 and trends N 45° E. The dike has an approximate two-foot wide surface exposure and visibly extends ninety-three feet (Photograph 4). Another dike is located 135 ft due south of MW-3 and trends N 45° E. Its surface exposure is approximately 6 ft wide and visibly extends 60 ft (Photograph 5). Numerous other smaller dikes cut across the surface at similar trends, some of which can be seen in Photograph 6. The observed material that makes up these dikes are highly weathered, highly fractured, fine-grained mafic rock that appears to be meta-volcanic. It weathers to a soft, yellow to black rock.

At the request of the Solid Waste Section, JEI performed a magnetometer survey on April 10-20, 2005 to locate metavolcanic and diabase dikes across the site. A report detailing the event and results is included as Appendix DH-7. In general, the survey located a few small areas of elevated magnetic field strength that may represent metavolcanic dikes. The most pronounced of these are located in the west-central part of the site between piezometers P-16 and P-5 and in the north-northeast portion of the site. These areas of elevated magnetic field strengths are likely too weak to represent diabase.

Bedrock surface elevation contours, based on auger refusal depths and additional information obtained from rock coring, are shown on Drawing DH-4. Auger refusal was used to define the top of bedrock for the site.

3.3.2 Joints and Fractures

A general conceptual model of fracture distribution at the site is useful for predicting preferred groundwater flow pathways. The model described below is based on the topography of the area surrounding the site, fracture orientations and densities in site outcrops (or lack thereof) and inferences from regional and site geology.

Topography of the area surrounding the site is shown on Drawing DH-1. The orientation of many first and second order stream segments may have been determined by geomorphological development of slopes draining to Poppaw Creek, rather than by fracture control. Because of this, the utility of topographic fracture trace analyses is limited as can be seen on the fracture trace diagram and on the Rose Diagram included as Appendix DH-8. The Rose diagram shows that fracture orientations are generally random.

Of the rock exposures found on site, only one appears to be in place. That outcrop, located near P-5, consists of a weathered schist with a foliation of N44°W 72°NE. No fractures were identified in the outcrop. The strike and dip of fractures found in rock core taken at the site could not be determined as the core was not oriented, nor were there any pervasive fabric features that would allow for this determination. Generally, the fractures within the granite were great in number and randomly oriented.

Diabase dikes in this region typically create fracture zones in the country rock adjacent to their contacts. These fracture zones are limited in their horizontal/lateral extent, and are often characterized to be about 1/10 of the thickness of the dike, occurring on both sides of the feature. It is likely that there are many random fracture orientations associated with the rock adjacent to the dikes. Although no diabase dikes have been observed on site, the small metavolcanic dikes are expected to act in a similar way. One rock core (P-26) encountered metavolcanic material, which was highly-fractured with vertical to nearly horizontal dips and voids of up to 1.5 feet.

3.3.3 Definition and Properties of the Subsurface Hydrogeologic Units

Three subsurface hydrogeologic units for the site are defined in this section. Properties of the units described herein will allow description of a general conceptual model of groundwater flow in the site area. Estimates of hydraulic conductivity, effective porosity, and preferred flow directions assigned to the units are made with reference to the laboratory test results presented in Table 3 and Appendix DH-9, to the slug tests presented in Table 2 and Appendix DH-4, and to drilling information contained in Appendices DH-1 and DH-2. Because some of the groundwater flow at this site occurs in fractures, and because the subsurface is heterogeneous, utility of the numbers contained in those tables is limited, and properties are assigned, in large part, on the basis of geologic considerations described in the above sections.

3.3.3.1 Sapolite Hydrogeologic Unit

The sapolite unit is continuous across the site and intersects the water table over large portions of the site. Sapolite is the uppermost hydrogeologic unit along the northern facility boundary as

demonstrated in wells MW-5 and MW-8 and piezometer P-19S. Saprolite is also the uppermost hydrogeologic unit along the proposed southern boundary as demonstrated by piezometers P-17 and P-22 and hand auger piezometers P-27, -28, -29, and -30. Saprolite is the uppermost hydrogeologic unit in the topographic depression near the center of the proposed facility as demonstrated by P-20. All of the borings encountered this unit, although there were distinct and unpredictable differences in the thickness of this unit across the site. Split-spoon samples and auger cuttings of this material are generally described in boring logs as silty sands and sandy silts. Fat and lean clays were noted in numerous borings as minor units that were generally found above the water table. These soils appear to be discontinuous in nature and its hydraulic characteristics are indistinguishable from the other saprolite. Thus, these soils were not considered as a separate unit.

Laboratory soils classifications of split-spoon samples, composite samples, and undisturbed (Shelby tube) samples were defined as silty sands, clayey sands, sandy silts, elastic silt, or lean clay (Table 3; Appendix DH-9). The average total porosity for the saprolite unit, as determined by laboratory testing of Shelby Tube samples, is approximately 0.38. Specific yield values for samples collected in the saprolite unit were calculated using the percent sand, silt, and clay based on the Wentworth Soil Classification System from the grain size distribution graphs for each sample found in Appendix DH-9. The relative percentages of sand, silt and clay for each sample were applied to Johnson's (1967) *Textural Classification Triangle for Unconsolidated Material* to obtain approximate specific yield values. A copy of this triangle is included in Appendix DH-9. Approximate values for effective porosity of the saprolite aquifer is assumed to be 0.21 based on the average of values provided on Table 3 and was used for velocity calculations. This value was obtained by taking the average of all effective porosity values found in Table 3, in order to account for lateral and vertical variability. Hydraulic conductivities are expected to be on the order of 10^{-4} centimeters per second (cm/s), based on slug test data from piezometer P-19S screened within saprolite (Table 2). The saprolite unit is considered to represent a minor hydrogeologic unit for the area around the proposed disposal areas.

3.3.3.2 Partially Weathered Rock Hydrogeologic Unit

The partially weathered rock (PWR) unit is defined as the zone between saprolite and bedrock that has blow counts of at least 50 over 6 inches during standard penetration tests before auger refusal has been encountered. The PWR unit appears to be discontinuous across the site. Four borings (P-16, -17, -19D, and -23) were advanced into bedrock without encountering the unit. PWR is similar in composition to the silty sands and sandy silts that overly it. Laboratory soils classifications of one split-spoon sample collected from this unit were defined as clayey sand (Table 3; Appendix DH-9) and its hydraulic properties are very similar to those of the saprolite unit; therefore, the PWR is relatively indistinguishable from the saprolite unit based on its soil classification and hydraulic properties.

Groundwater within the upper five to ten feet of the PWR unit in most parts of the expansion area is expected to be stored and transmitted in pore spaces, and the material can be reasonably described as hydraulically isotropic. Below this depth, groundwater will tend to be stored and transmitted in fractures. Hydraulic conductivities of the upper parts of the PWR unit are estimated to be similar to

those estimated by slug tests in saprolite wells performed during the current investigation. Hydraulic conductivities are expected to be on the order of 10^{-4} to 10^{-5} cm/s (Table 2).

The laboratory-derived porosity as determined from one undisturbed sample was approximately 0.35 (Table 3). Effective porosities of the upper parts of the PWR unit are expected to be similar to those often used for the saprolite unit, approximately 0.21. The specific yield calculation for one PWR sample was 0.28, which falls within the range of specific yields for the saprolite unit. With depth through the weathering profile, effective porosities are expected to decrease to only a few percent (Harned and Daniel, 1989).

3.3.3.3 Fractured Bedrock Hydrogeologic Unit

The beginning of the fractured bedrock unit is defined by auger refusal with a typical truck-mounted hollow-stem auger drilling rig. The fractured bedrock is the uppermost hydrogeologic unit in two locations within the proposed facility boundary. One of those areas is in the southern portion of the proposed Phase 3-A expansion area as indicated by piezometers P-24 and P-25. Groundwater levels in monitoring wells MW-10S and MW-10D and piezometer P-26 indicate that the water table transitions from fractured bedrock to PWR and saprolite in the northern portion of the proposed Phase 3-A expansion area. Fractured bedrock is also the uppermost hydrogeologic unit near the center of the proposed facility at the site topographic high where P-21 is located.

Hydraulic conductivities estimated by slug tests in fractured bedrock wells are in the range of 10^{-4} to 10^{-6} cm/sec (Table 2). Hydraulic conductivities of the fractured bedrock unit are expected to fall within this range, and vary locally with fracture intensity (see Section 3.2.2). Although previous investigations characterized bedrock at the site as highly competent with very few fractures, recent rock cores indicate that bedrock is highly fractured and weathered to a depth of at least 50 feet. Groundwater flow through this unit is predicted to be similar to non-consolidated sediments. Effective porosity of bedrock is typically expected to be one percent or less (Heath, 1989), but at this site it is expected to be one percent or higher. In areas where dikes are in contact with the granite, the fracture intensity is predicted to be much greater. Rock core data including rock quality designations (RQDs) are summarized in Table 4.

3.3.4 Weathering Profile

The majority of the area beneath the current landfill and the proposed facility is underlain by a relatively thin layer of saprolite and partially weathered rock. Depth to bedrock ranges from approximately 5 to 40 feet below ground surface and the average depth to bedrock is approximately 17 feet below ground surface. Some localized zones near or along the drainages are characterized by bedrock that is relatively shallow, between 5 and 10 feet below ground surface.

The typical weathering profile for the site consists of several feet of unconsolidated saprolite grading into several feet of PWR which grades into competent fractured bedrock; however, there are some areas where PWR is relatively thin to absent. A few borings encountered saprolite interlayered with PWR. The interface between partially weathered rock and unweathered bedrock is generally unclear with rock core showing substantial weathering at depths of 40 feet or more. Rock Quality

Designations (RQDs), fracture counts and descriptions of rock core from site borings (Table 4 and Appendices DH-1 and DH-2) confirm this. Standard penetration tests (SPT) and auger refusal information (Appendices DH-1 and DH-2) are highly variable over short intervals; the SPT blow counts were generally very low for some of the borings.

3.4 Site Hydrogeology

The following section discusses the hydrogeological aspects of the site, with emphasis on the proposed C&D disposal area. A significant amount of hydrogeologic investigation has been performed on the site, including the installation of 10 monitoring wells, 24 piezometers, 6 borings, and 7 rock corings.

3.4.1 Hydrology and Discharge Features

As discussed in section 2.0, the site is located on a group of knolls and valleys, the highest elevations of which rise approximately 100 feet above the floodplain of Poppaw Creek (Figure 1). Regionally, surface water and groundwater both flow north and northwest to Poppaw Creek, which is located adjacent to the north and northwest property line of the site. Groundwater beneath the site flows in three vertically interconnected hydrogeologic units; saprolite, PWR, and a fractured bedrock aquifer. In the vicinity of the proposed Phase 3-A C&D cell, groundwater flow is generally to the north, and discharges directly to Poppaw Creek, with a component of discharge to the on-site tributary east of the proposed cell that also flows to Poppaw Creek. In the vicinity of the proposed Phase 3-B C&D cell, groundwater flow is northwest and eventually discharges to Poppaw Creek west of the site boundary.

3.4.2 Site Groundwater Flow Regime

The surficial aquifer beneath the site occurs within saprolite, PWR, and bedrock. Generally, the saprolite and PWR units are relatively thin (5 to 40 feet thick) in the area in and around the proposed cells. The upper parts of saprolite and PWR are expected to behave as a relatively isotropic, porous medium, where groundwater flow directions conform to the potentiometric surface defined by water table wells. The potentiometric surface based on water level readings taken on August 2, 2005, is shown on Drawing DH-3.

With increasing depth through the partially weathered rock and upper portions of bedrock, groundwater flow is expected to be governed increasingly by fracture pathways. No preferred fracture orientations were noted for the PWR or bedrock unit as determined by several split spoon samples and rock cores.

3.4.2.1 Horizontal Gradient Calculations

Horizontal hydraulic gradients for the proposed C&D disposal areas were calculated using one well pair and four groundwater flow line segments, which are positioned perpendicular to the groundwater surface contours on the groundwater surface contour map (Drawing DH-3). Estimates of hydraulic conductivity obtained from slug tests on individual wells at the site are considered to be higher than actual conductivities for site-scale movement of groundwater. Curves generated by the

slug test recovery data indicate that the data are dominated by near-field, or skin effects, and are reflective, in part, of the properties of the well screen filter pack. The geometric mean of the hydraulic conductivities of saprolite and PWR as determined by aquifer testing ($K_s = 1.09E^{-4}$ cm/sec) was used for groundwater flow calculations for the site. Groundwater flow velocities were calculated using saprolite and PWR K values because the site's uppermost aquifer is primarily in those hydrogeologic units. Also, these values will result in higher flow rates than bedrock K values, therefore giving a conservative estimate of groundwater flow across the site.

The average horizontal gradients for flow line segments along with the geometric mean of K values for slug-tested wells were used to estimate linear groundwater flow velocities. Average linear groundwater flow velocities were computed using the following modified Darcy equation:

$$V = Ki/n$$

where V = average linear velocity (feet per day), K = hydraulic conductivity (ft/day), i = horizontal hydraulic gradient, and n = effective porosity. An effective porosity of 0.21 was assumed for all units.

Data and calculations for the horizontal gradients are presented in Table 6. The calculated horizontal gradients from one well pair and four flow line segments across the site range from 0.02 to 0.04 ft/ft. Calculated linear groundwater velocities ranged from approximately 10.74 to 21.48 ft/year.

The above equation makes the simplifying assumptions of a homogeneous, isotropic aquifer in a porous medium. An average linear groundwater flow velocity was calculated across areas where bedrock is the surficial aquifer because rock cores have shown that bedrock is highly fractured to the point that groundwater flow is expected to behave relatively similar to the unconsolidated hydrogeologic units. Although slug tests should not be used to determine a quantitative value for groundwater flow in bedrock fractures, slug test data can provide a qualitative idea of groundwater recovery in bedrock wells. Groundwater flow velocities within the fractured bedrock aquifer are likely to be highly variable, and in some cases, less than those velocities calculated for the saprolite and PWR units.

3.4.2.2 Vertical Gradient Calculations

Two nested well pairs (MW-10S/D and P-19S/D) were used to measure vertical hydraulic gradients. Wells MW-10S and MW-10D are located east of the proposed disposal area, adjacent to a tributary of Poppaw Creek. Piezometers P-19S and P-19D are located downgradient of the proposed disposal area near Poppaw Creek at the northern boundary of the site. Calculations were performed using water levels measured on two different dates. Vertical gradients were calculated using the vertical distance between the screen midpoints. Vertical gradients calculated for each well pair suggest seasonal fluctuations with groundwater discharge in spring and groundwater recharge in summer near the surface water features. A summary of vertical gradient data is presented in Table 7.

3.5 Site Suitability

The following paragraphs discuss the proposed site's suitability as a C&D waste management facility with special attention to the areas of proposed disposal.

3.5.1 Relationship of Geology and Groundwater to Waste Disposal Units

Numerous wells and piezometers have been drilled on site, and the area has been adequately explored. The geologic characteristics of the site are typical of the Piedmont and should pose no unusual monitoring requirements.

3.5.1.1 Vertical Separation from Bedrock

Only depth to bedrock data based on auger refusal were used to produce the bedrock surface contours presented in Drawing DH-4. Depths to bedrock estimated by Trigon for piezometers installed with an air-hammer in 1997 are shown on Drawing DH-4 for reference, but were not used. In general these depths are deeper than the contoured surface so leaving them out resulted in a more conservative bedrock surface map. Proposed base grade contours are also shown on Drawing DH-4 to allow comparison of the vertical separation from bedrock. The proposed base grades are at least 4 feet above the top of competent bedrock. In the area beneath the proposed footprint for the Phase 3-A waste disposal cell, the uppermost aquifer is transitioning from bedrock in the southern portion of the cell to saprolite and PWR in the northern portion of the proposed disposal area. In the area beneath the proposed footprint for the Phase 3-B waste disposal cell, the uppermost aquifer is entirely within the saprolite/PWR unit. This is illustrated on the hydrogeologic cross-sections presented in Drawings DH-5 and DH-6.

3.5.1.2 Vertical Separation from Seasonal High Water Table

At the time design base grades for the C&D area were finalized, only limited seasonal groundwater data were available for the site piezometers installing in 2005; therefore, predictions of the seasonal range of water levels for the site were based primarily on the recorded ranges of available measurements from site monitoring wells installed between 1997 and 2002. Observed water table elevation data and calculations of the seasonal high water levels for the site wells are presented in Tables 8 and 9.

Historical precipitation data for Burlington, NC between 1950 and 2004 are presented in Table 10. These data demonstrate annual precipitation ranging from 30.29 to 65.07 inches per year. The mean annual precipitation over the entire historical record is 44.88 inches per year with a standard deviation of 6.56 inches per year. The mean precipitation over the last three years for which data has been compiled (2002-2004) was 47.77 inches per year, which is above the historical mean. Also, the highest annual precipitation ever recorded occurred in 2003. These precipitation data suggest that maximum groundwater levels determined from water level measurements between 2002 and 2005 should include the highest water levels to be reasonably expected at this site. Since most of the wells used to determine the seasonal high water table for the site were installed in January 2002 or earlier, we have good coverage of water level measurements for the 2002-2005 period.

To determine appropriate adjustment factors to predict the seasonal high water table from the most recent (August 2, 2005) water level data, we compared the maximum water level observed for the period 2002-2005 to the August 2005 level for each well for which we had adequate data. We then computed an average difference between the 2002-2005 maximum and the August 2005 levels for two subsets of wells: 1) wells screened in saprolite or PWR; and 2) wells screened in fractured bedrock. Rounding these averages up to the nearest ¼ foot gave us adjustment factors of 2.25 feet for saprolite/PWR wells and 3.25 feet for bedrock wells. Adjusted high water elevations were calculated by adding 2.25 feet to the August 2, 2005 groundwater elevation for any well screened in saprolite and/or PWR or by adding 3.25 to the August 2, 2005 groundwater elevation for any well screened in bedrock.

The calculations and adjustments used to estimate the seasonal high water table surfaces are shown in Tables 8 and 9. If the maximum historic groundwater elevation (including all data back to 1997) for any well was higher than the adjusted groundwater elevation, the maximum historic groundwater elevation was used as the seasonal high. If the adjusted groundwater elevation was higher than ground surface for any well, the ground surface elevation was used. Proposed base of liner elevations are at least four feet above the estimated seasonal high groundwater levels, as seen on the Seasonal High Groundwater Contour Map (Drawing DH-7) and in cross-sections presented in Drawings DH-5 and DH-6.

3.5.2 Potential Groundwater Receptors

Well WW-1 is the only water supply well located within the proposed facility boundary. The well is associated with a former dwelling and is currently being used for water level data only and is not used as a water source. The well will be removed and abandoned prior to violation of the buffers specified in Rule .0503(2)(f)(ii). Specific well abandonment activities are summarized in Section 4.0 of this report.

There are several residences along Foster Store Road (east of the site) that obtain water from individual water supply wells that are within 500 feet of the proposed facility boundary. The closest of these wells is less than 100 feet from the proposed facility boundary. None of the dwellings or water wells are within 500 feet of the proposed waste disposal areas. All of the residences and wells along Foster Store Road are upgradient of the proposed facility.

There are also residences with water supply wells along Alamance Church Road (west of the site), two of which are approximately 470-480 feet from the western facility boundary. None of the dwellings or their water wells are within 500 feet of the proposed waste disposal areas. Although these residences are generally down-gradient of the site, they are not downgradient of the proposed Phase 3 waste disposal units.

3.5.3 Ability to Effectively Monitor Groundwater

No known or potentially significant sources of groundwater contamination have been identified within 2000 feet of the site boundary. The nearest commercial property that could be a potential source is an automotive body shop located approximately 1200 feet northwest of the site on the other

side of Poppaw Creek. Even if there were a significant release from the body shop, it would not compromise our ability to monitor for a release from the landfill.

Groundwater flowing north-northwest in the three interconnected hydrogeologic units from the proposed disposal areas will be monitored by the well network described in the Groundwater Monitoring Plan. There are no known conditions, physical or hydrogeologic, which will interfere with the effective monitoring of the proposed facility, and specifically the proposed C&D disposal areas. The discharge feature (Poppaw Creek) along the northern facility boundary is expected to act as an effective groundwater flow boundary between the proposed Phase 3 cells and potential receptors.

3.6 Conclusions

The purpose of this Hydrogeologic Report is to present the assessment of geologic and hydrogeologic characteristics of the proposed site, especially as they relate to proposed C&D construction. This report presents our current understanding of the groundwater flow regime and the relationship of the solid waste management units to groundwater receptors and groundwater discharge features. In addition, this report demonstrates that the proposed site can be monitored effectively for potential releases. Hydrogeologic data from the site indicate that it is appropriate for C&D waste management activities.

In summary, a review of the geologic and hydrogeologic data indicates that the site is located within typical Piedmont terrain. The uppermost aquifer at the site is generally contained within three interconnected hydrogeologic units (saprolite, partially weathered rock, and fractured bedrock). Depths to groundwater and bedrock are well defined in and around the site. Study of the regional and site structural setting indicates little potential for preferential flow paths and are reflected in the site drainages. No other site-specific preferential fractures were noted in the rock core collected or outcrops observed during this study. Instead, bedrock appears to be highly fractured with intersecting trends to a depth of at least 40 feet, to an extent that groundwater is expected to follow the general interpreted flow direction and velocity. Therefore, the design of an effective groundwater monitoring system for the facility is possible. The facility boundary extends to a groundwater discharge, Poppaw Creek, and a minimum of a 500-foot buffer exists between the residential dwellings and their water wells, and the proposed C&D disposal areas.

4.0 GROUNDWATER MONITORING PLAN

4.1 Introduction and Purpose

This plan shall replace any previous groundwater monitoring plans that may have been submitted for Coble's Sandrock C&D Landfill. This Groundwater Monitoring Plan will serve as a guidance document for collecting and analyzing groundwater and surface water samples, managing the associated analytical results, and monitoring for potential releases to the uppermost aquifer from the Coble's Sandrock C&D Landfill. The plan complies with Section .0600 of the North Carolina Solid Waste Management Rules which specifies the requirements for groundwater and surface water

monitoring at C&D landfills. The plan also addresses the specific issues addressed in the Solid Waste Section's January 1995 policy memorandum (*Re: Sampling and Analysis Requirements, Construction and Demolition Landfills and Closed Sanitary Landfills*).

4.2 Groundwater Monitoring Network

The groundwater monitoring network is designed to monitor for potential releases to the uppermost aquifer at the proposed site. The boring log and well completion details for all of the existing groundwater monitoring wells are included as Appendices DH-1 and DH-2 to this report. A summary of well construction specifications, well status, and the role of each well in the proposed monitoring plan is provided in Table 11.

4.2.1 Background and Compliance Monitoring Wells

Monitoring well MW-6 (formerly P-3) is proposed to remain the upgradient background monitoring well for the facility. This well was installed during site characterization activities in August 1997. Although installed as a piezometer, it meets the requirements for a long term monitoring point. A protective casing was added to this well during field activities performed in January 2002. This well replaced MW-3 as the facility background well before the November 2003 sampling event. Monitoring wells MW-2, -4, and -7 are proposed to remain downgradient compliance wells. Wells MW-2 and -4 were installed during the original permitting activities in 1997. Well MW-7 replaced MW-5 at the request of the Solid Waste Section before the November 2003 sampling event. Newly installed monitoring wells MW-8 and -10S are proposed to become downgradient compliance wells. MW-9 will need to be abandoned for construction of a proposed sediment basin, so piezometer P-19S will be converted to a compliance well to take its place. Wells MW-1 and -3 will be abandoned for the construction of the proposed Phase 3 Cell A disposal area. Well MW-5 will continue to be used for the collection of groundwater level data. The proposed monitoring well network is shown on Drawing DH-8. In addition, piezometer P-16 will be converted to a compliance well to monitor the proposed Phase 3 Cell B disposal area. Thus, the proposed compliance network will include the following eight wells: MW-2, MW-4, MW-7, MW-6 (background), MW-8, MW-10S, P-19S, and P-16.

4.2.2 Installation and Maintenance of Groundwater Monitoring Network

Monitoring wells MW-2, -4, and -6 were installed by Trigon Engineering Consultants, Inc. between March and August 1997 as part of the permitting activities for the initial waste cell. Well construction activities are discussed in the December 1997 submittal titled *Construction and Demolition Landfill Permit Application Siting Requirements*. Monitoring well MW-7 was installed by JEI on December 19, 2002, at the request of the Solid Waste Section. Wells MW-8, -9, and -10S were installed by JEI between March 21 and 25, 2005, as part of Phase 3 permitting activities. The wells were constructed according to specifications for monitoring wells codified in 15A NCAC Subchapter 2C, Section .0100, and according to draft guidance document *North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities* (March 1995). Piezometers P-16 and P-19S were installed by JEI in January 2002 and meet the requirements for a permanent monitoring well in accordance with 15A NCAC Subchapter 2C, Section .0100 except that P-16 lacks

a protective, lockable surface casing and a well identification tag. These will be added prior to construction of Phase 3 Cell B.

The facility monitoring wells will be used and maintained in accordance with design specifications throughout the life of the monitoring program. Routine monitoring well maintenance will include inspection and correction/repair of well identification tags, cement pads, well caps and locks, and access to the wells. Should it be determined that the background or a compliance monitoring well no longer provides samples representative of the quality of groundwater passing the relevant point of compliance, the Solid Waste Section will be notified. The owner will re-evaluate the monitoring network, and recommendations will be made for modifying, rehabilitating, abandoning, or installing replacement or additional monitoring wells, as appropriate.

4.3 Groundwater Monitoring

Groundwater samples will be collected and analyzed according to the methods and analyses outlined in the Solid Waste Section's January 1995 memorandum entitled *Sampling and Analysis Requirements for Construction and Demolition Landfills and Closed Sanitary Landfills*. The list of analytes provided in that memo includes the Appendix I list of volatile organic constituents (VOCs) and the 8 RCRA (Resource Conservation and Recovery Act) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). Additional field parameters including pH, specific conductivity, and temperature will be collected during each event. The laboratory analytical results and field parameters will be submitted to the Solid Waste Section at least semiannually. Any exceedances of the NC 2L Drinking Water Standards will be identified in the semiannual submittals.

4.3.1 Establishment of Background Data

A minimum of one independent groundwater sample will be collected from the background and compliance wells prior to the start of disposal operations in the respective areas at the proposed C&D facility.

4.3.2 Groundwater Sampling Methodology

Groundwater samples will be collected in accordance with Solid Waste Management Rules 15A NCAC 13B .1630 through .1633 and guidance provided in the *Draft North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities; Solid Waste Section, Division of Solid Waste Management; Department of Environment, Health and Natural Resources* (March 1995). Details of well purging, sample withdrawal, and decontamination methods as well as chain-of-custody procedures are outlined below.

Static water elevations and the total well depth will be measured to the nearest 0.01 of a foot in each well prior to the sampling of each well. An electronic depth meter will be used for the measurements. This device is lowered into the well and emits an audible tone when water is reached. The distance from the top of the well casing to the water surface and to the bottom of the well will be measured using the tape attached to the probe. Reference elevations of the proposed wells have been obtained from a North Carolina registered land surveyor.

A low-yield well (one that is incapable of yielding three well volumes within a reasonable time) will be purged so that water is removed from the bottom of the screened interval. Low-yield wells will be evacuated to dryness once. As soon as the well recharges or within 24 hours, the first sample will be field tested for pH, temperature, and specific conductance. Samples will then be collected and containerized in the order of the parameters' volatilization sensitivity (i.e., volatile organics then total metals).

A high-yield well (one that is capable of yielding more than three well volumes during purging) will be purged so that water is drawn down from the uppermost part of the water column to ensure that fresh water from the formation will move upward in the screen. At no time will a well be evacuated to dryness if the recharge rate causes the formation water to vigorously cascade down the sides of the screen, which could cause an accelerated loss of volatiles.

A minimum of three well volumes will be evacuated from high-yield wells prior to sampling. A well volume is defined as the water contained within the well casing and pore spaces of the surrounding filter pack. The well volume will be calculated using the following formulas:

$$V_c = (d_c^2/4) \times 3.14 \times h_w \times 7.48 \text{ gallons/cubic foot}$$
$$V_c \text{ (gallons)} = 0.163 \times h_w$$

where:

V_c = volume in the well casing
 d_c = casing diameter in feet ($d_c = 0.167$)
 h_w = height of the water column (i.e., well depth minus depth to water)

The purge volume will be a minimum of 3 times the calculated well volume.

Each well will be evacuated (purged) and sampled with a disposable bailer. The bailer will be lowered gently into the well to minimize the possibility of causing degassing of the water. All equipment used for sampling will be handled in such a manner to ensure that the equipment remains decontaminated prior to use. In between wells and following completion of the field sampling, the electronic depth meter will be decontaminated. Clean disposable gloves will be worn by sampling personnel.

The upgradient/background well will always be sampled first, followed by the downgradient wells. The order of sampling of the downgradient wells will be evaluated each sampling event to provide a sequence going from less contaminated to more contaminated based on the previous sampling event.

Field measurements of temperature, pH, and specific conductance will be made before and after sample collection as a check on the stability of the water sampled over time. The direct reading equipment used at each well will be calibrated according to the manufacturer's specifications prior to each sampling event. Groundwater samples will be collected and containerized in the order of the volatilization sensitivity (i.e., VOCs first, followed by the metals).

Pre-preserved sample containers will be supplied by the laboratory. The VOC vials will be filled in such a manner that no headspace remains after filling. Immediately upon collection, all samples will be placed in coolers on ice where they will be stored prior to/and during transit to the laboratory.

In between wells and following completion of the field sampling, the electronic depth meter will be decontaminated using the following procedure.

- 1) Phosphate-free soap and distilled water wash;
- 2) Distilled water rinse;
- 3) Air dry.

Samples collected will be properly containerized, packed into pre-cooled coolers, and either hand-delivered or shipped via overnight courier to the laboratory for analysis. The chain-of-custody program will allow for tracing of possession and handling of samples from the time of field collection through laboratory analysis. The chain-of-custody program will include sample labels and seals, field logs, and chain-of-custody record, and laboratory log.

Labels sufficiently durable to remain legible when wet will contain the following information:

- Job and sample identification number;
- Monitoring well number or other location;
- Date and time of collection;
- Name of collector;
- Parameter to be analyzed; and
- Preservative, if applicable.

The shipping container will be sealed to ensure that the samples have not been disturbed during transport to the laboratory. The tape is labeled with instructions to notify the shipper if the seal is broken prior to receipt at the laboratory. If the sample cannot be analyzed because of damage or disturbance, whenever possible, the damaged sample will be replaced during the same compliance period.

The field log will contain sheets documenting the following information:

- Identification of the well;
- Well depth;
- Static water level depth;
- Presence of immiscible layers, odors or other indications of potential contamination;
- Well yield-high or low;
- Purge volume (given in gallons or number of bailers);
- Time well was purged;
- Date and time of collection;
- Well sampling sequence;
- Types of sampling containers used and sample identification numbers;

- Preservative used;
- Field analysis data and methods;
- Field observations on sampling event;
- Name of collector(s);
- Internal temperature of shipping container at the time of sample placement; and
- Climatic conditions including air temperatures.

The chain-of-custody record is required to establish the documentation necessary to trace sample possession from time of collection to time of receipt at destination. A chain-of-custody record will accompany each individual shipment. The record will contain the following information:

- Sample destination and transporter;
- Sample identification numbers;
- Signature of collector;
- Date and time of collection;
- Sample type;
- Identification of well;
- Number of sample containers in shipping container;
- Parameters requested for analysis;
- Signature of person(s) involved in the chain of possession;
- Inclusive dates of possession; and
- Internal temperature of shipping container upon opening in laboratory (noted by the laboratory).

A copy of the completed chain-of-custody sheet will accompany the shipment and will be returned to the shipper with the analytical results. The chain of custody record will also be used as the analysis request sheet.

A field blank will be collected and analyzed during each sampling event to verify that the sample collection and handling processes have not affected the integrity of the field samples. The field blank will be prepared in the field from lab pure water (Type II reagent grade water) supplied by the laboratory. One field blank will be prepared for each sampling event. The field blank will be generated by exposing the lab pure water to the sampling environment and sampling equipment/media in the same manner as actual field samples being collected. The lab will provide appropriate sample containers for generation of the field blank(s). The field blank will be subjected to the same analysis(es) as the groundwater samples. As with all other samples, the time(s) of the field blank collection will be recorded so that the sampling sequence is documented. The field blank monitors for contamination from the sampling equipment/media, or from cross-contamination that might occur between samples and sample containers as they are opened and exposed to the sampling environment.

Whenever groundwater samples are being collected for volatiles analysis, a trip blank will be generated by the laboratory prior to shipment of sampling containers and coolers to the field. The same lab pure water as above shall be used. The trip blank shall be transported with the empty

sampling containers to the field, but will not be opened at any time prior to analysis at the laboratory. The trip blank will accompany the groundwater samples in the cooler(s) back to the laboratory and will be analyzed by the same volatile methods as the associated field samples. The trip blank monitors for potential cross-contamination that might occur between samples or that may be a result of the shipping environment.

Concentration levels of any contaminants found in the field blanks or trip blanks will not be used to correct the groundwater data, but will be noted accordingly. Contaminants present in trip blanks or field blanks at concentrations within an order of magnitude of those observed in the corresponding groundwater samples may be cause for resampling.

4.3.3 Sample Analysis Requirements

4.3.3.1 Analytical Requirements

Analysis of groundwater samples from the facility will be analyzed by a laboratory certified by the NCDENR. Analyses will be performed in accordance with U.S. EPA SW 846 methods. Method numbers and Practical Quantitation Limits (PQLs) to be used will be those listed in the January 1995 memorandum entitled *Sampling and Analysis Requirements for Construction and Demolition Landfills and Closed Sanitary Landfills*. This memorandum is included as Appendix DH-10.

4.3.3.2 Reporting and Record Keeping

The laboratory analytical results will be submitted to the Solid Waste Section at least semiannually. The following measurements, analytical data, calculations, and other relevant groundwater monitoring records will be kept throughout the active life of the facility and the post-closure care period:

- Records of all groundwater quality data;
- Associated sample collection field logs and measurements, such as static water level measured in compliance wells at the time of sample collection; and
- Notices and reports of NC 2L exceedances, reporting or data error, missing data, etc.

4.3.3.3 Well Abandonment

All recently installed piezometers or pre-existing wells at the site that are not used for permanent monitoring will be properly abandoned in accordance with the procedures for permanent abandonment, as described in 15A NCAC 2C Rule .0113(a)(2). The piezometers and wells will be progressively abandoned as necessary to complete construction activities. The remaining piezometers will be used to supplement groundwater elevation data. The piezometers and wells that are within the proposed footprints of Phase 3 waste cells will be overdrilled before they are grouted. Other wells that will potentially interfere with clearing and construction activities will be grouted in place without overdrilling.

Inactive supply well WW-1 will be permanently abandoned before construction of any waste cell that would produce a violation of buffers specified in Rule .0503(2)(f)(ii). The abandonment will be performed in conformance with Rule .0113(a)(2).

4.4 Surface Water Monitoring

Two surface water monitoring points are proposed for the facility as shown on Drawing DH-8. Surface water point SW-1 is located to monitor water quality in Poppaw Creek, shortly after it enters the site. The sample location is at the property line near the northwest edge of the site.

Surface water monitoring point SW-2 will serve as a downstream monitoring point. Samples from this point will be collected at a location approximately 350 feet northeast of the proposed Phase 3 disposal area near the northeastern corner of the site and where a small tributary that flows adjacent to the eastern property boundary discharges into Poppaw Creek.

The surface water will be sampled for the constituents as outlined above that are required for C&D landfills and the locations will be monitored at least semiannually during the life of the facility. The results of the analysis of the surface water data will be submitted to the Solid Waste Section semiannually with the groundwater data.

4.5 Ability to Effectively Monitor Releases from Proposed C&D Areas

No known or potential sources of significant contamination have been identified within 2000 feet of the property boundary. There are no known conditions, physical or hydrogeologic, which will interfere with the effective monitoring of the proposed C&D cells.

5.0 REFERENCES

Bouwer, H. and Rice, R.C., June 1976, A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells; Water Resources Research, American Geophysical Union, pp. 423-428.

Bouwer, H., 1989, The Bouwer and Rice slug test-an update; Ground Water, vol. 27, No. 3, May-June, pp. 304 - 309.

Brown, Philip M., Chief Geologist, 1985, Geologic Map of North Carolina, The North Carolina Geologic Survey, scale 1:500,000.

Butler, J. Robert, and Secor, Jr., Donald T., 1991, The Central Piedmont, in Horton, J. W., Jr., and Zullo, V. A., eds., The Geology of the Carolinas: The University of Tennessee Press, p. 59-78.

Carpenter III, P. Albert, Geologic Map of Region G, North Carolina: A Guide for NC Mineral Resource Development and Land Use Planning: NC Mineral Resources Sec., Regional Geology Series 2, 76 p.

Harned, D.A., and Daniel, Charles C., III, 1989, The Transition Zone Between Bedrock and Saprolite: Conduit For Contamination?, *in* Ground Water in the Piedmont; Edited by Daniel, C., White, R., and Stone, P., Proceedings published by Clemson University, pp. 336-348.

Heath, R.C., 1989, The Piedmont ground-water system, *in* Ground Water in the Piedmont; Edited by Daniel, C., White, R., and Stone, P., Proceedings published by Clemson University, pp. 1-13.

North Carolina Dept. Environment, Health, and Natural Resources (NCDEHNR), 1995, Sampling and Analysis Requirements, Construction and Demolition Landfills and Closed Sanitary Landfills, N.C. Solid Waste Section.

North Carolina Dept. Environment, Health, and Natural Resources (NCDEHNR), 1995, Draft N.C. Water Quality Monitoring Guidance Document for Solid Waste Facilities.

Parker, B.L. et al. May 1994. 1) A conceptual understanding of contaminant migration in fractured media, 2) Calculations and real data: fractured media. IN: Dissolved Organic Contaminants in Groundwater Short Course [unpublished short course notes and published references contained therein]. Waterloo Centre for Groundwater Research, Univ. Of Waterloo, Ontario.

RCRA Ground Water Monitoring Technical Enforcement Guidance Document (TEGD), 1986.

Ragland, Paul C., 1991, Mesozoic igneous rocks, in Horton, J. W., Jr., and Zullo, V. A., eds., The Geology of the Carolinas: The University of Tennessee Press, p. 171-190.

Trigon Engineering Consultants, Inc., 1997, Construction and Demolition Landfill Permit Application Siting Requirements Prepared For Coble's Sandrock, Inc.

Trigon Engineering Consultants, Inc., 1998, Construction and Demolition Landfill Permit Application and Construction Plan Application Prepared For Coble's Sandrock, Inc.

TABLE 2
Summary of Slug Test Data
Coble's Sandrock Construction and Demolition Landfill

| WELL AND PIEZOMETER IDENTIFICATION | SATURATED AQUIFER THICKNESS VALUE (feet) | SCREEN LENGTH (feet) | WELL DIAMETER (inches) | SLUG TEST TYPE | HYDRAULIC CONDUCTIVITY K (cm/s) | SCREENED LITHOLOGY |
|------------------------------------|--|----------------------|------------------------|----------------|---------------------------------|--------------------|
|------------------------------------|--|----------------------|------------------------|----------------|---------------------------------|--------------------|

Saprolite

| | | | | | | |
|------------------|------|---|---|---------|-----------------|-----------|
| P-19S | 7.61 | 6 | 2 | Falling | 1.27E-04 | Saprolite |
| P-19S | 7.61 | 6 | 2 | Rising | 1.61E-04 | Saprolite |
| Geomean = | | | | | 1.43E-04 | |

Partially Weathered Rock (PWR)

| | | | | | | |
|------------------|-------|----|---|---------|-----------------|-----|
| MW-9 | 15.86 | 15 | 2 | Falling | 1.11E-04 | PWR |
| MW-9 | 15.86 | 15 | 2 | Rising | 9.18E-05 | PWR |
| P-18 | 9.81 | 15 | 2 | Rising | 7.45E-05 | PWR |
| Geomean = | | | | | 9.12E-05 | |

Bedrock

| | | | | | | |
|------------------|-----|----|---|---------|-----------------|---------|
| TW-1 | --- | 5 | 2 | Rising | 1.27E-04 | Bedrock |
| TW-2 | --- | 15 | 2 | Rising | 1.40E-04 | Bedrock |
| P-16 | 50 | 15 | 2 | Falling | 6.92E-06 | Bedrock |
| P-16 | 50 | 15 | 2 | Rising | 1.88E-06 | Bedrock |
| P-19D | 50 | 15 | 2 | Falling | 1.49E-05 | Bedrock |
| P-19D | 50 | 15 | 2 | Rising | 2.16E-06 | Bedrock |
| P-21 | 50 | 15 | 2 | Falling | 2.82E-05 | Bedrock |
| P-21 | 50 | 15 | 2 | Rising | 1.58E-05 | Bedrock |
| P-25 | 50 | 10 | 2 | Rising | 2.43E-04 | Bedrock |
| Geomean = | | | | | 2.10E-05 | |

Supplemental Data

| | | | | | | |
|------------------|------|----|---|---------|-----------------|-------------------|
| MW-1 | --- | 15 | 2 | Rising | 1.85E-04 | Saprolite/PWR |
| MW-2 | --- | 15 | 2 | Rising | 1.66E-04 | Saprolite/PWR |
| MW-4 | --- | 15 | 2 | Rising | 7.60E-04 | Saprolite/PWR |
| MW-5 | 9.45 | 10 | 2 | Rising | 3.53E-05 | Saprolite/PWR |
| P-17 | 50 | 15 | 2 | Falling | 8.25E-04 | Saprolite/Bedrock |
| P-17 | 50 | 15 | 2 | Rising | 3.17E-04 | Saprolite/Bedrock |
| P-22 | 8.32 | 6 | 2 | Falling | 6.02E-05 | Saprolite/PWR |
| P-22 | 8.32 | 6 | 2 | Rising | 2.66E-05 | Saprolite/PWR |
| Geomean = | | | | | 1.56E-04 | |

NOTES:

1. --- = data not available
2. Aquifer analysis for MW-1, -2, and -4 were performed by Trigon Engineering Consultants, Inc. on May 14, 1998.
3. Aquifer analysis for TW-1 and TW-2 were performed by Trigon Engineering Consultants, Inc. on June 23, 1998.
4. Aquifer analysis for MW-5, P-16, -17, -19S, -19D, -21, and -22 were performed by Joyce Engineering, Inc. between February 5-18, 2002.
5. Aquifer analysis for MW-9, P-18 and P-25 were performed by Joyce Engineering, Inc. on September 16, 2005.

| BORING NUMBER | HYDROGEOLOGIC UNIT | SAMPLE DEPTH (feet) | SAMPLE TYPE | USCS CLASSIFICATION | USCS SYMBOL | NATURAL MOISTURE CONTENT (%) | DRY UNIT WEIGHT (pcf) | GRADATION RESULTS (% passing) | | | | | | | | USDA SOIL CLASSIFICATION SYSTEM | | ASTM SOIL CLASSIFICATION SYSTEM | | |
|---------------|--------------------|---------------------|-------------|---------------------|-------------|------------------------------|-----------------------|-------------------------------|-----------|------|-------|-------------------|------|------|-------|---------------------------------|--------------|---------------------------------|--------------|--------------|
| | | | | | | | | 1' | 3/4' | 1/2' | 3/8" | #4 | #10 | #40 | #100 | #200 | PERCENT SILT | PERCENT CLAY | PERCENT SILT | PERCENT CLAY |
| | | | | | | | | B-1 | Saprolite | 0-7 | Bag | Sandy Clayey Silt | ML | 17.5 | 101.0 | 100 | 100 | 100 | 100 | 99 |
| B-1 | Saprolite | 0-10 | --- | Sandy Silt | ML | --- | --- | 100 | 100 | 100 | 100 | 99 | 94 | 64 | 38 | 35 | 27.5 | 2 | 31 | |
| B-2 | Saprolite | 0-5 | --- | Sandy Silt | ML | --- | --- | 100 | 100 | 100 | 100 | 100 | 99 | 75 | 44 | 42 | 36.5 | 1 | 40 | |
| B-3 | Saprolite | 0-15 | --- | Sandy Silt | ML | --- | --- | 100 | 100 | 100 | 100 | 100 | 98 | 58 | 32 | 31 | 27 | 0.5 | 28 | |
| B-5 | Saprolite | 0-10 | --- | Sandy Silt | ML | --- | --- | 100 | 100 | 100 | 100 | 100 | 96 | 71 | 49 | 47 | 34 | 8 | 36.5 | |
| MW-1 | Saprolite | 0-7 | Bag | Sandy Silt | ML | 27.3 | 101.4 | 100 | 100 | 100 | 100 | 100 | 96 | 85 | 49 | 47 | 27.5 | 9.5 | 36 | |
| MW-2 | Saprolite | 0-10 | --- | Sandy Silt | ML | 27.3 | --- | 100 | 100 | 100 | 100 | 100 | 99 | 75 | 49 | 48 | 30.5 | 11 | 35 | |
| MW-3 | Saprolite | 0-10 | --- | Sandy Silt | ML | --- | --- | 100 | 100 | 100 | 100 | 99 | 92 | 46 | 22 | 21 | 16.5 | 1 | 19 | |
| MW-4 | Saprolite | 0-10 | --- | Sandy Silt | ML | --- | --- | 100 | 100 | 100 | 100 | 100 | 92 | 51 | 29 | 28 | 20.5 | 2 | 24.5 | |
| MW-4 | Saprolite | 11-12.5 | Undisturbed | Sandy Silt | ML | 14.2 | 111.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| UD-1 | --- | 0.5-2.5 | Undisturbed | --- | --- | 31.6 | 85.6 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| P-15 | Saprolite | 5-7 | Split Spoon | Silty Clayey Sand | SC-SM | --- | --- | 100 | 100 | 100 | 100.0 | 99.0 | 89.5 | 58.8 | 42.9 | 35.2 | --- | --- | --- | |
| P-17 | Saprolite | 5-7 | Split Spoon | Elastic Silt | MH | --- | --- | 100 | 100 | 100 | 100.0 | 100.0 | 99.2 | 94.3 | 92.0 | 90.2 | --- | --- | --- | |
| P-19S | Saprolite | 4-6 | Undisturbed | Silty Sand | SM | 27.2 | 99.0 | 100 | 100 | 100 | 98.4 | 95.5 | 90.7 | 56.7 | 39.0 | 32.5 | --- | --- | --- | |
| P-20 | Saprolite/PWR | 20-22 | Split Spoon | Silty Sand | SM | --- | --- | 100 | 100 | 100 | 100.0 | 99.1 | 84.8 | 40.3 | 25.2 | 18.3 | --- | --- | --- | |
| P-21 | Saprolite | 2-10 | Bulk | Sandy Lean Clay | CL | --- | 108.4 | 100 | 100 | 100 | 100.0 | 100.0 | 97.0 | 89.0 | 83.7 | 78.4 | --- | --- | --- | |
| P-23 | Saprolite | 0-2 | Split Spoon | Sandy Elastic Silt | MH | --- | --- | 100 | 100 | 100 | 100.0 | 100.0 | 95.7 | 77.6 | 71.2 | 67.2 | --- | --- | --- | |
| MW-8 | Saprolite | 2-6 | Composite | Sandy Lean Clay | CL | --- | --- | 100 | 100 | 100 | 100.0 | 99.3 | 98.3 | 90.3 | --- | 65.1 | 30.72 | 32.46 | 26.27 | |
| MW-8 | PWR | 15-22 | Composite | Clayey Sand | SC | --- | --- | 100 | 100 | 100 | 100.0 | 99.1 | 93.1 | 59.8 | --- | 27.3 | 21.65 | 3.73 | 21.19 | |
| P-24 | Saprolite | 5-12 | Composite | Clayey Sand | SC | --- | --- | 100 | 100 | 100 | 99.4 | 97.5 | 90.0 | 64.3 | --- | 42.1 | 27.08 | 16.12 | 22.9 | |

NOTES:

- na = not applicable
- NP = non-plastic
- = no data available
- Soils analysis performed by Trigon Engineering Consultants, Inc. and Geotechnics
- NP = Non-Plastic material; therefore, Atterberg Limits not available.
- The USDA Soil Classification System sets a grain size boundary for sand and silt at 0.05 mm and for silt and clay at 0.002 mm.
- The ASTM Soil Classification System sets a grain size boundary for sand and silt at 0.075 mm and for silt and clay at 0.005 mm.
- The Wentworth Soil Classification System sets a grain size boundary for sand and silt at 0.0625 mm and for silt and clay at 0.0039 mm.
- The grain size distribution from the Wentworth Soil Classification System was plotted on the Textural Classification Triangle developed by A.I. Johnson (1967) to determine specific yield, which is considered approximately equivalent to effective porosity, and recorded on the test report.
- Effective porosity values were calculated assuming that all material greater than 0.0625 mm is sand size. There is a minor amount of material larger than sand in each sample provided.
- The porosity values provided are an average of "Before Test" and "After Test" porosity values provided on the porosity data sheets in Appendix DH-9.

TABLE 4
Summary of Rock Core Data
Coble's Sandrock Construction and Demolition Landfill

| BORING LOCATION | CORED INTERVAL (feet) | % RECOVERY | % RQD |
|------------------------|----------------------------------|-------------------|--------------|
| C-1 | 45.4-50.4 | 91 | 61 |
| | 50.4-55.4 | 100 | 100 |
| C-2 | 38.5-43.5 | 98 | 86 |
| | 43.5-48.5 | 100 | 90 |
| C-3 | 13.1-18.1 | 98 | 85 |
| | 18.1-23.1 | 100 | 90 |
| TW-1 | 13.2-17.5 | 85 | --- |
| | 17.5-22.6 | 80 | 86 |
| TW-2 | 8.5-13.5 | 93 | 90 |
| | 13.5-18.5 | 97 | 100 |
| | 18.5-23.5 | 84 | 98 |
| | 23.5-28.5 | 100 | 100 |
| P-21 | 44-50 | 82 | 38 |
| P-26 | 25-30 | 85 | 28 |
| | 30-35 | 70 | 36 |
| | 35-40 | 38 | 0 |
| | 40-45 | 94 | 62 |
| | 45-48.5 | 95 | 43 |

NOTES:

1. C-1, C-2 and C-3 were cored in July and August 1997 by Trigon Engineering Consultants, Inc. using an NQ wire-line rock coring device on a Mobil B-61 rig.
2. TW-1 and TW-2 were cored between June and July 1998 by Trigon Engineering Consultants, Inc.
3. P-21 was cored in February 2002 by Bedford Well Drilling, Inc. using an NQ wire-line rock coring device on a Ingersoll-Rand A-300 rig.
4. P-26 was cored in March 2005 by SAEDACCO using an NQ rock coring device on a Gus Pech GP-1100E rig.
5. TW-2 was in metavolcanic rock. P-26 was cored through metavolcanic rock from approximately 35 to 41.5 feet below ground surface. The other rock cores were in granite.
6. RQD = Rock Quality Designator.

| Piezometer Number | USGS G.S. Elev. | Approximate Stickup | USGS TOC Elev. | GW Elev. 04/30/02 | GW Elev. 05/20/02 | GW Elev. 06/25/02 | GW Elev. 07/29/02 | GW Elev. 08/23/02 | GW Elev. 10/04/02 | GW Elev. 11/21/02 | GW Elev. 12/19/02 | GW Elev. 04/29/03 | GW Elev. 07/10/03 |
|-------------------|-----------------|---------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| MW-1 | 600.26 | 2.2 | 602.46 | 568.17 | 567.94 | 567.28 | 567.10 | 566.91 | 567.41 | 570.60 | --- | --- | 570.1 |
| MW-2 | 580.31 | 2 | 582.31 | 567.84 | 567.05 | 565.23 | 565.75 | 564.78 | 566.83 | 570.36 | 569.96 | --- | 568.5 |
| MW-3 | 610.23 | 2.82 | 613.05 | 576.09 | 575.94 | 574.63 | 574.80 | 573.87 | 574.92 | 578.47 | --- | --- | 579.4 |
| MW-4 | 580.64 | 2 | 582.64 | 568.21 | 567.93 | 566.39 | 567.50 | 566.38 | 567.92 | 569.74 | 569.48 | --- | 568.5 |
| MW-5 | 575.21 | 2.2 | 577.41 | 569.32 | 569.06 | 567.89 | 568.95 | 568.07 | 569.18 | 570.45 | 570.33 | 570.32 | 570.3 |
| MW-6 | 652.86 | -0.3 | 652.56 | 623.94 | 623.81 | 623.35 | 622.77 | 622.44 | 622.59 | 626.32 | --- | --- | 634.5 |
| MW-7 | 580.83 | 2.5 | 583.33 | --- | --- | --- | --- | --- | --- | --- | 576.48 | --- | 574.5 |
| MW-8 | 571.50 | 2.76 | 574.26 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-9 | 586.43 | 2.66 | 589.09 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-10S | 589.62 | 2.84 | 592.46 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MW-10D | 589.90 | 2.86 | 592.76 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WW-1 | 622.83 | 2.37 | 625.20 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-2 | 578.86 | --- | 578.86 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-2A | 578.96 | --- | 578.96 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-4 | 628.56 | 3.32 | 631.88 | 603.84 | 603.42 | 602.76 | 602.52 | 602.18 | 602.52 | 607.34 | --- | --- | 607.1 |
| P-5 | 611.26 | 0.65 | 611.91 | 602.82 | 602.17 | 601.44 | 602.43 | 601.32 | 601.86 | 606.18 | --- | --- | 605 |
| P-6 | 602.93 | 3.13 | 606.06 | 578.74 | 578.33 | 577.75 | 577.53 | 577.73 | 578.74 | 585.74 | 586.93 | --- | --- |
| P-7 | 617.90 | 3.61 | 621.51 | 597.36 | 596.67 | 595.49 | 596.26 | 595.48 | 596.40 | 599.45 | 599.42 | --- | --- |
| P-15 | 649.07 | 2.15 | 651.22 | 610.59 | 610.47 | 610.1 | 609.79 | 609.57 | 609.37 | 611.02 | --- | 614.16 | 614.91 |
| P-16 | 609.85 | 2.2 | 612.05 | 596.35 | 595.57 | 594.92 | 594.83 | 594.17 | 595.41 | 604.32 | --- | 600.34 | 600.13 |
| P-17 | 643.78 | 2.5 | 646.28 | 630.88 | 630.26 | 628.04 | 626.40 | 625.86 | 626.31 | 631.77 | --- | 639.47 | 639.25 |
| P-18 | 652.16 | -0.4 | 651.76 | 627.53 | 627.27 | 626.60 | 626.07 | 625.67 | 625.88 | 628.19 | --- | 629.81 | --- |
| P-19S | 569.18 | 3 | 572.18 | 566.44 | 566.09 | 564.38 | 566.11 | 564.48 | 565.93 | 567.65 | --- | 567.41 | 567.31 |
| P-19D | 569.65 | 2.2 | 571.85 | 566.42 | 566.06 | 564.59 | 565.76 | 564.37 | 565.68 | 568.44 | --- | 567.38 | 567.24 |
| P-20 | 638.81 | 2.3 | 641.11 | 629.35 | 628.25 | 626.87 | 625.82 | 625.17 | 625.42 | 631.50 | --- | 633.69 | 636.84 |
| P-21 | 665.67 | 2.75 | 668.42 | 620.52 | 620.45 | 619.81 | 618.92 | 619.16 | 619.01 | 621.06 | --- | 627.44 | 629.30 |
| P-22 | 627.90 | 2 | 629.90 | 621.51 | 620.26 | 619.18 | 625.47 | 618.61 | 625.41 | 627.30 | --- | 627.07 | 627.64 |
| P-23 | 637.87 | 2.5 | 640.37 | 610.34 | 609.95 | 609.24 | 609.01 | 608.75 | 609.06 | 612.64 | --- | 617.50 | 618.15 |
| P-24 | 612.52 | 1.37 | 613.89 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-25 | 616.37 | 1.44 | 617.81 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-26 | 594.27 | 2.86 | 597.13 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-27 | 625.25 | 2.2 | 627.45 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-28 | 610.36 | 2.79 | 613.15 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-29 | 617.31 | 2.18 | 619.49 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P-30 | 634.75 | 2.74 | 637.49 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

NOTES:

- 24-hr water levels are not available for MW-5, P-16, -17, -26, -27, -28, -29, and -30.
- 7 day waterlevels were taken on 1/24/02 for MW-5, P-15, -16, -17, -22, and -23; 7 day waterlevels were taken on 2/5/02 for P-19D, -20, and -21; 7 day waterlevels were taken on 2/6/02 for P-18 and -19S; 7 day waterlevels were taken on 4/4/05 for MW-8, -9, -10S, -10D, -24, -25, and -26.
- 7 day water level was taken at 5 days for P-19D; and at 6 days for MW-5, P-16, -17, -19S, and -21.
- = not available
- Water levels were measured to the nearest hundredth of a foot.
- Water levels are measured from top of casing (TOC).
- "N/A" piezometers were not available for sampling due to damaged casing

- Water level for MW
- Elevations for PZ-8
- P-6 and P-7 were
- MW-3 was former

TABLE 6
Hydraulic Gradients and Linear Flow Velocities
Coble's Sandrock Construction and Demolition Landfill

| PIEZOMETER PAIR | HYDRAULIC CONDUCTIVITY (K, cm/s) | DISTANCE BETWEEN PAIRS (ft) | FLOW DIRECTION | 08/02/05 Groundwater Elevations | | |
|-----------------|-------------------------------------|-----------------------------|----------------|---------------------------------|---------------------|---------------------|
| | | | | Elevation (ft, MSL) | Gradient (ft/ft) | Velocity (ft/yr) |
| P-25 MW-8 | 1.09E-04 | 1030 | NW | 595.96 567.97 | 0.03 | 16.11 |
| i_1 | 1.09E-04 | 2287 | NW | 630 565 | 0.03 | 16.11 |
| i_2 | 1.09E-04 | 705 | WNW | 600 570 | 0.04 | 21.48 |
| i_3 | 1.09E-04 | 1013 | WNW | 630 585 | 0.04 | 21.48 |
| i_4 | 1.09E-04 | 816 | WSW | 630 615 | 0.02 | 10.74 |

NOTES:

1. The geometric mean of K estimated from individual well slug tests was used to calculate the hydraulic conductivity.
2. An effective porosity of 0.21 was assumed in the velocity calculations.

TABLE 7
Summary of Vertical Gradients
Coble's Sandrock Construction and Demolition Landfill

| WELL PAIR | SCREENED INTERVALS (feet) | DISTANCE BETWEEN SCREEN MIDPOINTS (feet) | 04/04/05 | | 08/02/05 | |
|-----------|------------------------------|---|--|------------------------------|--|------------------------------|
| | | | ELEVATION ABOVE MEAN SEA LEVEL (feet) | VERTICAL GRADIENT (ft/ft) | ELEVATION ABOVE MEAN SEA LEVEL (feet) | VERTICAL GRADIENT (ft/ft) |
| MW-10D | 54-64 | 45.0 | 585.95 | -0.0311 | 584.25 | 0.0020 |
| MW-10S | 6.5-21.5 | | 584.55 | | 584.34 | |
| P-19D | 45-60 | 45.5 | 567.68 | -0.0090 | 566.70 | 0.0024 |
| P-19S | 4-10 | | 567.27 | | 566.81 | |

NOTES:

1. Positive vertical gradient values indicate downward flow direction and negative vertical gradient values indicate upward flow direction.

TABLE 8

**Summary of Estimated Long-Term Seasonal High Groundwater Elevations for Saprolite and PWR Wells and Piezometers at
Coble's Sandrock Construction and Demolition Landfill**

| Well | 08/02/05 Groundwater Elevations | Seasonal High Adjustment | 08/02/05 Groundwater Elevation + Seasonal High Adjustment | Maximum Groundwater Elevation | Ground Surface Elevation | Estimated High Groundwater Elevation |
|------|---------------------------------------|-----------------------------|--|-------------------------------------|-----------------------------|--|
| 1 | 567.85 | 2.25 | 570.10 | 571.48 | 600.26 | 571.48 |
| 2 | 566.91 | 2.25 | 569.16 | 570.36 | 580.31 | 570.36 |
| 4 | 567.69 | 2.25 | 569.94 | 569.74 | 580.64 | 569.74 |
| 5 | 570.07 | 2.25 | 572.32 | 570.92 | 575.21 | 572.32 |
| 7 | 572.61 | 2.25 | 574.86 | 576.48 | 580.83 | 576.48 |
| 8 | 567.97 | 2.25 | 570.22 | 568.84 | 571.50 | 570.22 |
| 9 | 568.24 | 2.25 | 570.49 | 569.71 | 586.43 | 570.49 |
| | 633.33 | 2.25 | 635.58 | 641.49 | 643.78 | 641.49 |
| | 630.79 | 2.25 | 633.04 | 633.09 | 652.16 | 633.09 |
| 3 | 566.81 | 2.25 | 569.06 | 567.65 | 569.18 | 569.06 |
| | 631.69 | 2.25 | 633.94 | 636.84 | 638.81 | 636.84 |
| | 626.83 | 2.25 | 629.08 | 627.64 | 627.90 | 627.64 |

TABLE 9

**Summary of Estimated Long-Term Seasonal High Groundwater Elevations for Bedrock Wells and Piezometers at
Coble's Sandrock Construction and Demolition Landfill**

| meter or Well ID | 08/02/05 Groundwater Elevations | Seasonal High Adjustment | 08/02/05 Groundwater Elevation + Seasonal High Adjustment | Maximum Water Elevation | Ground Surface Elevation | Estimated |
|------------------|---------------------------------|--------------------------|---|-------------------------|--------------------------|-----------|
| MW-3 | 578.60 | 3.25 | 581.85 | 580.30 | 610.23 | |
| MW-6 | 627.69 | 3.25 | 630.94 | 634.57 | 652.86 | |
| IW-10S | 584.34 | 3.25 | 587.59 | 584.55 | 589.62 | |
| W-10D | 584.25 | 3.25 | 587.50 | 585.95 | 589.90 | |
| P-4 | 604.66 | 3.25 | 607.91 | 609.56 | 628.56 | |
| P-5 | 605.55 | 3.25 | 608.80 | 607.91 | 611.26 | |
| P-6 | 586.93 | 3.25 | 590.18 | 586.93 | 602.93 | 5 |
| P-7 | 599.42 | 3.25 | 602.67 | 599.45 | 617.90 | 6 |
| P-15 | 614.27 | 3.25 | 617.52 | 615.30 | 649.07 | 6 |
| P-16 | 598.35 | 3.25 | 601.60 | 604.95 | 609.85 | 60 |
| P-19D | 566.70 | 3.25 | 569.95 | 568.44 | 569.65 | 56 |
| P-21 | 605.00 | 3.25 | 608.25 | 606.75 | 610.00 | 60 |

TABLE 10
Summary of Precipitation Data for Burlington, North Carolina
Coble's Sandrock Construction and Demolition Landfill

| AR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 50 | 0.00 z |
| 51 | 0.00 z | 1.88 | 3.21 | 4.43 | 0.06 z | 1.56 o | 2.63 | 1.11 u | 0.00 z | 0.00 z | 0.00 z |
| 52 | 0.00 z | 1.57 | 3.39 |
| 53 | 4.48 | 4.79 | 4.54 | 3.21 | 2.11 | 3.84 | 2.80 | 1.45 | 3.99 | 0.27 | 0.54 |
| 54 | 6.68 | 1.50 | 5.54 | 2.50 | 3.72 | 2.63 | 4.78 | 4.00 | 0.66 | 7.45 | 5.14 |
| 55 | 1.94 | 3.98 | 2.43 | 4.33 | 2.96 | 2.49 | 6.28 | 5.36 | 5.07 | 4.32 | 2.33 |
| 56 | 1.51 | 5.92 | 3.03 | 3.53 | 2.22 | 2.77 | 4.65 | 4.56 | 6.84 | 4.51 | 2.32 |
| 57 | 3.66 | 5.89 | 3.01 | 3.79 | 1.66 | 4.00 | 3.68 | 6.13 | 6.87 | 2.27 | 5.44 |
| 58 | 4.66 | 3.61 | 2.67 | 5.55 | 5.16 | 4.10 | 3.94 | 6.81 | 1.52 | 1.95 | 2.02 |
| 59 | 2.62 | 3.28 | 2.89 | 4.98 | 2.85 | 1.68 | 5.81 | 5.75 | 3.91 | 7.33 | 3.25 |
| 60 | 3.95 | 5.61 | 5.97 | 4.16 | 3.99 | 1.08 | 6.20 | 4.94 | 3.99 | 2.35 | 0.65 |
| 61 | 1.81 | 5.13 | 5.68 | 4.07 | 5.56 | 4.53 | 3.32 | 7.62 | 0.65 | 1.32 | 1.88 |
| 62 | 6.58 | 4.26 a | 4.55 | 2.47 a | 2.76 | 7.11 | 5.14 | 3.12 | 3.89 | 0.78 | 5.63 |
| 63 | 2.59 | 3.23 | 5.68 | 2.50 | 1.56 | 1.87 | 3.76 | 2.71 | 7.66 | 0.39 | 5.84 |
| 64 | 4.15 | 4.55 | 2.38 | 3.38 | 0.88 | 4.51 | 4.89 | 6.24 | 3.60 | 5.33 | 1.70 |
| 65 | 1.81 | 2.58 | 4.39 | 3.45 | 1.22 | 8.12 | 11.56 | 3.42 | 3.03 | 3.11 | 1.48 |
| 66 | 4.99 | 4.97 | 1.30 | 1.36 | 5.72 | 1.04 | 1.52 | 3.27 | 4.63 | 3.10 | 1.88 |
| 67 | 1.83 | 3.37 | 1.59 | 1.76 | 4.62 | 2.94 | 4.02 | 7.89 | 2.50 | 0.85 | 1.21 |
| 68 | 4.00 | 0.67 | 4.32 | 2.06 | 4.98 | 2.24 | 4.49 | 3.25 | 0.10 | 2.71 | 4.37 |
| 69 | 1.68 | 3.67 | 3.87 | 5.48 | 4.22 | 6.76 | 4.74 | 3.19 | 4.06 | 1.15 | 0.80 |
| 70 | 1.79 | 3.50 | 4.21 | 3.87 | 3.10 | 3.02 | 5.34 | 5.16 | 1.30 | 6.50 | 3.70 |
| 71 | 1.70 | 3.63 | 3.86 | 2.86 | 5.83 | 2.16 | 3.41 | 5.19 | 3.68 | 8.74 | 2.67 |
| 72 | 1.78 | 4.42 | 2.42 | 2.03 | 5.01 | 5.04 | 4.81 | 3.40 | 7.52 | 3.93 | 5.54 |
| 73 | 2.98 | 3.39 | 5.27 | 4.96 | 4.52 | 7.42 | 4.18 | 2.31 | 2.52 | 1.95 | 0.96 |
| 74 | 5.09 | 3.39 | 3.42 | 2.14 | 8.75 | 5.55 | 1.67 | 6.29 | 8.55 | 0.82 | 2.05 |
| 75 | 6.54 | 3.64 | 8.29 | 1.19 | 2.96 | 1.46 | 8.73 | 4.56 | 8.61 | 1.70 | 2.31 |
| 76 | 3.15 | 1.54 | 2.00 | 0.47 | 4.31 | 4.99 | 1.07 | 1.88 | 2.75 | 4.95 | 2.35 |
| 77 | 2.69 | 1.77 | 3.79 | 1.38 | 2.68 | 6.43 | 1.45 | 2.93 | 5.76 | 5.24 | 2.56 |
| 78 | 8.43 | 1.19 | 4.07 | 6.51 | 6.84 | 4.14 | 5.25 | 7.51 | 1.56 | 1.95 | 2.59 a |
| 79 | 5.86 | 4.96 | 3.76 | 2.98 | 5.85 | 7.20 | 3.70 | 3.60 | 7.54 | 2.50 | 3.81 |
| 80 | 4.43 | 1.82 | 5.69 | 2.79 | 3.86 | 8.17 | 4.53 | 2.58 | 4.18 | 4.56 | 2.62 |
| 81 | 1.04 | 4.52 | 2.91 | 1.55 | 3.67 | 3.36 | 8.50 | 4.67 | 2.72 | 5.13 | 0.45 |
| 82 | 5.13 | 5.81 | 1.66 | 4.21 | 6.23 | 10.16 | 3.43 | 1.55 | 1.94 | 4.74 | 2.88 |
| 83 | 1.86 | 4.08 | 5.06 | 7.59 | 5.61 | 2.59 | 0.79 | 1.99 | 2.63 | 3.44 | 5.02 |
| 84 | 4.72 | 6.85 | 7.22 | 3.50 | 4.39 | 2.92 | 8.64 | 2.20 | 0.66 | 2.98 | 1.76 |
| 85 | 4.07 | 5.18 | 1.36 | 0.68 | 4.47 | 1.18 | 9.63 | 10.19 | 0.07 | 2.92 | 8.86 |
| 86 | 0.96 | 1.51 | 2.44 | 2.65 | 2.45 | 1.14 | 4.11 | 6.05 a | 1.05 | 2.48 | 4.24 |
| 87 | 4.22 b | 3.45 | 3.18 | 6.76 a | 1.47 | 1.06 | 4.48 | 2.65 | 7.66 | 1.19 | 3.72 |
| 88 | 2.70 | 1.27 | 1.55 | 3.17 | 4.87 | 0.00 z | 3.02 | 3.01 | 4.02 | 2.63 | 3.94 |
| 89 | 1.67 | 6.63 a | 7.87 | 3.39 | 3.87 | 6.65 | 5.35 | 5.95 | 2.53 | 3.00 | 2.46 |
| 90 | 4.63 | 3.28 | 2.57 a | 1.98 | 7.52 | 0.89 | 2.48 | 3.85 a | 0.16 | 7.78 | 2.21 |
| 91 | 5.00 | 1.93 | 5.61 | 2.58 a | 2.72 | 2.29 a | 6.32 | 4.38 | 4.68 | 1.21 | 0.40 |
| 92 | 3.70 | 3.10 | 2.90 | 3.16 | 3.38 | 6.75 | 2.49 | 3.57 | 1.97 | 5.42 | 4.88 |
| 93 | 3.89 | 3.59 | 8.50 a | 4.59 | 3.33 | 1.60 | 7.36 | 2.93 | 3.17 | 1.14 | 3.73 |
| 94 | 4.77 a | 2.39 | 5.92 | 2.42 | 1.10 a | 1.37 a | 6.44 | 4.67 | 0.80 | 1.17 | 1.55 |
| 95 | 4.94 | 3.21 | 3.57 a | 0.70 | 3.52 | 12.00 | 4.97 | 5.06 | 1.67 | 6.84 | 4.02 |

DRAWINGS

- Drawing DH-0** **Title Page**
- Drawing DH-1** **Drawing Legend, Notes, Legends and Abbreviations**
- Drawing DH-2** **Boring, Piezometer, and Monitoring Well Location Plan**
- Drawing DH-3** **Groundwater Surface Elevation Contour Map – August 2, 2005**
- Drawing DH-4** **Bedrock Surface Elevation Map w/ Proposed Base Grades**
- Drawing DH-5** **Hydrogeologic Cross-Sections – Lines of Section**
- Drawing DH-6** **Hydrogeologic Cross-Sections A-A', B-B', C-C', and D-D'**
- Drawing DH-7** **Estimated Seasonal High Groundwater Elevation Map w/ Proposed Base Grades**
- Drawing DH-8** **Proposed Monitoring Plan**

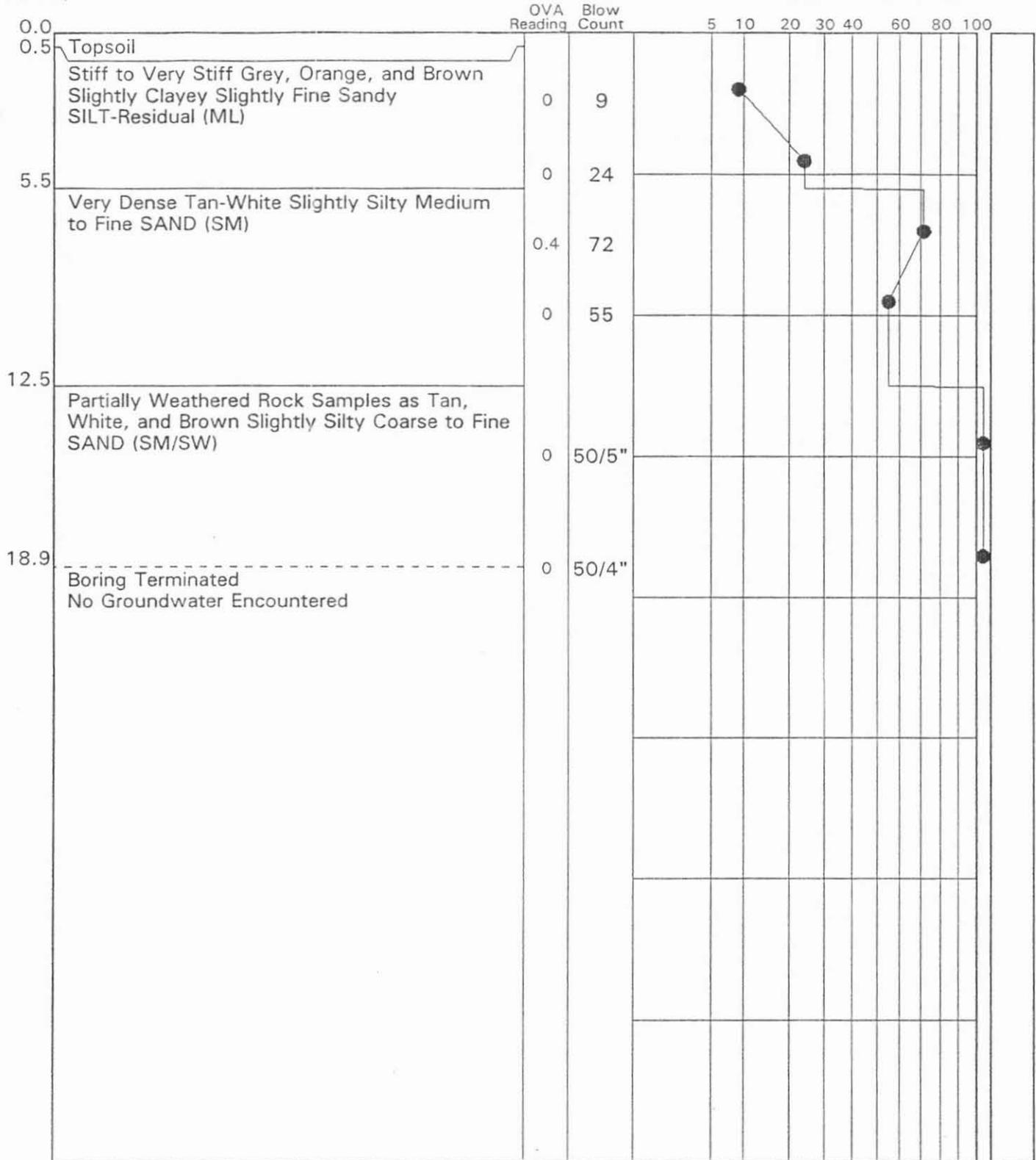
APPENDIX DH-1

**Boring Logs and Construction Diagrams for Piezometers and
Monitoring Wells from Previous Investigations**

DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

▨ UNDISTURBED SAMPLE

≡ WATER TABLE-24 HR.

▨ 50% ROCK CORE RECOVERY

≡ WATER TABLE-1 HR.

◀ LOSS OF DRILLING WATER

▨ CAVE-IN DEPTH

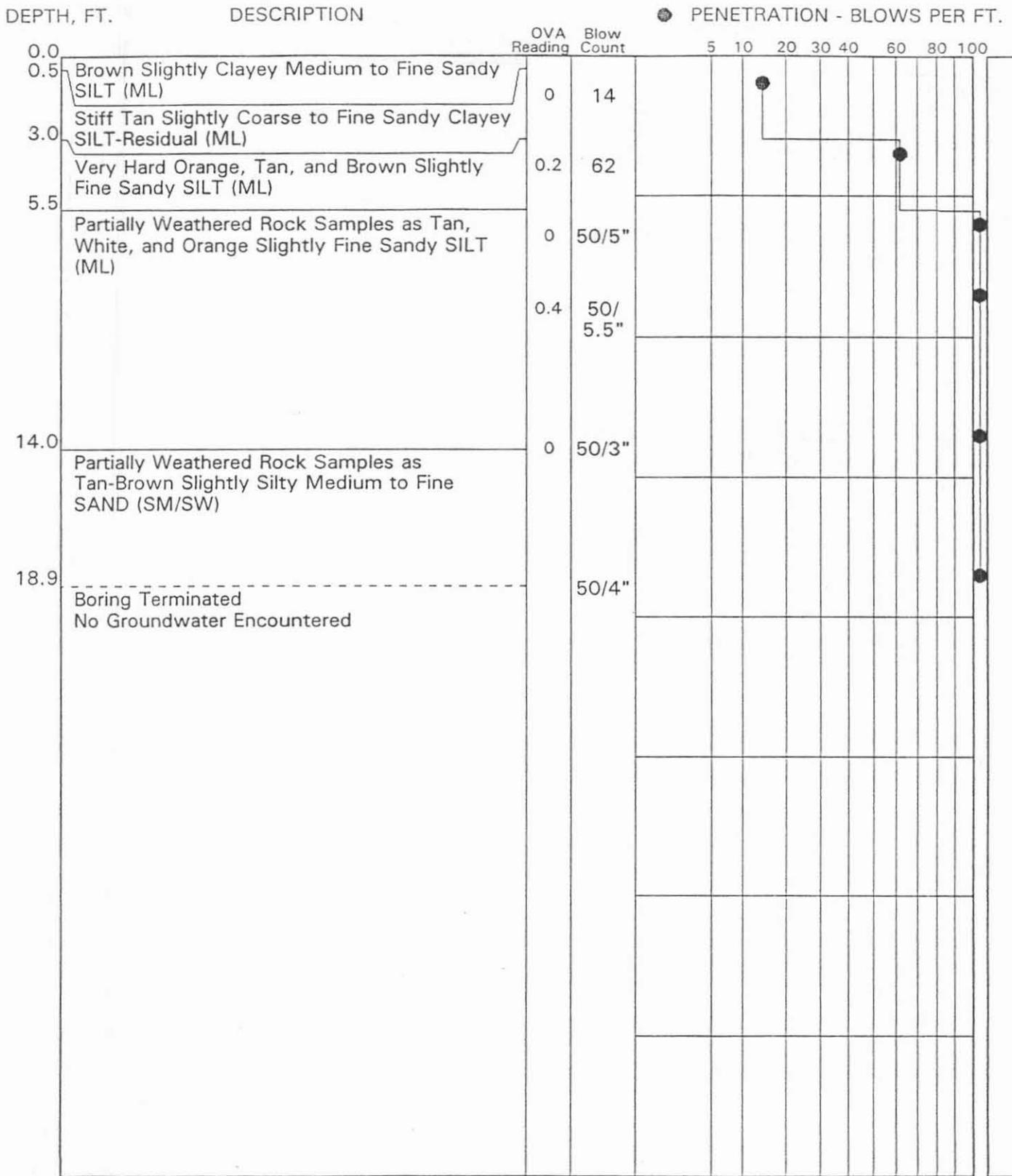
BORING NO. B-1

DATE DRILLED 3/24/97

JOB NO. 152-97-010C

PAGE 1 of 1





TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

▨ UNDISTURBED SAMPLE

▨ 50% ROCK CORE RECOVERY

◀ LOSS OF DRILLING WATER

≡ WATER TABLE-24 HR.

≡ WATER TABLE-1 HR.

■ CAVE-IN DEPTH

BORING NO. B-2

DATE DRILLED 4/1/97

JOB NO. 152-97-010C

PAGE 1 of 1



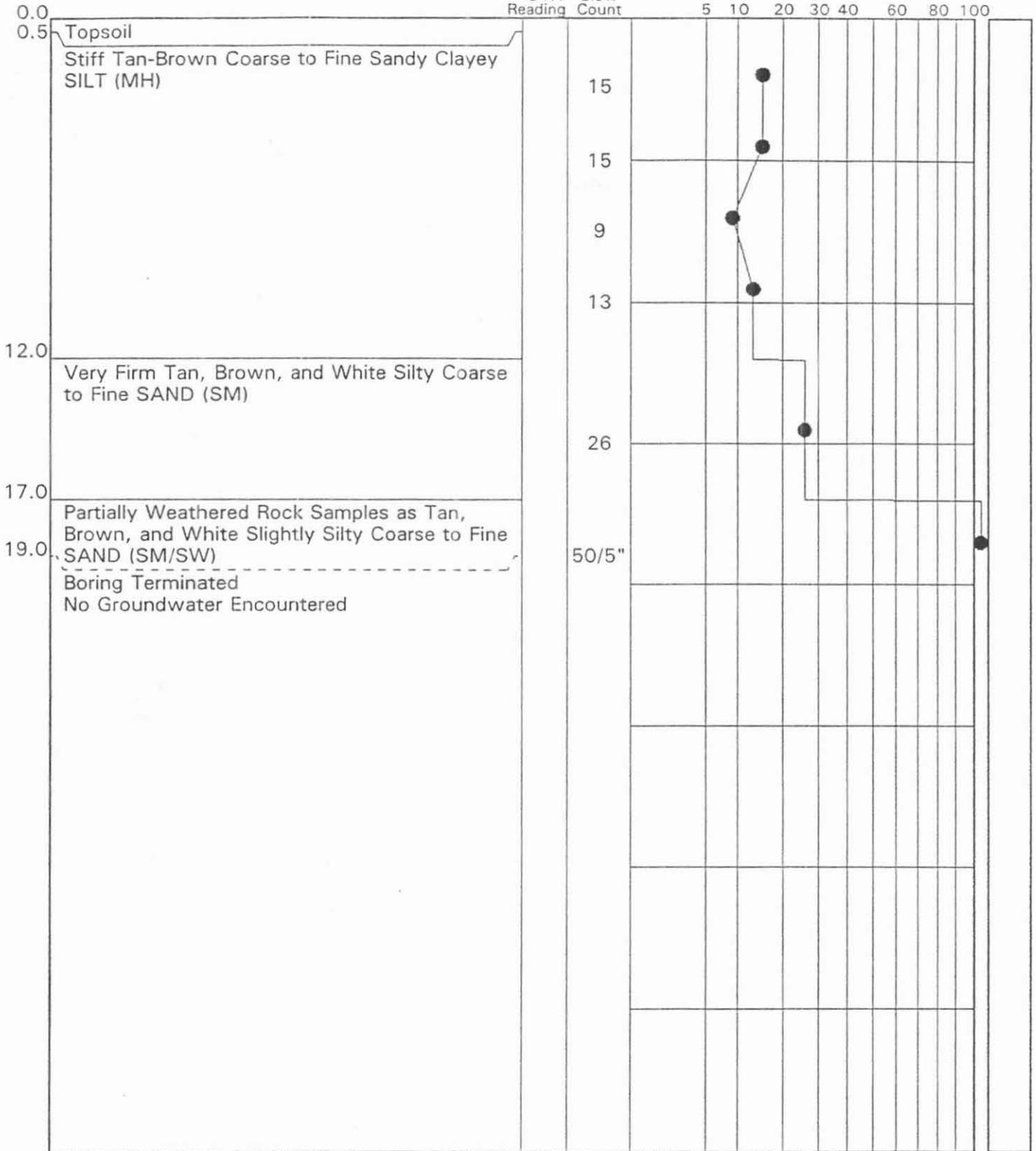
DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.

OVA Reading Blow Count

5 10 20 30 40 60 80 100



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

- ▨ UNDISTURBED SAMPLE
- ≡ WATER TABLE-24 HR.
- ▨ 50% ROCK CORE RECOVERY
- ≡ WATER TABLE-1 HR.
- ◀ LOSS OF DRILLING WATER
- CAVE-IN DEPTH

BORING NO. B-3
 DATE DRILLED 3/27/97
 JOB NO. 152-97-010C
 PAGE 1 of 1



| DEPTH, FT. | DESCRIPTION | OVA Reading | Blow Count | PENETRATION - BLOWS PER FT. | | | | | | | | | | | | | |
|------------|---|-------------|------------|-----------------------------|----|----|----|----|----|----|-----|--|--|--|--|--|--|
| | | | | 5 | 10 | 20 | 30 | 40 | 60 | 80 | 100 | | | | | | |
| 0.0 | | | | | | | | | | | | | | | | | |
| 0.5 | Topsoil | | | | | | | | | | | | | | | | |
| 1.0 | Tan-Brown Slightly Coarse to Fine Sandy Clayey SILT (MH) | | 23 | | | | | | | | | | | | | | |
| 3.0 | Firm Tan, Brown, and White Silty Coarse to Fine SAND (SM) | | | | | | | | | | | | | | | | |
| | Partially Weathered Rock Samples as Tan, Boring, and White Silty Coarse to Fine SAND (SM) | | 50/4.5" | | | | | | | | | | | | | | |
| | | | 50/5" | | | | | | | | | | | | | | |
| 10.5 | Auger Refusal No Groundwater Encountered | | 50/6" | | | | | | | | | | | | | | |

NOTE: Split-spoon bounced off bottom of hole.

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

-  UNDISTURBED SAMPLE
-  WATER TABLE-24 HR.
-  50% ROCK CORE RECOVERY
-  WATER TABLE-1 HR.
-  LOSS OF DRILLING WATER
-  CAVE-IN DEPTH

BORING NO. B-4
DATE DRILLED 4/1/97
JOB NO. 152-97-010C
PAGE 1 of 1



DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.

0.0

OVA Reading Blow Count

5 10 20 30 40 60 80 100

Auger Probe

10.0

Auger Refusal
No Groundwater Encountered

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

▨ UNDISTURBED SAMPLE

≡ WATER TABLE-24 HR.

▨ 50% ROCK CORE RECOVERY

≡ WATER TABLE-1 HR.

◀ LOSS OF DRILLING WATER

▨ CAVE-IN DEPTH

BORING NO. B-4A

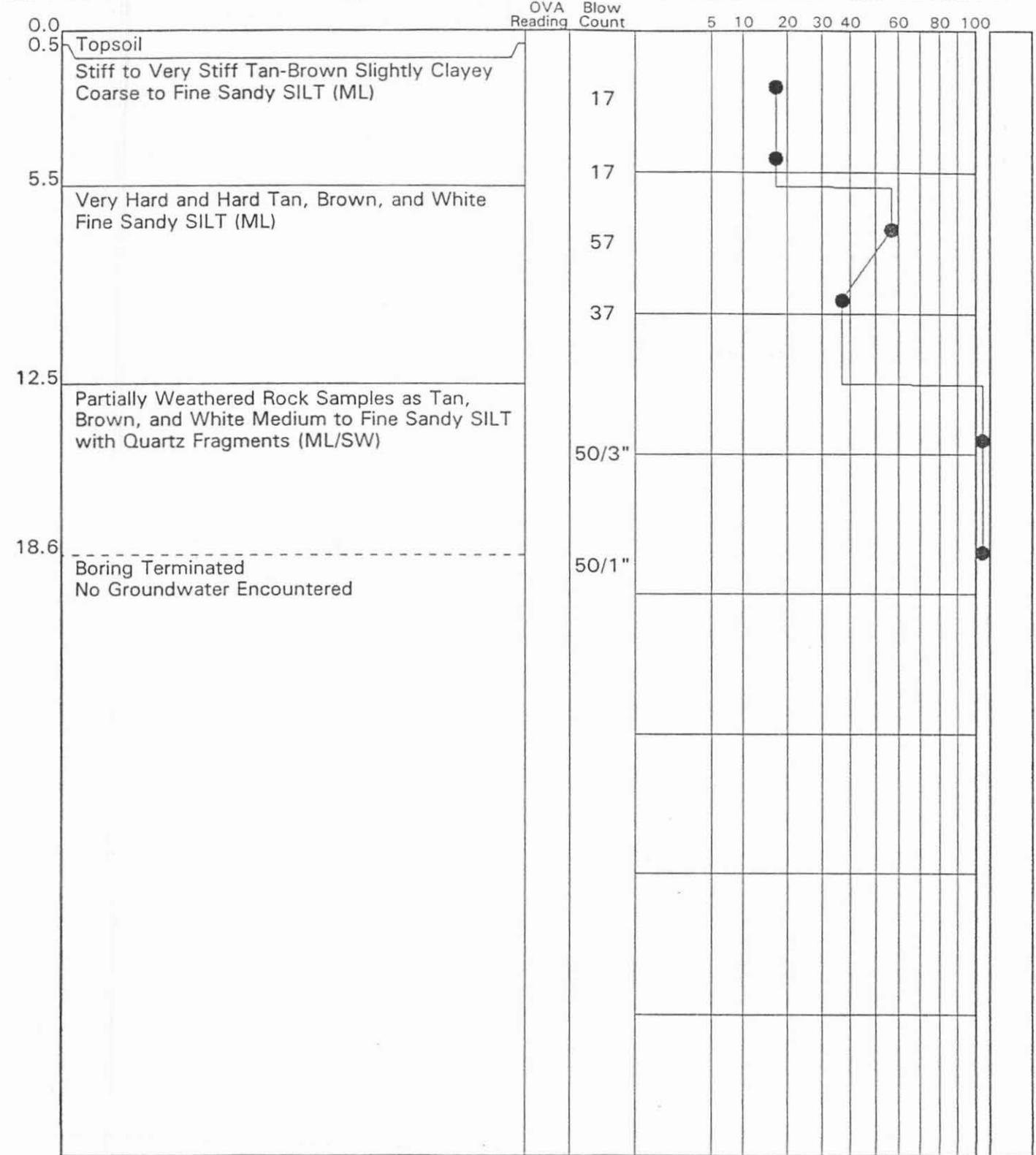
DATE DRILLED 4/1/97

JOB NO. 152-97-010C

PAGE 1 of 1



DEPTH, FT. DESCRIPTION ● PENETRATION - BLOWS PER FT.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

- ▨ UNDISTURBED SAMPLE ≡ WATER TABLE-24 HR.
- ▨ 50% ROCK CORE RECOVERY ≡ WATER TABLE-1 HR.
- ◀ LOSS OF DRILLING WATER ■ CAVE-IN DEPTH

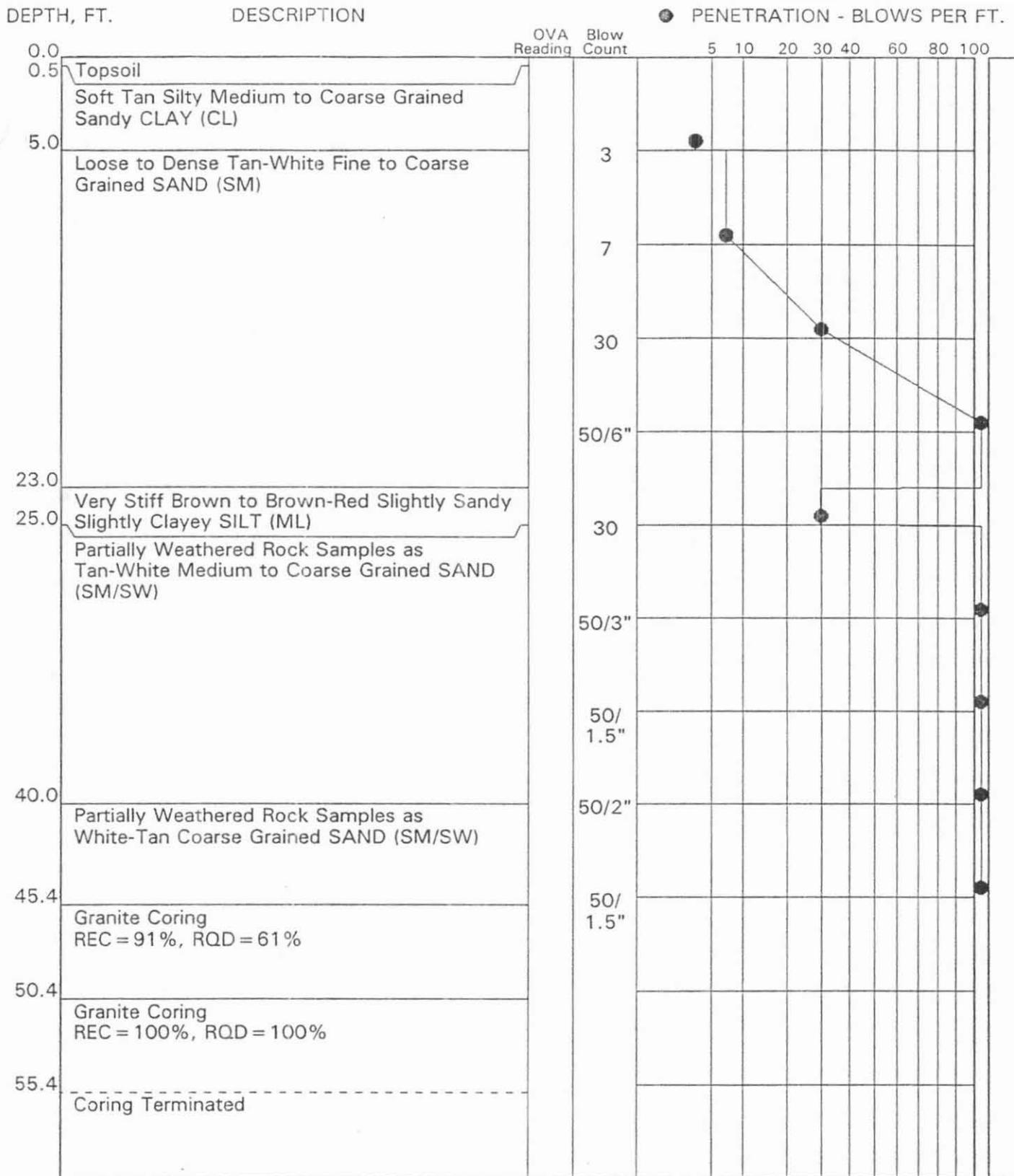
BORING NO. B-5

DATE DRILLED 3/27/97

JOB NO. 152-97-010C

PAGE 1 of 1





TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
 DRIVING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

-  UNDISTURBED SAMPLE
-  WATER TABLE-24 HR.
-  50% ROCK CORE RECOVERY
-  WATER TABLE-1 HR.
-  LOSS OF DRILLING WATER
-  CAVE-IN DEPTH

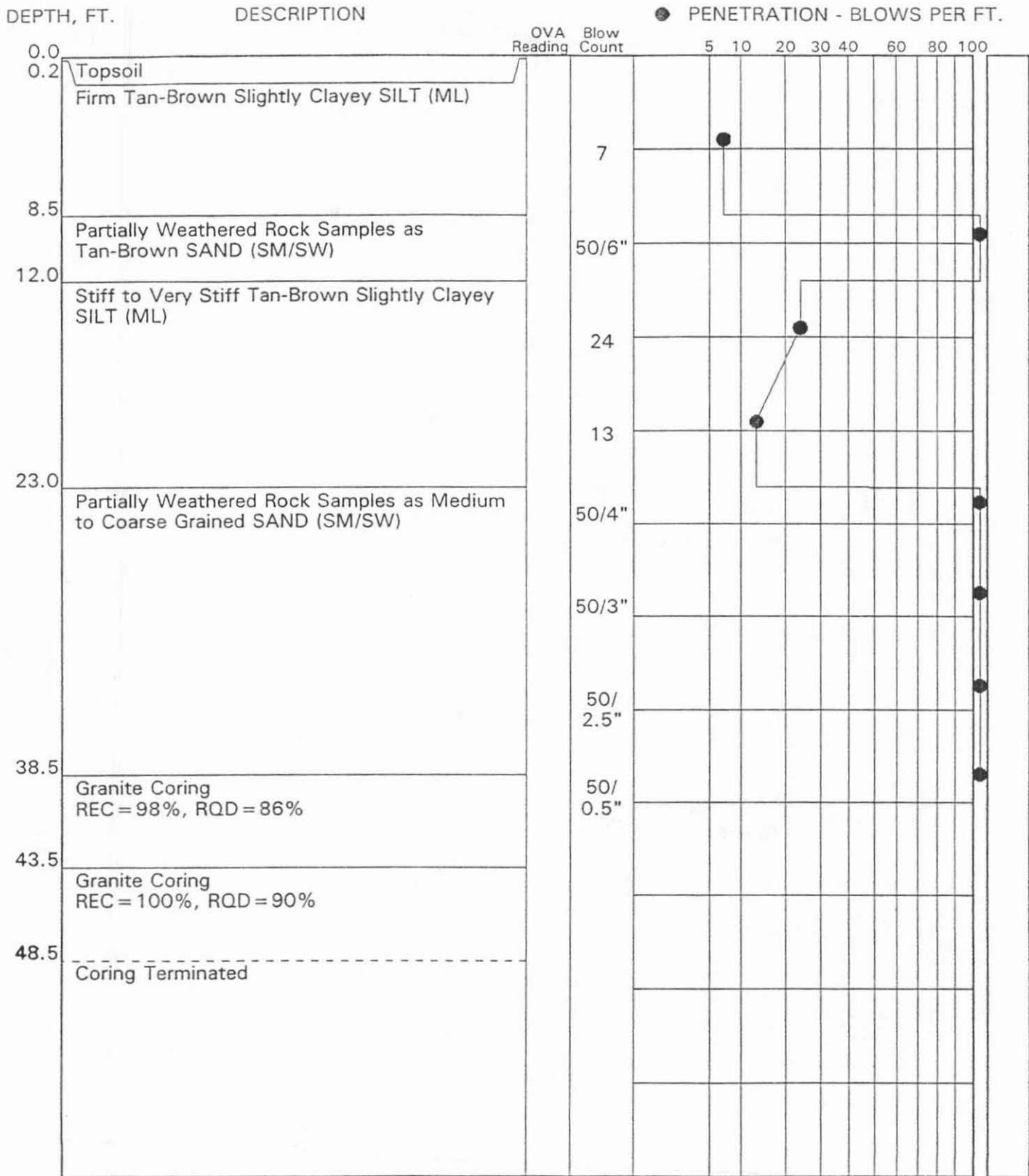
BORING NO. C-1

DATE DRILLED 7/29/97

JOB NO. 152-97-010C

PAGE 1 of 1





TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
 DRIVING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

- UNDISTURBED SAMPLE
- WATER TABLE-24 HR.
- 50% ROCK CORE RECOVERY
- WATER TABLE-1 HR.
- LOSS OF DRILLING WATER
- CAVE-IN DEPTH

BORING NO. C-2

DATE DRILLED 7/29/97

JOB NO. 152-97-010C

PAGE 1 of 1



DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.

OVA Reading Blow Count

5 10 20 30 40 60 80 100

0.0

1.0

Firm Red-Brown Silty Clay (CL)
Loose White-Tan Coarse to Medium Grained SAND (SM)

7

9

12.5

13.1

Partially Weathered Rock Samples as
White-Tan Coarse to Medium Grained SAND (SM/SW)
Granite Coring
REC = 98%, RQD = 85%

18.1

Granite Coring
REC = 100%, RQD = 90%

23.1

Coring Terminated

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE-24 HR.

50% ROCK CORE RECOVERY

WATER TABLE-1 HR.

LOSS OF DRILLING WATER

CAVE-IN DEPTH

BORING NO. C-3

DATE DRILLED 8/1/97

JOB NO. 152-97-010C

PAGE 1 of 1



DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.

0.0

Blow
Count

5 10 20 30 40 60 80 100

Unconsolidated Material - See Boring Log for MW-4
Tricone Refusal @ 13.2'

13.2

Rock Core - Igneous, high quartz content, 4 - 14 inches between joints, joint spacing \leq 1mm, joint surfaces clean, no filling, quartzose granite.
REC = 85%, RQD = Granite

17.5

REC = 80%, RQD = 86%

22.6

End of Core Hole

12.0'

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER
PENETRATING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

▨ UNDISTURBED SAMPLE

≡ WATER TABLE-24 HR.

|50% ROCK CORE RECOVERY

≡ WATER TABLE-1 HR.

◀ LOSS OF DRILLING WATER

■ CAVE-IN DEPTH

BORING NO. TW-1

DATE DRILLED 6/12/98

JOB NO. 152-97-010C

PAGE 1 of 1



WELL CONSTRUCTION RECORD

Quad. No. _____ Serial No. _____
 Lat. _____ Long. _____ Pc _____
 Minor Basin _____
 Basin Code _____
 Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Trigon Engineering Consultants, Inc.

DRILLER REGISTRATION NUMBER 813

STATE WELL CONSTRUCTION PERMIT NUMBER: NA

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

Nearest Town: Liberty County: Alamance
Foster Store Road
 (Road, Community, or Subdivision and Lot No.)

TW-1

2. OWNER Kent Coble
 ADDRESS Foster Store Road
 (Street or Route No.)

| From | Depth | To | DRILLING LOG Formation Description |
|------|-------|----|---------------------------------------|
| | | | See Boring Log TW-1 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Liberty North Carolina
 City or Town State Zip Code

3. DATE DRILLED 06/12/98 USE OF WELL Monitoring
 4. TOTAL DEPTH 22.6 CUTTINGS COLLECTED Yes No
 5. DOES WELL REPLACE EXISTING WELL? Yes No
 6. STATIC WATER LEVEL: 12.5 FT. above TOP OF CASING,
 below
 TOP OF CASING IS 0 FT. ABOVE LAND SURFACE
 7. YIELD (gpm): N/A METHOD OF TEST N/A
 8. WATER ZONES (depth): N/A
 9. CHLORINATION: Type N/A Amount N/A

If additional space is needed, use back of form.

| 1. CASING: Depth | Diameter | Wall Thickness or Weight/Ft. | Material |
|----------------------------------|-----------|---------------------------------|------------|
| From <u>0</u> To <u>17.6</u> Ft. | <u>2"</u> | <u>Schedule 40</u> | <u>PVC</u> |
| From _____ To _____ Ft. | _____ | _____ | _____ |
| From _____ To _____ Ft. | _____ | _____ | _____ |

LOCATION SKETCH

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

See Drawing No. 151-97-010C-2

| 11. GROUT: Depth | Material | Method |
|-------------------------|-----------------|-------------|
| From _____ To _____ Ft. | <u>Portland</u> | <u>Pour</u> |
| From _____ To _____ Ft. | _____ | _____ |

| 12. SCREEN: Depth | Diameter | Slot Size | Material |
|-------------------------------------|-----------|------------------|------------------|
| From <u>17.6</u> To <u>22.6</u> Ft. | <u>2"</u> | <u>in. 0.010</u> | <u>in. PVC</u> |
| From _____ To _____ Ft. | _____ | <u>in. _____</u> | <u>in. _____</u> |
| From _____ To _____ Ft. | _____ | <u>in. _____</u> | <u>in. _____</u> |

| 13. GRAVEL PACK: Depth | Size | Material |
|-------------------------------------|--------------------|-------------|
| From <u>15.5</u> To <u>22.6</u> Ft. | <u>Fine Filter</u> | <u>Sand</u> |
| From _____ To _____ Ft. | _____ | _____ |

14. REMARKS: Bentonite at 0' to 15.5'

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

DATE _____

SIGNATURE OF CONTRACTOR OR AGENT
 Submit original to Division of Environmental Management and copy to well ow

DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.

| DEPTH, FT. | DESCRIPTION | Blow Count | PENETRATION - BLOWS PER FT. | | | | | | | | | | | | | | | | | |
|------------|---|------------|-----------------------------|----|----|----|----|----|----|-----|--|--|--|--|--|--|--|--|--|--|
| | | | 5 | 10 | 20 | 30 | 40 | 60 | 80 | 100 | | | | | | | | | | |
| 0.0 | Unconsolidated Material - Loose Light Tan Coarse to Fine Sandy SILT Tricone Refusal @ 8.5' | | | | | | | | | | | | | | | | | | | |
| 8.5 | Light Colored Metamorphosed Felsic Granitic Rock (9.4' to 10.8' interbedded with intermediate metavolcanic "dike material") | REC 93% | | | | | | | | | | | | | | | | | | |
| 10.8 | Medium to Dark Grey-Green Intermediate Metavolcanic Rock. "Dike Material" Fractures 4 to 48 inches apart, <1mm spacing. | RQD 90% | | | | | | | | | | | | | | | | | | |
| | | REC 97% | | | | | | | | | | | | | | | | | | |
| | | RQD 100% | | | | | | | | | | | | | | | | | | |
| | | REC 84% | | | | | | | | | | | | | | | | | | |
| | | RQD 98% | | | | | | | | | | | | | | | | | | |
| | | REC 100% | | | | | | | | | | | | | | | | | | |
| | | RQD 100% | | | | | | | | | | | | | | | | | | |
| 29.5 | Coring Terminated | | | | | | | | | | | | | | | | | | | |

17.0'

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. TW-2

DATE DRILLED 7/29/98

JOB NO. 152-97-010C

PAGE 1 of 1

▨ UNDISTURBED SAMPLE

≡ WATER TABLE-24 HR.

▨ 50% ROCK CORE RECOVERY

≡ WATER TABLE-1 HR.

◀ LOSS OF DRILLING WATER

▨ CAVE-IN DEPTH



WELL CONSTRUCTION RECORD

Quad. No. _____ Serial No. _____
 Lat. _____ Long. _____ Pc _____
 Minor Basin _____
 Basin Code _____
 Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR Trigon Engineering Consultants, Inc.

STATE WELL CONSTRUCTION
 PERMIT NUMBER: NA

DRILLER REGISTRATION NUMBER 813

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

Nearest Town: Liberty
Foster Store Road
 (Road, Community, or Subdivision and Lot No.)

County: Alamance

TW-2

2. OWNER Kent Coble
 ADDRESS Foster Store Road
 (Street or Route No.)

| From | Depth | To | DRILLING LOG Formation Description |
|------|-------|----|---------------------------------------|
| | | | See Boring Log TW-2 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Liberty North Carolina
 City or Town State Zip Code

3. DATE DRILLED 07/29/98 USE OF WELL Monitoring

4. TOTAL DEPTH 29.5 CUTTINGS COLLECTED Yes No

5. DOES WELL REPLACE EXISTING WELL? Yes No

6. STATIC WATER LEVEL: _____ FT. above TOP OF CASING,
 below
 TOP OF CASING IS 0.5 FT. ABOVE LAND SURFACE

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

8. WATER ZONES (depth): N/A

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

If additional space is needed, use back of form.

| Depth | Diameter | Wall Thickness or Weight/Ft. | Material |
|----------------------------------|-----------|---------------------------------|------------|
| From <u>0</u> To <u>14.5</u> Ft. | <u>2"</u> | <u>Schedule 40</u> | <u>PVC</u> |
| From _____ To _____ Ft. | _____ | _____ | _____ |
| From _____ To _____ Ft. | _____ | _____ | _____ |

LOCATION SKETCH

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

See Drawing No. 151-97-010C-2

| Depth | Material | Method |
|----------------------------------|-----------------|-------------|
| From <u>0</u> To <u>10.5</u> Ft. | <u>Portland</u> | <u>Hand</u> |
| From _____ To _____ Ft. | _____ | _____ |

| Depth | Diameter | Slot Size | Material |
|-------------------------------------|-----------|------------------|------------------|
| From <u>14.5</u> To <u>29.5</u> Ft. | <u>2"</u> | <u>in. 0.010</u> | <u>in. PVC</u> |
| From _____ To _____ Ft. | _____ | <u>in. _____</u> | <u>in. _____</u> |
| From _____ To _____ Ft. | _____ | <u>in. _____</u> | <u>in. _____</u> |

| Depth | Size | Material |
|-------------------------------------|--------------------|-------------|
| From <u>12.5</u> To <u>29.5</u> Ft. | <u>Fine Filter</u> | <u>Sand</u> |
| From _____ To _____ Ft. | _____ | _____ |

14. REMARKS: Bentonite at 10.5 to 12.5'

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

DATE _____

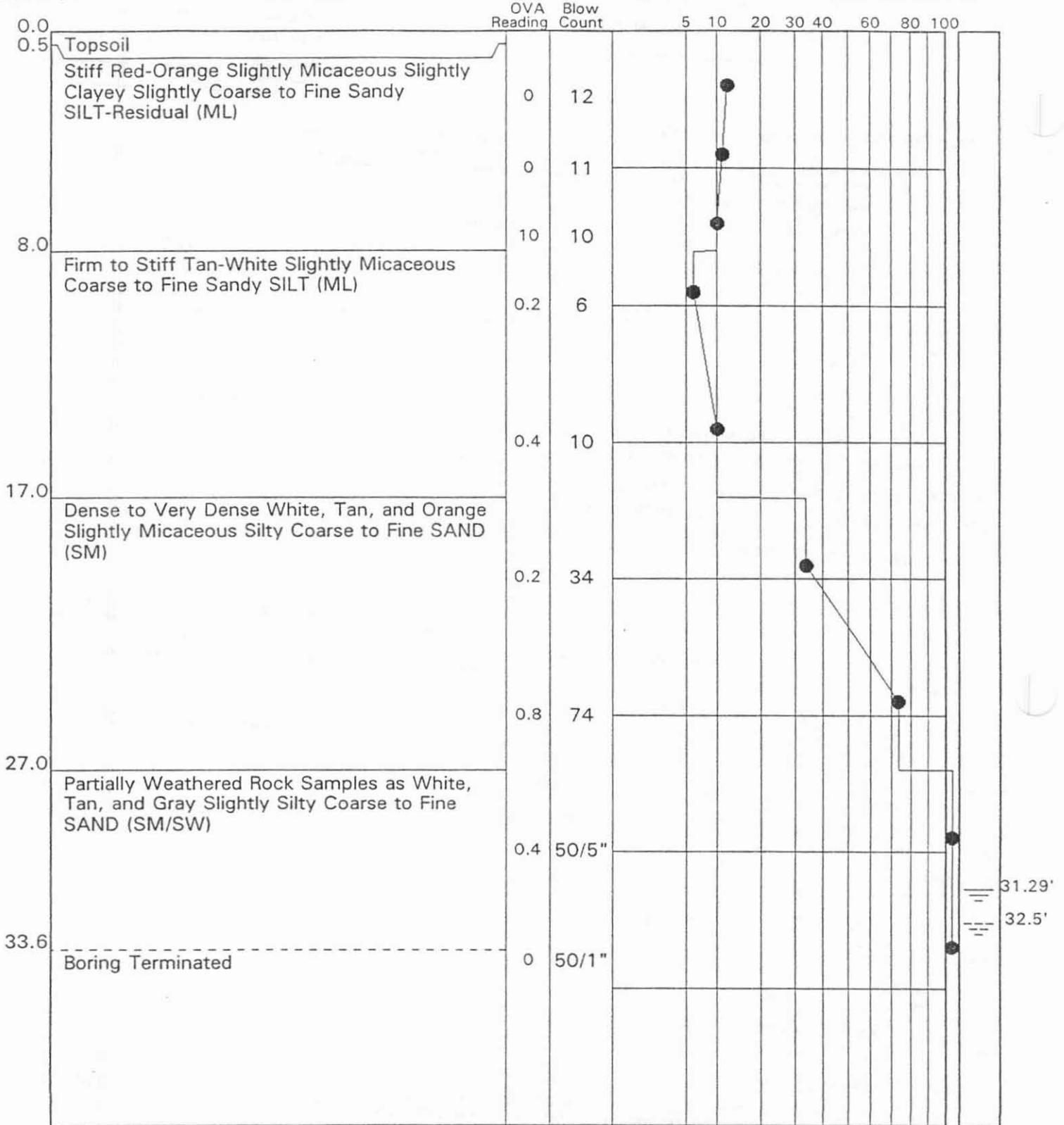
SIGNATURE OF CONTRACTOR OR AGENT

Submit original to Division of Environmental Management and copy to well owner

DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.



TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

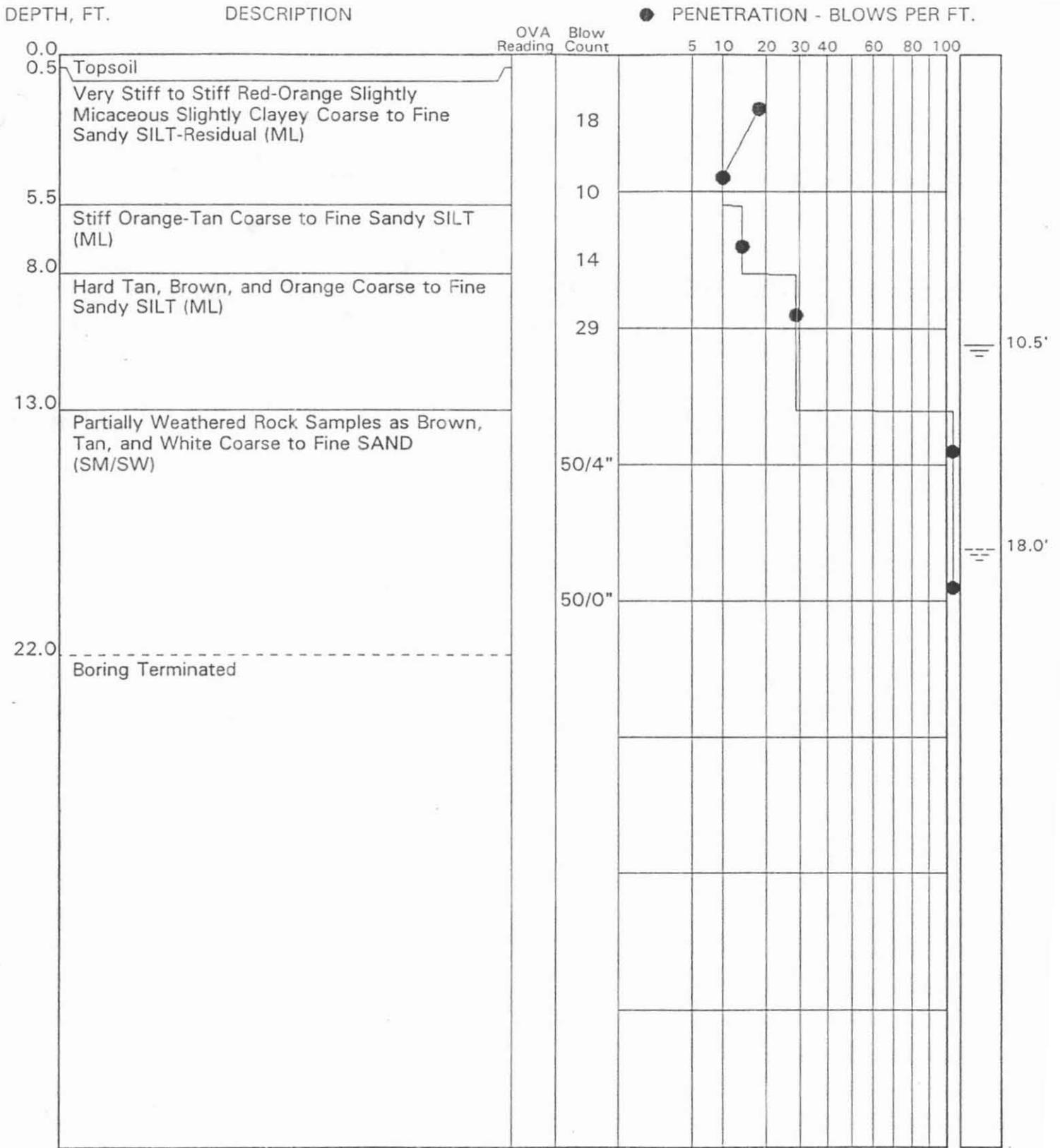
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

- ▨ UNDISTURBED SAMPLE
- ▨ 50% ROCK CORE RECOVERY
- ◀ LOSS OF DRILLING WATER
- ≡ WATER TABLE-24 HR.
- ≡ WATER TABLE-1 HR.
- CAVE-IN DEPTH

BORING NO. MW-1
 DATE DRILLED 3/25/97
 JOB NO. 152-97-010C
 PAGE 1 of 1





TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE-24 HR.

50% ROCK CORE RECOVERY

WATER TABLE-1 HR.

LOSS OF DRILLING WATER

CAVE-IN DEPTH

BORING NO. MW-2

DATE DRILLED 3/28/97

JOB NO. 152-97-010C

PAGE 1 of 1



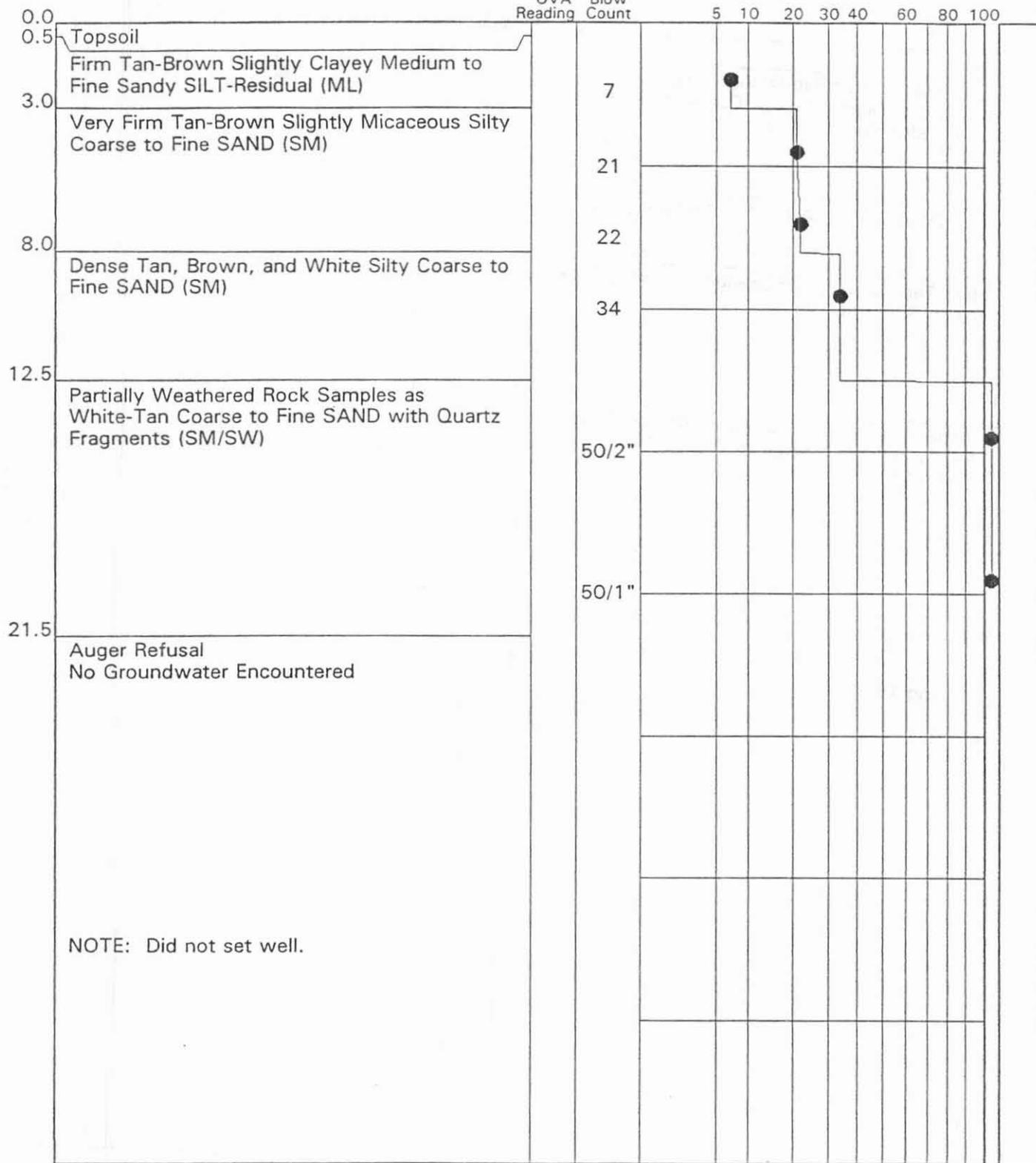
DEPTH, FT.

DESCRIPTION

● PENETRATION - BLOWS PER FT.

OVA Reading Blow Count

5 10 20 30 40 60 80 100



NOTE: Did not set well.

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER DRIVING 30 IN. REQUIRED TO DRIVE 1.4 IN, I.D. SAMPLER 1 FT.

UNDISTURBED SAMPLE

WATER TABLE-24 HR.

50% ROCK CORE RECOVERY

WATER TABLE-1 HR.

LOSS OF DRILLING WATER

CAVE-IN DEPTH

BORING NO. MW-3

DATE DRILLED 3/31/97

JOB NO. 152-97-010C

PAGE 1 of 1





LOG OF BORING MW-5

(Page 1 of 1)

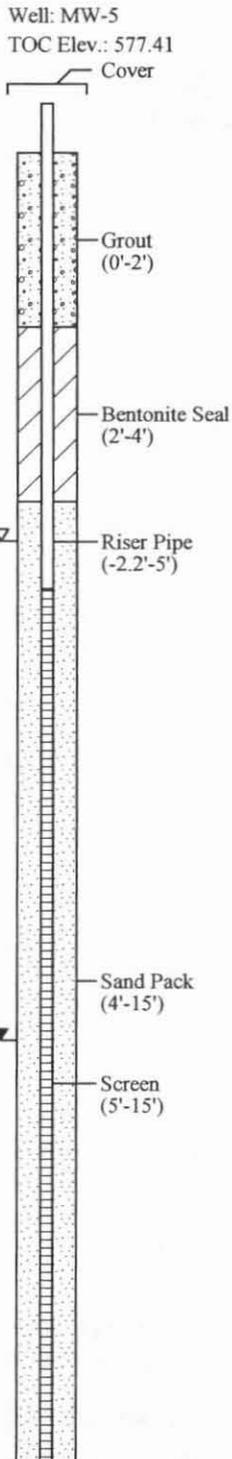
Coble's Sandrock
C&D Permit Modification
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/18/02
Date Completed : 01/18/02
Hole Diameter : 6.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 801773.030
Easting Coord. : 1842527.075
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 575.21 | Blow Count | % Rec. | USCS | DESCRIPTION | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|-------------------------------|
| 0 | 575 | 2 | | SM | SANDY SILT - orange/tan | |
| 1 | 574 | 2 | 60 | CH | FAT CLAY - gray/tan, moist | |
| 2 | 573 | 2 | | CH | | |
| 3 | 572 | | | CH | | |
| 4 | 571 | | | CH | | |
| 5 | 570 | 5 | | SC | SANDY CLAY - tan, moist | |
| 6 | 569 | 9 | 75 | SM | SANDY SILT - light gray to white with some granitic texture, iron staining in place of mafic minerals, noticeable clay content, moist | |
| 7 | 568 | 11 | | SM | | |
| 8 | 567 | 12 | | SM | | |
| 9 | 566 | | | SM | | |
| 10 | 565 | 3 | | CH | FAT CLAY - tan | |
| 11 | 564 | 5 | 70 | CH | | |
| 12 | 563 | 9 | | CH | | |
| 13 | 562 | 18 | | PWR | PWR - gray with white coarse-grained quartz crystals, hard to drill through, wet | |
| 14 | 561 | | | PWR | | |
| 15 | | 50/1 | 5 | | Auger refusal at 15 ft | |

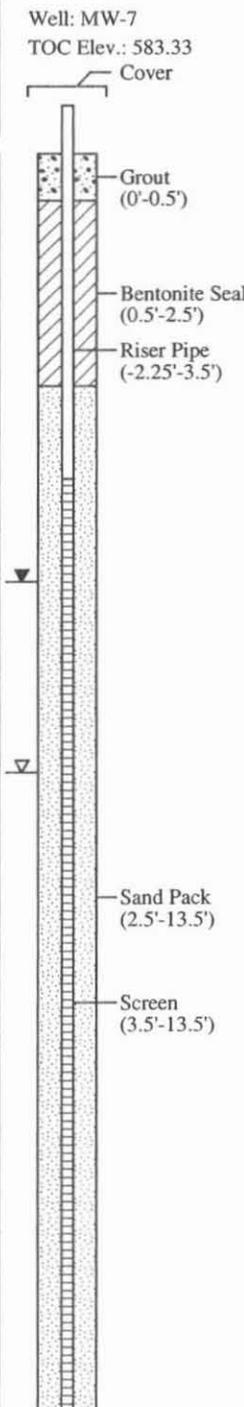


Coble's Sandrock
New Well Installation
Alamance County, NC

JEI Project No. 419.00, Task 14

Date Started : 12/19/02
Date Completed : 12/19/02
Hole Diameter : 6.25-inch
Drilling Method : Air Rotary w/ Tricone Bit
Sampling Method : Drill Cuttings

Drilling Company : Graham & Currie, Inc.
Logged By : David Reedy
Surveyed By : Trittech Civil Env., PC
Northing : 801573.32
Easting : 1842522.11

| Depth in Feet | Surf. Elev. 581.08 | USCS | DESCRIPTION | Well: MW-7 TOC Elev.: 583.33 | Well Construction Information |
|---------------|--------------------|------|---|--|---|
| 0 | 581 | SM | SANDY SILT- orange silty sand with some clay, coarse grained sand, moist |  | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 12/19/02 Hole Diameter(s) : 6.25 inch Drilling Method(s) : Air Rotary w/ tricone bit Company Rep. : Dan Graham</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.25 feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 2 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4"X4" Locking alum. casing</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> |
| 1 | 580 | | | | |
| 2 | 579 | | | | |
| 3 | 578 | | | | |
| 4 | 577 | | | | |
| 5 | 576 | | | | |
| 6 | 575 | | | | |
| 7 | 574 | PWR | PARTIAL WEATHERED ROCK- more competent, yellow/orange silty sand Wet cuttings at 8 ft Coarse-grained sandrock material at 10 ft, tan/orange color Drilling terminated at top of rock at 13.5 ft | <p>1. Drilling performed with an Ingersoll Rand T3W drilling rig utilizing a 6-inch tricone bit.</p> <p>2. Solid triangle represents water level at time of well construction (6.85 feet below TOC). Open triangle represents water level on July 9, 2003 (8.91 feet below TOC).</p> | |
| 8 | 573 | | | | |
| 9 | 572 | | | | |
| 10 | 571 | | | | |
| 11 | 570 | | | | |
| 12 | 569 | | | | |
| 13 | 568 | | | | |
| 14 | | | | | |

APPENDIX DH-2

**Boring Logs and Construction Diagrams for Piezometers and
Monitoring Wells from the Current Investigation**



LOG OF BORING MW-8

(Page 1 of 1)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/21/05
Date Completed : 03/21/05
Hole Diameter : 8.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802580.807320
Easting Coord. : 1842586.6295300
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf Elev. 571.50 | Blow Count | % Rec. | USCS | DESCRIPTION | | <p style="text-align: center;">Well Construction Information</p> |
|---------------|-------------------|------------|--------|------|--|--|---|
| | | | | | | | |
| 0 | | 2 | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/21/05 Hole Diameter(s) : 8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.76-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DS# 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers.</p> <p>2. Solid triangle represents water level at time of drilling (11.43 feet below TOC). Open triangle represents water level ~24 hours after well construction (5.91 feet below TOC). Solid square represents water level 7 days after well construction (4.15 feet below TOC).</p> | <p>WELL CONSTRUCTION INFORMATION</p> |
| 0.571 | | 2 | | SM | SANDY SILT- reddish brown with organics | | |
| 1 | | 2 | 85 | | | | |
| 1.570 | | 2 | | | LEAN CLAY - tan to orange | | |
| 2 | | 2 | | CL | | | |
| 2.569 | | 2 | 85 | | | | |
| 3 | | 2 | | | CLAYEY SILT - tan, wet at 4 feet, very moist below | | |
| 3.568 | | 6 | | ML | | | |
| 4 | | 3 | | | | | |
| 4.567 | | 4 | 85 | | | | |
| 5 | | 5 | | | SILTY SAND - white with relic structure | | |
| 5.566 | | 10 | | | | | |
| 6 | | 4 | | | | | |
| 6.565 | | 5 | 85 | | | | |
| 7 | | 5 | | | | | |
| 7.564 | | 10 | | | | | |
| 8 | | 5 | | | | | |
| 8.563 | | 13 | 85 | | | | |
| 9 | | 13 | | | | | |
| 9.562 | | 18 | | | Relic structure has granitic texture | | |
| 10 | | 7 | | SM | | | |
| 10.561 | | 7 | 85 | | | | |
| 11 | | 13 | | | | | |
| 11.560 | | 18 | | | | | |
| 12 | | | | | | | |
| 12.559 | | | | | | | |
| 13 | | | | | | | |
| 13.558 | | | | | | | |
| 14 | | | | | | | |
| 14.557 | | | | | | | |
| 15 | | | | | | | |
| 15.556 | | 31 | 30 | | PARTIALLY WEATHERED ROCK - white clayey sand with granitic texture | | |
| 16 | | 50/3 | | | | | |
| 16.555 | | | | | | | |
| 17 | | | | | | | |
| 17.554 | | | | PWR | | | |
| 18 | | | | | | | |
| 18.553 | | | | | | | |
| 19 | | | | | Iron staining and weathered mica present at 20 feet | | |
| 19.552 | | | | | Terminated boring at 20 feet | | |
| 20 | | 50/5 | 20 | | | | |



LOG OF BORING MW-9

(Page 1 of 2)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/21/05
Date Completed : 03/21/05
Hole Diameter : 8.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802741.0630780
Easting Coord. : 1843102.1614300
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 586.43 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: MW-9 Elev.: 589.09 Cover | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|--------------------------------------|---|
| 0 | | 3 | | | CLAYEY SAND - 2 inches of topsoil followed by orange coarse-grained clayey sand, moist | | WELL CONSTRUCTION Date Compl. : 03/21/05 Hole Diameter(s) : 8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.66-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout PROTECTIVE CSG. Type : 4" X 4" Alum., locking WELL PAD Type : 3' X 3' X 6" Concrete |
| 0.586 | | 4 | 90 | | | | |
| 1 | | 5 | | SC | | | |
| 1.585 | | 8 | | | | | |
| 2 | | | | | SILTY SAND - orange with some weathered mica, moist | | |
| 2.584 | | | | | | | |
| 3 | | 3 | | | | | |
| 3.583 | | 4 | 85 | | | | |
| 4 | | 5 | | | PARTIALLY WEATHERED ROCK - white silty sand with granitic texture, weathered mica, and iron staining, dry | | |
| 4.582 | | 12 | | SM | | | |
| 5 | | | | | | | |
| 5.581 | | 3 | | | | | |
| 6 | | 20 | 25 | | PWR | | 1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. 2. Solid triangle represents water level at time of drilling (38.38 feet below TOC). Open triangle represents water level ~24 hours after well construction (21.91 feet below TOC). Solid square represents water level 7 days after well construction (16.62 feet below TOC). |
| 6.580 | | 50/5 | | | | | |
| 7 | | | | | | | |
| 7.579 | | | | | | | |
| 8 | | | | | | | |
| 8.578 | | | | | | | |
| 9 | | | | | | | |
| 9.577 | | | | | | | |
| 10 | | | | | | | |
| 10.576 | | | | | | | |
| 11 | | | | | | | |
| 11.575 | | | | | | | |
| 12 | | | | | | | |
| 12.574 | | | | | | | |
| 13 | | | | | | | |
| 13.573 | | | | | | | |
| 14 | | | | | | | |
| 14.572 | | | | | | | |
| 15 | | | | | | | |
| 15.571 | | | | | | | |
| 16 | | | | | | | |
| 16.570 | | | | | | | |
| 17 | | | | | | | |
| 17.569 | | | | | | | |
| 18 | | | | | | | |
| 18.568 | | | | | | | |
| 19 | | | | | | | |



LOG OF BORING MW-9

(Page 2 of 2)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/21/05
Date Completed : 03/21/05
Hole Diameter : 8.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802741.0630780
Easting Coord. : 1843102.1614300
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 586.43 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: MW-9 Elev.: 589.09 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|------------------------------|---|
| 19 | 567 | | | | | Bentonite Seal (16.5'-19.5') | WELL CONSTRUCTION Date Compl. : 03/21/05 Hole Diameter(s) : 8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.66-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout PROTECTIVE CSG. Type : 4" X 4" Alum., locking WELL PAD Type : 3' X 3' X 6" Concrete 1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. 2. Solid triangle represents water level at time of drilling (38.38 feet below TOC). Open triangle represents water level ~24 hours after well construction (21.91 feet below TOC). Solid square represents water level 7 days after well construction (16.62 feet below TOC). |
| 20 | 566 | 50/3 | 10 | | | | |
| 21 | 565 | | | | | | |
| 22 | 564 | | | | | | |
| 23 | 563 | | | | | | |
| 24 | 562 | | | | | Riser Pipe (-2.66'-22.5') | |
| 25 | 561 | 50/4 | 5 | | Brown and white silty sand with pebble-size quartz fragments, slightly moist | | |
| 26 | 560 | | | | | | |
| 27 | 559 | | | | | | |
| 28 | 558 | | | PWR | | | |
| 29 | 557 | | | | | | |
| 30 | 556 | 50/0 | 0 | | | Sand Pack (19.5'-37.5') | |
| 31 | 555 | | | | | | |
| 32 | 554 | | | | | Screen (22.5'-37.5') | |
| 33 | 553 | | | | | | |
| 34 | 552 | | | | | | |
| 35 | 551 | 50/0 | 0 | | | | |
| 36 | 550 | | | | | | |
| 37 | 549 | | | | Auger refusal at 37.5 feet | | |
| 38 | | | | | | | |



LOG OF BORING MW-10S

(Page 1 of 1)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/22/05
Hole Diameter : 12.25-inch/8.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802197.9668300
Easting Coord. : 1843379.0247800
Survey By : Tritch Civil Env., P.C.
Logged By : David Y. Reedy II

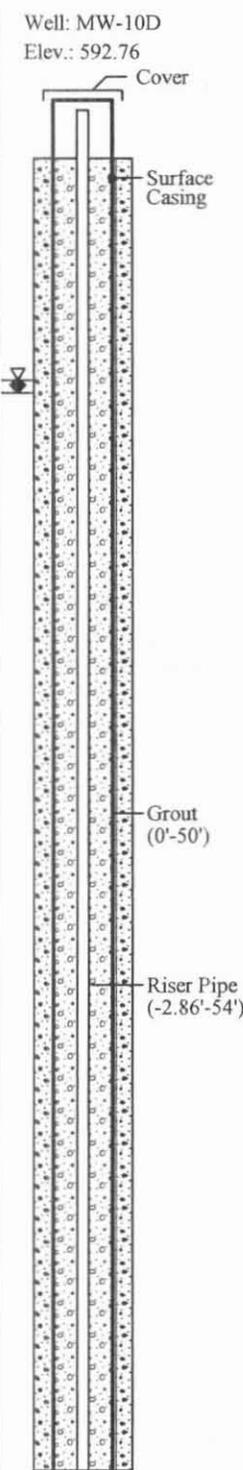
| Depth in Feet | Surf. Elev. 589.62 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: MW-10S Elev.: 592.46 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|--|---|
| 0 | | | | CL | FILL - orange sandy clay | <p>Well: MW-10S Elev.: 592.46</p> <p>Cover</p> <p>Grout (0'-3')</p> <p>Bentonite Seal (3'-5')</p> <p>Riser Pipe (-2.84'-6.5')</p> <p>Sand Pack (5'-21.5')</p> <p>Screen (6.5'-21.5')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/22/05 Hole Diameter(s) : 12.25-inch/8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.84-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 8.25-inch ID hollow stem augers to auger refusal. Borehole was continued utilizing an 8.25-inch hammer to approximately 21.5 feet.</p> <p>2. Solid triangle represents water level at time of drilling (11.45 feet below TOC). Open triangle represents water level ~24 hours after well construction (8.38 feet below TOC). Solid square represents water level 6 days after well construction (6.83 feet below TOC).</p> |
| 1 | 589 | | | TS | TOPSOIL - brown with organics | | |
| 2 | 588 | | | SM | SILTY SAND - orange | | |
| 3 | 587 | | | PWR | PARTIALLY WEATHERED ROCK - white and orange silty sand with granitic texture | | |
| 4 | 586 | | | | Auger refusal at 5 feet | | |
| 5 | 585 | 50/4 | 10 | BR | BEDROCK - green to gray metavolcanic rock from 5 to 6 feet | | |
| 6 | 584 | | | | BEDROCK - granitic rock | | |
| 7 | 583 | | | | | | |
| 8 | 582 | | | | | | |
| 9 | 581 | | | | Possible fracture at 9 feet, based on color of cuttings and temporary reduction of dust | | |
| 10 | 580 | | | | Possible fracture at 10 feet based on drilling response | | |
| 11 | 579 | | | | | | |
| 12 | 578 | | | | | | |
| 13 | 577 | | | | | | |
| 14 | 576 | | | | Wet cuttings by 14 feet | | |
| 15 | 575 | | | | | | |
| 16 | 574 | | | | BEDROCK - green to gray metavolcanic cuttings Possible fracture at 16 feet, based on reduction of dust | | |
| 17 | 573 | | | | | | |
| 18 | 572 | | | | Very weathered zone from 18 to 21.5 feet, moist green cuttings | | |
| 19 | 571 | | | | | | |
| 20 | 570 | | | | Very wet brown cuttings at 20 feet | | |
| 21 | 569 | | | | Terminated drilling at 21.5 feet | | |
| 22 | 568 | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/25/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802203.6444670
Easting Coord. : 1843369.3340900
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 589.90 | Blow Count | % Rec. | USCS | DESCRIPTION |  | <p>Well Construction Information</p> |
|---------------|--------------------|------------|--------|------|--|---|---|
| | | | | | <p>WELL CONSTRUCTION</p> | | |
| 0 | | | | CL | FILL - orange sandy clay, moist | <p>Date Compl. : 03/25/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>SURFACE CASING Material : Schedule 40 PVC Diameter : 6-inch</p> <p>WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.86-feet</p> <p>WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG. Type : 4" X 4" Alum., locking</p> <p>WELL PAD Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 8.25-inch hammer to approximately 30 feet. Six-inch surface casing was installed and grouted in place to 30 feet. The boring was advance utilizing a 5.75-inch hammer to approximately 64 feet.</p> <p>2. Solid triangle represents water level at time of drilling (26.45 feet below TOC). Open triangle represents water level ~24 hours after well construction (6.60 feet below TOC). Solid square represents water level 6 days after well construction (6.81 feet below TOC).</p> | |
| 1 | 589 | | | TS | TOPSOIL - brown with organics | | |
| 2 | 588 | | | SM | SILTY SAND - orange | | |
| 3 | 587 | | | PWR | PARTIALLY WEATHERED ROCK - tan cuttings, hammer starts to fire at 3 feet | | |
| 4 | 586 | | | | BEDROCK - white granitic cuttings | | |
| 5 | 585 | | | BR | Possible fracture at 8 feet, based on reduction of dust | | |
| 6 | 584 | | | | | | |
| 7 | 583 | | | | | | |
| 8 | 582 | | | | | | |
| 9 | 581 | | | | | | |
| 10 | 580 | | | | | | |
| 11 | 579 | | | | | | |
| 12 | 578 | | | | | | |
| 13 | 577 | | | | | | |
| 14 | 576 | | | | | | |
| 15 | 575 | | | | Wet cuttings at 13 feet after stopping to add drill rod | | |
| 16 | 574 | | | | Producing a lot of water by 15 feet with very little cuttings | | |
| 17 | 573 | | | | Minor amount of green cuttings at 16 feet | | |
| 18 | 572 | | | | | | |
| 19 | 571 | | | | | | |
| 20 | 570 | | | | | | |
| 21 | 569 | | | | | | |
| 22 | 568 | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/25/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802203.6444670
Easting Coord. : 1843369.3340900
Survey By : Tritsch Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 589.90 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: MW-10D Elev.: 592.76 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|-------------------------------|---|
| 22 | | | | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/25/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>SURFACE CASING</p> <p>Material : Schedule 40 PVC Diameter : 6-inch</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.86-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 8.25-inch hammer to approximately 30 feet. Six-inch surface casing was installed and grouted in place to 30 feet. The boring was advance utilizing a 5.75-inch hammer to approximately 64 feet.</p> <p>2. Solid triangle represents water level at time of drilling (26.45 feet below TOC). Open triangle represents water level ~24 hours after well construction (6.60 feet below TOC). Solid square represents water level 6 days after well construction (6.81 feet below TOC).</p> |
| 23 | 567 | | | | | | |
| 24 | 566 | | | | | | |
| 25 | 565 | | | | | | |
| 26 | 564 | | | | | | |
| 27 | 563 | | | | | | |
| 28 | 562 | | | | | | |
| 29 | 561 | | | | | | |
| 30 | 560 | | | | Terminated boring at 30 feet to set surface casing. Resumed drilling on 03/25/05 | | |
| 31 | 559 | | | | | | |
| 32 | 558 | | | | | | |
| 33 | 557 | BR | | | Tan weathered cuttings at 33 feet, producing some water | | |
| 34 | 556 | | | | | | |
| 35 | 555 | | | | | | |
| 36 | 554 | | | | | | |
| 37 | 553 | | | | | | |
| 38 | 552 | | | | | | |
| 39 | 551 | | | | | | |
| 40 | 550 | | | | | | |
| 41 | 549 | | | | | | |
| 42 | 548 | | | | | | |
| 43 | 547 | | | | Weathered rock continues, producing a lot a water by 43 feet | | |
| 44 | 546 | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/25/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802203.6444670
Easting Coord. : 1843369.3340900
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 589.90 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: MW-10D Elev.: 592.76 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---|---|
| 44 | | | | | | <p>Grout (0'-50')</p> <p>Bentonite Seal (50'-52')</p> <p>Riser Pipe (-2.86'-54')</p> <p>Sand Pack (52'-64')</p> <p>Screen (54'-64')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/25/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>SURFACE CASING</p> <p>Material : Schedule 40 PVC Diameter : 6-inch</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.86-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 8.25-inch hammer to approximately 30 feet. Six-inch surface casing was installed and grouted in place to 30 feet. The boring was advance utilizing a 5.75-inch hammer to approximately 64 feet.</p> <p>2. Solid triangle represents water level at time of drilling (26.45 feet below TOC). Open triangle represents water level ~24 hours after well construction (6.60 feet below TOC). Solid square represents water level 6 days after well construction (6.81 feet below TOC).</p> |
| 45 | 545 | | | | Possible fracture at 45 feet, based on drilling response | | |
| 46 | 544 | | | | | | |
| 47 | 543 | | | | | | |
| 48 | 542 | | | | | | |
| 49 | 541 | | | | Competent bedrock at 53 feet | | |
| 50 | 540 | | | | | | |
| 51 | 539 | | | | | | |
| 52 | 538 | | | | | | |
| 53 | 537 | | | | | | |
| 54 | 536 | | | BR | | | |
| 55 | 535 | | | | | | |
| 56 | 534 | | | | | | |
| 57 | 533 | | | | | | |
| 58 | 532 | | | | | | |
| 59 | 531 | | | | | | |
| 60 | 530 | | | | | | |
| 61 | 529 | | | | | | |
| 62 | 528 | | | | Large mud filled fracture from 62 to 63 feet | | |
| 63 | 527 | | | | | | |
| 64 | 526 | | | | Terminated boring at 64 feet | | |
| 65 | 525 | | | | | | |
| 66 | 524 | | | | | | |



LOG OF BORING P-15

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| | | | | |
|--|-----------------|-------------------------|------------------|-------------------------------|
| Coble's Sandrock C&D Permit Application Alamance County, NC JEI Project No. 419.00, Task 06 | Date Started | : 01/16/02 | Drilling Company | : Bedford Well Drilling, Inc. |
| | Date Completed | : 01/17/02 | Northing Coord. | : 799910.089 |
| | Hole Diameter | : 8.25-inch/6.25-inch | Easting Coord. | : 1842914.445 |
| | Drilling Method | : HSA/Downhole Hammer | Survey By | : Tritech Civil Env., P.C. |
| | Sampling Method | : Split Spoons/Cuttings | Logged By | : David Y. Reedy II |

| Depth in Feet | Surf. Elev. 649.07 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-15 Elev.: 651.22 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---------------------------------|-------------------------------|
| 0 | 649 | 5 | | TS | TOPSOIL- Dark brown with organics | | |
| 1 | 648 | 2 | 10 | SC | CLAYEY SAND - orange/yellow, moist | | |
| 2 | 647 | 4 | | | Becoming more of a sandy clay, orange, moist | | |
| 3 | 646 | 7 | | SM | Becoming sandier, rock fragments present, dry | | |
| 4 | 645 | 7 | | | SILTY SAND - orange/yellow, fine-grained quartz grains present | | |
| 5 | 644 | 15 | 75 | PWR | Faint granitic texture apparent, slightly moist | | |
| 6 | 643 | 22 | | | Becoming dryer and changing to gray in color, weathered pebbles are present | | |
| 7 | 642 | 33 | | SM | Very hard drilling from 13 to 15 feet | | |
| 8 | 641 | 14 | 50 | | SILTY SAND - tan with granitic texture, very dry, possible fracture preserved at 16 feet oriented at approximately 70 degrees. | | |
| 9 | 640 | 32 | | BR | Augers getting hung up in hole and augering is terminated at 17 feet, near refusal | | |
| 10 | 639 | 40 | | | BEDROCK - whitish yellow cuttings, dry, hard rock | | |
| 11 | 638 | 50/ | | | | | |
| 12 | 637 | 5.75 | | | | | |
| 13 | 636 | | | | | | |
| 14 | 635 | | | | | | |
| 15 | 634 | 9 | | | | | |
| 16 | 633 | 13 | 100 | | | | |
| 17 | 632 | 15 | | | | | |
| 18 | 631 | 22 | | | | | |
| 19 | 630 | | | | | | |
| 20 | 629 | | | | | | |
| 21 | 628 | | | | | | |
| 22 | 627 | | | | | | |
| 23 | 626 | | | | | | |
| 24 | 625 | | | | | | |
| 25 | | | | | | | |



LOG OF BORING P-15

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/16/02
Date Completed : 01/17/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 799910.089
Easting Coord. : 1842914.445
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 649.07 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-15 Elev.: 651.22 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|---|---|
| 25 | 624 | | | | | <p>Grout (0'-36')</p> <p>Riser Pipe (-2.15'-40')</p> <p>Bentonite Seal (36'-38')</p> <p>Sand Pack (38'-50')</p> <p>Screen (40'-50')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/17/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.15-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal. Borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 50 feet.</p> <p>2. Solid triangle represents water level at time of drilling (50.60 feet below TOC). Solid square represents water level ~24 hours after well construction (41.08 feet below TOC). Open triangle represents water level 7 days after well construction (40.62 feet below TOC). Dry cuttings were observed with air rotary drilling from 17-50 feet.</p> |
| 26 | 623 | | | | | | |
| 27 | 622 | | | | | | |
| 28 | 621 | | | | | | |
| 29 | 620 | | | | | | |
| 30 | 619 | | | | | | |
| 31 | 618 | | | | | | |
| 32 | 617 | | | | | | |
| 33 | 616 | | | | | | |
| 34 | 615 | | | | | | |
| 35 | 614 | | | | | | |
| 36 | 613 | | | | | | |
| 37 | 612 | | | | | | |
| 38 | 611 | | | BR | | | |
| 39 | 610 | | | | | | |
| 40 | 609 | | | | | | |
| 41 | 608 | | | | | | |
| 42 | 607 | | | | | | |
| 43 | 606 | | | | | | |
| 44 | 605 | | | | | | |
| 45 | 604 | | | | Soft spot or possible fracture at 45 feet, about a foot thick | | |
| 46 | 603 | | | | | | |
| 47 | 602 | | | | | | |
| 48 | 601 | | | | | | |
| 49 | 600 | | | | | | |
| 50 | | | | | Terminated boring at 50 feet | | |



LOG OF BORING P-16

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/18/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800591.064
Easting Coord. : 1842674.247
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 609.85 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-16 TOC Elev.: 612.05 Cover | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|--|-------------------------------|
| 0 | | 2 | | TS | TOPSOIL- Dark brown with organics | | |
| 1 | 609 | 2 | 70 | | | | |
| | | 3 | | | SANDY CLAY - white/orange, moist, quartz grains visible | | |
| 2 | 608 | 5 | | SM | | | |
| 3 | 607 | | | | | | |
| 4 | 606 | | | | | | |
| 5 | 605 | 50/ | 20 | SM | SILTY SAND - granitic texture, very hard to drill through <i>Auger refusal at 5 feet</i> | | |
| 6 | 604 | 5.5 | | | BEDROCK - weathered rock with yellow cuttings, dry | | |
| 7 | 603 | | | | | | |
| 8 | 602 | | | | | | |
| 9 | 601 | | | | | | |
| 10 | 600 | | | | | | |
| 11 | 599 | | | | | | |
| 12 | 598 | | | | | | |
| 13 | 597 | | | BR | | | |
| 14 | 596 | | | | | | |
| 15 | 595 | | | | Soft spot or possible fracture at 15 feet | | |
| 16 | 594 | | | | | | |
| 17 | 593 | | | | | | |
| 18 | 592 | | | | Becomes competent at 18 feet with white cuttings | | |
| 19 | 591 | | | | | | |
| 20 | 590 | | | | | | |
| 21 | 589 | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC
JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/18/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800591.064
Easting Coord. : 1842674.247
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 609.85 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-16 TOC Elev.: 612.05 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--------------------------------|---------------------------------|---|
| 21 | | | | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/18/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.20-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal. Borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 41 feet.</p> <p>2. Solid triangle represents water level at time of drilling (30.90 feet below TOC). Open triangle represents water level 6 days after well construction (12.63 feet below TOC). Dry cuttings were observed with air rotary drilling from 18-41 feet.</p> |
| 22 | 588 | | | | | | |
| 23 | 587 | | | | | | |
| 24 | 586 | | | | | | |
| 25 | 585 | | | | | | |
| 26 | 584 | | | | Becomes very hard at 26 feet | | |
| 27 | 583 | | | | | | |
| 28 | 582 | | | | | | |
| 29 | 581 | | | | | | |
| 30 | 580 | | | | | | |
| 31 | 579 | | | BR | | | |
| 32 | 578 | | | | | | |
| 33 | 577 | | | | | | |
| 34 | 576 | | | | | | |
| 35 | 575 | | | | | | |
| 36 | 574 | | | | | | |
| 37 | 573 | | | | | | |
| 38 | 572 | | | | | | |
| 39 | 571 | | | | | | |
| 40 | 570 | | | | | | |
| 41 | 569 | | | | Drilling terminated at 41 feet | | |
| 42 | 568 | | | | | | |



LOG OF BORING P-17

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/18/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 799356.506
Easting Coord. : 1844577.645
Survey By : Tritch Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 643.78 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-17 TOC Elev.: 646.28 Cover | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---|--|
| 0 | | 1 | | TS | TOPSOIL - Dark brown with organics | <p>Grout (0'-17')</p> <p>Riser Pipe (-2.5'-21')</p> <p>Bentonite Seal (17'-19')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/18/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.50-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> |
| 1 | 643 | 1 | 45 | | SANDY SILT - tan/orange, moist, contains some clay | | |
| 2 | 642 | 3 | | | | | |
| 3 | 641 | 4 | | SM | | | |
| 4 | 640 | | | | | | |
| 5 | 639 | 5 | | | SILT - tan/orange, mottled texture, moist | | |
| 6 | 638 | 9 | 70 | | | | |
| 7 | 637 | 11 | | | | | |
| 8 | 636 | 12 | | | | | |
| 9 | 635 | | | | | | |
| 10 | 634 | 3 | | MH | Clayey sand zone approximately 0.5 feet thick, saturated | | |
| 11 | 633 | 4 | 60 | | | | |
| 12 | 632 | 5 | | | | | |
| 13 | 631 | 7 | | | | | |
| 14 | 630 | | | | | | |
| 15 | 629 | 5 | | SC | SANDY CLAY - tan medium-grained sand, saturated | | |
| 16 | 628 | 9 | 60 | | | | |
| 17 | 627 | 13 | | | SILTY CLAY - tan/orange and moist | | |
| 18 | 626 | 16 | | CL | | | |

1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to 20 feet. Borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 36 feet.

2. Solid triangle represents water level at time of drilling (19.82 feet below TOC). Open triangle represents water level 6 days after well construction (12.63 feet below TOC).



LOG OF BORING P-17

(Page 2 of 2)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/18/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 799356.506
Easting Coord. : 1844577.645
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 643.78 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-17 TOC Elev.: 646.28 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|---------------------------------|--|
| 18 | | | | | | | WELL CONSTRUCTION Date Compl. : 01/18/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.50-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout PROTECTIVE CSG. Type : 4" X 4" Alum., locking WELL PAD Type : 3' X 3' X 6" Concrete 1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to 20 feet. Borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 36 feet. 2. Solid triangle represents water level at time of drilling (19.82 feet below TOC). Open triangle represents water level 6 days after well construction (12.63 feet below TOC). |
| 19 | 625 | | | CL | | Bentonite Seal (17'-19') | |
| 20 | 624 | 6 | | | CLAYEY SILT - with pebble-size rock fragments, moist | | |
| 21 | 623 | 13 | 60 | ML | Auger refusal at 22 feet | | |
| 22 | 622 | 41 | | | | Riser Pipe (-2.5'-21') | |
| 23 | 621 | 50/5 | | | BEDROCK - weathered white rock fragments that consist of mainly quartz, moist | | |
| 24 | 620 | | | | Gray cuttings, moist, rather hard material | | |
| 25 | 619 | | | | | | |
| 26 | 618 | | | | | | |
| 27 | 617 | | | | | | |
| 28 | 616 | | | | | Sand Pack (19'-36') | |
| 29 | 615 | | | BR | | Screen (21'-36') | |
| 30 | 614 | | | | | | |
| 31 | 613 | | | | | | |
| 32 | 612 | | | | | | |
| 33 | 611 | | | | | | |
| 34 | 610 | | | | | | |
| 35 | 609 | | | | | | |
| 36 | 608 | | | | Drilling terminated at 36 feet | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/30/02
Date Completed : 01/30/02
Hole Diameter : 8.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800605.058
Easting Coord. : 1844289.782
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 652.16 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-18 TOC Elev.: 651.76 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---|--|
| 0 | 652 | 2 | | | SILTY SAND - tan with some organics to 0.5 ft | <p>Cover</p> <p>Grout (0'-15')</p> <p>Riser Pipe (0.4'-19')</p> <p>Bentonite Seal (15'-17')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/30/02 Hole Diameter(s) : 8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : -0.4-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 6" Flush mount</p> <p>WELL PAD</p> <p>Type : 2' X 2' X 6" Concrete</p> |
| 1 | 651 | 6 | 65 | SM | FAT CLAY - orange, slightly moist | | |
| 2 | 650 | 4 | | | | | |
| 3 | 649 | | | CH | SILTY SAND - white with orange iron staining, granitic texture, medium-grained quartz grains, slightly moist | | |
| 4 | 648 | 4 | | | | | |
| 5 | 647 | 4 | | | Changes to tan/brown/orange silty sand with strong granitic texture, some clay mixed in, large mica crystals, slightly moist | | |
| 6 | 646 | 6 | 85 | SM | | | |
| 7 | 645 | 11 | | | | | |
| 8 | 644 | | | | PARTIALLY WEATHERED ROCK - silty sand with strong granitic texture | | |
| 9 | 643 | 4 | 75 | | | | |
| 10 | 642 | 13 | | | White/orange/brown silty sand, medium to course-grained, dry | | |
| 11 | 641 | 23 | | | | | |
| 12 | 640 | 47 | | | | | |
| 13 | 639 | 50/4 | | PWR | | | |
| 14 | 638 | | | | | | |
| 15 | 637 | | | | | | |
| 16 | 636 | 50/5 | 10 | | | | |
| 17 | | | | | | | |

1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers.

2. Solid triangle represents water level at time of drilling (32.66 feet below TOC). Solid square represents water level ~24 hours after well construction (25.12 feet below TOC). Open triangle represents water level 7 days after well construction (24.78 feet below TOC).

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/30/02
Date Completed : 01/30/02
Hole Diameter : 8.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800605.058
Easting Coord. : 1844289.782
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 652.16 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-18 TOC Elev.: 651.76 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---------------------------------|---|
| 17 | 635 | | | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/30/02 Hole Diameter(s) : 8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : -0.4-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 6" Flush mount</p> <p>WELL PAD</p> <p>Type : 2' X 2' X 6" Concrete</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers.</p> <p>2. Solid triangle represents water level at time of drilling (32.66 feet below TOC). Solid square represents water level ~24 hours after well construction (25.12 feet below TOC). Open triangle represents water level 7 days after well construction (24.78 feet below TOC).</p> |
| 18 | 634 | | | | Material becomes softer at 18 ft | | |
| 19 | 633 | | | | | | |
| 20 | 632 | | | | | | |
| 21 | 631 | 50/4 | 25 | | Tan/orange/brown silty sand, coarse-grained quartz and weathered micas, slight moisture on grains | Riser Pipe (0.4'-19') | |
| 22 | 630 | | | | | | |
| 23 | 629 | | | | Some pebble sized quartz and rock fragments in cuttings at 23 ft, moist | | |
| 24 | 628 | | | | | | |
| 25 | 627 | 27 | | PWR | White/orange/brown silty sand, granitic texture, medium grained quartz with weathered micas, some moisture on grains | Sand Pack (17'-34') | |
| 26 | 626 | 50/ | 65 | | | | |
| 27 | 625 | 5.75 | | | | Screen (19'-34') | |
| 28 | 624 | | | | | | |
| 29 | 623 | | | | | | |
| 30 | 622 | 50 | 50 | | White with some orange iron staining, medium grained silty sand with some clay, slightly moist grains | | |
| 31 | 621 | 50/2 | | | | | |
| 32 | 620 | | | | | | |
| 33 | 619 | | | | | | |
| 34 | | | | | Auger refusal at 34 ft | | |



LOG OF BORING P-19S

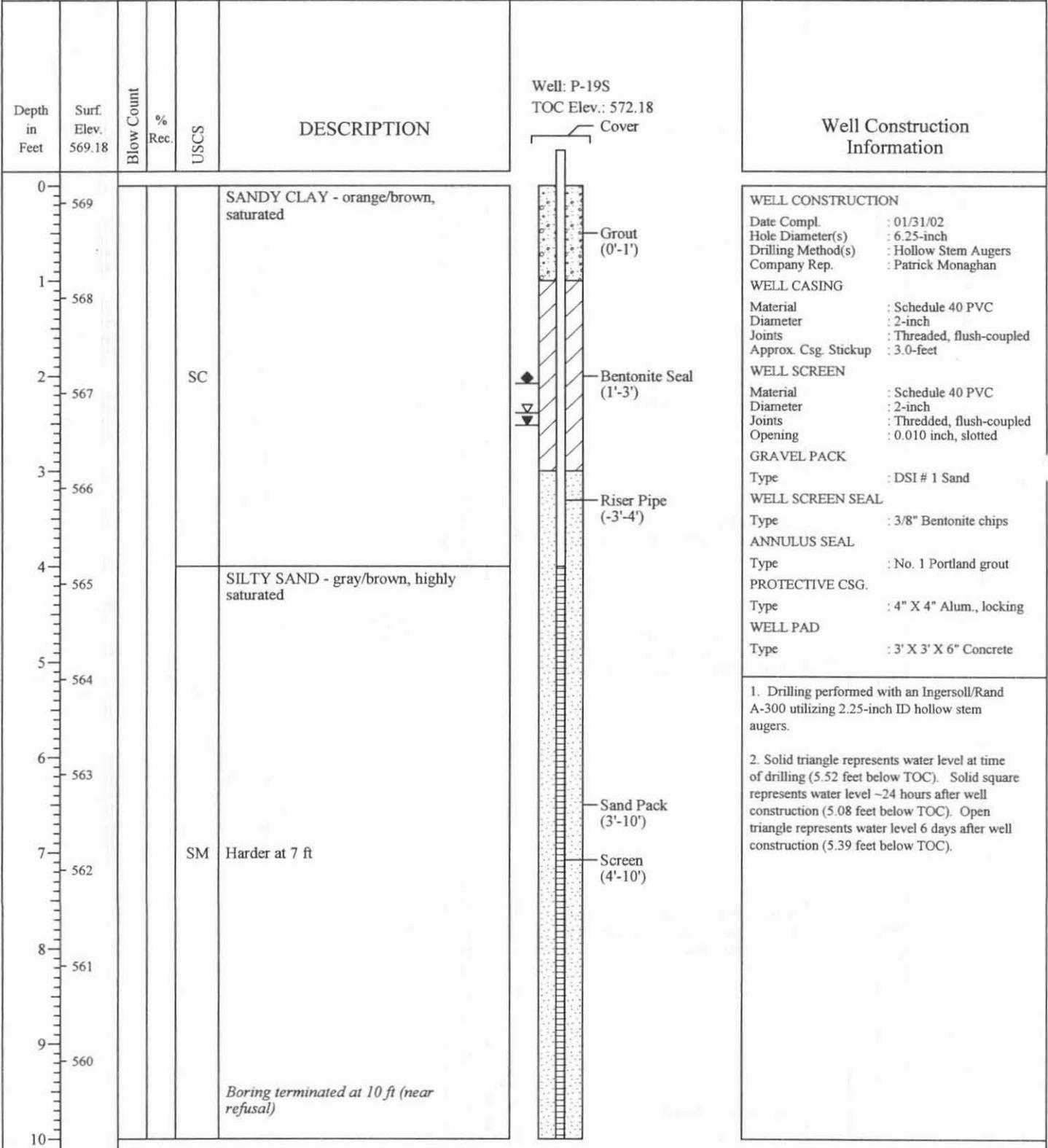
(Page 1 of 1)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/31/02
Date Completed : 01/31/02
Hole Diameter : 6.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 802873.387
Easting Coord. : 1843159.210
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II



Coble's Sandrock
C&D Permit Application
Alamance County, NC

Date Started : 01/18/02
Date Completed : 01/31/02
Hole Diameter : 10.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 802869.867
Easting Coord. : 1843148.340
Survey By : Tritch Civil Env., P.C.
Logged By : David Y. Reedy II

JEI Project No. 419.00, Task 06

| Depth in Feet | Surf. Elev. 569.65 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-19D TOC Elev.: 571.85 Cover Surface Casing Grout (0'-41') Riser Pipe (-2.20'-45') | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|--|-------------------------------|
| 0 | | 2 | | SC | SANDY CLAY - minimal topsoil (2" thick), orange/brown sandy clay with some quartz grains | | |
| 1 | 569 | 2 | 80 | SP | POORLY SORTED SAND - brown, coarse-grained | | |
| 2 | 568 | 3 | | | | | |
| 3 | 567 | 4 | | SC | SANDY CLAY - brown, organic | | |
| 4 | 566 | | | | | | |
| 5 | 565 | 2 | 50 | | SILTY SAND - gray with ~1" green organic clay layers at ~5.5 ft and 6.5ft, saturated at ~5 ft while clays are dry | | |
| 6 | 564 | 6 | | | | | |
| 7 | 563 | 5 | | SM | Coarse grained pwr with large quartz grains with silts and clays still present, iron staining <i>Auger refusal at 10 feet</i> | | |
| 8 | 562 | | | | | | |
| 9 | 561 | | | | | | |
| 10 | 560 | | | | | | |
| 11 | 559 | 50/1 | 10 | BR | BEDROCK - hard coarse grained granite, cuttings gray with large white quartz grains | | |
| 12 | 558 | | | | | | |
| 13 | 557 | | | | | | |
| 14 | 556 | | | | | | |
| 15 | 555 | | | | | | |
| 16 | 554 | | | | | | |
| 17 | 553 | | | | | | |
| 18 | 552 | | | | | | |
| 19 | 551 | | | | | | |
| 20 | 550 | | | | | | |
| 21 | 549 | | | | | | |
| 22 | 548 | | | | | | |
| 23 | 547 | | | | | | |
| 24 | 546 | | | | | | |
| 25 | 545 | | | | | | |
| 26 | 544 | | | | | | |
| 27 | 543 | | | | Water-bearing fracture hit at ~27 ft | | |
| 28 | 542 | | | | | | |
| 29 | 541 | | | | | | |
| 30 | 540 | | | | | | |

1. Drilling performed with an Ingersoll/Rand A-300 utilizing 2.25-inch ID hollow stem augers to auger refusal. Borehole was overdrilled with an Ingersoll/Rand T-3 air rig utilizing a 10-inch hammer to approximately 13 feet to set 10.25-inch steel surface casing. Borehole was continued to 40 feet to set 6.25-inch PVC surface casing. The annular space was grouted up using No. 1 Portland grout and allowed to set approximately 24 hours. The borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 60 feet.

2. Well was dry at time of drilling. Solid square represents water level ~24 hours after well construction (42.04 feet below TOC). Open triangle represents water level 5 days after well construction (5.59 feet below TOC). Dry cuttings were observed with air rotary drilling from 40-60 feet.

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/18/02
Date Completed : 01/31/02
Hole Diameter : 10.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 802869.867
Easting Coord. : 1843148.340
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 569.65 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-19D TOC Elev.: 571.85 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|---|--|
| 30 | | | | | | <p>Surface Casing</p> <p>Grout (0'-41')</p> <p>Riser Pipe (-2.20'-45')</p> <p>Bentonite Seal (41'-43')</p> <p>Sand Pack (43'-60')</p> <p>Screen (45'-60')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/18/02 Hole Diameter(s) : 10.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.20-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>SURFACE CSG.</p> <p>Type : 10.25-inch steel Type : 6.25-inch PVC</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 2.25-inch ID hollow stem augers to auger refusal. Borehole was overdrilled with an Ingersoll/Rand T-3 air rig utilizing a 10-inch hammer to approximately 13 feet to set 10.25-inch steel surface casing. Borehole was continued to 40 feet to set 6.25-inch PVC surface casing. The annular space was grouted up using No. 1 Portland grout and allowed to set approximately 24 hours. The borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 60 feet.</p> <p>2. Well was dry at time of drilling. Solid square represents water level ~24 hours after well construction (42.04 feet below TOC). Open triangle represents water level 5 days after well construction (5.59 feet below TOC). Dry cuttings were observed with air rotary drilling from 40-60 feet.</p> |
| 31 | 539 | | | | | | |
| 32 | 538 | | | | | | |
| 33 | 537 | | | | Water-bearing fracture hit at ~33 ft | | |
| 34 | 536 | | | | Hard white granite with quartz fillings and mafic minerals and mica | | |
| 35 | 535 | | | | | | |
| 36 | 534 | | | | | | |
| 37 | 533 | | | | | | |
| 38 | 532 | | | | | | |
| 39 | 531 | | | | | | |
| 40 | 530 | | | | Terminated drilling with 10" .i.hammer at 40 ft | | |
| 41 | 529 | | | | Grouted in surface casings and waited ~24 hours | | |
| 42 | 528 | | | | Very dry cuttings | | |
| 43 | 527 | | | | | | |
| 44 | 526 | | | | | | |
| 45 | 525 | | | BR | | | |
| 46 | 524 | | | | | | |
| 47 | 523 | | | | | | |
| 48 | 522 | | | | Possible fracture at ~48 ft | | |
| 49 | 521 | | | | | | |
| 50 | 520 | | | | | | |
| 51 | 519 | | | | | | |
| 52 | 518 | | | | | | |
| 53 | 517 | | | | | | |
| 54 | 516 | | | | | | |
| 55 | 515 | | | | Possible fracture at ~55 ft | | |
| 56 | 514 | | | | | | |
| 57 | 513 | | | | | | |
| 58 | 512 | | | | | | |
| 59 | 511 | | | | | | |
| 60 | 510 | | | | Drilling terminated at 60 ft | | |



LOG OF BORING P-20

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| | | | | |
|---|-----------------|-------------------------|------------------|-------------------------------|
| Coble's Sandrock C&D Permit Modification Alamance County, NC JEI Project No. 419.00, Task 06 | Date Started | : 01/29/02 | Drilling Company | : Bedford Well Drilling, Inc. |
| | Date Completed | : 01/29/02 | Northing Coord. | : 800650.073 |
| | Hole Diameter | : 6.25-inch | Easting Coord. | : 1843430.852 |
| | Drilling Method | : Hollow Stem Augers | Survey By | : Tritech Civil Env., P.C. |
| | Sampling Method | : Split Spoons/Cuttings | Logged By | : David Y. Reedy II |

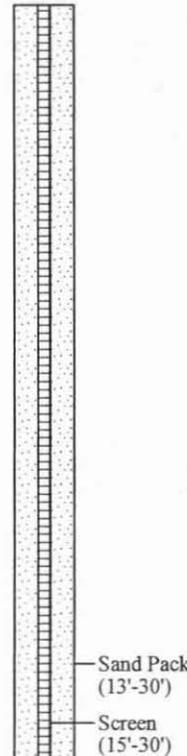
| Depth in Feet | Surf. Elev. 638.81 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-20 TOC Elev.: 641.11 | Well Construction Information WELL CONSTRUCTION Date Compl. : 01/29/02 Hole Diameter(s) : 6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.30-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout |
|---------------|--------------------|------------|--------|------|--|---|---|
| 0 | | 1 | | TS | TOPSOIL - light brown, organics | | |
| 1 | 638 | 4 | 60 | | SILTY SAND - orange/tan with some clays, becomes very coarse at ~2 ft with pebble sized quartz grains, iron staining in coarse zones | | |
| 2 | 637 | 10 | | | | | |
| 3 | 636 | | | | | | |
| 4 | 635 | | | | | | |
| 5 | 634 | 8 | | | Strong granitic texture, coarse grained silty sand with white quartz crystals with green weathered micas, moist | | |
| 6 | 633 | 9 | 85 | | | | |
| 7 | 632 | 7 | | | | | |
| 8 | 631 | 11 | | SM | | | |
| 9 | 630 | | | | | | |
| 10 | 629 | 16 | | | Tan medium grained silty sand with some clay, some dark iron staining present | | |
| 11 | 628 | 20 | 75 | | | | |
| 12 | 627 | 22 | | | | | |
| 13 | 626 | 14 | | | | | |
| 14 | 625 | | | | | | |
| 15 | 624 | | | | | | |

Coble's Sandrock
C&D Permit Modification
Alamance County, NC
JEI Project No. 419.00, Task 06

Date Started : 01/29/02
Date Completed : 01/29/02
Hole Diameter : 6.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800650.073
Easting Coord. : 1843430.852
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 638.81 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-20 TOC Elev.: 641.11 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---------------------------------|---|
| 15 | | 9 | | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/29/02 Hole Diameter(s) : 6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.30-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 2.25-inch ID hollow stem augers to auger refusal at approximately 30 feet.</p> <p>2. Solid triangle represents water level at time of drilling (26.40 feet below TOC). Solid square represents water level ~24 hours after well construction (12.93 feet below TOC). Open triangle represents water level 7 days after well construction (12.99 feet below TOC).</p> |
| 16 | 623 | 15 | 75 | | Tan/brown/white, strong granitic texture, silty sand with coarse grained quartz grains, moist | | |
| 17 | 622 | 17 | | | | | |
| 18 | 621 | | | SM | | | |
| 19 | 620 | | | | | | |
| 20 | 619 | 21 | | | | | |
| 21 | 618 | 38 | 65 | | PARTIALLY WEATHERED ROCK - white/orange/black, coarse grained sandy silt, strong granitic texture, prominent iron staining | | |
| 22 | 617 | 50/5.5 | | | | | |
| 23 | 616 | | | | Cuttings become very moist at 23 ft | | |
| 24 | 615 | | | | | | |
| 25 | 614 | 43 | 50 | PWR | Becomes white with orange iron staining, very coarse grained with quartz and feldspar grains, moisture on large grains | | |
| 26 | 613 | 50/5 | | | | | |
| 27 | 612 | | | | | | |
| 28 | 611 | | | | | | |
| 29 | 610 | | | | Cuttings become saturated at 29 ft tan silty sand with clay, coarse grained quartz mixed in, saturated | | |
| 30 | 609 | 50/2 | 25 | | Auger refusal at 30 ft | | |





LOG OF BORING P-21

(Page 1 of 2)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/30/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Tricone/Core/Hammer
Sampling Method : Split Spoons/Core/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800451.154
Easting Coord. : 1843731.694
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 665.67 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-21 TOC Elev.: 668.42 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|--|--|
| 0 | | 1 | | | TOPSOIL- brown with organics | <p>Grout (0'-43.5')</p> <p>Riser Pipe (-2.75'-47.5')</p> | WELL CONSTRUCTION Date Compl. : 01/30/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : HSA/Tricone/Core Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.75-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout 1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal. Six feet of rock core was obtained using an NQ wire-line rock coring device on an Ingersoll/Rand A-300 rig. Borehole was overdrilled with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 62.5 feet. 2. Solid triangle represents water level at time of drilling (64.56 feet below TOC). Solid square represents water level ~24 hours after well construction (48.50 feet below TOC). Open triangle represents water level 6 days after well construction (48.43 feet below TOC). Dry cuttings were observed with air rotary drilling from 23-62.5 feet. 3. Penetration rate during rock coring was 0.5 ft/195 sec from 44-46 feet; 0.5 ft/165 sec from 46-48 feet; and 0.5 ft/60 sec from 48-50 feet. |
| 1 | 665 | 2 | 40 | SC | SANDY CLAY - reddish orange, fine grained sand, no structure, moist | | |
| 2 | 664 | 5 | | | | | |
| 3 | 663 | | | | | | |
| 4 | 662 | | | | | | |
| 5 | 661 | | | | | | |
| 6 | 660 | 13 | 70 | CH | FAT CLAY - red, rather dry | | |
| 7 | 659 | 17 | | | | | |
| 8 | 658 | 27 | | | | | |
| 9 | 657 | 50/5.5 | | | PARTIALLY WEATHERED ROCK - red silty clay, dry | | |
| 10 | 656 | | | | | | |
| 11 | 655 | 12 | 85 | | White silty sand, contains some clay, changes abruptly, contact in spoon at ~80 degree angle | | |
| 12 | 654 | 17 | | | Hit hard material at 12 ft, < ft thick | | |
| 13 | 653 | 50/5.5 | | | | | |
| 14 | 652 | | | | | | |
| 15 | 651 | | | PWR | Changes to an orange sandy silt, dryer, very hard to drill through | | |
| 16 | 650 | 12 | 35 | | | | |
| 17 | 649 | 50/2 | | | | | |
| 18 | 648 | | | | | | |
| 19 | 647 | | | | | | |
| 20 | 646 | | | | Orange sandy silt with some clays, rather dry | | |
| 21 | 645 | 50/5.5 | 30 | | Auger refusal at 23 ft, use tricone bit .i.to advance | | |
| 22 | 644 | | | | | | |
| 23 | 643 | | | | | | |
| 24 | 642 | 50/5 | 30 | | BEDROCK - orange, hard to drill through, but not solid | | |
| 25 | 641 | | | | | | |
| 26 | 640 | | | | | | |
| 27 | 639 | | | | | | |
| 28 | 638 | | | BR | Becomes harder at 29 ft, cuttings become lighter in color, tan | | |
| 29 | 637 | | | | | | |
| 30 | 636 | | | | | | |
| 31 | 635 | | | | | | |
| 32 | 634 | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/30/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Tricone/Core/Hammer
Sampling Method : Split Spoons/Core/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800451.154
Easting Coord. : 1843731.694
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 665.67 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-21 TOC Elev.: 668.42 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|---|--|
| 32 | | | | | Cuttings begin to look more like weathered rock | <p>Grout (0'-43.5')</p> <p>Riser Pipe (-2.75'-47.5')</p> <p>Bentonite Seal (43.5'-45.5')</p> <p>Sand Pack (45.5'-62.5')</p> <p>Screen (47.5'-62.5')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/30/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : HSA/Tricone/Core Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.75-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal. Six feet of rock core was obtained using an NQ wire-line rock coring device on an Ingersoll/Rand A-300 rig. Borehole was overdrilled with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 62.5 feet.</p> <p>2. Solid triangle represents water level at time of drilling (64.56 feet below TOC). Solid square represents water level ~24 hours after well construction (48.50 feet below TOC). Open triangle represents water level 6 days after well construction (48.43 feet below TOC). Dry cuttings were observed with air rotary drilling from 23-62.5 feet.</p> <p>3. Penetration rate during rock coring was 0.5 ft/195 sec from 44-46 feet; 0.5 ft/165 sec from 46-48 feet; and 0.5 ft/60 sec from 48-50 feet.</p> |
| 33 | 633 | | | | Becomes softer at 33 ft | | |
| 34 | 632 | | | | | | |
| 35 | 631 | | | | | | |
| 36 | 630 | | | | | | |
| 37 | 629 | | | | | | |
| 38 | 628 | | | | | | |
| 39 | 627 | | | | | | |
| 40 | 626 | | | | | | |
| 41 | 625 | | | | Still in weathered rock, not very hard, does not seem competent | | |
| 42 | 624 | | | | Hit possible water bearing fracture at 42 ft | | |
| 43 | 623 | | | | | | |
| 44 | 622 | | | | Core: 44-50 ft; Rec = 82%; RQD = 38%; could not add down pressure to rig without stopping up the core barrel; soft, highly weathered, tan, fine to medium grained granite, highly fractured with a lot of iron and magnesium staining | | |
| 45 | 621 | | | | | | |
| 46 | 620 | | | | | | |
| 47 | 619 | | | BR | | | |
| 48 | 618 | | | | | | |
| 49 | 617 | | | | | | |
| 50 | 616 | | | | | | |
| 51 | 615 | | | | | | |
| 52 | 614 | | | | | | |
| 53 | 613 | | | | | | |
| 54 | 612 | | | | | | |
| 55 | 611 | | | | Cuttings change to lighter tan | | |
| 56 | 610 | | | | | | |
| 57 | 609 | | | | | | |
| 58 | 608 | | | | | | |
| 59 | 607 | | | | | | |
| 60 | 606 | | | | | | |
| 61 | 605 | | | | | | |
| 62 | 604 | | | | Terminated boring at 62.5 feet | | |
| 63 | 603 | | | | | | |
| 64 | 602 | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/17/02
Date Completed : 01/17/02
Hole Diameter : 8.25-inch
Drilling Method : Hollow Stem Augers
Sampling Method : Split Spoons

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800107.753
Easting Coord. : 1843920.412
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 627.9 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-22 TOC Elev.: 629.90 | Well Construction Information |
|---------------|-------------------|------------|--------|------|--|---|--|
| 0 | | | | | TOPSOIL - Dark brown with organics | <p>Bentonite Seal (0'-3')</p> <p>Riser Pipe (-2.0'-4')</p> <p>Sand Pack (3'-10')</p> <p>Screen (4'-10')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/17/02 Hole Diameter(s) : 8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.0-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal.</p> <p>2. Solid triangle represents water level at time of drilling (3.97 feet below TOC). Solid square represents water level ~24 hours after well construction (3.44 feet below TOC). Open triangle represents water level 7 days after well construction (2.86 feet below TOC).</p> |
| 1 | 627 | 1 | 70 | TS | SILTY SAND - tan/yellow, contains minimal clay, fine to medium-grained quartz grains, very wet | | |
| 2 | 626 | 2 | | SM | Yellowish silty sand with granitic texture, dry | | |
| 3 | 625 | | | | | | |
| 4 | 624 | | | | | | |
| 5 | 623 | 10 | | | | | |
| 6 | 622 | 50 | 60 | PWR | PARTIALLY WEATHERED ROCK - silty sand with granitic texture | | |
| 7 | 621 | 50/4 | | | | | |
| 8 | 620 | | | | Some course-grained quartz fragments present at 10 feet, dry | | |
| 9 | 619 | 50/4 | 35 | | Auger refusal at 10 feet | | |
| 10 | 618 | | | | | | |



LOG OF BORING P-23

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/16/02
Date Completed : 01/17/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800001.018
Easting Coord. : 1843472.682
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 637.87 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-23 TOC Elev.: 640.37 Cover | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|--|--|
| 0 | | 2 | | | SANDY SILT - reddish orange, quartz grains visible, moist | | WELL CONSTRUCTION Date Compl. : 01/17/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.50-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout PROTECTIVE CSG. Type : 4" X 4" Alum., locking WELL PAD Type : 3' X 3' X 6" Concrete |
| 1 | 637 | 5 | 65 | | | | |
| 2 | 636 | 7 | | | | | |
| 3 | 635 | 10 | | | | | |
| 4 | 634 | | | | | | |
| 5 | 633 | | | | | | |
| 6 | 632 | 6 | | | | | |
| 7 | 631 | 9 | 85 | | | | |
| 8 | 630 | 10 | | | | | |
| 9 | 629 | 11 | | SM | | | |
| 10 | 628 | | | | Tan/orange, faint granitic texture, becoming coarser with depth, slightly moist | | |
| 11 | 627 | 6 | | | | | |
| 12 | 626 | 6 | 50 | | | | |
| 13 | 625 | 8 | | | Color change to white/orange, higher clay concentration, faint granitic texture, slightly moist | | |
| 14 | 624 | 8 | | | | | |
| 15 | 623 | 24 | | | Weathered rock chips in cuttings | | |
| 16 | 622 | | | | | | |
| 17 | 621 | 6 | | | | | |
| 18 | 620 | 11 | 70 | | | | |
| 19 | 619 | 10 | | | SILTY SAND - fine-grained silty sand with quartz and feldspar grains | | |
| 20 | 618 | 9 | | | | | |
| 21 | 617 | | | | | | |
| | | 17 | | | Strong granitic texture at 17 feet | | |
| | | 32 | | | | | |
| | | 33 | | | Fine-grained silty sand, white granitic appearance, coarse-grained quartz grains present, moist at 22 feet | | |
| | | 25 | 70 | SM | | | |

1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal. Borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 41.0 feet.

2. Solid triangle represents water level at time of drilling (35.71 feet below TOC). Solid square represents water level ~24 hours after well construction (31.04 feet below TOC). Open triangle represents water level 7 days after well construction (30.60 feet below TOC). Dry cuttings were observed with air rotary drilling from 27-41 feet.



LOG OF BORING P-23

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 06

Date Started : 01/16/02
Date Completed : 01/17/02
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : Bedford Well Drilling, Inc.
Northing Coord. : 800001.018
Easting Coord. : 1843472.682
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 637.87 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-23 TOC Elev.: 640.37 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---------------------------------|---|
| 21 | | 17 | 70 | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 01/17/02 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Patrick Monaghan Drilling Method(s) : Downhole Hammer Company Rep. : Mike Monaghan</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.50-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>PROTECTIVE CSG.</p> <p>Type : 4" X 4" Alum., locking</p> <p>WELL PAD</p> <p>Type : 3' X 3' X 6" Concrete</p> <p>1. Drilling performed with an Ingersoll/Rand A-300 utilizing 4.25-inch ID hollow stem augers to auger refusal. Borehole was continued with an Ingersoll/Rand T-3 air rig utilizing a 6-inch hammer to approximately 41.0 feet.</p> <p>2. Solid triangle represents water level at time of drilling (35.71 feet below TOC). Solid square represents water level ~24 hours after well construction (31.04 feet below TOC). Open triangle represents water level 7 days after well construction (30.60 feet below TOC). Dry cuttings were observed with air rotary drilling from 27-41 feet.</p> |
| 22 | 616 | 25 | | SM | Coarsening to a medium-grained silty sand, much sandier, more prominent granitic texture, slightly moist | | |
| 23 | 615 | | | | | | |
| 24 | 614 | | | | | | |
| 25 | 613 | 12 | | | | | |
| 26 | 612 | 24 | 85 | | Auger refusal at 27 feet | | |
| 27 | 611 | 31 | | BR | BEDROCK - hard weathered rock, yellow cuttings | | |
| 28 | 610 | | | | | | |
| 29 | 609 | | | | | | |
| 30 | 608 | | | | | | |
| 31 | 607 | | | | | | |
| 32 | 606 | | | | | | |
| 33 | 605 | | | | | | |
| 34 | 604 | | | | | | |
| 35 | 603 | | | | | | |
| 36 | 602 | | | | | | |
| 37 | 601 | | | | | | |
| 38 | 600 | | | | | | |
| 39 | 599 | | | | | | |
| 40 | 598 | | | | | | |
| 41 | 597 | | | | Drilling terminated at 41 feet | | |
| 42 | 596 | | | | | | |



LOG OF BORING P-24

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/24/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 801640.1465480
Easting Coord. : 1843019.3592300
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 612.52 | Blow Count | USCS | DESCRIPTION | Well: P-24 Elev.: 613.89 | Well Construction Information |
|---------------|--------------------|------------|------|--|--|--|
| 0 | | | | SILTY SAND - dark gray clayey sand | <p>Grout (0'-24')</p> <p>Riser Pipe (-1.37'-28')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/24/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 1.37-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. Boring was continued utilizing 6.25-inch downhole hammer.</p> <p>2. Solid triangle represents water level at time of drilling (26.76 feet below TOC). Open triangle represents water level ~24 hours after well construction (26.44 feet below TOC). Solid square represents water level 11 days after well construction (26.04 feet below TOC).</p> |
| 1 | 612 | | | Color changes to tan | | |
| 2 | 611 | | | | | |
| 3 | 610 | | | | | |
| 4 | 609 | | | | | |
| 5 | 608 | | | | | |
| 6 | 607 | 6 | 85 | | | |
| 7 | 606 | 11 | | | | |
| 8 | 605 | 10 | | | | |
| 9 | 604 | 13 | SM | | | |
| 10 | 603 | | | Orange and white clayey sand with thin zones of green silt (1 to 2 inches thick) | | |
| 11 | 602 | 6 | | | | |
| 12 | 601 | 6 | | | | |
| 13 | 600 | 7 | | | | |
| 14 | 599 | 8 | | | | |
| 15 | 598 | | | White clayey sand with abundant quartz pebbles and iron staining, dry | | |
| 16 | 597 | 17 | | | | |
| 17 | 596 | 22 | | | | |
| 18 | 595 | 27 | | | | |
| 19 | 594 | 50/3 | PWR | PARTIALLY WEATHERED ROCK - white clayey sand with abundant quartz pebbles <i>Auger refusal at 18 feet</i> | | |
| | | | BR | BEDROCK - light tan weathered granitic cuttings, coarse sand to small pebble size cuttings | | |



LOG OF BORING P-24

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Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/24/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 801640.1465480
Easting Coord. : 1843019.3592300
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 612.52 | Blow Count | USCS | DESCRIPTION | Well: P-24 Elev.: 613.89 | Well Construction Information |
|---------------|--------------------|------------|------|---|---|--|
| 19 | | | | | <p>Grout (0'-24')</p> <p>Bentonite Seal (24'-26')</p> <p>Riser Pipe (-1.37'-28')</p> <p>Sand Pack (26'-38')</p> <p>Screen (28'-38')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/24/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 1.37-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. Boring was continued utilizing 6.25-inch downhole hammer.</p> <p>2. Solid triangle represents water level at time of drilling (26.76 feet below TOC). Open triangle represents water level ~24 hours after well construction (26.44 feet below TOC). Solid square represents water level 11 days after well construction (26.04 feet below TOC).</p> |
| 19 | 593 | | | | | |
| 20 | 592 | | | | | |
| 21 | 591 | | | | | |
| 22 | 590 | | | | | |
| 23 | 589 | | | | | |
| 24 | 588 | | | | | |
| 25 | 587 | | | | | |
| 26 | 586 | | | Becomes more competent at 26 feet | | |
| 27 | 585 | | | | | |
| 28 | 584 | | BR | | | |
| 29 | 583 | | | | | |
| 30 | 582 | | | Water bearing rock encountered at 30 feet | | |
| 31 | 581 | | | | | |
| 32 | 580 | | | Wet cuttings at 32 feet, cuttings consist of quartz, feldspar, and hornblend grains | | |
| 33 | 579 | | | | | |
| 34 | 578 | | | | | |
| 35 | 577 | | | | | |
| 36 | 576 | | | | | |
| 37 | 575 | | | | | |
| 38 | | | | Terminated boring at 38 feet | | |



LOG OF BORING P-25

(Page 1 of 2)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/24/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 801851.9868760
Easting Coord. : 1843307.8001000
Survey By : Tritch Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 616.37 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-25 Elev.: 617.81 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|-----------------------------|--|
| 0 | 616 | | | | SILTY SAND - orange/tan silty sand with pebble size rock fragments | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/24/05 Hole Diameter(s) : 6.25-inch/8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 1.44-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. Boring was continued utilizing 6.25-inch downhole hammer.</p> <p>2. Solid triangle represents water level at time of drilling (20.70 feet below TOC). Open triangle represents water level ~24 hours after well construction (20.13 feet below TOC). Solid square represents water level 11 days after well construction (19.59 feet below TOC).</p> |
| 1 | 615 | | | | | | |
| 2 | 614 | | | SM | | | |
| 3 | 613 | | | | | | |
| 4 | 612 | | | | | | |
| 5 | 611 | 4 | | | SILT - grayish tan silt, dry | | |
| 6 | 610 | 12 | 95 | ML | | | |
| 7 | 609 | 50/6 | | | PARTIALLY WEATHERED ROCK - white silty gravel with weathered quartz and mica | | |
| 8 | 608 | | | | | | |
| 9 | 607 | | | | | | |
| 10 | 606 | 50/6 | 15 | PWR | Moist cuttings at 11 feet | | |
| 11 | 605 | | | | | | |
| 12 | 604 | | | | | | |
| 13 | 603 | | | | Auger refusal at 14 feet | | |
| 14 | 602 | 50/0 | 0 | | BEDROCK - orange and tan, very weathered material | | |
| 15 | 601 | | | | | | |
| 16 | 600 | | | BR | Hammer fires for the first time at 16 feet indicating competent rock, coarse sand size quartz and feldspar cuttings | | |
| 17 | 599 | | | | | | |
| 18 | 598 | | | | | | |
| 19 | | | | | White silt size cuttings by 19 feet | | |



LOG OF BORING P-25

(Page 2 of 2)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/22/05
Date Completed : 03/24/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/Downhole Hammer
Sampling Method : Split Spoons/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 801851.9868760
Easting Coord. : 1843307.8001000
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II

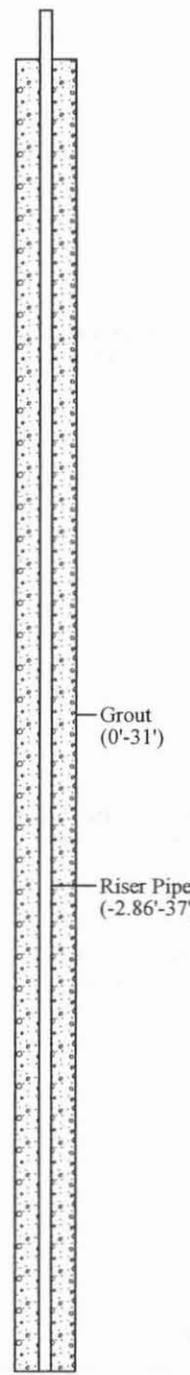
| Depth in Feet | Surf. Elev. 616.37 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-25 Elev.: 617.81 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|-----------------------------|--|
| 19 | 597 | | | | | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/24/05 Hole Diameter(s) : 6.25-inch/8.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 1.44-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. Boring was continued utilizing 6.25-inch downhole hammer.</p> <p>2. Solid triangle represents water level at time of drilling (20.70 feet below TOC). Open triangle represents water level ~24 hours after well construction (20.13 feet below TOC). Solid square represents water level 11 days after well construction (19.59 feet below TOC).</p> |
| 20 | 596 | | | | | | |
| 21 | 595 | | | | | | |
| 22 | 594 | | | | | | |
| 23 | 593 | | | | Small pebble size cuttings of quartz, feldspar, and hornblend at 23 feet | | |
| 24 | 592 | | | | | | |
| 25 | 591 | | | | | | |
| 26 | 590 | | | | | | |
| 27 | 589 | | | | | | |
| 28 | 588 | | | | | | |
| 29 | 587 | | | BR | | | |
| 30 | 586 | | | | Possible small fracture at 30 feet, based on reduction of dust and tan colored cuttings | | |
| 31 | 585 | | | | | | |
| 32 | 584 | | | | Possible water bearing fracture at 32 feet based on drilling response and reduction of dust | | |
| 33 | 583 | | | | | | |
| 34 | 582 | | | | | | |
| 35 | 581 | | | | | | |
| 36 | 580 | | | | | | |
| 37 | 579 | | | | | | |
| 38 | | | | | Terminated boring at 38 feet | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/21/05
Date Completed : 03/28/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/NQ Core/Downhole Hammer
Sampling Method : Split Spoons/Core/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802588.7498230
Easting Coord. : 1842908.6996400
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 594.27 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-26 Elev.: 597.13 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---|--|
| 0 | 594 | 1 | | | SANDY CLAY - brown |  | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 03/28/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : NQ Rock Coring Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.86-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 1 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : No. 1 Portland grout</p> <p>1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. Rock coring was performed utilizing a NQ core barrel from 25 to 48.5 feet. Boring was overdrilled utilizing 6.25-inch downhole hammer.</p> <p>2. Boring was dry at the time of drilling. Solid triangle represents water level 7 days after well construction (26.71 feet below TOC).</p> |
| 1 | 593 | 2 | 95 | | Changes to orange at 1.5 feet, moist | | |
| 2 | 592 | 3 | | CL | | | |
| 3 | 591 | | | | | | |
| 4 | 590 | | | | | | |
| 5 | 589 | 4 | | | SILTY SAND - orange and white mottled silty sand. moist | | |
| 6 | 588 | 5 | 95 | | | | |
| 7 | 587 | 10 | | | | | |
| 8 | 586 | | | SM | | | |
| 9 | 585 | | | | White coarse grained silty sand, granitic texture with weathered quartz and mica, dry | | |
| 10 | 584 | 13 | | | | | |
| 11 | 583 | 32 | 95 | | | | |
| 12 | 582 | 50/5 | | | PARTIALLY WEATHERED ROCK - white coarse grained silty sand, granitic texture, weathered quartz and mica, dry | | |
| 13 | 581 | | | | | | |
| 14 | 580 | | | | | | |
| 15 | 579 | 33 | 40 | | | | |
| 16 | 578 | 50/5 | | PWR | | | |
| 17 | 577 | | | | | | |
| 18 | | | | | | | |



LOG OF BORING P-26

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 03/21/05
Date Completed : 03/28/05
Hole Diameter : 8.25-inch/6.25-inch
Drilling Method : HSA/NQ Core/Downhole Hammer
Sampling Method : Split Spoons/Core/Cuttings

Drilling Company : SAEDACCO
Northing Coord. : 802588.7498230
Easting Coord. : 1842908.6996400
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II

| Depth in Feet | Surf. Elev. 594.27 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-26 Elev.: 597.13 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|-----------------------------|--|
| 36 | 558 | | | | changing back to highly fractured metavolcanic rock. Fractures range from nearly horizontal to nearly vertical with no apparent pattern. | | WELL CONSTRUCTION Date Compl. : 03/28/05 Hole Diameter(s) : 8.25-inch/6.25-inch Drilling Method(s) : Hollow Stem Augers Company Rep. : Robert Miller Drilling Method(s) : NQ Rock Coring Company Rep. : Robert Miller Drilling Method(s) : Downhole Hammer Company Rep. : Robert Miller WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.86-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 1 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : No. 1 Portland grout 1. Drilling performed with a Gus Pech GP-1100E utilizing 4.25-inch ID hollow stem augers to auger refusal. Rock coring was performed utilizing a NQ core barrel from 25 to 48.5 feet. Boring was overdrilled utilizing 6.25-inch downhole hammer. 2. Boring was dry at the time of drilling. Solid triangle represents water level 7 days after well construction (26.71 feet below TOC). |
| 37 | 557 | | | | | | |
| 38 | 556 | | | | | | |
| 39 | 555 | | | | | | |
| 40 | 554 | | | | 40 to 45-foot core run: RQD = 62%, Recovery = 94%; Metavolcanic rock continues to 41.5 feet. Weathered granite from 41.5 to 45 feet with very weathered hornblend. Fracture spacing ranges from 4 to 6 inches and dips from approximately 15 to 35 degrees. | | |
| 41 | 553 | | | | | | |
| 42 | 552 | | | | | | |
| 43 | 551 | | | | | | |
| 44 | 550 | | | BR | | | |
| 45 | 549 | | | | 40 to 50-foot core run: RQD = 43%, Recovery = 95%; Highly fractured, very weathered granite. Fractures range from nearly horizontal to nearly vertical with a spacing there ranges from 1 to 9 inches. Coring was stopped at 48.5 feet because core barrel stopped up with small rock fragments. | | |
| 46 | 548 | | | | | | |
| 47 | 547 | | | | | | |
| 48 | 546 | | | | | | |
| 49 | 545 | | | | | | |
| 50 | 544 | | | | | | |
| 51 | 543 | | | | Boring was overdrilled and advanced to 52 feet. | | |
| 52 | 542 | | | | | | |
| 53 | 541 | | | | | | |
| 54 | | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 04/04/05
Date Completed : 04/04/05
Hole Diameter : 2.5-inch
Drilling Method : Hand Auger
Sampling Method : Soil Core

Northing Coord. : 799415.2582420
Easting Coord. : 1843889.0495900
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II
 : Ben Draper

| Depth in Feet | Surf. Elev. 625.25 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-27 Elev.: 627.45 | Well Construction Information |
|---------------|--------------------|------------|--------|------|---|--|--|
| 0 | | | | | LEAN CLAY - brown with some sand, saturated | <p>Bentonite Seal (0'-1')</p> <p>Riser Pipe (-2.20'-2.5')</p> <p>Sand Pack (1'-4.5')</p> <p>Screen (2.5'-4.5')</p> | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 04/04/05 Hole Diameter(s) : 2.5-inch Drilling Method(s) : Hand Auger Company Rep. : David Y. Reedy II : Ben Draper</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.20-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 2 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : 3/8" Bentonite chips</p> |
| 625 | | | | CL | | | |
| | | | | | SILTY SAND - gray | | |
| 1 | | | | | | | |
| 624 | | | | | | | |
| | | | | | | | |
| 2 | | | | | | | |
| 623 | | | | | | | |
| | | | | SM | | | |
| 3 | | | | | | | |
| 622 | | | | | | | |
| | | | | | | | |
| 4 | | | | | | | |
| 621 | | | | | | | |
| | | | | | Terminated boring at 4.5 feet | | |
| 5 | | | | | | | |

- Piezometer installed with a hand auger.
- Solid triangle represents water level at time of drilling (5.95 feet below TOC). Open triangle represents water level 15 days after well construction (2.45 feet below TOC).



LOG OF BORING P-28

(Page 1 of 1)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 04/04/05
Date Completed : 04/04/05
Hole Diameter : 2.5-inch
Drilling Method : Hand Auger
Sampling Method : Soil Core

Northing Coord. : 799572.9421430
Easting Coord. : 1843510.3166300
Survey By : Tritech Civil Env., P.C.
Logged By : David Y. Reedy II
Ben Draper

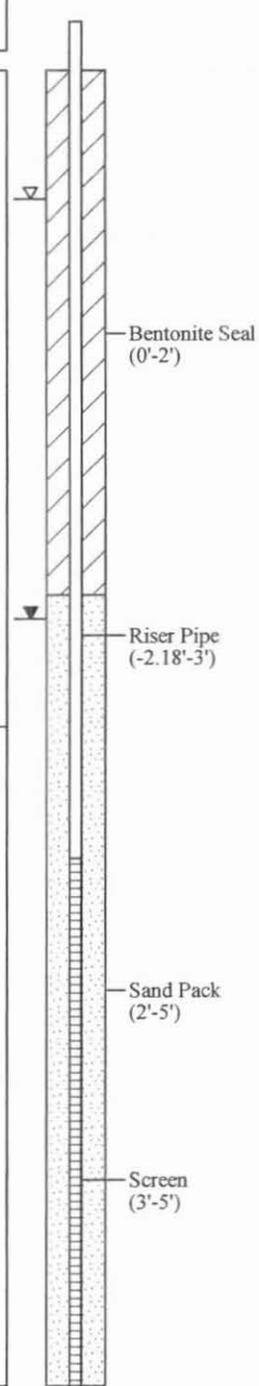
| Depth in Feet | Surf. Elev. 610.36 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-28 Elev.: 613.15 | Well Construction Information |
|---------------|--------------------|------------|--------|--|---|---|--|
| 0 | | | | CH | FAT CLAY - brown with yellow sandy zones, saturated | | WELL CONSTRUCTION Date Compl. : 04/04/05 Hole Diameter(s) : 2.5-inch Drilling Method(s) : Hand Auger Company Rep. : David Y. Reedy II Ben Draper WELL CASING Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.79-feet WELL SCREEN Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Opening : 0.010 inch, slotted GRAVEL PACK Type : DSI # 2 Sand WELL SCREEN SEAL Type : 3/8" Bentonite chips ANNULUS SEAL Type : 3/8" Bentonite chips |
| 610 | | | CL | LEAN CLAY - gray sandy lean clay | | | |
| 609 | | | SM | SILTY SAND - gray and yellow coarse grained silty sand | | | |
| 608 | | | | | Terminated boring at 4 feet | 1. Piezometer installed with a hand auger. 2. Solid triangle represents water level at time of drilling (3.28 feet below TOC). Open triangle represents water level 15 days after well construction (3.52 feet below TOC). | |
| 607 | | | | | | | |
| 4 | | | | | | | |

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 04/04/05
Date Completed : 04/04/05
Hole Diameter : 2.5-inch
Drilling Method : Hand Auger
Sampling Method : Soil Core

Northing Coord. : 799763.1042900
Easting Coord. : 1843747.3543300
Survey By : Trittech Civil Env., P.C.
Logged By : David Y. Reedy II
Ben Draper

| Depth in Feet | Surf. Elev. 617.31 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-29 Elev.: 619.49 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|---|---|
| 0 | | | | | CLAYEY SAND - gray |  | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 04/04/05 Hole Diameter(s) : 2.5-inch Drilling Method(s) : Hand Auger Company Rep. : David Y. Reedy II Ben Draper</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.18-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 2 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : 3/8" Bentonite chips</p> |
| 617 | | | | | | | |
| 1 | | | | SC | | | |
| 616 | | | | | | | |
| 2 | | | | | SILTY SAND - gray with minor clay lenses | | |
| 615 | | | | | | | |
| 3 | | | | SM | | | |
| 614 | | | | | | | |
| 4 | | | | | | | |
| 613 | | | | | | | |
| 5 | | | | | Terminated boring at 5 feet | | |

WELL CONSTRUCTION

Date Compl. : 04/04/05
Hole Diameter(s) : 2.5-inch
Drilling Method(s) : Hand Auger
Company Rep. : David Y. Reedy II
Ben Draper

WELL CASING

Material : Schedule 40 PVC
Diameter : 2-inch
Joints : Threaded, flush-coupled
Approx. Csg. Stickup : 2.18-feet

WELL SCREEN

Material : Schedule 40 PVC
Diameter : 2-inch
Joints : Thredded, flush-coupled
Opening : 0.010 inch, slotted

GRAVEL PACK

Type : DSI # 2 Sand

WELL SCREEN SEAL

Type : 3/8" Bentonite chips

ANNULUS SEAL

Type : 3/8" Bentonite chips

1. Piezometer installed with a hand auger.
2. Solid triangle represents water level at time of drilling (4.27 feet below TOC). Open triangle represents water level 15 days after well construction (2.67 feet below TOC).



LOG OF BORING P-30

(Page 1 of 1)

Coble's Sandrock
C&D Permit Application
Alamance County, NC

JEI Project No. 419.00, Task 19

Date Started : 04/04/05
Date Completed : 04/04/05
Hole Diameter : 2.5-inch
Drilling Method : Hand Auger
Sampling Method : Soil Core

Northing Coord. : 799303.3458790
Easting Coord. : 1844228.8326400
Survey By : Tritch Civil Env., P.C.
Logged By : David Y. Reedy II
Ben Draper

| Depth in Feet | Surf. Elev. 634.75 | Blow Count | % Rec. | USCS | DESCRIPTION | Well: P-30 Elev.: 637.49 | Well Construction Information |
|---------------|--------------------|------------|--------|------|--|-----------------------------|--|
| 0 | | | | | SILTY SAND - gray | | <p>WELL CONSTRUCTION</p> <p>Date Compl. : 04/04/05 Hole Diameter(s) : 2.5-inch Drilling Method(s) : Hand Auger Company Rep. : David Y. Reedy II Ben Draper</p> <p>WELL CASING</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Threaded, flush-coupled Approx. Csg. Stickup : 2.74-feet</p> <p>WELL SCREEN</p> <p>Material : Schedule 40 PVC Diameter : 2-inch Joints : Thredded, flush-coupled Opening : 0.010 inch, slotted</p> <p>GRAVEL PACK</p> <p>Type : DSI # 2 Sand</p> <p>WELL SCREEN SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>ANNULUS SEAL</p> <p>Type : 3/8" Bentonite chips</p> <p>1. Piezometer installed with a hand auger.</p> <p>2. Solid triangle represents water level at time of drilling (3.13 feet below TOC). Open triangle represents water level 15 days after well construction (3.18 feet below TOC).</p> |
| 634 | | | | | Changes to yellow medium grained silty sand at 4 inches, saturated | | |
| 633 | | | | | | | |
| 632 | | | | SM | | | |
| 631 | | | | | Terminated boring at 4 feet | | |

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Michael F. Monaghan CERTIFICATION # 2895
 WELL CONTRACTOR COMPANY NAME Bedford Well Drilling, Inc. PHONE # (540) -586-1449
 STATE WELL CONSTRUCTION PERMIT# 1192 ASSOCIATED WQ PERMIT# _____
 (if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
 Monitoring Recovery Heat Pump Water Injection Other If Other, List Use Piezometer Installation

2. WELL LOCATION:

Nearest Town: Liberty County Alamance
5833 Foster Stone Road 27298
 (Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
 (check appropriate box)
 Latitude/longitude of well location

3. OWNER: Coble's Sandrock
 Address 5833 Foster Stone Road
 (Street or Route No.)
Liberty NC 27298
 City or Town State Zip Code
(336)-565-4750
 Area code- Phone number

(degrees/minutes/seconds)
 Latitude/longitude source: GPS Topographic map
 (check box)

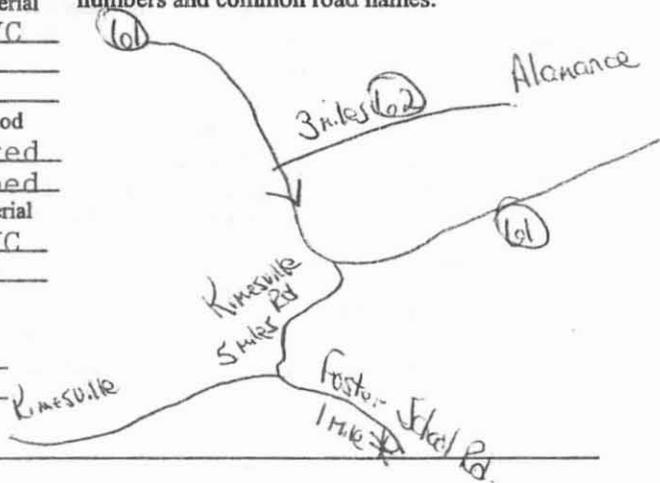
4. DATE DRILLED 01/18/02
 5. TOTAL DEPTH: 50'
 6. DOES WELL REPLACE EXISTING WELL? YES NO
 7. STATIC WATER LEVEL Below Top of Casing: _____ FT.
 (Use "+" if Above Top of Casing)
 8. TOP OF CASING IS 2.5 FT. Above Land Surface*
 *Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.
 9. YIELD (gpm): N/A METHOD OF TEST N/A
 10. WATER ZONES (depth): N/A

| DEPTH | | DRILLING LOG |
|-------|----|--------------------------|
| From | To | Formation Description |
| 0 | 15 | Silty Sand / Sepsinite |
| 15 | 17 | Partially weathered Rock |
| 17 | 50 | Granite / Bedrock |
| | | |
| | | |
| | | |
| | | |
| | | |

11. DISINFECTION: Type N/A Amount N/A
 12. CASING: Wall Thickness
 From +2.5 To 40 Ft. 2 Sch 40 Material PVC
 From _____ To _____ Ft. _____ Sch _____ Material _____
 From _____ To _____ Ft. _____ Sch _____ Material _____
 13. GROUT: Depth Material Method
 From 36 To 38 Ft. Bent. Chips Poured
 From 0 To 36 Ft. Bent./Cement Pumped
 14. SCREEN: Depth Diameter Slot Size Material
 From 40 To 50 Ft. 2 in. .010 in. PVC
 From _____ To _____ Ft. _____ in. _____ in. _____
 15. SAND/GRAVEL PACK: Depth Size Material
 From 38 To 50 Ft. #1 Sand
 From _____ To _____ Ft. _____ Size _____ Material _____

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



16. REMARKS: P-15

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

Michael F. Monaghan SIGNATURE OF PERSON CONSTRUCTING THE WELL
 1/18/02 DATE

COPY

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Michael F. Monaghan CERTIFICATION # 2895

WELL CONTRACTOR COMPANY NAME Bedford Well Drilling, Inc. PHONE # 640 586-1449

STATE WELL CONSTRUCTION PERMIT# 1192 ASSOCIATED WQ PERMIT# _____
(if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
Monitoring Recovery Heat Pump Water Injection Other If Other, List Use Piezometer Installed

2. WELL LOCATION:
Nearest Town: Liberty County Alamance
5833 Foster Store Road 27298
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
(check appropriate box)

Latitude/longitude of well location

3. OWNER: Cable's Landrock
Address 5833 Foster Store Road
(Street or Route No.)

(degrees/minutes/seconds)
Latitude/longitude source: GPS Topographic map
(check box)

Liberty NC 27298
City or Town State Zip Code
(336)-565-4750
Area code- Phone number

| DEPTH | | DRILLING LOG |
|-------|----|--------------------------|
| From | To | Formation Description |
| 0 | 5 | Silty Sand / Saprolite |
| 5 | 18 | Partially Weathered Rock |
| 18 | 41 | Granite Bedrock |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

4. DATE DRILLED 01-18-02

5. TOTAL DEPTH: 41'

6. DOES WELL REPLACE EXISTING WELL? YES NO

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

8. TOP OF CASING IS 2.5 FT. Above Land Surface*

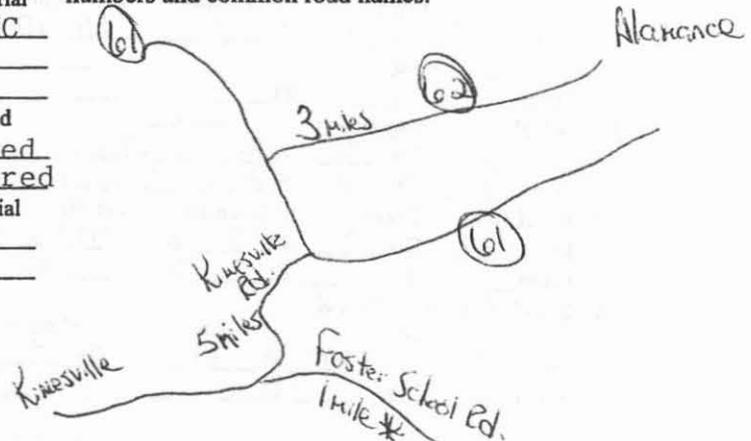
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.

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

10. WATER ZONES (depth): N/A

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



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

| Depth | | Diameter | | Wall Thickness | Material |
|------------------|--------------|---------------|---------------|----------------|------------|
| From | To | Ft. | or Weight/Ft. | Sch | |
| From <u>+2.5</u> | To <u>26</u> | Ft. <u>2"</u> | | <u>Sch 40</u> | <u>PVC</u> |
| From _____ | To _____ | Ft. _____ | | | |
| From _____ | To _____ | Ft. _____ | | | |

| Depth | | Material | Method |
|----------------|--------------|--------------------------|---------------|
| From <u>0</u> | To <u>22</u> | <u>Ft. Bent/Cement</u> | <u>Pumped</u> |
| From <u>22</u> | To <u>24</u> | <u>Ft. Bent. Pellets</u> | <u>Poured</u> |

| Depth | | Diameter | Slot Size | Material |
|----------------|--------------|----------------------|------------------|------------|
| From <u>26</u> | To <u>41</u> | <u>Ft. 2 in.</u> | <u>.010 in.</u> | <u>PVC</u> |
| From _____ | To _____ | <u>Ft. _____ in.</u> | <u>_____ in.</u> | |

| Depth | | Size | Material |
|----------------|--------------|------------------|-------------|
| From <u>24</u> | To <u>41</u> | <u>Ft. #1</u> | <u>Sand</u> |
| From _____ | To _____ | <u>Ft. _____</u> | |

16. REMARKS: P-16

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

Michael F. Monaghan
SIGNATURE OF PERSON CONSTRUCTING THE WELL

1/18/02
DATE

COPY

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Michael F. Monaghan CERTIFICATION # 2895

WELL CONTRACTOR COMPANY NAME Bedford Well Drilling, Inc. PHONE # (540) 586-1449

STATE WELL CONSTRUCTION PERMIT# 1192 ASSOCIATED WQ PERMIT# _____
(if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
Monitoring Recovery Heat Pump Water Injection Other If Other, List Use Pizometer

2. WELL LOCATION:
Nearest Town: Liberty County Alamance
5833 Foster Store Road 27298
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
(check appropriate box)
Latitude/longitude of well location

3. OWNER: Coble's Sandrock
Address 5833 Foster Store Road
(Street or Route No.)

(degrees/minutes/seconds)
Latitude/longitude source: GPS Topographic map
(check box)

Liberty NC 27298
City or Town State Zip Code

| DEPTH | | DRILLING LOG |
|-----------|-----------|---------------------------------|
| From | To | Formation Description |
| <u>0</u> | <u>20</u> | <u>Sandy Clay / Saprolite</u> |
| <u>20</u> | <u>36</u> | <u>Partially Weathered Rock</u> |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Area code- Phone number

4. DATE DRILLED 1-18-02

5. TOTAL DEPTH: 36'

6. DOES WELL REPLACE EXISTING WELL? YES NO

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

8. TOP OF CASING IS 2.5 FT. Above Land Surface*

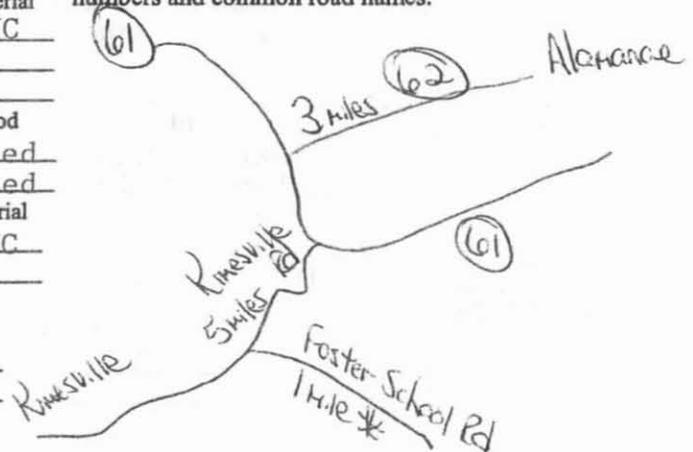
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.

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

10. WATER ZONES (depth): N/A

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



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

| CASING: | | Depth | Diameter | Wall Thickness | Material |
|-------------|-----------|-----------|---------------|----------------|----------|
| From | To | Ft. | Ft. | or Weight/Ft. | |
| <u>+2.5</u> | <u>21</u> | <u>2"</u> | <u>Sch 40</u> | <u>PVC</u> | |
| | | | | | |
| | | | | | |

| GROUT: | | Depth | Material | Method |
|-----------|-----------|--------------------|---------------|--------|
| From | To | Ft. | | |
| <u>0</u> | <u>17</u> | <u>Cement/Bent</u> | <u>Poured</u> | |
| <u>17</u> | <u>19</u> | <u>Bent. Chips</u> | <u>Poured</u> | |

| SCREEN: | | Depth | Diameter | Slot Size | Material |
|-----------|-----------|----------|-------------|------------|----------|
| From | To | Ft. | in. | in. | |
| <u>21</u> | <u>36</u> | <u>2</u> | <u>.010</u> | <u>PVC</u> | |
| | | | | | |

| SAND/GRAVEL PACK: | | Depth | Size | Material |
|-------------------|-----------|-----------|-------------|----------|
| From | To | Ft. | | |
| <u>19</u> | <u>36</u> | <u>#1</u> | <u>Sand</u> | |
| | | | | |

16. REMARKS: P-17

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

Michael F. Monaghan
SIGNATURE OF PERSON CONSTRUCTING THE WELL

1/18/02
DATE

COPY

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Michael P. Monaghan CERTIFICATION # 2842

WELL CONTRACTOR COMPANY NAME Bedford Well Drilling, Inc. PHONE # 549 586-1449

STATE WELL CONSTRUCTION PERMIT# 1192 ASSOCIATED WQ PERMIT# _____
(if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
Monitoring Recovery Heat Pump Water Injection Other Other, List Use Pizometer

2. WELL LOCATION:
Nearest Town: Liberty County Alamance
5833 Foster Store Rd., 27298
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
(check appropriate box)

Latitude/longitude of well location

3. OWNER: Coble's Sandrock
Address 5833 Foster Store Rd.

(Street or Route No.)
Eden NC 27298
City or Town State Zip Code

(336)-565-4750
Area code- Phone number

(degrees/minutes/seconds)
Latitude/longitude source: GPS Topographic map
(check box)

| DEPTH | | DRILLING LOG |
|-------|----|--------------------------|
| From | To | Formation Description |
| 0 | 10 | Silty Sand/Saprolite |
| 10 | 34 | Partially Weathered Rock |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

4. DATE DRILLED 01/28/02

5. TOTAL DEPTH: 34'

6. DOES WELL REPLACE EXISTING WELL? YES NO

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

8. TOP OF CASING IS 0 FT. Above Land Surface*

*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.

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

10. WATER ZONES (depth): N/A

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

12. CASING: Wall Thickness

| From | To | Depth | Diameter | or Weight/Ft. | Material |
|------|----|-------|----------|---------------|----------|
| 0 | 19 | Ft. | 2" | Sch 40 | PVC |
| | | | | | |
| | | | | | |

13. GROUT: Depth Material Method

| From | To | Depth | Material | Method |
|------|----|-------|-------------|--------|
| 0 | 15 | Ft. | Bent/Cement | Poured |
| 15 | 17 | Ft. | Bent. Chips | Poured |

14. SCREEN: Depth Diameter Slot Size Material

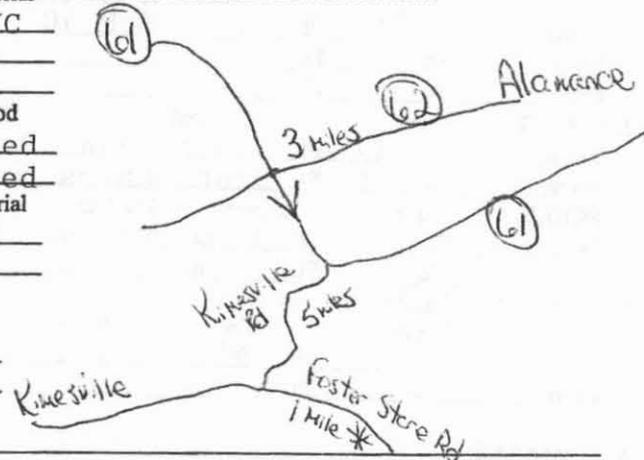
| From | To | Depth | Diameter | Slot Size | Material |
|------|----|-------|----------|-----------|----------|
| 19 | 34 | Ft. | 2 in. | 010 in. | PVC |
| | | | | | |

15. SAND/GRAVEL PACK: Depth Size Material

| From | To | Depth | Size | Material |
|------|----|-------|------|----------|
| 17 | 34 | Ft. | #1 | Sand |
| | | | | |

16. REMARKS: _____ P-18

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



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

Patrick Monaghan SIGNATURE OF PERSON CONSTRUCTING THE WELL
1/28/02 DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days. GW-1 REV. 07/2001

COPY

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Michael P. Monaghan CERTIFICATION # 2842

WELL CONTRACTOR COMPANY NAME Bedford Well Drilling, Inc. PHONE # (540) 586-1449

STATE WELL CONSTRUCTION PERMIT# 1192 ASSOCIATED WQ PERMIT# _____
(if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
Monitoring Recovery Heat Pump Water Injection Other If Other, List Use Piezometer Installed

2. WELL LOCATION:

Nearest Town: Liberty County Alamance
5833 Foster Store Road 27298
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
(check appropriate box)

Latitude/longitude of well location

(degrees/minutes/seconds)

Latitude/longitude source: GPS Topographic map
(check box)

3. OWNER: Coble's Sandrock

Address 5833 Foster Store Rd.
(Street or Route No.)

Eden NC 27298
City or Town State Zip Code

(330) 565-4750
Area code- Phone number

4. DATE DRILLED 01/17/02

5. TOTAL DEPTH: 30'

6. DOES WELL REPLACE EXISTING WELL? YES NO

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

8. TOP OF CASING IS 2.5 FT. Above Land Surface*

*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.

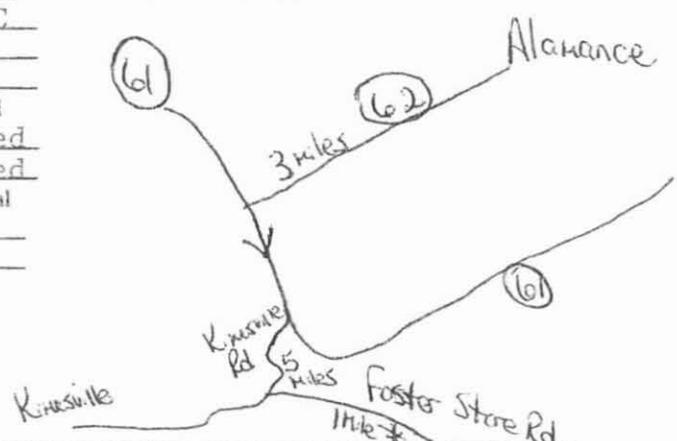
9. YIELD (gpm): N/A METHOD OF TEST N/A

10. WATER ZONES (depth): N/A

| DEPTH | | DRILLING LOG |
|-------|----|--------------------------|
| From | To | Formation Description |
| 0 | 20 | Silty Sand |
| 20 | 30 | Partially weathered Rock |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



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

12. CASING: Wall Thickness

| From | Depth | To | Diameter | or Weight/Ft. | Material |
|------|-------|-----|----------|---------------|----------|
| +2.5 | 15 | Ft. | 2" | Sch 40 | PVC |
| | | | | | |
| | | | | | |

13. GROUT: Depth Material Method

From 0 To 11 Ft. Bent./Cement Poured

From 11 To 13 Ft. Bent. Chips Poured

14. SCREEN: Depth Diameter Slot Size Material

From 15 To 30 Ft. 2 in. .010 in. PVC

15. SAND/GRAVEL PACK: Depth Size Material

From 13 To 30 Ft. #1 Sand

16. REMARKS: F-20

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

Patrick Monaghan SIGNATURE OF PERSON CONSTRUCTING THE WELL
1/17/02 DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mall Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days. GW-1 REV. 07/2001

COPY

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Michael F. Monaghan CERTIFICATION # 2895

WELL CONTRACTOR COMPANY NAME Bedford Well Drilling, Inc. PHONE # (540) 586-1449

STATE WELL CONSTRUCTION PERMIT# 1192 ASSOCIATED WQ PERMIT# _____
(if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
Monitoring Recovery Heat Pump Water Injection Other If Other, List Use Piezometer

2. WELL LOCATION:
Nearest Town: Liberty County Alamance
5833 Foster Store Road 27298
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
(check appropriate box)

Latitude/longitude of well location

3. OWNER: Coble's Sandrock
Address 5833 Foster Store Road
Liberty NC 27298
(Street or Route No.)

(degrees/minutes/seconds)
Latitude/longitude source: GPS Topographic map
(check box)

City or Town State Zip Code
Liberty NC 27298

Area code- Phone number

(336) 565-4750

4. DATE DRILLED 01/16/02

5. TOTAL DEPTH: 62'

6. DOES WELL REPLACE EXISTING WELL? YES NO

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

(Use "+" if Above Top of Casing)

8. TOP OF CASING IS 2.5 FT. Above Land Surface*

*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.

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

10. WATER ZONES (depth): N/A

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

12. CASING: Wall Thickness

| From | Depth | To | Ft. | Diameter | or Weight/Ft. | Material |
|------------------|--------------|---------------|---------------|------------|---------------|----------|
| From <u>+2.5</u> | To <u>47</u> | Ft. <u>2"</u> | <u>Sch 40</u> | <u>PVC</u> | | |
| From _____ | To _____ | Ft. _____ | _____ | _____ | _____ | _____ |
| From _____ | To _____ | Ft. _____ | _____ | _____ | _____ | _____ |

13. GROUT: Depth Material Method

| From | Depth | To | Ft. | Material | Method |
|----------------|--------------|------------------------|---------------|----------|--------|
| From <u>0</u> | To <u>43</u> | Ft. <u>Bent/Cement</u> | <u>Poured</u> | | |
| From <u>43</u> | To <u>45</u> | Ft. <u>Bent Chips</u> | <u>Poured</u> | | |

14. SCREEN: Depth Diameter Slot Size Material

| From | Depth | To | Ft. | Diameter | Slot Size | Material |
|----------------|--------------|------------------|-----------------|------------|-----------|----------|
| From <u>47</u> | To <u>62</u> | Ft. <u>2 in.</u> | <u>.010 in.</u> | <u>PVC</u> | | |
| From _____ | To _____ | Ft. _____ | _____ | _____ | _____ | _____ |

15. SAND/GRAVEL PACK: Size Material

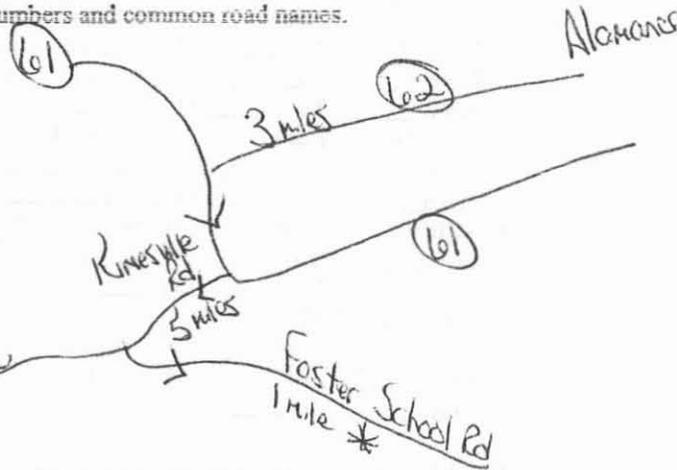
| From | Depth | To | Ft. | Size | Material |
|----------------|--------------|---------------|-------------|-------|----------|
| From <u>45</u> | To <u>62</u> | Ft. <u>#1</u> | <u>Sand</u> | | |
| From _____ | To _____ | Ft. _____ | _____ | _____ | _____ |

16. REMARKS: P-21

| DEPTH | | DRILLING LOG |
|-----------|-----------|---------------------------------|
| From | To | Formation Description |
| <u>0</u> | <u>10</u> | <u>Silt</u> |
| | | <u>Clay</u> |
| | | <u>Saprolite</u> |
| <u>10</u> | <u>29</u> | <u>Silty Sand / Saprolite</u> |
| <u>29</u> | <u>54</u> | <u>Partially Weathered Rock</u> |
| <u>54</u> | <u>62</u> | <u>Granite Bedrock</u> |

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



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

Michael F. Monaghan

SIGNATURE OF PERSON CONSTRUCTING THE WELL

1/16/02
DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

GW-1 REV. 07/2001

WELL CONSTRUCTION RECORD

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

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Robert Miller CERTIFICATION # 2675
 WELL CONTRACTOR COMPANY NAME SAEDACCO PHONE # (803) 548-2180
 STATE WELL CONSTRUCTION PERMIT# _____ ASSOCIATED WQ PERMIT# _____
 (if applicable) (if applicable)

1. WELL USE (Check Applicable Box): Residential Municipal/Public Industrial Agricultural
 Monitoring Recovery Heat Pump Water Injection Other If Other, List Use _____

2. WELL LOCATION:
 Nearest Town: Kimesville County Alamance

 (Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
 Ridge Slope Valley Flat
 (check appropriate box)
 Latitude/longitude of well location

 (degrees/minutes/seconds)

3. OWNER: Coble's Sandrock C & D Lanfill
 Address Foster Store Road

 (Street or Route No.)
Kimesville NC
 City or Town State Zip Code
 (803) _____
 Area code- Phone number

Latitude/longitude source: GPS Topographic map
 (check box)

| DEPTH | | DRILLING LOG |
|-------|----|-----------------------|
| From | To | Formation Description |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

4. DATE DRILLED March 28, 2005
 5. TOTAL DEPTH: 52 Feet
 6. DOES WELL REPLACE EXISTING WELL? YES NO
 7. STATIC WATER LEVEL Below Top of Casing: _____ FT.
 (Use "+" if Above Top of Casing)
 8. TOP OF CASING IS _____ FT. Above Land Surface*
 *Top of casing terminated at/or below land surface requires a
 variance in accordance with 15A NCAC 2C .0118.
 9. YIELD (gpm): _____ METHOD OF TEST _____
 10. WATER ZONES (depth): _____

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.

11. DISINFECTION: Type _____ Amount _____
 12. CASING:

| Depth | Diameter | Wall Thickness | Material |
|-------------------------|----------|----------------|----------|
| From 0 To 37 Ft. | 2 inch | Sch 40 | PVC |
| From _____ To _____ Ft. | _____ | _____ | _____ |
| From _____ To _____ Ft. | _____ | _____ | _____ |

| Depth | Material | Method |
|-------------------|-----------------|--------|
| From 0 To 32 Ft. | Portland Cement | Tremie |
| From 32 To 35 Ft. | Bentonite Chips | Pour |

| Depth | Diameter | Slot Size | Material |
|-------------------------|-----------|-----------|----------|
| From 37 To 52 Ft. | 2 in. | .010 in. | PVC |
| From _____ To _____ Ft. | _____ in. | _____ in. | _____ |

| Depth | Size | Material |
|-------------------------|-------|----------|
| From 35 To 52 Ft. | # 1 | Sand |
| 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 PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Attn: Information Management, 1617 Mail Service Center - Raleigh, NC 27699-1617, Phone No. (919) 733-7015, within 30 days.



MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock
 Date: 09/13/05
 Casing Type: PVC
 Well/Boring Number: MW-9
 Casing Diameter in inches (Dr): 2 inches
 Screened Interval: 22.5-37.5 feet below TOC
 Riser Elevation: 2.66
 Total Well Depth (Lw) in feet: 37.50
 Depth to Water (Lf) in feet: 22.11
 Time of Measurement: 9:10

Volume of water in well, using $V=0.041 (Dr)^2 (Lw - Lf) =$ 2.5 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conductivity (μ S/cm) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|-----------------------|-------------|------|-------------------------------|-------------------|---------------------|------------------------|-------|
| Before Development | 16.1 | 7.46 | 223 | 8.92 | 0.0 | 22.11 | 10:58 |
| After Purging | | | | | | | |
| 1 Well Vol | 15.1 | 7.29 | 221 | 669 | 2.5 | --- | 11:02 |
| 2 Well Vol | 15.4 | 7.21 | 206 | 867 | 5.0 | 27.10 | --- |
| 3 Well Vol | 15.2 | 7.30 | 200 | 637 | 7.5 | --- | 11:13 |
| 4 Well Vol | 15.4 | 7.06 | 195.5 | >1000 | 10.0 | 31.40 | 11:15 |
| 5 Well Vol | 15.4 | 7.22 | 194.2 | >1000 | 12.5 | --- | 11:21 |
| 6 Well Vol | 15.2 | 7.07 | 184.7 | >1000 | 15.0 | 32.84 | 11:28 |
| 7 Well Vol | 15.1 | 7.13 | 188.7 | >1000 | 17.5 | --- | 11:37 |
| 8 Well Vol | 15.3 | 7.08 | 168.4 | >1000 | 20.0 | 35.15 | 11:41 |
| 9 Well Vol | 15.3 | 7.18 | 203 | >1000 | 22.5 | --- | 11:48 |
| 9 Well Vol | 15.4 | 7.26 | 195 | >1000 | 23.0 | DRY | 11:56 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) Bailer If pumped, pumping rate: _____
 Well Purged Dry 9 & 16 gal Continuous Recharge _____
 Notes concerning condition of well, odors, color, etc.: _____
 Cloudy, temps in low 80s _____

Developer's Signature



MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock
Date: 09/13/05
Casing Type: PVC
Well/Boring Number: MW-9
Casing Diameter in inches (Dr): 2 inches
Screened Interval: 22.5-37.5 feet below TOC
Riser Elevation: 2.66
Total Well Depth (Lw) in feet: 37.50
Depth to Water (Lf) in feet: 22.11
Time of Measurement: 9:10

Volume of water in well, using V=0.041 (Dr)^2 (Lw - Lf) = 2.5 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

Table with 8 columns: Temp (C), pH, Conductivity (uS/cm), Clarity/Color, Volume (gallons), Water Level (ft), Time. Rows include measurements for wells 9 through 16.

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) Bailer
Well Purged Dry 9 & 16 gal
Notes concerning condition of well, odors, color, etc.: Cloudy, temps in low 80s

Developer's Signature [Handwritten Signature]



MONITORING WELL DEVELOPMENT DATA SHEET

Project: 419.06

Date: 2/5/02 – 2/6/02

Casing Type: Schedule 40 PVC

Well/Boring Number: P-16

Casing Diameter (Dr): 2"

Screened Interval: 28.2-43.2

Riser Elevation:

Total Well Depth (Lw): 43.2

Depth to Water (Lf): 13.71

Time of Measurement: 1449

Volume of water in well, using $V=0.041 (Dr)^2 (Lw-Lf) = 29.49 = 4.81$ gal

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity (μ S/cm) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|--------------------|-------------|------|------------------------------------|--------------------|---------------------|------------------------|------|
| Before Development | 11.3 | 6.10 | 168.2 | clear | 0 | 13.71 | 1459 |
| After Purging | 12.6 | 7.27 | 203.0 | cloudy tan | 24.12 | dry | 1240 |
| 1 Well Vol | 12.6 | 6.73 | 206.0 | >1000 | 4.81 | | 1511 |
| 2 Well Vol | 11.6 | 6.77 | 181.2 | cloudy | 9.62 | 39.19 | 1537 |
| 3 Well Vol | 13.4 | 6.60 | 200.0 | cloudy | 14.12 | dry | 1556 |
| 3 Well Vol 2/6/02 | 12.6 | 7.06 | 215.0 | slightly cloudy | 14.12 | 18.88 | 1217 |
| 4 Well Vol | 13.2 | 6.93 | 219.0 | slightly cloudy | 19.12 | | 1221 |
| 5 Well Vol | 12.6 | 7.27 | 203.0 | slightly cloudy | 24.12 | dry | 1240 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (pump and bailer)

If pumped, pumping rate:

Well Purged Dry @ 14.12 and 24.12 gal.

Continuous Recharge: no

NOTES:

2/5/02, temp in low 30's, sunny

2/6/02, temp in low 40's, cloudy

Sampler's Signature



MONITORING WELL DEVELOPMENT DATA SHEET

Project: 419.06

Date: 2/5/02

Casing Type: Schedule 40 PVC

Well/Boring Number: P-17

Casing Diameter (Dr): 2"

Screened Interval: 23.5-38.5

Riser Elevation:

Total Well Depth (Lw): 38.5

Depth to Water (Lf): 17.88

Time of Measurement: 1055

Volume of water in well, using $V=0.041 (Dr)^2 (Lw-Lf) = 20.62 = 3.36 \text{ gal}$

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity ($\mu\text{S}/\text{cm}$) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|--------------------|-------------|------|--|-----------------------------|---------------------|------------------------|-------|
| Before Development | 13.8 | 7.67 | 63.4 | >1000 | 0 | 17.88 | 1346 |
| After Purging | 13.2 | 6.55 | 60.2 | clear | 13.44 | 18.92 | 1430 |
| 1 Well Vol | 13.2 | 7.52 | 66.9 | orange >1000 tan | 3.36 | | 13.49 |
| 2 Well Vol | 13.6 | 6.82 | 62.5 | >1000 slightly cloudy | 6.72 | | 1403 |
| 3 Well Vol | 14.0 | 6.97 | 61.7 | cloudy | 10.08 | | 1417 |
| 4 Well Vol | 13.2 | 6.55 | 60.2 | clear | 13.44 | 18.92 | 1430 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (pump)

If pumped, pumping rate:

Well Purged Dry @

Continuous Recharge: yes

NOTES:

temps in low 30's, sunny

Sampler's Signature



MONITORING WELL DEVELOPMENT DATA SHEET

Project: 419.06

Date: 2/5/02

Casing Type: Schedule 40 PVC

Well/Boring Number: P-19S

Casing Diameter (Dr): 2"

Screened Interval: 7.0-13.0

Riser Elevation:

Total Well Depth (Lw): 13.0

Depth to Water (Lf): 5.37

Time of Measurement: 1055

Volume of water in well, using $V=0.041 (Dr)^2 (Lw-Lf) = 7.63 = 1.24 \text{ gal}$

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity ($\mu\text{S}/\text{cm}$) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|--------------------|-------------|------|--|-----------------------------|---------------------|------------------------|------|
| Before Development | 9.4 | 6.96 | 99.1 | clear | 0 | 5.37 | 1100 |
| After Purging | 9.8 | 6.39 | 112.1 | cloudy | 23.72 | 8.26 | 1208 |
| 1 Well Vol | 9.4 | 6.77 | 96.5 | >1000 | 1.24 | 6.45 | 1104 |
| 2 Well Vol | 9.7 | 6.60 | 103.4 | >1000 | 2.48 | 7.09 | 1107 |
| 3 Well Vol | 9.8 | 6.52 | 108.1 | >1000 | 3.72 | 7.55 | 1110 |
| 4 Well Vol | 9.7 | 6.50 | 107.1 | >1000 | 4.96 | 7.28 | 1113 |
| 5 Well Vol | 9.8 | 6.47 | 110.6 | >1000 | 6.20 | 7.48 | 1117 |
| 6 Well Vol | 9.8 | 6.46 | 113.0 | >1000 | 7.44 | 7.31 | 1121 |
| 8 Well Vol | 9.8 | 6.46 | 111.0 | >1000 | 9.92 | 7.79 | 1126 |
| 8 Well Vol | 9.8 | 5.96 | 119.0 | >1000 slightly cloudy | 10.00 | 9.65 | 1136 |
| 11.3 Well Vol | 9.7 | 6.38 | 113.8 | cloudy | 14.00 | 9.64 | 1143 |
| 12.3 Well Vol | 9.7 | 6.40 | 111.6 | cloudy | 15.24 | 8.71 | 1147 |
| 13.3 Well Vol | 9.7 | 6.41 | 113.3 | cloudy | 16.48 | 9.37 | 1151 |
| 16.1 Well Vol | 9.7 | 6.07 | 113.5 | cloudy | 20.00 | 10.30 | 1157 |
| 17.1 Well Vol | 9.7 | 6.31 | 111.7 | cloudy | 21.24 | 9.06 | 1201 |
| 18.1 Well Vol | 9.7 | 6.37 | 110.9 | cloudy | 22.48 | 8.97 | 1205 |

19.1 Well Vol 9.8 6.39 112.1 cloudy 23.72 8.26 1208
(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer)

If pumped, pumping rate:

Well Purged Dry @

Continuous Recharge : yes

NOTES:

temps in low 30's, sunny

Sampler's Signature



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MONITORING WELL DEVELOPMENT DATA SHEET

Project: 419.06

Date: 2/5/02 – 2/6/02

Casing Type: Schedule 40 PVC

Well/Boring Number: P-19D

Casing Diameter (Dr): 2"

Screened Interval: 47.2-62.2

Riser Elevation:

Total Well Depth (Lw): 62.2

Depth to Water (Lf): 5.59

Time of Measurement: 1214

Volume of water in well, using $V=0.041 (Dr)^2 (Lw-Lf) = 56.61 = 9.23$ gal

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity (μ S/cm) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|---------------------|-------------|------|------------------------------------|-------------------|---------------------|------------------------|-------|
| Before Development | 13.6 | 6.37 | 245.0 | clear | 0 | 5.59 | 1231 |
| After Purging | 12.6 | 6.06 | 221.0 | cloudy | 24.00 | dry | 1549 |
| 1 Well Vol 2/5/02 | 14.1 | 7.13 | 210.0 | clear | 9.23 | 50.45 | 1246 |
| 1.5 Well Vol | 14.4 | 6.91 | 322.0 | gray >1000 | 13.25 | dry | 1315 |
| 1.5 Well Vol 2/6/02 | 12.0 | 7.18 | 174.5 | tan cloudy | 13.25 | 35.99 | 1126 |
| 2 Well Vol | 13.7 | 6.93 | 213.0 | cloudy | 18.25 | | 1148 |
| 2.2 Well Vol | 13.6 | 6.94 | 209.0 | cloudy | 20.00 | dry | 11.52 |
| 2.2 Well Vol | 12.3 | 6.04 | 210.0 | clear | 20.00 | 52.40 | 1537 |
| 2.5 Well Vol | 12.6 | 6.06 | 221.0 | gray cloudy | 24.00 | dry | 1549 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (pump and bailer)

If pumped, pumping rate:

Well Purged Dry @ 13.25, 20.0, and 24.0 gal.

Continuous Recharge: no

NOTES: 2/5/02, temps in low 30's, sunny

2/6/02, temps in low 40's, cloudy

Sampler's Signature



MONITORING WELL DEVELOPMENT DATA SHEET

Project: 419.06

Date: 2/5/02 – 2/6/02

Casing Type: Schedule 40 PVC

Well/Boring Number: P-21

Casing Diameter (Dr): 2"

Screened Interval: 47.5-62.5

Riser Elevation:

Total Well Depth (Lw): 62.5

Depth to Water (Lf): 48.43

Time of Measurement: 0849

Volume of water in well, using $V=0.041 (Dr)^2 (Lw-Lf) = 9.82' = 17.17 = 2.80 \text{ gal}$

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity ($\mu\text{S}/\text{cm}$) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|---------------------|--------------|------|--|-----------------------------|---------------------|------------------------|------|
| Before Development | 6.6 | 7.21 | 113.9 | clear | 0 | 48.43 | 0911 |
| After Purging | 14.7 | 6.08 | 138.7 | cloudy | 34.80 | 59.22 | 1526 |
| 1 Well Vol 2/5/02 | 9.0 | 7.10 | 133.3 | clear | 2.80 | | 0917 |
| 2 Well Vol | 7.5 | 6.96 | 123.2 | clear brown | 5.60 | 53.15 | 0928 |
| 3 Well Vol | 13.1 | 6.72 | 145.3 | >1000 | 8.20 | 56.76 | 0948 |
| 3.5 Well Vol | 13.6 | 6.25 | 145.1 | >1000 | 10.00 | dry | 0955 |
| 3.5 Well Vol | 14.1 | 6.35 | 143.2 | clear | 10.00 | 48.40 | 1750 |
| 5.5 Well Vol | 14.3 | 6.33 | 141.1 | >1000 | 15.60 | 56.55 | 1807 |
| 7.5 Well Vol | | | | >1000 | 21.20 | dry | 1819 |
| 7.5 Well Vol 2/6/02 | 12.1 | 6.95 | 135.7 | cloudy | 21.20 | | 1047 |
| 10.5 Well Vol | 13.1 | 6.78 | 133.5 | cloudy | 29.20 | 60.35 | 1104 |
| 10.5 Well Vol | 13.4 | 7.28 | 137.9 | clear slightly cloudy | 29.20 | 48.72 | 1506 |
| 11.5 Well Vol | 14.8 | 6.21 | 138.3 | cloudy red | 32.00 | | 1515 |
| 12.5 Well Vol | 14.7 | 6.08 | 138.7 | cloudy | 34.80 | 59.22 | 1526 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (pump and bailer)

If pumped, pumping rate:

Well Purged Dry @ 10.0 and 21.2 gal.

Continuous Recharge: no

Sampler's Signature



ENGINEERING, INC.

MONITORING WELL DEVELOPMENT DATA SHEET

Project: 419.06

Date: 2/5/02 – 2/6/02

Casing Type: Schedule 40 PVC

Well/Boring Number: P-22

Casing Diameter (Dr): 2"

Screened Interval: 6.2-12.2

Riser Elevation:

Total Well Depth (Lw): 12.2

Depth to Water (Lf): 3.18

Time of Measurement: 0815

Volume of water in well, using $V=0.041 (Dr)^2 (Lw-Lf) = 9.02 = 1.47 \text{ gal}$

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity ($\mu\text{S}/\text{cm}$) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|---------------------|-------------|------|--|-------------------|---------------------|------------------------|------|
| Before Development | 7.4 | 7.44 | 258.0 | clear | 0 | 3.18 | 8.23 |
| After Purging | 10.0 | 6.73 | 252.0 | >1000 tan | 9.72 | dry | 1433 |
| 1 Well Vol 2/5/02 | 7.6 | 7.07 | 255.0 | >1000 | 1.5 | dry | 0835 |
| 1 Well Vol | 8.4 | 7.60 | 257.0 | clear | 1.5 | 3.41 | 1727 |
| 1.8 Well Vol | 9.6 | 7.13 | 256.0 | >1000 | 2.6 | 7.10 | 1732 |
| 3.4 Well Vol | 9.5 | 6.38 | 249.0 | >1000 | 5.0 | dry | 17.8 |
| 3.4 Well Vol 2/6/02 | 8.1 | 7.37 | 250.0 | clear | 5.0 | 3.54 | 1026 |
| 5.1 Well Vol | 8.9 | 7.14 | 255.0 | >1000 | 7.5 | dry | 1031 |
| 5.1 Well Vol | 9.5 | 6.96 | 256.0 | clear | 7.5 | 4.48 | 1428 |
| 5.9 Well Vol | 10.0 | 6.82 | 258.0 | >1000 | 8.61 | 8.42 | 1431 |
| 6.6 Well Vol | 10.0 | 6.73 | 252.0 | >1000 | 9.72 | dry | 1433 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer)

If pumped, pumping rate:

Well Purged Dry @ 1.5, 5.0, 7.5, and 9.72 gal.

Continuous Recharge: no

NOTES: 2/5/02, temp in mid 20's, sunny 2/6/02, temp in mid 40's, cloudy

Sampler's Signature



MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock
 Date: 09/13/05
 Casing Type: PVC
 Well/Boring Number: P-18
 Casing Diameter in inches (Dr): 2 inches
 Screened Interval: 19-34 feet below TOC
 Riser Elevation: -0.4 feet
 Total Well Depth (Lw) in feet: 34.00 feet
 Depth to Water (Lf) in feet: 21.48
 Time of Measurement: 12:52

Volume of water in well, using $V=0.041 (Dr)^2 (Lw - Lf) =$ 2 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity (μ S/cm) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|-------------------------------|-------------|-------------|------------------------------------|-------------------|---------------------|------------------------|--------------|
| Before Development | <u>16.5</u> | <u>6.08</u> | <u>345</u> | <u>38.3</u> | <u>0.0</u> | <u>21.48</u> | <u>12:36</u> |
| After Purging | | | | | | | |
| 1 Well Vol | <u>16.7</u> | <u>6.04</u> | <u>358</u> | <u>>1000</u> | <u>2.0</u> | <u>---</u> | <u>12:40</u> |
| 2 Well Vol | <u>16.0</u> | <u>6.03</u> | <u>361</u> | <u>>1000</u> | <u>4.0</u> | <u>---</u> | <u>12:46</u> |
| 3 Well Vol | <u>16.5</u> | <u>6.12</u> | <u>357</u> | <u>>1000</u> | <u>6.0</u> | <u>32.15</u> | <u>12:56</u> |
| 3.5 Well Vol | <u>17.3</u> | <u>6.19</u> | <u>225</u> | <u>>1000</u> | <u>7.0</u> | <u>DRY</u> | <u>13:03</u> |
| 3.5 Well Vol | <u>16.6</u> | <u>6.90</u> | <u>367</u> | <u>817</u> | <u>7.0</u> | <u>22.88</u> | <u>15:33</u> |
| 4.5 Well Vol | <u>16.1</u> | <u>6.18</u> | <u>355</u> | <u>>1000</u> | <u>9.0</u> | <u>---</u> | <u>15:38</u> |
| 5 Well Vol | <u>16.4</u> | <u>6.30</u> | <u>353</u> | <u>>1000</u> | <u>10.0</u> | <u>DRY</u> | <u>15:47</u> |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) Bailer If pumped, pumping rate: _____
 Well Purged Dry 7 & 10 gal. Continuous Recharge _____
 Notes concerning condition of well, odors, color, etc.: _____
Cloudy, temps in low 80s

Developer's Signature



MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock
 Date: 09/13/05
 Casing Type: PVC
 Well/Boring Number: P-25
 Casing Diameter in inches (Dr): 2 inches
 Screened Interval: 28-38 feet below TOC
 Riser Elevation: 1.44
 Total Well Depth (Lw) in feet: 38.00
 Depth to Water (Lf) in feet: 22.80
 Time of Measurement: 10:54

Volume of water in well, using $V=0.041 (Dr)^2 (Lw - Lf) =$ 2.5 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conductivity (µS/cm) | Clarity/Color | Volume (gallons) | Water Level (ft) | Time |
|---------------------------|-------------|-------------|----------------------|-----------------|------------------|------------------|--------------|
| Before Development | <u>17.4</u> | <u>6.60</u> | <u>1488</u> | <u>23.3</u> | <u>0.0</u> | <u>22.80</u> | <u>10:58</u> |
| After Purging | | | | | | | |
| 1 Well Vol | <u>17.4</u> | <u>6.67</u> | <u>1556</u> | <u>>1000</u> | <u>2.5</u> | <u>—</u> | <u>11:02</u> |
| 2 Well Vol | <u>17.1</u> | <u>6.60</u> | <u>1530</u> | <u>>1000</u> | <u>5.0</u> | <u>30.60</u> | <u>—</u> |
| 3 Well Vol | <u>17.0</u> | <u>6.66</u> | <u>1504</u> | <u>>1000</u> | <u>7.5</u> | <u>—</u> | <u>11:13</u> |
| 4 Well Vol | <u>16.9</u> | <u>6.69</u> | <u>1499</u> | <u>>1000</u> | <u>10.0</u> | <u>32.15</u> | <u>11:15</u> |
| 5 Well Vol | <u>17.4</u> | <u>6.74</u> | <u>1487</u> | <u>>1000</u> | <u>12.5</u> | <u>—</u> | <u>11:21</u> |
| 6 Well Vol | <u>16.8</u> | <u>6.70</u> | <u>1465</u> | <u>>1000</u> | <u>15.0</u> | <u>33.12</u> | <u>11:28</u> |
| 7 Well Vol | <u>17.5</u> | <u>6.72</u> | <u>1469</u> | <u>>1000</u> | <u>17.5</u> | <u>—</u> | <u>11:37</u> |
| 8 Well Vol | <u>16.8</u> | <u>6.71</u> | <u>1472</u> | <u>>1000</u> | <u>20.0</u> | <u>35.80</u> | <u>11:41</u> |
| 9 Well Vol | <u>17.4</u> | <u>6.77</u> | <u>1432</u> | <u>>1000</u> | <u>22.5</u> | <u>—</u> | <u>11:48</u> |
| 10 Well Vol | <u>17.1</u> | <u>6.75</u> | <u>1445</u> | <u>>1000</u> | <u>25.0</u> | <u>36.29</u> | <u>11:56</u> |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) Bailer If pumped, pumping rate: _____
 Well Purged Dry No Continuous Recharge _____
 Notes concerning condition of well, odors, color, etc.: _____
 Cloudy, temps in low 80s _____

Developer's Signature *Patrick Reedy*



MONITORING WELL DEVELOPMENT DATA SHEET

Project: Coble's Sandrock
 Date: 09/13/05
 Casing Type: PVC
 Well/Boring Number: P-25
 Casing Diameter in inches (Dr): 2 inches
 Screened Interval: 28-38 feet below TOC
 Riser Elevation: 1.44
 Total Well Depth (Lw) in feet: 38.00
 Depth to Water (Lf) in feet: 22.80
 Time of Measurement: 10:54

Volume of water in well, using $V=0.041 (Dr)^2 (Lw - Lf) =$ 2.5 Gallons

FIELD MEASUREMENT OF PHYSICAL PARAMETERS

| | Temp (C) | pH | Conduc- tivity (μ S/cm) | Clarity/ Color | Volume (gallons) | Water Level (ft) | Time |
|-------------|-------------|------|------------------------------------|-------------------|---------------------|------------------------|-------|
| 11 Well Vol | 17.1 | 6.76 | 1415 | >1000 | 27.5 | — | 12:04 |
| 12 Well Vol | 17.8 | 6.78 | 1460 | >1000 | 30.0 | 36.27 | 12:12 |
| 12 Well Vol | 17.5 | 6.58 | 1519 | 250 | 30.0 | 23.95 | 14:16 |
| 13 Well Vol | 17.4 | 6.67 | 1540 | >1000 | 32.5 | — | 14:22 |
| 14 Well Vol | 17.4 | 6.70 | 1507 | >1000 | 35.0 | 29.64 | 14:29 |
| 15 Well Vol | 17.4 | 6.67 | 1464 | >1000 | 37.5 | — | 14:38 |
| 16 Well Vol | 17.3 | 6.63 | 1490 | >1000 | 40.0 | 30.79 | 14:46 |
| 17 Well Vol | 17.0 | 6.60 | 1437 | >1000 | 42.5 | — | 14:52 |
| 18 Well Vol | 17.8 | 6.71 | 1476 | >1000 | 45.0 | 31.99 | 15:00 |
| 19 Well Vol | 17.4 | 6.66 | 1443 | >1000 | 47.5 | — | 15:08 |
| 20 Well Vol | 17.5 | 6.69 | 1442 | 508 | 50.0 | 35.82 | 15:13 |
| 21 Well Vol | 17.3 | 6.65 | 1456 | 156 | 52.5 | 34.35 | 15:20 |

(Fill in one or more of the above columns depending on available equipment)

Method of purging (bailer or pump) Bailer If pumped, pumping rate: _____
 Well Purged Dry No Continuous Recharge _____
 Notes concerning condition of well, odors, color, etc.: _____
 Cloudy, temps in low 80s _____

Developer's Signature

APPENDIX DH-3

Survey of Piezometer and Monitoring Well Locations

Coble Sandrock C&D Landfill
 Monitoring Well & Piezometer Survey
 Project No. 05532-24
 Trittech Civil Environmental, P.C.

Note: Coordinates (X,Y,Z) Are N.C. Grid - NAD '83 Based Upon Control
 Established By Suttle's Surveying, P.A.

Field Surveys Performed 4/11 & 4/18 2005
 Elevations Determined By Closed-Loop Differential Leveling

| POINT | NORTHING (Y) | EASTING (X) | ELEV. | DESCRIPTION |
|-------|----------------|-----------------|--------|-------------|
| 484 | 799303.3458790 | 1844228.8326400 | 637.49 | PZ-30 |
| | | | 634.75 | GROUND |
| 485 | 799415.2582420 | 1843889.0495900 | 627.45 | PZ-27 |
| | | | 625.25 | GROUND |
| 486 | 799763.1042900 | 1843747.3543300 | 619.49 | PZ-29 |
| | | | 617.31 | GROUND |
| 488 | 799572.9421430 | 1843510.3166300 | 613.15 | PZ-28 |
| | | | 610.36 | GROUND |
| 490 | 799656.9271540 | 1843260.6948800 | 625.20 | WW-2 |
| | | | 622.83 | GROUND |
| 491 | 801640.1465480 | 1843019.3592300 | 613.89 | PZ-24 |
| | | | 612.52 | GROUND |
| 492 | 801851.9868760 | 1843307.8001000 | 617.81 | PZ-25 |
| | | | 616.37 | GROUND |
| 494 | 802741.0630780 | 1843102.1614300 | 589.09 | MW-9 PVC |
| | | | 586.43 | P-K |
| 496 | 802580.8073020 | 1842586.6295300 | 574.26 | MW-8 PVC |
| | | | 571.50 | P-K |
| 497 | 802588.7498230 | 1842908.6996400 | 597.13 | PZ-26 |
| | | | 594.27 | GROUND |
| 498 | 802197.9668300 | 1843379.0247800 | 592.46 | MW-10S PVC |
| | | | 589.62 | P-K |
| 499 | 802203.6444670 | 1843369.3340900 | 592.76 | MW-10D PVC |
| | | | 589.90 | P-K |



Michael R. Stout
 4/19/2005

mon-well.tfr

| | | | | | |
|-----|------------|-------------|--------|--------|-------------------|
| 864 | 800927.820 | 1843019.175 | 611.91 | M WELL | P5 |
| 866 | 800451.154 | 1843731.694 | 668.42 | M WELL | P21 |
| 868 | 800107.753 | 1843920.412 | 629.90 | M.WELL | P22 |
| 874 | 800650.073 | 1843430.852 | 641.11 | | P20 |
| 881 | 802873.387 | 1843159.210 | 572.18 | | P19S |
| 882 | 802873.295 | 1843159.058 | 569.15 | | PK |
| 883 | 802869.867 | 1843148.340 | 571.85 | | P19D |
| 884 | 802869.552 | 1843148.214 | 569.57 | | PK |
| 887 | 801773.030 | 1842527.075 | 577.41 | | MW5 |
| 888 | 801773.547 | 1842526.961 | 574.91 | | PK |
| 892 | 800605.058 | 1844289.782 | 651.76 | | P15 ¹⁸ |
| 893 | 800605.106 | 1844289.155 | 651.75 | | PK |
| 897 | 800001.018 | 1843472.682 | 640.37 | | P23 |
| 898 | 800001.403 | 1843472.858 | 638.01 | | PK |
| 900 | 799910.089 | 1842914.445 | 651.22 | | P15 |
| 901 | 799910.310 | 1842914.625 | 649.01 | | PK |
| 904 | 799356.506 | 1844577.645 | 646.28 | | P17 |
| 905 | 799356.404 | 1844578.130 | 643.76 | | PK |
| 907 | 800591.064 | 1842674.247 | 612.05 | | P16 |
| 908 | 800591.396 | 1842674.174 | 609.57 | | PK |

APPENDIX DH-4

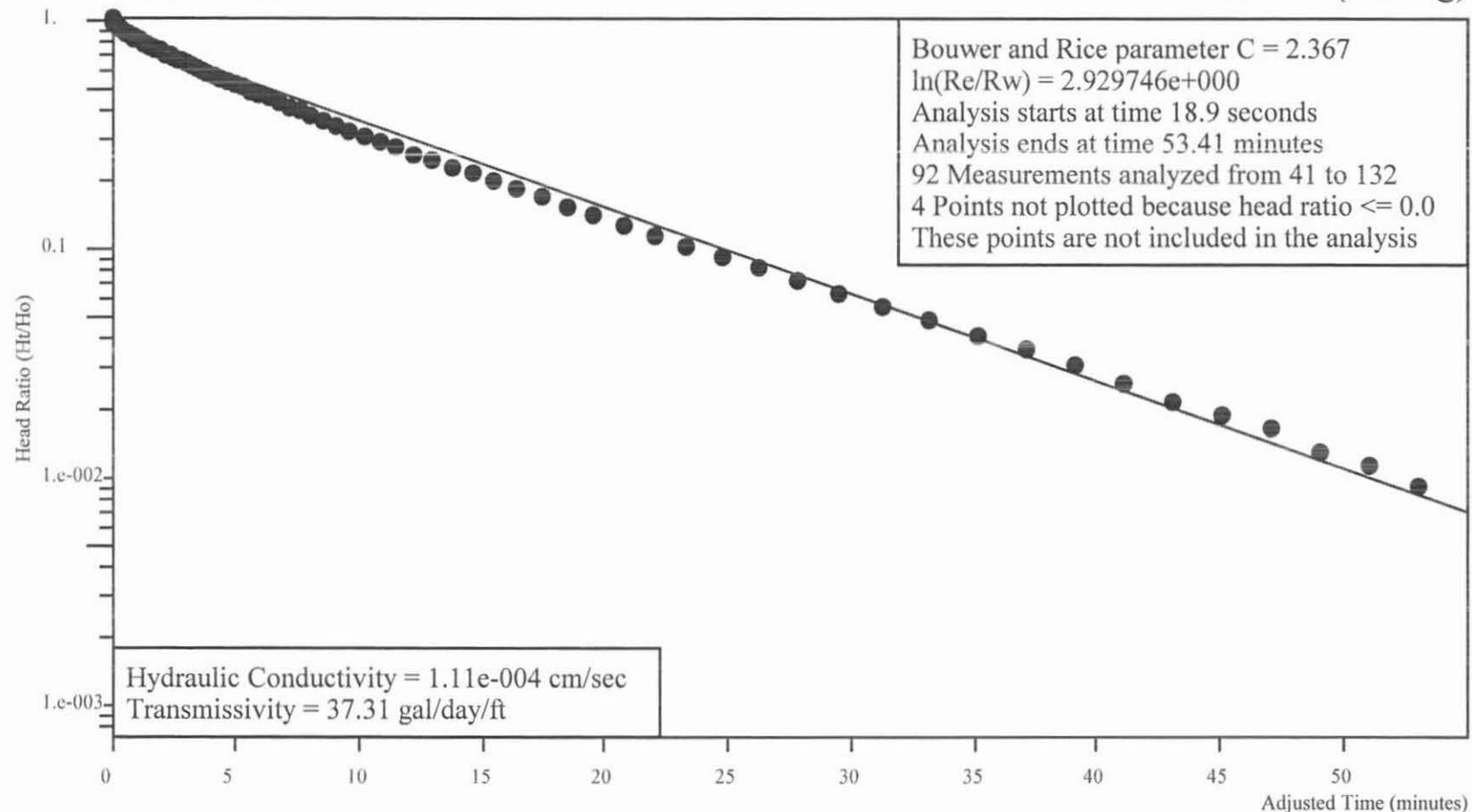
**Single Well Aquifer (Slug) Test Results from the Current
Investigation**

Aquifer Analysis September 16, 2005

Coble's Sandrock

Bower and Rice Graph

MW-9 (Falling)



Project Number 419.19

Analysis by D. Reedy of Joyce Engineering, Inc.

Ho is 1.403 feet at 18.9 seconds

Aquifer Analysis

Site Name: Coble's Sandrock
 Test Date: September 16, 2005
 Project Number: 419.19
 Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\0905 Slug Tes

Well Label: MW-9 (Falling)
 Aquifer Thickness: 15.86 feet
 Screen Length: 15. feet
 Casing Radius: 1.888 inches
 Effective Radius: 4.125 inches
 Static Water Level: 24.29 feet
 Water Table to Screen Bottom: 15.86 feet
 Anisotropy Ratio: 1.
 Time Adjustment: 18.9 Seconds

Test starts with trial 19

There are 140 time and drawdown measurements

Maximum head is 3.086 feet

Minimum head is -4.e-003 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|-------------|
| 1 | 0. | -18.9 | 24.29 | -1.e-003 | -3.24e-004 |
| 2 | 0.3 | -18.6 | 24.29 | 1.e-003 | 3.24e-004 |
| 3 | 0.6 | -18.3 | 24.29 | 3.e-003 | 9.721e-004 |
| 4 | 0.9 | -18. | 24.29 | 2.e-003 | 6.481e-004 |
| 5 | 1.2 | -17.7 | 24.28 | 6.e-003 | 1.944e-003 |
| 6 | 1.5 | -17.4 | 24.28 | 1.2e-002 | 3.889e-003 |
| 7 | 1.8 | -17.1 | 24.27 | 1.7e-002 | 5.509e-003 |
| 8 | 2.1 | -16.8 | 24.29 | -4.e-003 | -1.296e-003 |
| 9 | 2.4 | -16.5 | 24.28 | 1.e-002 | 3.24e-003 |
| 10 | 2.7 | -16.2 | 24.28 | 1.2e-002 | 3.889e-003 |
| 11 | 3. | -15.9 | 23.81 | 0.477 | 0.1546 |
| 12 | 3.3 | -15.6 | 23.89 | 0.399 | 0.1293 |
| 13 | 3.6 | -15.3 | 23.16 | 1.132 | 0.3668 |
| 14 | 3.9 | -15. | 23.2 | 1.086 | 0.3519 |
| 15 | 4.2 | -14.7 | 22.05 | 2.241 | 0.7262 |
| 16 | 4.5 | -14.4 | 22.86 | 1.431 | 0.4637 |
| 17 | 4.8 | -14.1 | 22.82 | 1.471 | 0.4767 |
| 18 | 5.1 | -13.8 | 22.62 | 1.671 | 0.5415 |
| 19 | 5.4 | -13.5 | 21.55 | 2.74 | 0.8879 |
| 20 | 5.7 | -13.2 | 21.2 | 3.086 | 1. |
| 21 | 6. | -12.9 | 23.2 | 1.094 | 0.3545 |
| 22 | 6.4 | -12.5 | 23.67 | 0.619 | 0.2006 |
| 23 | 6.7 | -12.2 | 23.18 | 1.11 | 0.3597 |
| 24 | 7.1 | -11.8 | 21.77 | 2.521 | 0.8169 |
| 25 | 7.5 | -11.4 | 22.15 | 2.142 | 0.6941 |
| 26 | 8. | -10.9 | 23.25 | 1.042 | 0.3377 |
| 27 | 8.4 | -10.5 | 23.04 | 1.25 | 0.4051 |
| 28 | 8.9 | -10. | 22.23 | 2.056 | 0.6662 |
| 29 | 9.5 | -9.4 | 22.67 | 1.617 | 0.524 |
| 30 | 10. | -8.9 | 23.07 | 1.217 | 0.3944 |
| 31 | 10.6 | -8.3 | 22.53 | 1.76 | 0.5703 |

Coble's Sandrock

| | | | | | |
|----|-------|-------|-------|-------|--------|
| 32 | 11.3 | -7.6 | 22.73 | 1.555 | 0.5039 |
| 33 | 11.9 | -7. | 22.93 | 1.365 | 0.4423 |
| 34 | 12.6 | -6.3 | 22.63 | 1.659 | 0.5376 |
| 35 | 13.4 | -5.5 | 22.9 | 1.387 | 0.4494 |
| 36 | 14.2 | -4.7 | 22.75 | 1.541 | 0.4994 |
| 37 | 15. | -3.9 | 22.86 | 1.429 | 0.4631 |
| 38 | 15.9 | -3. | 22.81 | 1.485 | 0.4812 |
| 39 | 16.8 | -2.1 | 22.87 | 1.417 | 0.4592 |
| 40 | 17.8 | -1.1 | 22.83 | 1.459 | 0.4728 |
| 41 | 18.9 | 0. | 22.89 | 1.403 | 0.4546 |
| 42 | 20. | 1.1 | 22.87 | 1.417 | 0.4592 |
| 43 | 21.2 | 2.3 | 22.89 | 1.405 | 0.4553 |
| 44 | 22.4 | 3.5 | 22.91 | 1.381 | 0.4475 |
| 45 | 23.8 | 4.9 | 22.91 | 1.375 | 0.4456 |
| 46 | 25.2 | 6.3 | 22.92 | 1.369 | 0.4436 |
| 47 | 26.7 | 7.8 | 22.93 | 1.359 | 0.4404 |
| 48 | 28.2 | 9.3 | 22.94 | 1.349 | 0.4371 |
| 49 | 29.8 | 10.9 | 22.95 | 1.337 | 0.4332 |
| 50 | 31.5 | 12.6 | 22.96 | 1.329 | 0.4307 |
| 51 | 33.3 | 14.4 | 22.97 | 1.319 | 0.4274 |
| 52 | 35.2 | 16.3 | 22.98 | 1.309 | 0.4242 |
| 53 | 37.3 | 18.4 | 22.99 | 1.299 | 0.4209 |
| 54 | 39.5 | 20.6 | 23. | 1.289 | 0.4177 |
| 55 | 41.8 | 22.9 | 23.01 | 1.279 | 0.4145 |
| 56 | 44.3 | 25.4 | 23.02 | 1.272 | 0.4122 |
| 57 | 46.9 | 28. | 23.03 | 1.259 | 0.408 |
| 58 | 49.7 | 30.8 | 23.04 | 1.249 | 0.4047 |
| 59 | 52.6 | 33.7 | 23.05 | 1.239 | 0.4015 |
| 60 | 55.7 | 36.8 | 23.06 | 1.231 | 0.3989 |
| 61 | 59. | 40.1 | 23.07 | 1.219 | 0.395 |
| 62 | 62.5 | 43.6 | 23.08 | 1.209 | 0.3918 |
| 63 | 66.2 | 47.3 | 23.09 | 1.197 | 0.3879 |
| 64 | 70.1 | 51.2 | 23.11 | 1.185 | 0.384 |
| 65 | 74.3 | 55.4 | 23.11 | 1.175 | 0.3808 |
| 66 | 78.7 | 59.8 | 23.13 | 1.163 | 0.3769 |
| 67 | 83.4 | 64.5 | 23.14 | 1.151 | 0.373 |
| 68 | 88.4 | 69.5 | 23.15 | 1.137 | 0.3684 |
| 69 | 93.7 | 74.8 | 23.16 | 1.125 | 0.3645 |
| 70 | 99.3 | 80.4 | 23.18 | 1.109 | 0.3594 |
| 71 | 105.2 | 86.3 | 23.19 | 1.097 | 0.3555 |
| 72 | 111.5 | 92.6 | 23.21 | 1.081 | 0.3503 |
| 73 | 118.1 | 99.2 | 23.22 | 1.068 | 0.3461 |
| 74 | 125.1 | 106.2 | 23.24 | 1.052 | 0.3409 |
| 75 | 132.6 | 113.7 | 23.25 | 1.035 | 0.3354 |
| 76 | 140.5 | 121.6 | 23.27 | 1.019 | 0.3302 |
| 77 | 148.9 | 130. | 23.29 | 0.999 | 0.3237 |
| 78 | 157.8 | 138.9 | 23.31 | 0.985 | 0.3192 |
| 79 | 167.2 | 148.3 | 23.32 | 0.967 | 0.3134 |
| 80 | 177.2 | 158.3 | 23.34 | 0.947 | 0.3069 |
| 81 | 187.8 | 168.9 | 23.36 | 0.929 | 0.301 |
| 82 | 199. | 180.1 | 23.38 | 0.909 | 0.2946 |
| 83 | 210.9 | 192. | 23.4 | 0.889 | 0.2881 |
| 84 | 223.5 | 204.6 | 23.42 | 0.869 | 0.2816 |

Coble's Sandrock

| | | | | | |
|-----|-------|-------|-------|----------|------------|
| 85 | 236.8 | 217.9 | 23.44 | 0.847 | 0.2745 |
| 86 | 250.9 | 232. | 23.47 | 0.825 | 0.2673 |
| 87 | 265.8 | 246.9 | 23.49 | 0.803 | 0.2602 |
| 88 | 281.6 | 262.7 | 23.51 | 0.781 | 0.2531 |
| 89 | 298.4 | 279.5 | 23.53 | 0.759 | 0.2459 |
| 90 | 316.2 | 297.3 | 23.56 | 0.735 | 0.2382 |
| 91 | 335. | 316.1 | 23.58 | 0.713 | 0.231 |
| 92 | 354.9 | 336. | 23.6 | 0.689 | 0.2233 |
| 93 | 376. | 357.1 | 23.63 | 0.663 | 0.2148 |
| 94 | 398.4 | 379.5 | 23.65 | 0.641 | 0.2077 |
| 95 | 422.1 | 403.2 | 23.68 | 0.613 | 0.1986 |
| 96 | 447.2 | 428.3 | 23.7 | 0.591 | 0.1915 |
| 97 | 473.8 | 454.9 | 23.73 | 0.565 | 0.1831 |
| 98 | 502. | 483.1 | 23.75 | 0.539 | 0.1747 |
| 99 | 531.9 | 513. | 23.77 | 0.515 | 0.1669 |
| 100 | 563.5 | 544.6 | 23.81 | 0.479 | 0.1552 |
| 101 | 597. | 578.1 | 23.82 | 0.465 | 0.1507 |
| 102 | 632.5 | 613.6 | 23.85 | 0.441 | 0.1429 |
| 103 | 670.1 | 651.2 | 23.88 | 0.415 | 0.1345 |
| 104 | 709.9 | 691. | 23.9 | 0.391 | 0.1267 |
| 105 | 752.1 | 733.2 | 23.92 | 0.367 | 0.1189 |
| 106 | 796.8 | 777.9 | 23.95 | 0.343 | 0.1111 |
| 107 | 844.2 | 825.3 | 23.97 | 0.32 | 0.1037 |
| 108 | 894.4 | 875.5 | 23.99 | 0.299 | 9.689e-002 |
| 109 | 947.5 | 928.6 | 24.01 | 0.277 | 8.976e-002 |
| 110 | 1004 | 984.9 | 24.04 | 0.255 | 8.263e-002 |
| 111 | 1063 | 1045 | 24.06 | 0.235 | 7.615e-002 |
| 112 | 1127 | 1108 | 24.07 | 0.215 | 6.967e-002 |
| 113 | 1194 | 1175 | 24.09 | 0.197 | 6.384e-002 |
| 114 | 1264 | 1246 | 24.11 | 0.179 | 5.8e-002 |
| 115 | 1340 | 1321 | 24.13 | 0.161 | 5.217e-002 |
| 116 | 1419 | 1400 | 24.15 | 0.145 | 4.699e-002 |
| 117 | 1503 | 1484 | 24.16 | 0.129 | 4.18e-002 |
| 118 | 1593 | 1574 | 24.18 | 0.115 | 3.727e-002 |
| 119 | 1687 | 1668 | 24.19 | 0.102 | 3.305e-002 |
| 120 | 1787 | 1768 | 24.2 | 8.8e-002 | 2.852e-002 |
| 121 | 1893 | 1874 | 24.21 | 7.8e-002 | 2.528e-002 |
| 122 | 2006 | 1987 | 24.22 | 6.8e-002 | 2.203e-002 |
| 123 | 2125 | 2106 | 24.23 | 5.8e-002 | 1.879e-002 |
| 124 | 2245 | 2226 | 24.24 | 5.1e-002 | 1.653e-002 |
| 125 | 2365 | 2346 | 24.25 | 4.3e-002 | 1.393e-002 |
| 126 | 2485 | 2466 | 24.25 | 3.6e-002 | 1.167e-002 |
| 127 | 2605 | 2586 | 24.26 | 3.e-002 | 9.721e-003 |
| 128 | 2725 | 2706 | 24.26 | 2.6e-002 | 8.425e-003 |
| 129 | 2845 | 2826 | 24.27 | 2.3e-002 | 7.453e-003 |
| 130 | 2965 | 2946 | 24.27 | 1.8e-002 | 5.833e-003 |
| 131 | 3085 | 3066 | 24.27 | 1.6e-002 | 5.185e-003 |
| 132 | 3205 | 3186 | 24.28 | 1.3e-002 | 4.213e-003 |
| 133 | 3325 | 3306 | 24.28 | 9.e-003 | 2.916e-003 |
| 134 | 3445 | 3426 | 24.28 | 7.e-003 | 2.268e-003 |
| 135 | 3565 | 3546 | 24.28 | 7.e-003 | 2.268e-003 |
| 136 | 3685 | 3666 | 24.29 | 3.e-003 | 9.721e-004 |
| 137 | 3805 | 3786 | 24.29 | 1.e-003 | 3.24e-004 |

Coble's Sandrock

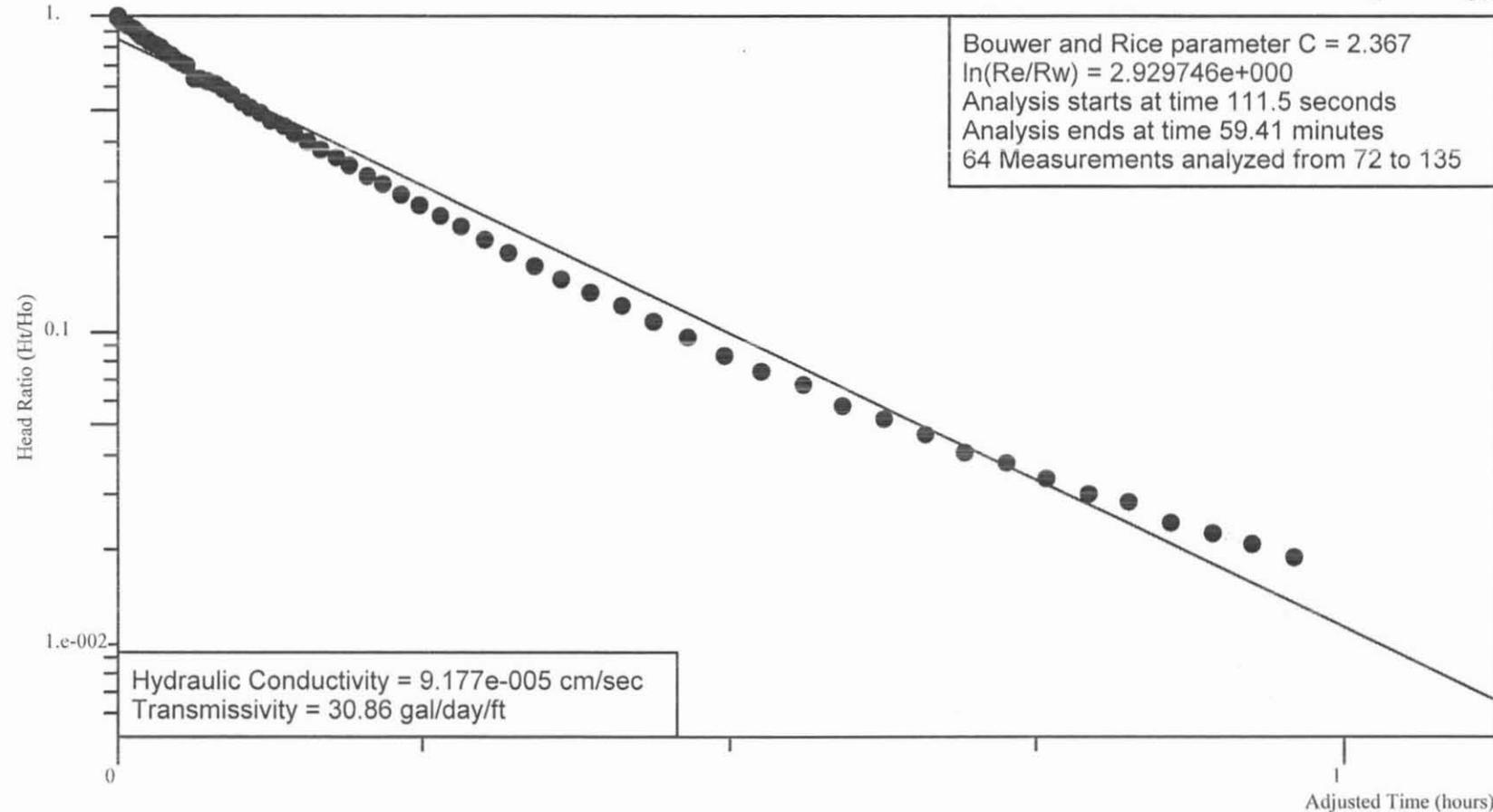
| | | | | | |
|-----|------|------|-------|----------|-------------|
| 138 | 3925 | 3906 | 24.29 | -1.e-003 | -3.24e-004 |
| 139 | 4045 | 4026 | 24.29 | -1.e-003 | -3.24e-004 |
| 140 | 4165 | 4146 | 24.29 | -3.e-003 | -9.721e-004 |

Aquifer Analysis September 16, 2005

Bouwer and Rice Graph

Coble's Sandrock

MW-9 (Rising)



Project Number 419.19

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 1.07 feet at 111.5 seconds

Aquifer Analysis

Site Name: Coble's Sandrock
 Test Date: September 16, 2005
 Project Number: 419.19
 Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\0905 Slug Tes

Well Label: MW-9 (Rising)
 Aquifer Thickness: 15.86 feet
 Screen Length: 15. feet
 Casing Radius: 1.888 inches
 Effective Radius: 4.125 inches
 Static Water Level: 24.3 feet
 Water Table to Screen Bottom: 15.86 feet
 Anisotropy Ratio: 1.
 Time Adjustment: 111.5 Seconds

Test starts with trial 13

There are 139 time and drawdown measurements

Maximum head is 1.881 feet

Minimum head is -4.1e-002 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|-------------|
| 1 | 0. | -111.5 | 24.27 | -3.2e-002 | -1.701e-002 |
| 2 | 0.3 | -111.2 | 24.26 | -3.8e-002 | -2.02e-002 |
| 3 | 0.6 | -110.9 | 24.26 | -4.e-002 | -2.127e-002 |
| 4 | 0.9 | -110.6 | 24.26 | -4.1e-002 | -2.18e-002 |
| 5 | 1.2 | -110.3 | 24.26 | -4.1e-002 | -2.18e-002 |
| 6 | 1.5 | -110. | 24.41 | 0.107 | 5.688e-002 |
| 7 | 1.8 | -109.7 | 25.02 | 0.724 | 0.3849 |
| 8 | 2.1 | -109.4 | 24.29 | -1.3e-002 | -6.911e-003 |
| 9 | 2.4 | -109.1 | 24.65 | 0.352 | 0.1871 |
| 10 | 2.7 | -108.8 | 25.38 | 1.084 | 0.5763 |
| 11 | 3. | -108.5 | 25.46 | 1.164 | 0.6188 |
| 12 | 3.3 | -108.2 | 25.83 | 1.527 | 0.8118 |
| 13 | 3.6 | -107.9 | 26.05 | 1.751 | 0.9309 |
| 14 | 3.9 | -107.6 | 26.18 | 1.881 | 1. |
| 15 | 4.2 | -107.3 | 25.84 | 1.537 | 0.8171 |
| 16 | 4.5 | -107. | 25.82 | 1.519 | 0.8075 |
| 17 | 4.8 | -106.7 | 25.98 | 1.685 | 0.8958 |
| 18 | 5.1 | -106.4 | 26.04 | 1.737 | 0.9234 |
| 19 | 5.4 | -106.1 | 25.9 | 1.597 | 0.849 |
| 20 | 5.7 | -105.8 | 25.82 | 1.517 | 0.8065 |
| 21 | 6. | -105.5 | 25.91 | 1.609 | 0.8554 |
| 22 | 6.4 | -105.1 | 25.97 | 1.673 | 0.8894 |
| 23 | 6.7 | -104.8 | 25.85 | 1.551 | 0.8246 |
| 24 | 7.1 | -104.4 | 25.82 | 1.523 | 0.8097 |
| 25 | 7.5 | -104. | 25.92 | 1.621 | 0.8618 |
| 26 | 8. | -103.5 | 25.86 | 1.555 | 0.8267 |
| 27 | 8.4 | -103.1 | 25.88 | 1.583 | 0.8416 |
| 28 | 8.9 | -102.6 | 26.01 | 1.712 | 0.9102 |
| 29 | 9.5 | -102. | 25.89 | 1.587 | 0.8437 |
| 30 | 10. | -101.5 | 25.86 | 1.559 | 0.8288 |
| 31 | 10.6 | -100.9 | 25.8 | 1.501 | 0.798 |

Coble's Sandrock

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 11.3 | -100.2 | 25.82 | 1.521 | 0.8086 |
| 33 | 11.9 | -99.6 | 25.79 | 1.489 | 0.7916 |
| 34 | 12.6 | -98.9 | 25.8 | 1.501 | 0.798 |
| 35 | 13.4 | -98.1 | 25.78 | 1.484 | 0.7889 |
| 36 | 14.2 | -97.3 | 25.77 | 1.472 | 0.7826 |
| 37 | 15. | -96.5 | 25.77 | 1.474 | 0.7836 |
| 38 | 15.9 | -95.6 | 25.76 | 1.458 | 0.7751 |
| 39 | 16.8 | -94.7 | 25.75 | 1.448 | 0.7698 |
| 40 | 17.8 | -93.7 | 25.74 | 1.442 | 0.7666 |
| 41 | 18.9 | -92.6 | 25.73 | 1.434 | 0.7624 |
| 42 | 20. | -91.5 | 25.72 | 1.424 | 0.757 |
| 43 | 21.2 | -90.3 | 25.71 | 1.414 | 0.7517 |
| 44 | 22.4 | -89.1 | 25.7 | 1.404 | 0.7464 |
| 45 | 23.8 | -87.7 | 25.69 | 1.394 | 0.7411 |
| 46 | 25.2 | -86.3 | 25.68 | 1.384 | 0.7358 |
| 47 | 26.7 | -84.8 | 25.67 | 1.374 | 0.7305 |
| 48 | 28.2 | -83.3 | 25.66 | 1.364 | 0.7251 |
| 49 | 29.8 | -81.7 | 25.65 | 1.354 | 0.7198 |
| 50 | 31.5 | -80. | 25.64 | 1.342 | 0.7135 |
| 51 | 33.3 | -78.2 | 25.63 | 1.332 | 0.7081 |
| 52 | 35.2 | -76.3 | 25.62 | 1.322 | 0.7028 |
| 53 | 37.3 | -74.2 | 25.61 | 1.31 | 0.6964 |
| 54 | 39.5 | -72. | 25.6 | 1.298 | 0.6901 |
| 55 | 41.8 | -69.7 | 25.59 | 1.288 | 0.6847 |
| 56 | 44.3 | -67.2 | 25.58 | 1.276 | 0.6784 |
| 57 | 46.9 | -64.6 | 25.56 | 1.263 | 0.6715 |
| 58 | 49.7 | -61.8 | 25.55 | 1.253 | 0.6661 |
| 59 | 52.6 | -58.9 | 25.54 | 1.239 | 0.6587 |
| 60 | 55.7 | -55.8 | 25.53 | 1.227 | 0.6523 |
| 61 | 59. | -52.5 | 25.52 | 1.215 | 0.6459 |
| 62 | 62.5 | -49. | 25.5 | 1.203 | 0.6396 |
| 63 | 66.2 | -45.3 | 25.49 | 1.191 | 0.6332 |
| 64 | 70.1 | -41.4 | 25.48 | 1.177 | 0.6257 |
| 65 | 74.3 | -37.2 | 25.47 | 1.165 | 0.6194 |
| 66 | 78.7 | -32.8 | 25.45 | 1.153 | 0.613 |
| 67 | 83.4 | -28.1 | 25.44 | 1.138 | 0.605 |
| 68 | 88.4 | -23.1 | 25.43 | 1.125 | 0.5981 |
| 69 | 93.7 | -17.8 | 25.41 | 1.11 | 0.5901 |
| 70 | 99.3 | -12.2 | 25.4 | 1.098 | 0.5837 |
| 71 | 105.2 | -6.3 | 25.38 | 1.084 | 0.5763 |
| 72 | 111.5 | 0. | 25.37 | 1.07 | 0.5688 |
| 73 | 118.1 | 6.6 | 25.35 | 1.054 | 0.5603 |
| 74 | 125.1 | 13.6 | 25.34 | 1.04 | 0.5529 |
| 75 | 132.6 | 21.1 | 25.33 | 1.026 | 0.5455 |
| 76 | 140.5 | 29. | 25.31 | 1.01 | 0.5369 |
| 77 | 148.9 | 37.4 | 25.29 | 0.994 | 0.5284 |
| 78 | 157.8 | 46.3 | 25.28 | 0.978 | 0.5199 |
| 79 | 167.2 | 55.7 | 25.26 | 0.962 | 0.5114 |
| 80 | 177.2 | 65.7 | 25.24 | 0.942 | 0.5008 |
| 81 | 187.8 | 76.3 | 25.22 | 0.924 | 0.4912 |
| 82 | 199. | 87.5 | 25.21 | 0.906 | 0.4817 |
| 83 | 210.9 | 99.4 | 25.19 | 0.888 | 0.4721 |
| 84 | 223.5 | 112. | 25.17 | 0.867 | 0.4609 |

Coble's Sandrock

| | | | | | |
|-----|-------|-------|-------|----------|------------|
| 85 | 236.8 | 125.3 | 25.15 | 0.849 | 0.4514 |
| 86 | 250.9 | 139.4 | 25.13 | 0.828 | 0.4402 |
| 87 | 265.8 | 154.3 | 25.11 | 0.811 | 0.4312 |
| 88 | 281.6 | 170.1 | 25.09 | 0.785 | 0.4173 |
| 89 | 298.4 | 186.9 | 25.06 | 0.764 | 0.4062 |
| 90 | 316.2 | 204.7 | 25.04 | 0.742 | 0.3945 |
| 91 | 335. | 223.5 | 24.98 | 0.682 | 0.3626 |
| 92 | 354.9 | 243.4 | 24.97 | 0.674 | 0.3583 |
| 93 | 376. | 264.5 | 24.97 | 0.672 | 0.3573 |
| 94 | 398.4 | 286.9 | 24.95 | 0.648 | 0.3445 |
| 95 | 422.1 | 310.6 | 24.92 | 0.624 | 0.3317 |
| 96 | 447.2 | 335.7 | 24.9 | 0.6 | 0.319 |
| 97 | 473.8 | 362.3 | 24.88 | 0.576 | 0.3062 |
| 98 | 502. | 390.5 | 24.85 | 0.55 | 0.2924 |
| 99 | 531.9 | 420.4 | 24.83 | 0.527 | 0.2802 |
| 100 | 563.5 | 452. | 24.8 | 0.501 | 0.2663 |
| 101 | 597. | 485.5 | 24.78 | 0.477 | 0.2536 |
| 102 | 632.5 | 521. | 24.75 | 0.453 | 0.2408 |
| 103 | 670.1 | 558.6 | 24.73 | 0.429 | 0.2281 |
| 104 | 709.9 | 598.4 | 24.7 | 0.404 | 0.2148 |
| 105 | 752.1 | 640.6 | 24.68 | 0.38 | 0.202 |
| 106 | 796.8 | 685.3 | 24.66 | 0.356 | 0.1893 |
| 107 | 844.2 | 732.7 | 24.63 | 0.334 | 0.1776 |
| 108 | 894.4 | 782.9 | 24.61 | 0.312 | 0.1659 |
| 109 | 947.5 | 836. | 24.59 | 0.29 | 0.1542 |
| 110 | 1004 | 892.3 | 24.57 | 0.268 | 0.1425 |
| 111 | 1063 | 951.9 | 24.55 | 0.248 | 0.1318 |
| 112 | 1127 | 1015 | 24.53 | 0.228 | 0.1212 |
| 113 | 1194 | 1082 | 24.51 | 0.208 | 0.1106 |
| 114 | 1264 | 1153 | 24.49 | 0.19 | 0.101 |
| 115 | 1340 | 1228 | 24.47 | 0.172 | 9.144e-002 |
| 116 | 1419 | 1308 | 24.46 | 0.156 | 8.293e-002 |
| 117 | 1503 | 1392 | 24.44 | 0.142 | 7.549e-002 |
| 118 | 1593 | 1481 | 24.43 | 0.128 | 6.805e-002 |
| 119 | 1687 | 1576 | 24.41 | 0.114 | 6.061e-002 |
| 120 | 1787 | 1676 | 24.4 | 0.102 | 5.423e-002 |
| 121 | 1893 | 1782 | 24.39 | 9.e-002 | 4.785e-002 |
| 122 | 2006 | 1894 | 24.38 | 8.e-002 | 4.253e-002 |
| 123 | 2125 | 2013 | 24.37 | 7.2e-002 | 3.828e-002 |
| 124 | 2245 | 2133 | 24.36 | 6.2e-002 | 3.296e-002 |
| 125 | 2365 | 2253 | 24.36 | 5.6e-002 | 2.977e-002 |
| 126 | 2485 | 2373 | 24.35 | 5.e-002 | 2.658e-002 |
| 127 | 2605 | 2493 | 24.34 | 4.4e-002 | 2.339e-002 |
| 128 | 2725 | 2613 | 24.34 | 4.e-002 | 2.127e-002 |
| 129 | 2845 | 2733 | 24.34 | 3.6e-002 | 1.914e-002 |
| 130 | 2965 | 2853 | 24.33 | 3.2e-002 | 1.701e-002 |
| 131 | 3085 | 2973 | 24.33 | 3.e-002 | 1.595e-002 |
| 132 | 3205 | 3093 | 24.33 | 2.6e-002 | 1.382e-002 |
| 133 | 3325 | 3213 | 24.32 | 2.4e-002 | 1.276e-002 |
| 134 | 3445 | 3333 | 24.32 | 2.2e-002 | 1.17e-002 |
| 135 | 3565 | 3453 | 24.32 | 2.e-002 | 1.063e-002 |
| 136 | 3685 | 3573 | 24.31 | 1.4e-002 | 7.443e-003 |
| 137 | 3805 | 3693 | 24.31 | 1.e-002 | 5.316e-003 |

Coble's Sandrock

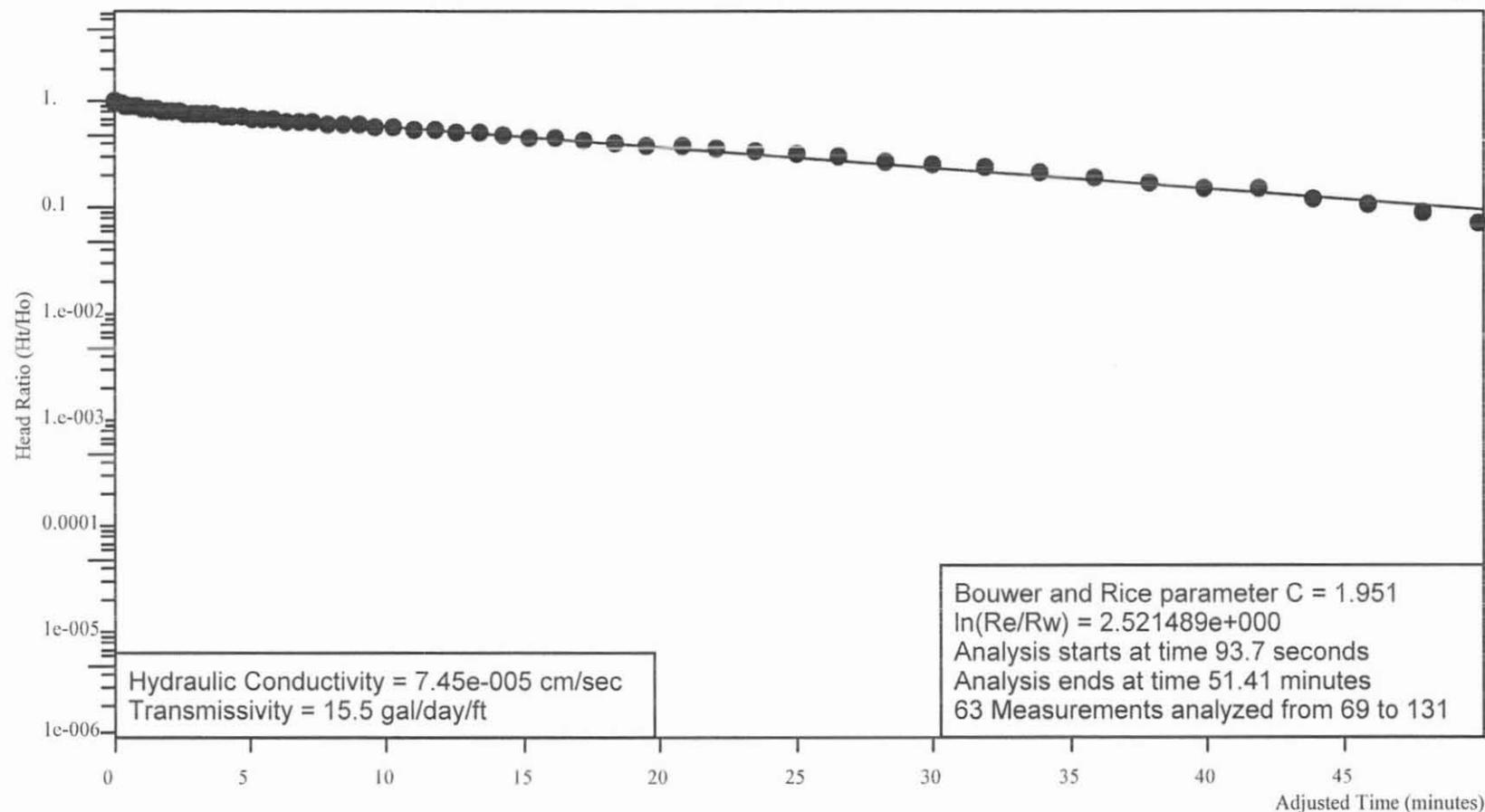
| | | | | | |
|-----|------|------|-------|----------|------------|
| 138 | 3925 | 3813 | 24.31 | 8.e-003 | 4.253e-003 |
| 139 | 4045 | 3933 | 24.31 | 1.1e-002 | 5.848e-003 |

Aquifer Analysis September 16, 2005

Bower and Rice Graph

Coble's Sandrock

P-18 (Rising)



Project Number 419.19

Ho is 0.679 feet at 93.7 seconds

Analysis by D. Reedy of Joyce Engineering, Inc.

Aquifer Analysis

Site Name: Coble's Sandrock
 Test Date: September 16, 2005
 Project Number: 419.19
 Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\0905 Slug Tes

Well Label: P-18 (Rising)
 Aquifer Thickness: 9.81 feet
 Screen Length: 15. feet
 Casing Radius: 1.888 inches
 Effective Radius: 4.125 inches
 Static Water Level: 22.84 feet
 Water Table to Screen Bottom: 9.81 feet
 Anisotropy Ratio: 1.
 Time Adjustment: 93.7 Seconds

Test starts with trial 4

There are 136 time and drawdown measurements

Maximum head is 3.423 feet

Minimum head is -1.381 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -93.7 | 23.52 | 0.682 | 0.1992 |
| 2 | 0.3 | -93.4 | 21.46 | -1.381 | -0.4034 |
| 3 | 0.6 | -93.1 | 25.74 | 2.897 | 0.8463 |
| 4 | 0.9 | -92.8 | 21.49 | -1.352 | -0.395 |
| 5 | 1.2 | -92.5 | 26.26 | 3.423 | 1. |
| 6 | 1.5 | -92.2 | 22.47 | -0.371 | -0.1084 |
| 7 | 1.8 | -91.9 | 25.89 | 3.054 | 0.8922 |
| 8 | 2.1 | -91.6 | 24.11 | 1.269 | 0.3707 |
| 9 | 2.4 | -91.3 | 24.73 | 1.891 | 0.5524 |
| 10 | 2.7 | -91. | 24.84 | 1.997 | 0.5834 |
| 11 | 3. | -90.7 | 24.38 | 1.542 | 0.4505 |
| 12 | 3.3 | -90.4 | 24.82 | 1.977 | 0.5776 |
| 13 | 3.6 | -90.1 | 24.47 | 1.626 | 0.475 |
| 14 | 3.9 | -89.8 | 24.66 | 1.821 | 0.532 |
| 15 | 4.2 | -89.5 | 24.57 | 1.729 | 0.5051 |
| 16 | 4.5 | -89.2 | 24.57 | 1.73 | 0.5054 |
| 17 | 4.8 | -88.9 | 24.58 | 1.737 | 0.5074 |
| 18 | 5.1 | -88.6 | 24.54 | 1.701 | 0.4969 |
| 19 | 5.4 | -88.3 | 24.55 | 1.707 | 0.4987 |
| 20 | 5.7 | -88. | 24.53 | 1.687 | 0.4928 |
| 21 | 6. | -87.7 | 24.53 | 1.687 | 0.4928 |
| 22 | 6.4 | -87.3 | 24.51 | 1.667 | 0.487 |
| 23 | 6.7 | -87. | 24.5 | 1.655 | 0.4835 |
| 24 | 7.1 | -86.6 | 24.48 | 1.643 | 0.48 |
| 25 | 7.5 | -86.2 | 24.47 | 1.633 | 0.4771 |
| 26 | 8. | -85.7 | 24.46 | 1.623 | 0.4741 |
| 27 | 8.4 | -85.3 | 24.45 | 1.607 | 0.4695 |
| 28 | 8.9 | -84.8 | 24.43 | 1.59 | 0.4645 |
| 29 | 9.5 | -84.2 | 24.41 | 1.574 | 0.4598 |
| 30 | 10. | -83.7 | 24.4 | 1.56 | 0.4557 |
| 31 | 10.6 | -83.1 | 24.38 | 1.544 | 0.4511 |

Coble's Sandrock

| | | | | | |
|----|-------|-------|-------|-------|--------|
| 32 | 11.3 | -82.4 | 24.37 | 1.526 | 0.4458 |
| 33 | 11.9 | -81.8 | 24.35 | 1.508 | 0.4405 |
| 34 | 12.6 | -81.1 | 24.33 | 1.488 | 0.4347 |
| 35 | 13.4 | -80.3 | 24.31 | 1.468 | 0.4289 |
| 36 | 14.2 | -79.5 | 24.29 | 1.446 | 0.4224 |
| 37 | 15. | -78.7 | 24.26 | 1.424 | 0.416 |
| 38 | 15.9 | -77.8 | 24.24 | 1.4 | 0.409 |
| 39 | 16.8 | -76.9 | 24.22 | 1.375 | 0.4017 |
| 40 | 17.8 | -75.9 | 24.19 | 1.349 | 0.3941 |
| 41 | 18.9 | -74.8 | 24.16 | 1.325 | 0.3871 |
| 42 | 20. | -73.7 | 24.14 | 1.297 | 0.3789 |
| 43 | 21.2 | -72.5 | 24.11 | 1.269 | 0.3707 |
| 44 | 22.4 | -71.3 | 24.08 | 1.239 | 0.362 |
| 45 | 23.8 | -69.9 | 24.05 | 1.209 | 0.3532 |
| 46 | 25.2 | -68.5 | 24.02 | 1.179 | 0.3444 |
| 47 | 26.7 | -67. | 23.99 | 1.147 | 0.3351 |
| 48 | 28.2 | -65.5 | 23.96 | 1.117 | 0.3263 |
| 49 | 29.8 | -63.9 | 23.93 | 1.086 | 0.3173 |
| 50 | 31.5 | -62.2 | 23.9 | 1.055 | 0.3082 |
| 51 | 33.3 | -60.4 | 23.86 | 1.024 | 0.2992 |
| 52 | 35.2 | -58.5 | 23.83 | 0.992 | 0.2898 |
| 53 | 37.3 | -56.4 | 23.8 | 0.962 | 0.281 |
| 54 | 39.5 | -54.2 | 23.77 | 0.932 | 0.2723 |
| 55 | 41.8 | -51.9 | 23.74 | 0.904 | 0.2641 |
| 56 | 44.3 | -49.4 | 23.72 | 0.876 | 0.2559 |
| 57 | 46.9 | -46.8 | 23.69 | 0.854 | 0.2495 |
| 58 | 49.7 | -44. | 23.67 | 0.83 | 0.2425 |
| 59 | 52.6 | -41.1 | 23.65 | 0.81 | 0.2366 |
| 60 | 55.7 | -38. | 23.63 | 0.791 | 0.2311 |
| 61 | 59. | -34.7 | 23.61 | 0.775 | 0.2264 |
| 62 | 62.5 | -31.2 | 23.6 | 0.761 | 0.2223 |
| 63 | 66.2 | -27.5 | 23.59 | 0.747 | 0.2182 |
| 64 | 70.1 | -23.6 | 23.57 | 0.735 | 0.2147 |
| 65 | 74.3 | -19.4 | 23.56 | 0.723 | 0.2112 |
| 66 | 78.7 | -15. | 23.55 | 0.711 | 0.2077 |
| 67 | 83.4 | -10.3 | 23.54 | 0.701 | 0.2048 |
| 68 | 88.4 | -5.3 | 23.53 | 0.689 | 0.2013 |
| 69 | 93.7 | 0. | 23.52 | 0.679 | 0.1984 |
| 70 | 99.3 | 5.6 | 23.51 | 0.669 | 0.1954 |
| 71 | 105.2 | 11.5 | 23.5 | 0.661 | 0.1931 |
| 72 | 111.5 | 17.8 | 23.49 | 0.65 | 0.1899 |
| 73 | 118.1 | 24.4 | 23.48 | 0.64 | 0.187 |
| 74 | 125.1 | 31.4 | 23.47 | 0.632 | 0.1846 |
| 75 | 132.6 | 38.9 | 23.46 | 0.624 | 0.1823 |
| 76 | 140.5 | 46.8 | 23.46 | 0.616 | 0.18 |
| 77 | 148.9 | 55.2 | 23.45 | 0.608 | 0.1776 |
| 78 | 157.8 | 64.1 | 23.44 | 0.6 | 0.1753 |
| 79 | 167.2 | 73.5 | 23.43 | 0.592 | 0.1729 |
| 80 | 177.2 | 83.5 | 23.42 | 0.584 | 0.1706 |
| 81 | 187.8 | 94.1 | 23.42 | 0.576 | 0.1683 |
| 82 | 199. | 105.3 | 23.41 | 0.57 | 0.1665 |
| 83 | 210.9 | 117.2 | 23.4 | 0.562 | 0.1642 |
| 84 | 223.5 | 129.8 | 23.39 | 0.554 | 0.1618 |

Coble's Sandrock

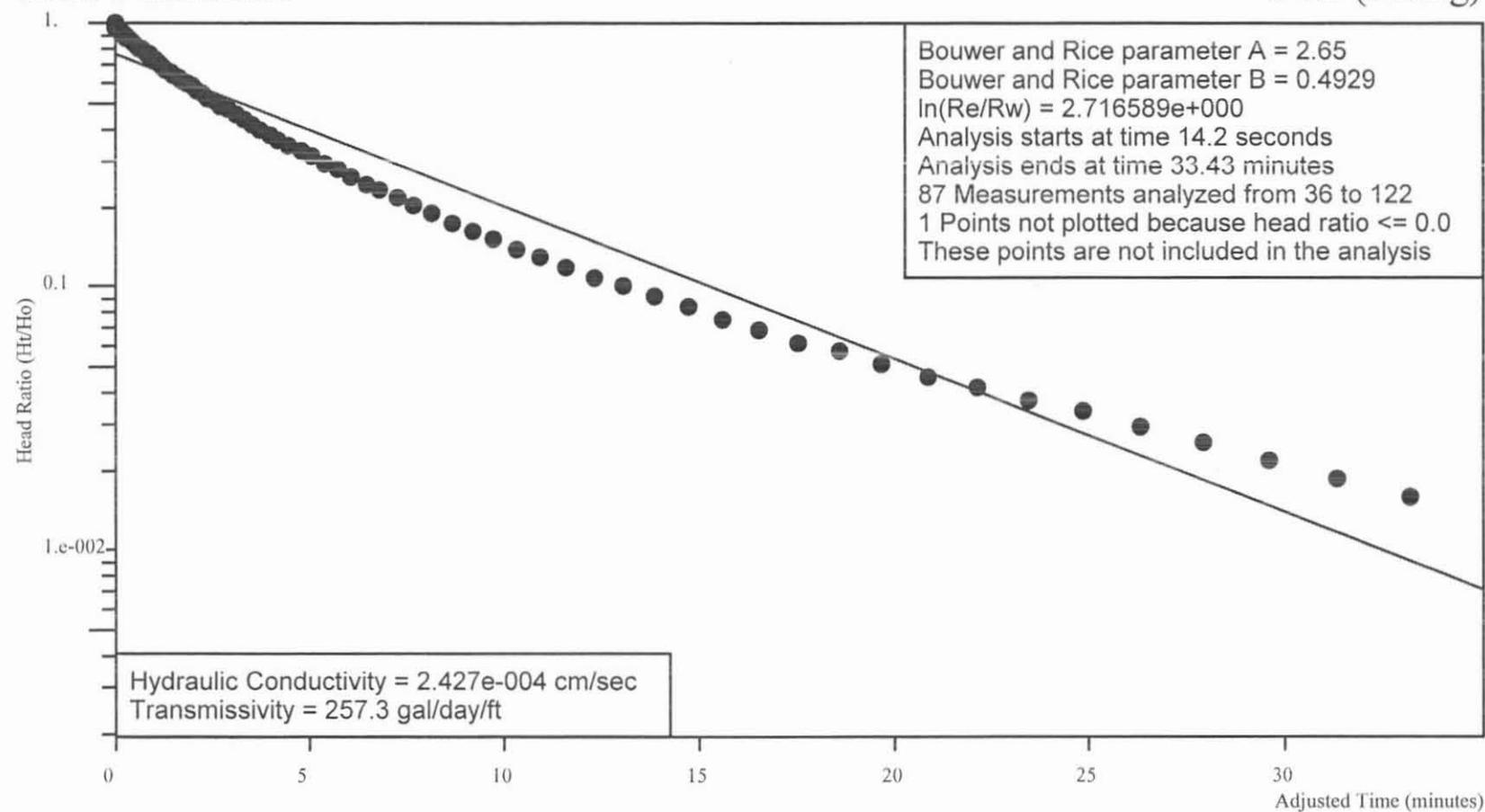
| | | | | | |
|-----|-------|-------|-------|----------|------------|
| 85 | 236.8 | 143.1 | 23.39 | 0.547 | 0.1598 |
| 86 | 250.9 | 157.2 | 23.38 | 0.539 | 0.1575 |
| 87 | 265.8 | 172.1 | 23.37 | 0.531 | 0.1551 |
| 88 | 281.6 | 187.9 | 23.36 | 0.525 | 0.1534 |
| 89 | 298.4 | 204.7 | 23.36 | 0.521 | 0.1522 |
| 90 | 316.2 | 222.5 | 23.36 | 0.515 | 0.1505 |
| 91 | 335. | 241.3 | 23.34 | 0.501 | 0.1464 |
| 92 | 354.9 | 261.2 | 23.33 | 0.494 | 0.1443 |
| 93 | 376. | 282.3 | 23.33 | 0.486 | 0.142 |
| 94 | 398.4 | 304.7 | 23.31 | 0.47 | 0.1373 |
| 95 | 422.1 | 328.4 | 23.31 | 0.466 | 0.1361 |
| 96 | 447.2 | 353.5 | 23.3 | 0.462 | 0.135 |
| 97 | 473.8 | 380.1 | 23.29 | 0.453 | 0.1323 |
| 98 | 502. | 408.3 | 23.29 | 0.445 | 0.13 |
| 99 | 531.9 | 438.2 | 23.27 | 0.434 | 0.1268 |
| 100 | 563.5 | 469.8 | 23.27 | 0.426 | 0.1245 |
| 101 | 597. | 503.3 | 23.26 | 0.416 | 0.1215 |
| 102 | 632.5 | 538.8 | 23.25 | 0.407 | 0.1189 |
| 103 | 670.1 | 576.4 | 23.23 | 0.395 | 0.1154 |
| 104 | 709.9 | 616.2 | 23.23 | 0.385 | 0.1125 |
| 105 | 752.1 | 658.4 | 23.22 | 0.375 | 0.1096 |
| 106 | 796.8 | 703.1 | 23.2 | 0.365 | 0.1066 |
| 107 | 844.2 | 750.5 | 23.19 | 0.353 | 0.1031 |
| 108 | 894.4 | 800.7 | 23.18 | 0.343 | 0.1002 |
| 109 | 947.5 | 853.8 | 23.17 | 0.33 | 9.641e-002 |
| 110 | 1004 | 910.1 | 23.16 | 0.32 | 9.349e-002 |
| 111 | 1063 | 969.7 | 23.15 | 0.308 | 8.998e-002 |
| 112 | 1127 | 1033 | 23.14 | 0.296 | 8.647e-002 |
| 113 | 1194 | 1100 | 23.12 | 0.284 | 8.297e-002 |
| 114 | 1264 | 1171 | 23.11 | 0.27 | 7.888e-002 |
| 115 | 1340 | 1246 | 23.1 | 0.258 | 7.537e-002 |
| 116 | 1419 | 1325 | 23.09 | 0.246 | 7.187e-002 |
| 117 | 1503 | 1410 | 23.07 | 0.232 | 6.778e-002 |
| 118 | 1593 | 1499 | 23.06 | 0.218 | 6.369e-002 |
| 119 | 1687 | 1593 | 23.04 | 0.204 | 5.96e-002 |
| 120 | 1787 | 1694 | 23.03 | 0.19 | 5.551e-002 |
| 121 | 1893 | 1800 | 23.02 | 0.178 | 5.2e-002 |
| 122 | 2006 | 1912 | 23. | 0.162 | 4.733e-002 |
| 123 | 2125 | 2031 | 22.99 | 0.148 | 4.324e-002 |
| 124 | 2245 | 2151 | 22.97 | 0.134 | 3.915e-002 |
| 125 | 2365 | 2271 | 22.96 | 0.12 | 3.506e-002 |
| 126 | 2485 | 2391 | 22.95 | 0.106 | 3.097e-002 |
| 127 | 2605 | 2511 | 22.94 | 0.102 | 2.98e-002 |
| 128 | 2725 | 2631 | 22.92 | 8.3e-002 | 2.425e-002 |
| 129 | 2845 | 2751 | 22.91 | 7.2e-002 | 2.103e-002 |
| 130 | 2965 | 2871 | 22.9 | 6.2e-002 | 1.811e-002 |
| 131 | 3085 | 2991 | 22.89 | 5.e-002 | 1.461e-002 |
| 132 | 3205 | 3111 | 22.88 | 4.e-002 | 1.169e-002 |
| 133 | 3325 | 3231 | 22.87 | 3.e-002 | 8.764e-003 |
| 134 | 3445 | 3351 | 22.86 | 2.2e-002 | 6.427e-003 |
| 135 | 3565 | 3471 | 22.85 | 1.2e-002 | 3.506e-003 |
| 136 | 3685 | 3591 | 22.84 | 4.e-003 | 1.169e-003 |

Aquifer Analysis September 16, 2005

Bouwer and Rice Graph

Coble's Sandrock

P-25 (Rising)



Project Number 419.19

Ho is 1.556 feet at 14.2 seconds

Analysis by D. Reedy of Joyce Engineering, Inc.

Aquifer Analysis

Site Name: Coble's Sandrock
 Test Date: September 16, 2005
 Project Number: 419.19
 Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\0905 Slug Tes

Well Label: P-25 (Rising)
 Aquifer Thickness: 50. feet
 Screen Length: 10. feet
 Casing Radius: 1.888 inches
 Effective Radius: 3.125 inches
 Static Water Level: 23.75 feet
 Water Table to Screen Bottom: 25.19 feet
 Anisotropy Ratio: 1.
 Time Adjustment: 14.2 Seconds

Test starts with trial 8

There are 130 time and drawdown measurements

Maximum head is 2.159 feet

Minimum head is -0.382 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -14.2 | 24.25 | 0.495 | 0.2293 |
| 2 | 0.3 | -13.9 | 23.97 | 0.216 | 0.1 |
| 3 | 0.6 | -13.6 | 24.64 | 0.886 | 0.4104 |
| 4 | 0.9 | -13.3 | 23.37 | -0.382 | -0.1769 |
| 5 | 1.2 | -13. | 24.65 | 0.9 | 0.4169 |
| 6 | 1.5 | -12.7 | 24.45 | 0.702 | 0.3252 |
| 7 | 1.8 | -12.4 | 24.79 | 1.041 | 0.4822 |
| 8 | 2.1 | -12.1 | 25.37 | 1.62 | 0.7503 |
| 9 | 2.4 | -11.8 | 25.91 | 2.159 | 1. |
| 10 | 2.7 | -11.5 | 25.73 | 1.977 | 0.9157 |
| 11 | 3. | -11.2 | 25.64 | 1.891 | 0.8759 |
| 12 | 3.3 | -10.9 | 25.63 | 1.875 | 0.8685 |
| 13 | 3.6 | -10.6 | 25.61 | 1.861 | 0.862 |
| 14 | 3.9 | -10.3 | 25.58 | 1.833 | 0.849 |
| 15 | 4.2 | -10. | 25.57 | 1.821 | 0.8434 |
| 16 | 4.5 | -9.7 | 25.56 | 1.811 | 0.8388 |
| 17 | 4.8 | -9.4 | 25.54 | 1.791 | 0.8296 |
| 18 | 5.1 | -9.1 | 25.52 | 1.773 | 0.8212 |
| 19 | 5.4 | -8.8 | 25.52 | 1.769 | 0.8194 |
| 20 | 5.7 | -8.5 | 25.53 | 1.777 | 0.8231 |
| 21 | 6. | -8.2 | 25.48 | 1.729 | 0.8008 |
| 22 | 6.4 | -7.8 | 25.46 | 1.712 | 0.793 |
| 23 | 6.7 | -7.5 | 25.45 | 1.699 | 0.7869 |
| 24 | 7.1 | -7.1 | 25.44 | 1.689 | 0.7823 |
| 25 | 7.5 | -6.7 | 25.43 | 1.679 | 0.7777 |
| 26 | 8. | -6.2 | 25.47 | 1.717 | 0.7953 |
| 27 | 8.4 | -5.8 | 25.45 | 1.703 | 0.7888 |
| 28 | 8.9 | -5.3 | 25.39 | 1.639 | 0.7591 |
| 29 | 9.5 | -4.7 | 25.37 | 1.623 | 0.7517 |
| 30 | 10. | -4.2 | 25.4 | 1.646 | 0.7624 |
| 31 | 10.6 | -3.6 | 25.36 | 1.608 | 0.7448 |

Coble's Sandrock

| | | | | | |
|----|-------|-------|-------|-------|--------|
| 32 | 11.3 | -2.9 | 25.35 | 1.596 | 0.7392 |
| 33 | 11.9 | -2.3 | 25.33 | 1.584 | 0.7337 |
| 34 | 12.6 | -1.6 | 25.32 | 1.574 | 0.729 |
| 35 | 13.4 | -0.8 | 25.31 | 1.564 | 0.7244 |
| 36 | 14.2 | 0. | 25.31 | 1.556 | 0.7207 |
| 37 | 15. | 0.8 | 25.3 | 1.546 | 0.7161 |
| 38 | 15.9 | 1.7 | 25.28 | 1.534 | 0.7105 |
| 39 | 16.8 | 2.6 | 25.28 | 1.526 | 0.7068 |
| 40 | 17.8 | 3.6 | 25.26 | 1.514 | 0.7013 |
| 41 | 18.9 | 4.7 | 25.25 | 1.504 | 0.6966 |
| 42 | 20. | 5.8 | 25.24 | 1.494 | 0.692 |
| 43 | 21.2 | 7. | 25.23 | 1.482 | 0.6864 |
| 44 | 22.4 | 8.2 | 25.22 | 1.469 | 0.6804 |
| 45 | 23.8 | 9.6 | 25.21 | 1.457 | 0.6748 |
| 46 | 25.2 | 11. | 25.2 | 1.447 | 0.6702 |
| 47 | 26.7 | 12.5 | 25.18 | 1.433 | 0.6637 |
| 48 | 28.2 | 14. | 25.17 | 1.423 | 0.6591 |
| 49 | 29.8 | 15.6 | 25.16 | 1.409 | 0.6526 |
| 50 | 31.5 | 17.3 | 25.15 | 1.397 | 0.6471 |
| 51 | 33.3 | 19.1 | 25.14 | 1.385 | 0.6415 |
| 52 | 35.2 | 21. | 25.12 | 1.371 | 0.635 |
| 53 | 37.3 | 23.1 | 25.11 | 1.357 | 0.6285 |
| 54 | 39.5 | 25.3 | 25.09 | 1.343 | 0.622 |
| 55 | 41.8 | 27.6 | 25.08 | 1.327 | 0.6146 |
| 56 | 44.3 | 30.1 | 25.06 | 1.311 | 0.6072 |
| 57 | 46.9 | 32.7 | 25.05 | 1.295 | 0.5998 |
| 58 | 49.7 | 35.5 | 25.03 | 1.279 | 0.5924 |
| 59 | 52.6 | 38.4 | 25.01 | 1.261 | 0.5841 |
| 60 | 55.7 | 41.5 | 24.99 | 1.241 | 0.5748 |
| 61 | 59. | 44.8 | 24.97 | 1.223 | 0.5665 |
| 62 | 62.5 | 48.3 | 24.95 | 1.202 | 0.5567 |
| 63 | 66.2 | 52. | 24.93 | 1.184 | 0.5484 |
| 64 | 70.1 | 55.9 | 24.91 | 1.164 | 0.5391 |
| 65 | 74.3 | 60.1 | 24.89 | 1.142 | 0.5289 |
| 66 | 78.7 | 64.5 | 24.87 | 1.122 | 0.5197 |
| 67 | 83.4 | 69.2 | 24.85 | 1.1 | 0.5095 |
| 68 | 88.4 | 74.2 | 24.83 | 1.076 | 0.4984 |
| 69 | 93.7 | 79.5 | 24.8 | 1.054 | 0.4882 |
| 70 | 99.3 | 85.1 | 24.78 | 1.028 | 0.4761 |
| 71 | 105.2 | 91. | 24.75 | 1.004 | 0.465 |
| 72 | 111.5 | 97.3 | 24.73 | 0.98 | 0.4539 |
| 73 | 118.1 | 103.9 | 24.7 | 0.954 | 0.4419 |
| 74 | 125.1 | 110.9 | 24.68 | 0.927 | 0.4294 |
| 75 | 132.6 | 118.4 | 24.65 | 0.901 | 0.4173 |
| 76 | 140.5 | 126.3 | 24.62 | 0.873 | 0.4044 |
| 77 | 148.9 | 134.7 | 24.6 | 0.847 | 0.3923 |
| 78 | 157.8 | 143.6 | 24.57 | 0.821 | 0.3803 |
| 79 | 167.2 | 153. | 24.55 | 0.795 | 0.3682 |
| 80 | 177.2 | 163. | 24.52 | 0.765 | 0.3543 |
| 81 | 187.8 | 173.6 | 24.49 | 0.737 | 0.3414 |
| 82 | 199. | 184.8 | 24.46 | 0.711 | 0.3293 |
| 83 | 210.9 | 196.7 | 24.43 | 0.683 | 0.3164 |
| 84 | 223.5 | 209.3 | 24.4 | 0.652 | 0.302 |

Coble's Sandrock

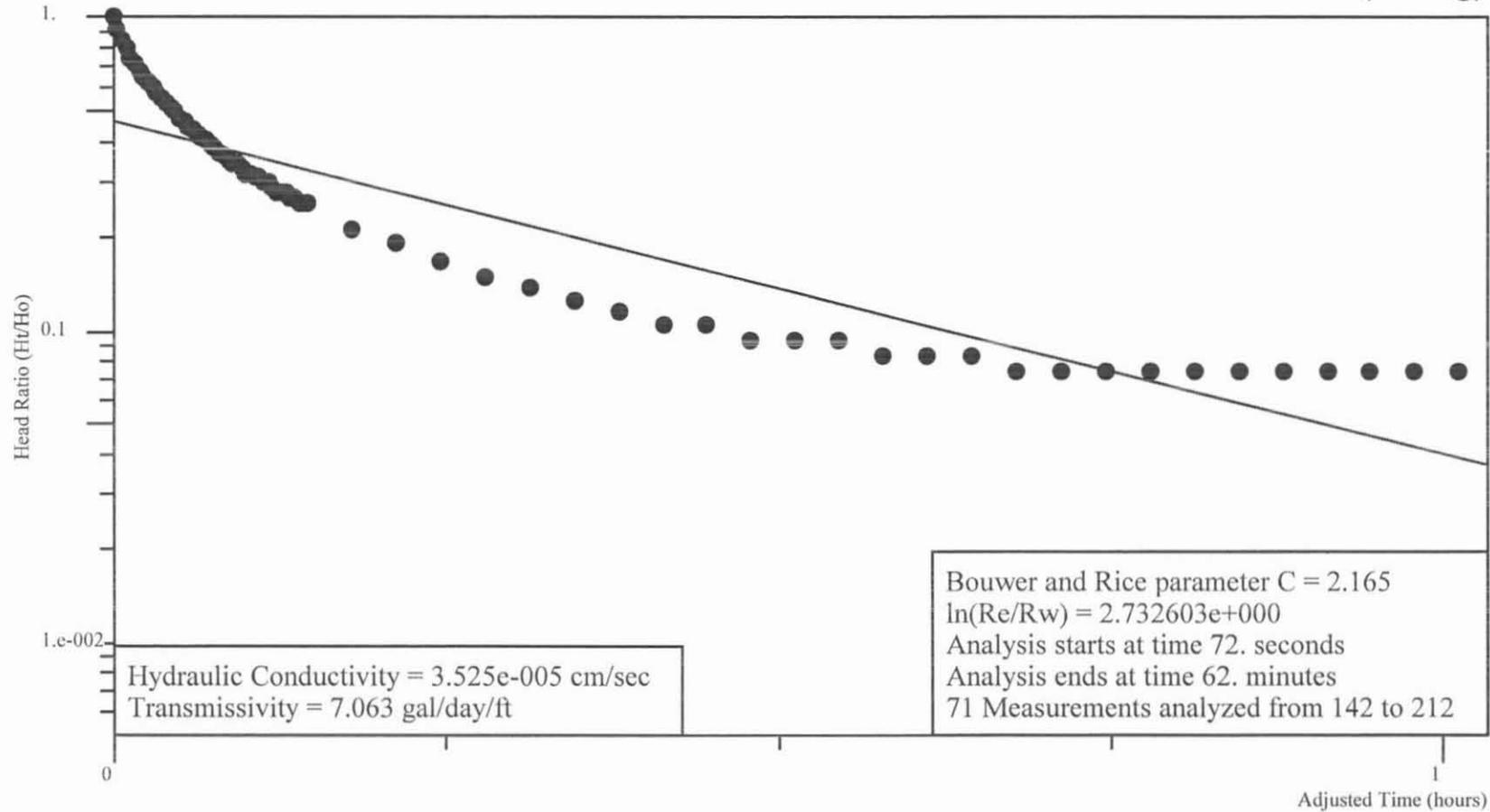
| | | | | | |
|-----|-------|-------|-------|----------|------------|
| 85 | 236.8 | 222.6 | 24.37 | 0.624 | 0.289 |
| 86 | 250.9 | 236.7 | 24.35 | 0.596 | 0.2761 |
| 87 | 265.8 | 251.6 | 24.32 | 0.568 | 0.2631 |
| 88 | 281.6 | 267.4 | 24.29 | 0.542 | 0.251 |
| 89 | 298.4 | 284.2 | 24.26 | 0.514 | 0.2381 |
| 90 | 316.2 | 302. | 24.24 | 0.49 | 0.227 |
| 91 | 335. | 320.8 | 24.21 | 0.462 | 0.214 |
| 92 | 354.9 | 340.7 | 24.19 | 0.436 | 0.2019 |
| 93 | 376. | 361.8 | 24.16 | 0.412 | 0.1908 |
| 94 | 398.4 | 384.2 | 24.14 | 0.386 | 0.1788 |
| 95 | 422.1 | 407.9 | 24.11 | 0.362 | 0.1677 |
| 96 | 447.2 | 433. | 24.09 | 0.34 | 0.1575 |
| 97 | 473.8 | 459.6 | 24.07 | 0.318 | 0.1473 |
| 98 | 502. | 487.8 | 24.05 | 0.296 | 0.1371 |
| 99 | 531.9 | 517.7 | 24.02 | 0.274 | 0.1269 |
| 100 | 563.5 | 549.3 | 24. | 0.254 | 0.1176 |
| 101 | 597. | 582.8 | 23.99 | 0.236 | 0.1093 |
| 102 | 632.5 | 618.3 | 23.97 | 0.218 | 0.101 |
| 103 | 670.1 | 655.9 | 23.95 | 0.202 | 9.356e-002 |
| 104 | 709.9 | 695.7 | 23.93 | 0.184 | 8.522e-002 |
| 105 | 752.1 | 737.9 | 23.92 | 0.169 | 7.828e-002 |
| 106 | 796.8 | 782.6 | 23.91 | 0.156 | 7.226e-002 |
| 107 | 844.2 | 830. | 23.89 | 0.142 | 6.577e-002 |
| 108 | 894.4 | 880.2 | 23.88 | 0.132 | 6.114e-002 |
| 109 | 947.5 | 933.3 | 23.87 | 0.118 | 5.465e-002 |
| 110 | 1004 | 989.6 | 23.86 | 0.106 | 4.91e-002 |
| 111 | 1063 | 1049 | 23.85 | 9.6e-002 | 4.447e-002 |
| 112 | 1127 | 1112 | 23.84 | 8.8e-002 | 4.076e-002 |
| 113 | 1194 | 1179 | 23.83 | 8.e-002 | 3.705e-002 |
| 114 | 1264 | 1250 | 23.82 | 7.e-002 | 3.242e-002 |
| 115 | 1340 | 1325 | 23.81 | 6.4e-002 | 2.964e-002 |
| 116 | 1419 | 1405 | 23.81 | 5.8e-002 | 2.686e-002 |
| 117 | 1503 | 1489 | 23.8 | 5.2e-002 | 2.409e-002 |
| 118 | 1593 | 1578 | 23.8 | 4.6e-002 | 2.131e-002 |
| 119 | 1687 | 1673 | 23.79 | 4.e-002 | 1.853e-002 |
| 120 | 1787 | 1773 | 23.78 | 3.4e-002 | 1.575e-002 |
| 121 | 1893 | 1879 | 23.78 | 2.9e-002 | 1.343e-002 |
| 122 | 2006 | 1992 | 23.77 | 2.5e-002 | 1.158e-002 |
| 123 | 2125 | 2110 | 23.77 | 1.9e-002 | 8.8e-003 |
| 124 | 2245 | 2230 | 23.77 | 1.8e-002 | 8.337e-003 |
| 125 | 2365 | 2350 | 23.77 | 1.6e-002 | 7.411e-003 |
| 126 | 2485 | 2471 | 23.75 | 4.e-003 | 1.853e-003 |
| 127 | 2605 | 2590 | 23.76 | 9.e-003 | 4.169e-003 |
| 128 | 2725 | 2711 | 23.76 | 7.e-003 | 3.242e-003 |
| 129 | 2845 | 2831 | 23.75 | 3.e-003 | 1.39e-003 |
| 130 | 2965 | 2950 | 23.76 | 8.e-003 | 3.705e-003 |

Aquifer Analysis February 13, 2002

Coble's Sandrock

Bouwer and Rice Graph

MW-5 (Rising)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 0.445 feet at 72. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 13, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\MW5RISIN

Well Label: MW-5 (Rising)
Aquifer Thickness: 9.45 feet
Screen Length: 10. feet
Casing Radius: 1.188 inches
Effective Radius: 3.125 inches
Static Water Level: 7.75 feet
Water Table to Screen Bottom: 9.45 feet
Anisotropy Ratio: 1.
Time Adjustment: 72. Seconds

Test starts with trial 28

There are 212 time and drawdown measurements

Maximum head is 1.962 feet

Minimum head is -1.e-002 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|-------------|
| 1 | 0. | -72. | 7.754 | 4.e-003 | 2.039e-003 |
| 2 | 0.198 | -71.8 | 7.75 | 0. | 0. |
| 3 | 0.396 | -71.6 | 7.75 | 0. | 0. |
| 4 | 0.6 | -71.4 | 7.75 | 0. | 0. |
| 5 | 0.798 | -71.2 | 7.75 | 0. | 0. |
| 6 | 0.996 | -71. | 7.75 | 0. | 0. |
| 7 | 1.2 | -70.8 | 7.75 | 0. | 0. |
| 8 | 1.398 | -70.6 | 7.745 | -5.e-003 | -2.548e-003 |
| 9 | 1.596 | -70.4 | 7.75 | 0. | 0. |
| 10 | 1.8 | -70.2 | 7.75 | 0. | 0. |
| 11 | 1.998 | -70. | 7.75 | 0. | 0. |
| 12 | 2.196 | -69.8 | 7.745 | -5.e-003 | -2.548e-003 |
| 13 | 2.4 | -69.6 | 7.75 | 0. | 0. |
| 14 | 2.598 | -69.4 | 7.75 | 0. | 0. |
| 15 | 2.796 | -69.2 | 7.75 | 0. | 0. |
| 16 | 3. | -69. | 7.754 | 4.e-003 | 2.039e-003 |
| 17 | 3.198 | -68.8 | 7.745 | -5.e-003 | -2.548e-003 |
| 18 | 3.396 | -68.6 | 7.745 | -5.e-003 | -2.548e-003 |
| 19 | 3.6 | -68.4 | 7.75 | 0. | 0. |
| 20 | 3.798 | -68.2 | 7.75 | 0. | 0. |
| 21 | 3.996 | -68. | 7.745 | -5.e-003 | -2.548e-003 |
| 22 | 4.2 | -67.8 | 7.75 | 0. | 0. |
| 23 | 4.398 | -67.6 | 7.74 | -1.e-002 | -5.097e-003 |
| 24 | 4.596 | -67.4 | 7.745 | -5.e-003 | -2.548e-003 |
| 25 | 4.8 | -67.2 | 7.792 | 4.2e-002 | 2.141e-002 |
| 26 | 4.998 | -67. | 9.48 | 1.73 | 0.8818 |
| 27 | 5.196 | -66.8 | 8.835 | 1.085 | 0.553 |
| 28 | 5.4 | -66.6 | 7.806 | 5.6e-002 | 2.854e-002 |
| 29 | 5.598 | -66.4 | 9.712 | 1.962 | 1. |
| 30 | 5.796 | -66.2 | 9.238 | 1.488 | 0.7584 |
| 31 | 6. | -66. | 9.385 | 1.635 | 0.8333 |

| | | | | | |
|----|-------|-------|-------|-------|--------|
| 32 | 6.198 | -65.8 | 9.214 | 1.464 | 0.7462 |
| 33 | 6.396 | -65.6 | 9.319 | 1.569 | 0.7997 |
| 34 | 6.6 | -65.4 | 9.338 | 1.588 | 0.8094 |
| 35 | 6.798 | -65.2 | 9.072 | 1.322 | 0.6738 |
| 36 | 6.996 | -65. | 9.12 | 1.37 | 0.6983 |
| 37 | 7.2 | -64.8 | 9.162 | 1.412 | 0.7197 |
| 38 | 7.398 | -64.6 | 9.238 | 1.488 | 0.7584 |
| 39 | 7.596 | -64.4 | 9.195 | 1.445 | 0.7365 |
| 40 | 7.8 | -64.2 | 9.172 | 1.422 | 0.7248 |
| 41 | 7.998 | -64. | 9.191 | 1.441 | 0.7345 |
| 42 | 8.196 | -63.8 | 9.176 | 1.426 | 0.7268 |
| 43 | 8.4 | -63.6 | 9.176 | 1.426 | 0.7268 |
| 44 | 8.598 | -63.4 | 9.162 | 1.412 | 0.7197 |
| 45 | 8.796 | -63.2 | 9.158 | 1.408 | 0.7176 |
| 46 | 9. | -63. | 9.148 | 1.398 | 0.7125 |
| 47 | 9.198 | -62.8 | 9.143 | 1.393 | 0.71 |
| 48 | 9.396 | -62.6 | 9.139 | 1.389 | 0.708 |
| 49 | 9.6 | -62.4 | 9.129 | 1.379 | 0.7029 |
| 50 | 9.798 | -62.2 | 9.12 | 1.37 | 0.6983 |
| 51 | 9.996 | -62. | 9.115 | 1.365 | 0.6957 |
| 52 | 10.2 | -61.8 | 9.105 | 1.355 | 0.6906 |
| 53 | 10.4 | -61.6 | 9.101 | 1.351 | 0.6886 |
| 54 | 10.6 | -61.4 | 9.091 | 1.341 | 0.6835 |
| 55 | 10.8 | -61.2 | 9.086 | 1.336 | 0.6809 |
| 56 | 11. | -61. | 9.082 | 1.332 | 0.6789 |
| 57 | 11.2 | -60.8 | 9.072 | 1.322 | 0.6738 |
| 58 | 11.4 | -60.6 | 9.067 | 1.317 | 0.6713 |
| 59 | 11.6 | -60.4 | 9.063 | 1.313 | 0.6692 |
| 60 | 11.8 | -60.2 | 9.053 | 1.303 | 0.6641 |
| 61 | 12. | -60. | 9.049 | 1.299 | 0.6621 |
| 62 | 12.2 | -59.8 | 9.044 | 1.294 | 0.6595 |
| 63 | 12.4 | -59.6 | 9.039 | 1.289 | 0.657 |
| 64 | 12.6 | -59.4 | 9.03 | 1.28 | 0.6524 |
| 65 | 12.8 | -59.2 | 9.025 | 1.275 | 0.6498 |
| 66 | 13. | -59. | 9.015 | 1.265 | 0.6448 |
| 67 | 13.2 | -58.8 | 9.011 | 1.261 | 0.6427 |
| 68 | 13.4 | -58.6 | 9.006 | 1.256 | 0.6402 |
| 69 | 13.6 | -58.4 | 9.001 | 1.251 | 0.6376 |
| 70 | 13.8 | -58.2 | 8.992 | 1.242 | 0.633 |
| 71 | 14. | -58. | 8.987 | 1.237 | 0.6305 |
| 72 | 14.2 | -57.8 | 8.982 | 1.232 | 0.6279 |
| 73 | 14.4 | -57.6 | 8.977 | 1.227 | 0.6254 |
| 74 | 14.6 | -57.4 | 8.973 | 1.223 | 0.6233 |
| 75 | 14.8 | -57.2 | 8.963 | 1.213 | 0.6182 |
| 76 | 15. | -57. | 8.958 | 1.208 | 0.6157 |
| 77 | 15.2 | -56.8 | 8.954 | 1.204 | 0.6137 |
| 78 | 15.4 | -56.6 | 8.949 | 1.199 | 0.6111 |
| 79 | 15.6 | -56.4 | 8.944 | 1.194 | 0.6086 |
| 80 | 15.8 | -56.2 | 8.935 | 1.185 | 0.604 |
| 81 | 16. | -56. | 8.93 | 1.18 | 0.6014 |
| 82 | 16.2 | -55.8 | 8.925 | 1.175 | 0.5989 |
| 83 | 16.4 | -55.6 | 8.921 | 1.171 | 0.5968 |
| 84 | 16.6 | -55.4 | 8.916 | 1.166 | 0.5943 |

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 85 | 16.8 | -55.2 | 8.911 | 1.161 | 0.5917 |
| 86 | 17. | -55. | 8.906 | 1.156 | 0.5892 |
| 87 | 17.2 | -54.8 | 8.897 | 1.147 | 0.5846 |
| 88 | 17.4 | -54.6 | 8.892 | 1.142 | 0.5821 |
| 89 | 17.6 | -54.4 | 8.887 | 1.137 | 0.5795 |
| 90 | 17.8 | -54.2 | 8.883 | 1.133 | 0.5775 |
| 91 | 18. | -54. | 8.878 | 1.128 | 0.5749 |
| 92 | 18.2 | -53.8 | 8.873 | 1.123 | 0.5724 |
| 93 | 18.4 | -53.6 | 8.868 | 1.118 | 0.5698 |
| 94 | 18.6 | -53.4 | 8.864 | 1.114 | 0.5678 |
| 95 | 18.8 | -53.2 | 8.859 | 1.109 | 0.5652 |
| 96 | 19. | -53. | 8.854 | 1.104 | 0.5627 |
| 97 | 19.2 | -52.8 | 8.845 | 1.095 | 0.5581 |
| 98 | 19.4 | -52.6 | 8.845 | 1.095 | 0.5581 |
| 99 | 19.6 | -52.4 | 8.835 | 1.085 | 0.553 |
| 100 | 19.8 | -52.2 | 8.835 | 1.085 | 0.553 |
| 101 | 20. | -52. | 8.83 | 1.08 | 0.5505 |
| 102 | 21. | -51. | 8.802 | 1.052 | 0.5362 |
| 103 | 22. | -50. | 8.778 | 1.028 | 0.524 |
| 104 | 23. | -49. | 8.755 | 1.005 | 0.5122 |
| 105 | 24. | -48. | 8.731 | 0.981 | 0.5 |
| 106 | 25. | -47. | 8.707 | 0.957 | 0.4878 |
| 107 | 26. | -46. | 8.684 | 0.934 | 0.476 |
| 108 | 27. | -45. | 8.665 | 0.915 | 0.4664 |
| 109 | 28. | -44. | 8.641 | 0.891 | 0.4541 |
| 110 | 29. | -43. | 8.622 | 0.872 | 0.4444 |
| 111 | 30. | -42. | 8.603 | 0.853 | 0.4348 |
| 112 | 31. | -41. | 8.584 | 0.834 | 0.4251 |
| 113 | 32. | -40. | 8.565 | 0.815 | 0.4154 |
| 114 | 33. | -39. | 8.551 | 0.801 | 0.4083 |
| 115 | 34. | -38. | 8.532 | 0.782 | 0.3986 |
| 116 | 35. | -37. | 8.518 | 0.768 | 0.3914 |
| 117 | 36. | -36. | 8.499 | 0.749 | 0.3818 |
| 118 | 37. | -35. | 8.484 | 0.734 | 0.3741 |
| 119 | 38. | -34. | 8.47 | 0.72 | 0.367 |
| 120 | 39. | -33. | 8.456 | 0.706 | 0.3598 |
| 121 | 40. | -32. | 8.442 | 0.692 | 0.3527 |
| 122 | 41. | -31. | 8.428 | 0.678 | 0.3456 |
| 123 | 42. | -30. | 8.418 | 0.668 | 0.3405 |
| 124 | 43. | -29. | 8.404 | 0.654 | 0.3333 |
| 125 | 44. | -28. | 8.394 | 0.644 | 0.3282 |
| 126 | 45. | -27. | 8.385 | 0.635 | 0.3236 |
| 127 | 46. | -26. | 8.371 | 0.621 | 0.3165 |
| 128 | 47. | -25. | 8.361 | 0.611 | 0.3114 |
| 129 | 48. | -24. | 8.352 | 0.602 | 0.3068 |
| 130 | 49. | -23. | 8.342 | 0.592 | 0.3017 |
| 131 | 50. | -22. | 8.333 | 0.583 | 0.2971 |
| 132 | 51. | -21. | 8.328 | 0.578 | 0.2946 |
| 133 | 52. | -20. | 8.319 | 0.569 | 0.29 |
| 134 | 53. | -19. | 8.309 | 0.559 | 0.2849 |
| 135 | 54. | -18. | 8.304 | 0.554 | 0.2824 |
| 136 | 55. | -17. | 8.295 | 0.545 | 0.2778 |
| 137 | 56. | -16. | 8.29 | 0.54 | 0.2752 |

| | | | | | |
|-----|------|------|-------|----------|------------|
| 138 | 57. | -15. | 8.281 | 0.531 | 0.2706 |
| 139 | 58. | -14. | 8.276 | 0.526 | 0.2681 |
| 140 | 59. | -13. | 8.271 | 0.521 | 0.2655 |
| 141 | 60. | -12. | 8.262 | 0.512 | 0.261 |
| 142 | 72. | 0. | 8.195 | 0.445 | 0.2268 |
| 143 | 84. | 12. | 8.157 | 0.407 | 0.2074 |
| 144 | 96. | 24. | 8.129 | 0.379 | 0.1932 |
| 145 | 108. | 36. | 8.105 | 0.355 | 0.1809 |
| 146 | 120. | 48. | 8.081 | 0.331 | 0.1687 |
| 147 | 132. | 60. | 8.067 | 0.317 | 0.1616 |
| 148 | 144. | 72. | 8.048 | 0.298 | 0.1519 |
| 149 | 156. | 84. | 8.039 | 0.289 | 0.1473 |
| 150 | 168. | 96. | 8.025 | 0.275 | 0.1402 |
| 151 | 180. | 108. | 8.015 | 0.265 | 0.1351 |
| 152 | 192. | 120. | 8.006 | 0.256 | 0.1305 |
| 153 | 204. | 132. | 7.996 | 0.246 | 0.1254 |
| 154 | 216. | 144. | 7.987 | 0.237 | 0.1208 |
| 155 | 228. | 156. | 7.977 | 0.227 | 0.1157 |
| 156 | 240. | 168. | 7.972 | 0.222 | 0.1131 |
| 157 | 252. | 180. | 7.963 | 0.213 | 0.1086 |
| 158 | 264. | 192. | 7.958 | 0.208 | 0.106 |
| 159 | 276. | 204. | 7.949 | 0.199 | 0.1014 |
| 160 | 288. | 216. | 7.944 | 0.194 | 9.888e-002 |
| 161 | 300. | 228. | 7.939 | 0.189 | 9.633e-002 |
| 162 | 312. | 240. | 7.934 | 0.184 | 9.378e-002 |
| 163 | 324. | 252. | 7.93 | 0.18 | 9.174e-002 |
| 164 | 336. | 264. | 7.925 | 0.175 | 8.919e-002 |
| 165 | 348. | 276. | 7.92 | 0.17 | 8.665e-002 |
| 166 | 360. | 288. | 7.915 | 0.165 | 8.41e-002 |
| 167 | 372. | 300. | 7.911 | 0.161 | 8.206e-002 |
| 168 | 384. | 312. | 7.906 | 0.156 | 7.951e-002 |
| 169 | 396. | 324. | 7.901 | 0.151 | 7.696e-002 |
| 170 | 408. | 336. | 7.901 | 0.151 | 7.696e-002 |
| 171 | 420. | 348. | 7.896 | 0.146 | 7.441e-002 |
| 172 | 432. | 360. | 7.892 | 0.142 | 7.238e-002 |
| 173 | 444. | 372. | 7.892 | 0.142 | 7.238e-002 |
| 174 | 456. | 384. | 7.887 | 0.137 | 6.983e-002 |
| 175 | 468. | 396. | 7.887 | 0.137 | 6.983e-002 |
| 176 | 480. | 408. | 7.882 | 0.132 | 6.728e-002 |
| 177 | 492. | 420. | 7.882 | 0.132 | 6.728e-002 |
| 178 | 504. | 432. | 7.878 | 0.128 | 6.524e-002 |
| 179 | 516. | 444. | 7.873 | 0.123 | 6.269e-002 |
| 180 | 528. | 456. | 7.873 | 0.123 | 6.269e-002 |
| 181 | 540. | 468. | 7.873 | 0.123 | 6.269e-002 |
| 182 | 552. | 480. | 7.868 | 0.118 | 6.014e-002 |
| 183 | 564. | 492. | 7.868 | 0.118 | 6.014e-002 |
| 184 | 576. | 504. | 7.863 | 0.113 | 5.759e-002 |
| 185 | 588. | 516. | 7.863 | 0.113 | 5.759e-002 |
| 186 | 600. | 528. | 7.863 | 0.113 | 5.759e-002 |
| 187 | 720. | 648. | 7.844 | 9.4e-002 | 4.791e-002 |
| 188 | 840. | 768. | 7.835 | 8.5e-002 | 4.332e-002 |
| 189 | 960. | 888. | 7.825 | 7.5e-002 | 3.823e-002 |
| 190 | 1080 | 1008 | 7.816 | 6.6e-002 | 3.364e-002 |

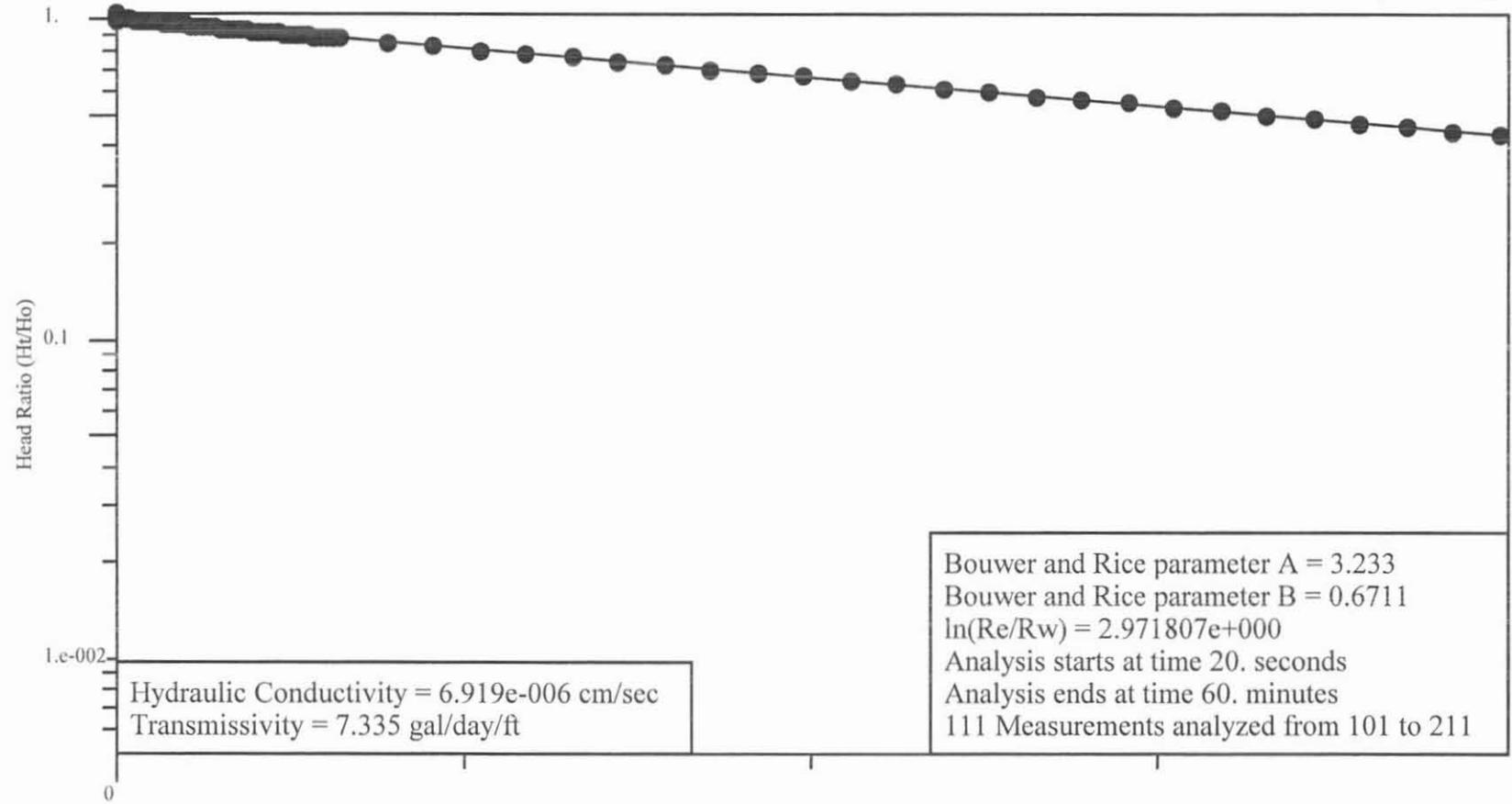
| | | | | | |
|-----|------|------|-------|----------|------------|
| 191 | 1200 | 1128 | 7.811 | 6.1e-002 | 3.109e-002 |
| 192 | 1320 | 1248 | 7.806 | 5.6e-002 | 2.854e-002 |
| 193 | 1440 | 1368 | 7.802 | 5.2e-002 | 2.65e-002 |
| 194 | 1560 | 1488 | 7.797 | 4.7e-002 | 2.396e-002 |
| 195 | 1680 | 1608 | 7.797 | 4.7e-002 | 2.396e-002 |
| 196 | 1800 | 1728 | 7.792 | 4.2e-002 | 2.141e-002 |
| 197 | 1920 | 1848 | 7.792 | 4.2e-002 | 2.141e-002 |
| 198 | 2040 | 1968 | 7.792 | 4.2e-002 | 2.141e-002 |
| 199 | 2160 | 2088 | 7.787 | 3.7e-002 | 1.886e-002 |
| 200 | 2280 | 2208 | 7.787 | 3.7e-002 | 1.886e-002 |
| 201 | 2400 | 2328 | 7.787 | 3.7e-002 | 1.886e-002 |
| 202 | 2520 | 2448 | 7.783 | 3.3e-002 | 1.682e-002 |
| 203 | 2640 | 2568 | 7.783 | 3.3e-002 | 1.682e-002 |
| 204 | 2760 | 2688 | 7.783 | 3.3e-002 | 1.682e-002 |
| 205 | 2880 | 2808 | 7.783 | 3.3e-002 | 1.682e-002 |
| 206 | 3000 | 2928 | 7.783 | 3.3e-002 | 1.682e-002 |
| 207 | 3120 | 3048 | 7.783 | 3.3e-002 | 1.682e-002 |
| 208 | 3240 | 3168 | 7.783 | 3.3e-002 | 1.682e-002 |
| 209 | 3360 | 3288 | 7.783 | 3.3e-002 | 1.682e-002 |
| 210 | 3480 | 3408 | 7.783 | 3.3e-002 | 1.682e-002 |
| 211 | 3600 | 3528 | 7.783 | 3.3e-002 | 1.682e-002 |
| 212 | 3720 | 3648 | 7.783 | 3.3e-002 | 1.682e-002 |

Aquifer Analysis February 13, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-16 (Falling)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

Ho is 1.996 feet at 20. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 13, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P16FALLI

Well Label: P-16 (Falling)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.188 inches
Effective Radius: 3.125 inches
Static Water Level: 12.31 feet
Water Table to Screen Bottom: 30.89 feet
Anisotropy Ratio: 1.
Time Adjustment: 20. Seconds

Test starts with trial 21

There are 211 time and drawdown measurements

Maximum head is 2.469 feet

Minimum head is -4.e-003 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -20. | 12.31 | -4.e-003 | -1.62e-003 |
| 2 | 0.198 | -19.8 | 12.31 | -4.e-003 | -1.62e-003 |
| 3 | 0.396 | -19.6 | 12.31 | -4.e-003 | -1.62e-003 |
| 4 | 0.6 | -19.4 | 12.31 | -4.e-003 | -1.62e-003 |
| 5 | 0.798 | -19.2 | 12.31 | -4.e-003 | -1.62e-003 |
| 6 | 0.996 | -19. | 12.31 | -4.e-003 | -1.62e-003 |
| 7 | 1.2 | -18.8 | 12.31 | -4.e-003 | -1.62e-003 |
| 8 | 1.398 | -18.6 | 12.3 | 1.5e-002 | 6.075e-003 |
| 9 | 1.596 | -18.4 | 12.31 | -4.e-003 | -1.62e-003 |
| 10 | 1.8 | -18.2 | 12.31 | 0. | 0. |
| 11 | 1.998 | -18. | 12.31 | -4.e-003 | -1.62e-003 |
| 12 | 2.196 | -17.8 | 12.31 | -4.e-003 | -1.62e-003 |
| 13 | 2.4 | -17.6 | 12.31 | -4.e-003 | -1.62e-003 |
| 14 | 2.598 | -17.4 | 12.17 | 0.143 | 5.792e-002 |
| 15 | 2.796 | -17.2 | 11.94 | 0.373 | 0.1511 |
| 16 | 3. | -17. | 11.56 | 0.754 | 0.3054 |
| 17 | 3.198 | -16.8 | 11.17 | 1.141 | 0.4621 |
| 18 | 3.396 | -16.6 | 10.89 | 1.423 | 0.5763 |
| 19 | 3.6 | -16.4 | 10.43 | 1.876 | 0.7598 |
| 20 | 3.798 | -16.2 | 10.22 | 2.087 | 0.8453 |
| 21 | 3.996 | -16. | 9.951 | 2.359 | 0.9554 |
| 22 | 4.2 | -15.8 | 9.841 | 2.469 | 1. |
| 23 | 4.398 | -15.6 | 9.932 | 2.378 | 0.9631 |
| 24 | 4.596 | -15.4 | 10.15 | 2.158 | 0.874 |
| 25 | 4.8 | -15.2 | 10.47 | 1.838 | 0.7444 |
| 26 | 4.998 | -15. | 10.73 | 1.576 | 0.6383 |
| 27 | 5.196 | -14.8 | 10.72 | 1.595 | 0.646 |
| 28 | 5.4 | -14.6 | 10.17 | 2.139 | 0.8663 |
| 29 | 5.598 | -14.4 | 9.932 | 2.378 | 0.9631 |
| 30 | 5.796 | -14.2 | 10.11 | 2.196 | 0.8894 |
| 31 | 6. | -14. | 10.3 | 2.015 | 0.8161 |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -13.8 | 10.47 | 1.838 | 0.7444 |
| 33 | 6.396 | -13.6 | 10.52 | 1.79 | 0.725 |
| 34 | 6.6 | -13.4 | 10.46 | 1.848 | 0.7485 |
| 35 | 6.798 | -13.2 | 10.32 | 1.986 | 0.8044 |
| 36 | 6.996 | -13. | 10.19 | 2.125 | 0.8607 |
| 37 | 7.2 | -12.8 | 10.1 | 2.211 | 0.8955 |
| 38 | 7.398 | -12.6 | 10.11 | 2.201 | 0.8915 |
| 39 | 7.596 | -12.4 | 10.19 | 2.12 | 0.8586 |
| 40 | 7.8 | -12.2 | 10.31 | 2.005 | 0.8121 |
| 41 | 7.998 | -12. | 10.39 | 1.919 | 0.7772 |
| 42 | 8.196 | -11.8 | 10.42 | 1.891 | 0.7659 |
| 43 | 8.4 | -11.6 | 10.39 | 1.924 | 0.7793 |
| 44 | 8.598 | -11.4 | 10.31 | 2.005 | 0.8121 |
| 45 | 8.796 | -11.2 | 10.23 | 2.082 | 0.8433 |
| 46 | 9. | -11. | 10.18 | 2.129 | 0.8623 |
| 47 | 9.198 | -10.8 | 10.19 | 2.12 | 0.8586 |
| 48 | 9.396 | -10.6 | 10.24 | 2.072 | 0.8392 |
| 49 | 9.6 | -10.4 | 10.3 | 2.01 | 0.8141 |
| 50 | 9.798 | -10.2 | 10.35 | 1.962 | 0.7947 |
| 51 | 9.996 | -10. | 10.36 | 1.948 | 0.789 |
| 52 | 10.2 | -9.798 | 10.34 | 1.967 | 0.7967 |
| 53 | 10.4 | -9.6 | 10.3 | 2.015 | 0.8161 |
| 54 | 10.6 | -9.402 | 10.25 | 2.058 | 0.8335 |
| 55 | 10.8 | -9.198 | 10.23 | 2.082 | 0.8433 |
| 56 | 11. | -9. | 10.23 | 2.077 | 0.8412 |
| 57 | 11.2 | -8.802 | 10.26 | 2.048 | 0.8295 |
| 58 | 11.4 | -8.598 | 10.3 | 2.01 | 0.8141 |
| 59 | 11.6 | -8.4 | 10.33 | 1.982 | 0.8028 |
| 60 | 11.8 | -8.202 | 10.33 | 1.977 | 0.8007 |
| 61 | 12. | -7.998 | 10.32 | 1.991 | 0.8064 |
| 62 | 12.2 | -7.8 | 10.29 | 2.02 | 0.8181 |
| 63 | 12.4 | -7.602 | 10.27 | 2.044 | 0.8279 |
| 64 | 12.6 | -7.398 | 10.26 | 2.053 | 0.8315 |
| 65 | 12.8 | -7.2 | 10.26 | 2.048 | 0.8295 |
| 66 | 13. | -7.002 | 10.28 | 2.034 | 0.8238 |
| 67 | 13.2 | -6.798 | 10.3 | 2.01 | 0.8141 |
| 68 | 13.4 | -6.6 | 10.31 | 1.996 | 0.8084 |
| 69 | 13.6 | -6.402 | 10.31 | 1.996 | 0.8084 |
| 70 | 13.8 | -6.198 | 10.31 | 2.005 | 0.8121 |
| 71 | 14. | -6. | 10.29 | 2.02 | 0.8181 |
| 72 | 14.2 | -5.802 | 10.28 | 2.034 | 0.8238 |
| 73 | 14.4 | -5.598 | 10.27 | 2.039 | 0.8258 |
| 74 | 14.6 | -5.4 | 10.28 | 2.034 | 0.8238 |
| 75 | 14.8 | -5.202 | 10.29 | 2.025 | 0.8202 |
| 76 | 15. | -4.998 | 10.3 | 2.01 | 0.8141 |
| 77 | 15.2 | -4.8 | 10.31 | 2.005 | 0.8121 |
| 78 | 15.4 | -4.602 | 10.31 | 2.005 | 0.8121 |
| 79 | 15.6 | -4.398 | 10.3 | 2.01 | 0.8141 |
| 80 | 15.8 | -4.2 | 10.29 | 2.02 | 0.8181 |
| 81 | 16. | -4.002 | 10.29 | 2.025 | 0.8202 |
| 82 | 16.2 | -3.798 | 10.28 | 2.029 | 0.8218 |
| 83 | 16.4 | -3.6 | 10.29 | 2.025 | 0.8202 |
| 84 | 16.6 | -3.402 | 10.29 | 2.02 | 0.8181 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -3.198 | 10.3 | 2.01 | 0.8141 |
| 86 | 17. | -3. | 10.31 | 2.005 | 0.8121 |
| 87 | 17.2 | -2.802 | 10.3 | 2.01 | 0.8141 |
| 88 | 17.4 | -2.598 | 10.3 | 2.01 | 0.8141 |
| 89 | 17.6 | -2.4 | 10.29 | 2.02 | 0.8181 |
| 90 | 17.8 | -2.202 | 10.29 | 2.025 | 0.8202 |
| 91 | 18. | -1.998 | 10.29 | 2.025 | 0.8202 |
| 92 | 18.2 | -1.8 | 10.29 | 2.02 | 0.8181 |
| 93 | 18.4 | -1.602 | 10.3 | 2.015 | 0.8161 |
| 94 | 18.6 | -1.398 | 10.3 | 2.01 | 0.8141 |
| 95 | 18.8 | -1.2 | 10.3 | 2.01 | 0.8141 |
| 96 | 19. | -1.002 | 10.28 | 2.029 | 0.8218 |
| 97 | 19.2 | -0.798 | 10.18 | 2.135 | 0.8647 |
| 98 | 19.4 | -0.6 | 10.18 | 2.135 | 0.8647 |
| 99 | 19.6 | -0.402 | 10.23 | 2.082 | 0.8433 |
| 100 | 19.8 | -0.198 | 10.27 | 2.044 | 0.8279 |
| 101 | 20. | 0. | 10.31 | 1.996 | 0.8084 |
| 102 | 21. | 1.002 | 10.33 | 1.977 | 0.8007 |
| 103 | 22. | 1.998 | 10.24 | 2.068 | 0.8376 |
| 104 | 23. | 3. | 10.33 | 1.977 | 0.8007 |
| 105 | 24. | 4.002 | 10.28 | 2.029 | 0.8218 |
| 106 | 25. | 4.998 | 10.29 | 2.02 | 0.8181 |
| 107 | 26. | 6. | 10.31 | 2.001 | 0.8104 |
| 108 | 27. | 7.002 | 10.3 | 2.015 | 0.8161 |
| 109 | 28. | 7.998 | 10.3 | 2.015 | 0.8161 |
| 110 | 29. | 9. | 10.31 | 2.005 | 0.8121 |
| 111 | 30. | 10. | 10.3 | 2.015 | 0.8161 |
| 112 | 31. | 11. | 10.3 | 2.01 | 0.8141 |
| 113 | 32. | 12. | 10.31 | 2.005 | 0.8121 |
| 114 | 33. | 13. | 10.3 | 2.01 | 0.8141 |
| 115 | 34. | 14. | 10.31 | 2.005 | 0.8121 |
| 116 | 35. | 15. | 10.3 | 2.01 | 0.8141 |
| 117 | 36. | 16. | 10.3 | 2.01 | 0.8141 |
| 118 | 37. | 17. | 10.31 | 2.005 | 0.8121 |
| 119 | 38. | 18. | 10.31 | 2.005 | 0.8121 |
| 120 | 39. | 19. | 10.31 | 2.005 | 0.8121 |
| 121 | 40. | 20. | 10.31 | 2.005 | 0.8121 |
| 122 | 41. | 21. | 10.31 | 2.005 | 0.8121 |
| 123 | 42. | 22. | 10.31 | 2.005 | 0.8121 |
| 124 | 43. | 23. | 10.31 | 2.005 | 0.8121 |
| 125 | 44. | 24. | 10.31 | 2.001 | 0.8104 |
| 126 | 45. | 25. | 10.31 | 2.001 | 0.8104 |
| 127 | 46. | 26. | 10.31 | 2.001 | 0.8104 |
| 128 | 47. | 27. | 10.31 | 2.001 | 0.8104 |
| 129 | 48. | 28. | 10.31 | 2.001 | 0.8104 |
| 130 | 49. | 29. | 10.31 | 2.001 | 0.8104 |
| 131 | 50. | 30. | 10.31 | 2.001 | 0.8104 |
| 132 | 51. | 31. | 10.31 | 1.996 | 0.8084 |
| 133 | 52. | 32. | 10.31 | 1.996 | 0.8084 |
| 134 | 53. | 33. | 10.31 | 1.996 | 0.8084 |
| 135 | 54. | 34. | 10.31 | 1.996 | 0.8084 |
| 136 | 55. | 35. | 10.31 | 1.996 | 0.8084 |
| 137 | 56. | 36. | 10.31 | 1.996 | 0.8084 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 138 | 57. | 37. | 10.31 | 1.996 | 0.8084 |
| 139 | 58. | 38. | 10.32 | 1.991 | 0.8064 |
| 140 | 59. | 39. | 10.32 | 1.991 | 0.8064 |
| 141 | 60. | 40. | 10.32 | 1.991 | 0.8064 |
| 142 | 72. | 52. | 10.32 | 1.986 | 0.8044 |
| 143 | 84. | 64. | 10.33 | 1.977 | 0.8007 |
| 144 | 96. | 76. | 10.34 | 1.972 | 0.7987 |
| 145 | 108. | 88. | 10.35 | 1.962 | 0.7947 |
| 146 | 120. | 100. | 10.35 | 1.958 | 0.793 |
| 147 | 132. | 112. | 10.36 | 1.953 | 0.791 |
| 148 | 144. | 124. | 10.37 | 1.943 | 0.787 |
| 149 | 156. | 136. | 10.37 | 1.939 | 0.7853 |
| 150 | 168. | 148. | 10.38 | 1.934 | 0.7833 |
| 151 | 180. | 160. | 10.38 | 1.929 | 0.7813 |
| 152 | 192. | 172. | 10.39 | 1.919 | 0.7772 |
| 153 | 204. | 184. | 10.4 | 1.915 | 0.7756 |
| 154 | 216. | 196. | 10.4 | 1.91 | 0.7736 |
| 155 | 228. | 208. | 10.4 | 1.905 | 0.7716 |
| 156 | 240. | 220. | 10.41 | 1.895 | 0.7675 |
| 157 | 252. | 232. | 10.42 | 1.891 | 0.7659 |
| 158 | 264. | 244. | 10.42 | 1.886 | 0.7639 |
| 159 | 276. | 256. | 10.43 | 1.881 | 0.7618 |
| 160 | 288. | 268. | 10.43 | 1.876 | 0.7598 |
| 161 | 300. | 280. | 10.44 | 1.872 | 0.7582 |
| 162 | 312. | 292. | 10.45 | 1.862 | 0.7542 |
| 163 | 324. | 304. | 10.45 | 1.857 | 0.7521 |
| 164 | 336. | 316. | 10.46 | 1.852 | 0.7501 |
| 165 | 348. | 328. | 10.46 | 1.848 | 0.7485 |
| 166 | 360. | 340. | 10.47 | 1.843 | 0.7465 |
| 167 | 372. | 352. | 10.47 | 1.838 | 0.7444 |
| 168 | 384. | 364. | 10.48 | 1.834 | 0.7428 |
| 169 | 396. | 376. | 10.49 | 1.824 | 0.7388 |
| 170 | 408. | 388. | 10.49 | 1.819 | 0.7367 |
| 171 | 420. | 400. | 10.5 | 1.814 | 0.7347 |
| 172 | 432. | 412. | 10.5 | 1.81 | 0.7331 |
| 173 | 444. | 424. | 10.51 | 1.805 | 0.7311 |
| 174 | 456. | 436. | 10.51 | 1.8 | 0.729 |
| 175 | 468. | 448. | 10.52 | 1.795 | 0.727 |
| 176 | 480. | 460. | 10.52 | 1.79 | 0.725 |
| 177 | 492. | 472. | 10.52 | 1.786 | 0.7234 |
| 178 | 504. | 484. | 10.53 | 1.776 | 0.7193 |
| 179 | 516. | 496. | 10.53 | 1.776 | 0.7193 |
| 180 | 528. | 508. | 10.54 | 1.767 | 0.7157 |
| 181 | 540. | 520. | 10.55 | 1.762 | 0.7136 |
| 182 | 552. | 532. | 10.55 | 1.757 | 0.7116 |
| 183 | 564. | 544. | 10.55 | 1.757 | 0.7116 |
| 184 | 576. | 556. | 10.56 | 1.747 | 0.7076 |
| 185 | 588. | 568. | 10.57 | 1.743 | 0.706 |
| 186 | 600. | 580. | 10.57 | 1.738 | 0.7039 |
| 187 | 720. | 700. | 10.62 | 1.69 | 0.6845 |
| 188 | 840. | 820. | 10.66 | 1.647 | 0.6671 |
| 189 | 960. | 940. | 10.71 | 1.599 | 0.6476 |
| 190 | 1080 | 1060 | 10.75 | 1.557 | 0.6306 |

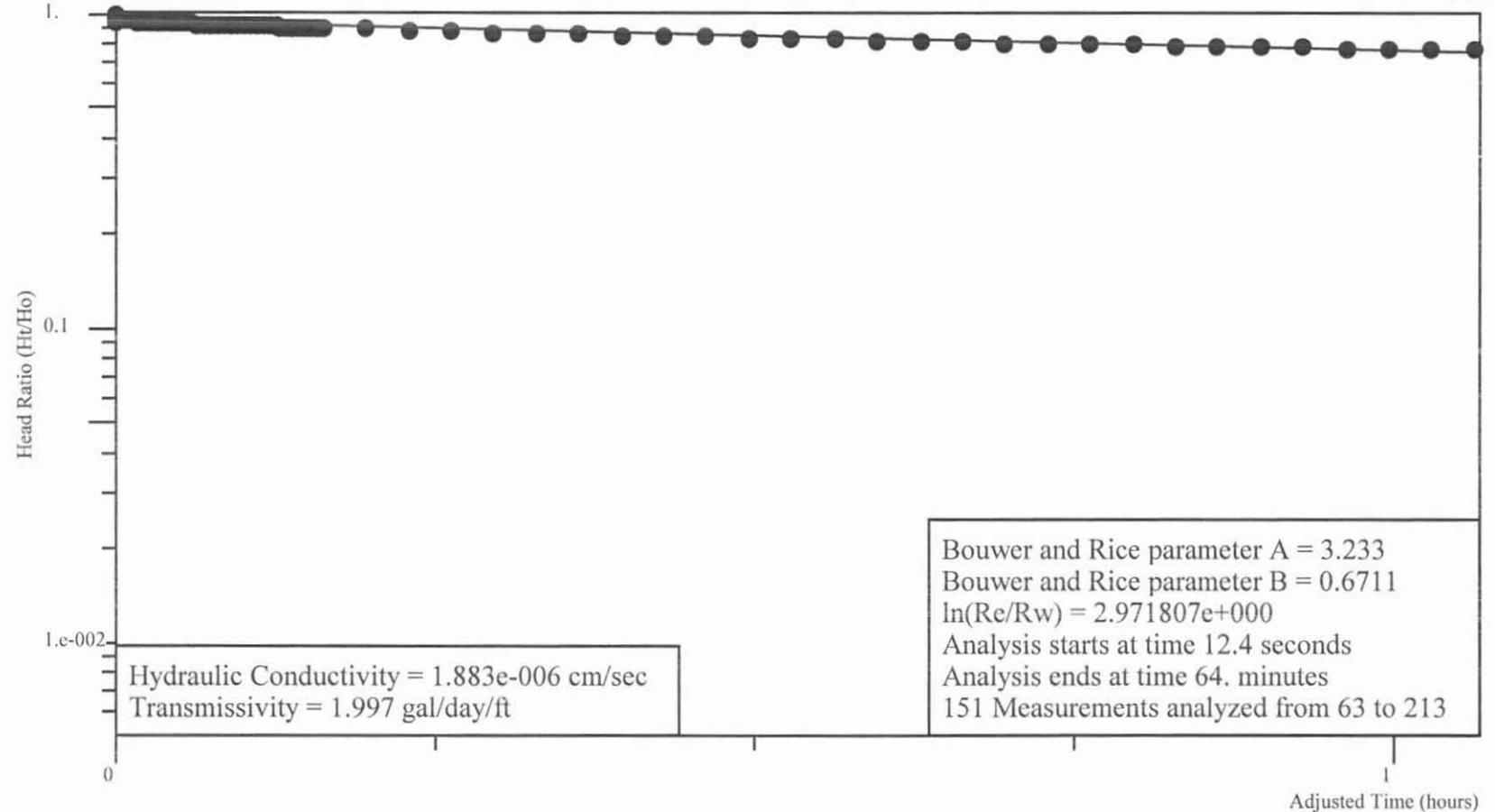
| | | | | | |
|-----|------|------|-------|-------|--------|
| 191 | 1200 | 1180 | 10.79 | 1.518 | 0.6148 |
| 192 | 1320 | 1300 | 10.83 | 1.476 | 0.5978 |
| 193 | 1440 | 1420 | 10.87 | 1.437 | 0.582 |
| 194 | 1560 | 1540 | 10.91 | 1.399 | 0.5666 |
| 195 | 1680 | 1660 | 10.95 | 1.361 | 0.5512 |
| 196 | 1800 | 1780 | 10.98 | 1.327 | 0.5375 |
| 197 | 1920 | 1900 | 11.02 | 1.289 | 0.5221 |
| 198 | 2040 | 2020 | 11.06 | 1.255 | 0.5083 |
| 199 | 2160 | 2140 | 11.09 | 1.217 | 0.4929 |
| 200 | 2280 | 2260 | 11.12 | 1.189 | 0.4816 |
| 201 | 2400 | 2380 | 11.16 | 1.151 | 0.4662 |
| 202 | 2520 | 2500 | 11.19 | 1.117 | 0.4524 |
| 203 | 2640 | 2620 | 11.22 | 1.089 | 0.4411 |
| 204 | 2760 | 2740 | 11.25 | 1.06 | 0.4293 |
| 205 | 2880 | 2860 | 11.28 | 1.031 | 0.4176 |
| 206 | 3000 | 2980 | 11.31 | 1.003 | 0.4062 |
| 207 | 3120 | 3100 | 11.34 | 0.974 | 0.3945 |
| 208 | 3240 | 3220 | 11.37 | 0.945 | 0.3827 |
| 209 | 3360 | 3340 | 11.39 | 0.917 | 0.3714 |
| 210 | 3480 | 3460 | 11.42 | 0.893 | 0.3617 |
| 211 | 3600 | 3580 | 11.45 | 0.864 | 0.3499 |

Aquifer Analysis February 13, 2002

Bouwer and Rice Graph

Coble's Sandrock

P-16 (Rising)



Project Number 419.06

Ho is 2.156 feet at 12.4 seconds

Analysis by D. Reedy of Joyce Engineering, Inc.

Aquifer Analysis

Site Name: Coble's Sandrock
 Test Date: February 13, 2002
 Project Number: 419.06
 Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P16RISIN

Well Label: P-16 (Rising)
 Aquifer Thickness: 50. feet
 Screen Length: 15. feet
 Casing Radius: 1.188 inches
 Effective Radius: 3.125 inches
 Static Water Level: 11.44 feet
 Water Table to Screen Bottom: 30.89 feet
 Anisotropy Ratio: 1.
 Time Adjustment: 12.4 Seconds

Test starts with trial 14

There are 213 time and drawdown measurements

Maximum head is 2.881 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -12.4 | 11.44 | 4.e-003 | 1.388e-003 |
| 2 | 0.198 | -12.2 | 11.44 | 4.e-003 | 1.388e-003 |
| 3 | 0.396 | -12. | 11.44 | 4.e-003 | 1.388e-003 |
| 4 | 0.6 | -11.8 | 11.45 | 9.e-003 | 3.124e-003 |
| 5 | 0.798 | -11.6 | 11.47 | 3.3e-002 | 1.145e-002 |
| 6 | 0.996 | -11.4 | 11.85 | 0.405 | 0.1406 |
| 7 | 1.2 | -11.2 | 12.91 | 1.469 | 0.5099 |
| 8 | 1.398 | -11. | 13.7 | 2.261 | 0.7848 |
| 9 | 1.596 | -10.8 | 13.8 | 2.357 | 0.8181 |
| 10 | 1.8 | -10.6 | 13.32 | 1.884 | 0.6539 |
| 11 | 1.998 | -10.4 | 12.79 | 1.35 | 0.4686 |
| 12 | 2.196 | -10.2 | 12.78 | 1.341 | 0.4655 |
| 13 | 2.4 | -9.996 | 13.29 | 1.851 | 0.6425 |
| 14 | 2.598 | -9.798 | 13.91 | 2.466 | 0.856 |
| 15 | 2.796 | -9.6 | 14.32 | 2.881 | 1. |
| 16 | 3. | -9.396 | 14.29 | 2.853 | 0.9903 |
| 17 | 3.198 | -9.198 | 13.9 | 2.457 | 0.8528 |
| 18 | 3.396 | -9. | 13.36 | 1.918 | 0.6657 |
| 19 | 3.6 | -8.796 | 12.99 | 1.555 | 0.5397 |
| 20 | 3.798 | -8.598 | 12.98 | 1.541 | 0.5349 |
| 21 | 3.996 | -8.4 | 13.32 | 1.875 | 0.6508 |
| 22 | 4.2 | -8.196 | 13.76 | 2.318 | 0.8046 |
| 23 | 4.398 | -7.998 | 14.05 | 2.609 | 0.9056 |
| 24 | 4.596 | -7.8 | 14.05 | 2.614 | 0.9073 |
| 25 | 4.8 | -7.596 | 13.77 | 2.333 | 0.8098 |
| 26 | 4.998 | -7.398 | 13.4 | 1.961 | 0.6807 |
| 27 | 5.196 | -7.2 | 13.14 | 1.703 | 0.5911 |
| 28 | 5.4 | -6.996 | 13.14 | 1.703 | 0.5911 |
| 29 | 5.598 | -6.798 | 13.37 | 1.927 | 0.6689 |
| 30 | 5.796 | -6.6 | 13.68 | 2.242 | 0.7782 |
| 31 | 6. | -6.396 | 13.89 | 2.447 | 0.8494 |

Coble's Sandrock

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -6.198 | 13.89 | 2.447 | 0.8494 |
| 33 | 6.396 | -6. | 13.7 | 2.256 | 0.7831 |
| 34 | 6.6 | -5.796 | 13.44 | 1.999 | 0.6939 |
| 35 | 6.798 | -5.598 | 13.26 | 1.818 | 0.631 |
| 36 | 6.996 | -5.4 | 13.25 | 1.808 | 0.6276 |
| 37 | 7.2 | -5.196 | 13.41 | 1.97 | 0.6838 |
| 38 | 7.398 | -4.998 | 13.63 | 2.185 | 0.7584 |
| 39 | 7.596 | -4.8 | 13.77 | 2.333 | 0.8098 |
| 40 | 7.8 | -4.596 | 13.78 | 2.338 | 0.8115 |
| 41 | 7.998 | -4.398 | 13.65 | 2.209 | 0.7667 |
| 42 | 8.196 | -4.2 | 13.47 | 2.028 | 0.7039 |
| 43 | 8.4 | -3.996 | 13.33 | 1.894 | 0.6574 |
| 44 | 8.598 | -3.798 | 13.33 | 1.889 | 0.6557 |
| 45 | 8.796 | -3.6 | 13.43 | 1.994 | 0.6921 |
| 46 | 9. | -3.396 | 13.58 | 2.142 | 0.7435 |
| 47 | 9.198 | -3.198 | 13.69 | 2.247 | 0.7799 |
| 48 | 9.396 | -3. | 13.7 | 2.256 | 0.7831 |
| 49 | 9.6 | -2.796 | 13.61 | 2.166 | 0.7518 |
| 50 | 9.798 | -2.598 | 13.48 | 2.042 | 0.7088 |
| 51 | 9.996 | -2.4 | 13.39 | 1.951 | 0.6772 |
| 52 | 10.2 | -2.196 | 13.38 | 1.942 | 0.6741 |
| 53 | 10.4 | -1.998 | 13.45 | 2.013 | 0.6987 |
| 54 | 10.6 | -1.8 | 13.56 | 2.118 | 0.7352 |
| 55 | 10.8 | -1.596 | 13.64 | 2.195 | 0.7619 |
| 56 | 11. | -1.398 | 13.64 | 2.199 | 0.7633 |
| 57 | 11.2 | -1.2 | 13.58 | 2.142 | 0.7435 |
| 58 | 11.4 | -0.996 | 13.49 | 2.052 | 0.7123 |
| 59 | 11.6 | -0.798 | 13.43 | 1.989 | 0.6904 |
| 60 | 11.8 | -0.6 | 13.42 | 1.98 | 0.6873 |
| 61 | 12. | -0.396 | 13.47 | 2.032 | 0.7053 |
| 62 | 12.2 | -0.198 | 13.54 | 2.104 | 0.7303 |
| 63 | 12.4 | 0. | 13.6 | 2.156 | 0.7484 |
| 64 | 12.6 | 0.204 | 13.6 | 2.161 | 0.7501 |
| 65 | 12.8 | 0.402 | 13.56 | 2.118 | 0.7352 |
| 66 | 13. | 0.6 | 13.5 | 2.061 | 0.7154 |
| 67 | 13.2 | 0.804 | 13.45 | 2.013 | 0.6987 |
| 68 | 13.4 | 1.002 | 13.45 | 2.009 | 0.6973 |
| 69 | 13.6 | 1.2 | 13.48 | 2.042 | 0.7088 |
| 70 | 13.8 | 1.404 | 13.53 | 2.09 | 0.7254 |
| 71 | 14. | 1.602 | 13.57 | 2.128 | 0.7386 |
| 72 | 14.2 | 1.8 | 13.57 | 2.133 | 0.7404 |
| 73 | 14.4 | 2.004 | 13.54 | 2.104 | 0.7303 |
| 74 | 14.6 | 2.202 | 13.5 | 2.061 | 0.7154 |
| 75 | 14.8 | 2.4 | 13.47 | 2.032 | 0.7053 |
| 76 | 15. | 2.604 | 13.47 | 2.028 | 0.7039 |
| 77 | 15.2 | 2.802 | 13.49 | 2.047 | 0.7105 |
| 78 | 15.4 | 3. | 13.53 | 2.085 | 0.7237 |
| 79 | 15.6 | 3.204 | 13.55 | 2.109 | 0.732 |
| 80 | 15.8 | 3.402 | 13.55 | 2.113 | 0.7334 |
| 81 | 16. | 3.6 | 13.53 | 2.094 | 0.7268 |
| 82 | 16.2 | 3.804 | 13.51 | 2.066 | 0.7171 |
| 83 | 16.4 | 4.002 | 13.48 | 2.042 | 0.7088 |
| 84 | 16.6 | 4.2 | 13.48 | 2.037 | 0.707 |

Coble's Sandrock

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 85 | 16.8 | 4.404 | 13.49 | 2.052 | 0.7123 |
| 86 | 17. | 4.602 | 13.52 | 2.075 | 0.7202 |
| 87 | 17.2 | 4.8 | 13.53 | 2.094 | 0.7268 |
| 88 | 17.4 | 5.004 | 13.54 | 2.099 | 0.7286 |
| 89 | 17.6 | 5.202 | 13.53 | 2.085 | 0.7237 |
| 90 | 17.8 | 5.4 | 13.51 | 2.066 | 0.7171 |
| 91 | 18. | 5.604 | 13.49 | 2.047 | 0.7105 |
| 92 | 18.2 | 5.802 | 13.49 | 2.047 | 0.7105 |
| 93 | 18.4 | 6. | 13.5 | 2.056 | 0.7136 |
| 94 | 18.6 | 6.204 | 13.51 | 2.07 | 0.7185 |
| 95 | 18.8 | 6.402 | 13.53 | 2.085 | 0.7237 |
| 96 | 19. | 6.6 | 13.53 | 2.09 | 0.7254 |
| 97 | 19.2 | 6.804 | 13.52 | 2.08 | 0.722 |
| 98 | 19.4 | 7.002 | 13.51 | 2.066 | 0.7171 |
| 99 | 19.6 | 7.2 | 13.49 | 2.052 | 0.7123 |
| 100 | 19.8 | 7.404 | 13.49 | 2.052 | 0.7123 |
| 101 | 20. | 7.602 | 13.5 | 2.056 | 0.7136 |
| 102 | 21. | 8.604 | 13.5 | 2.056 | 0.7136 |
| 103 | 22. | 9.6 | 13.51 | 2.07 | 0.7185 |
| 104 | 23. | 10.6 | 13.5 | 2.061 | 0.7154 |
| 105 | 24. | 11.6 | 13.5 | 2.056 | 0.7136 |
| 106 | 25. | 12.6 | 13.51 | 2.066 | 0.7171 |
| 107 | 26. | 13.6 | 13.5 | 2.061 | 0.7154 |
| 108 | 27. | 14.6 | 13.5 | 2.056 | 0.7136 |
| 109 | 28. | 15.6 | 13.5 | 2.061 | 0.7154 |
| 110 | 29. | 16.6 | 13.5 | 2.056 | 0.7136 |
| 111 | 30. | 17.6 | 13.5 | 2.056 | 0.7136 |
| 112 | 31. | 18.6 | 13.5 | 2.056 | 0.7136 |
| 113 | 32. | 19.6 | 13.5 | 2.056 | 0.7136 |
| 114 | 33. | 20.6 | 13.5 | 2.056 | 0.7136 |
| 115 | 34. | 21.6 | 13.5 | 2.056 | 0.7136 |
| 116 | 35. | 22.6 | 13.49 | 2.052 | 0.7123 |
| 117 | 36. | 23.6 | 13.49 | 2.052 | 0.7123 |
| 118 | 37. | 24.6 | 13.49 | 2.052 | 0.7123 |
| 119 | 38. | 25.6 | 13.49 | 2.052 | 0.7123 |
| 120 | 39. | 26.6 | 13.49 | 2.052 | 0.7123 |
| 121 | 40. | 27.6 | 13.49 | 2.052 | 0.7123 |
| 122 | 41. | 28.6 | 13.49 | 2.052 | 0.7123 |
| 123 | 42. | 29.6 | 13.49 | 2.052 | 0.7123 |
| 124 | 43. | 30.6 | 13.49 | 2.052 | 0.7123 |
| 125 | 44. | 31.6 | 13.49 | 2.052 | 0.7123 |
| 126 | 45. | 32.6 | 13.49 | 2.047 | 0.7105 |
| 127 | 46. | 33.6 | 13.49 | 2.047 | 0.7105 |
| 128 | 47. | 34.6 | 13.49 | 2.047 | 0.7105 |
| 129 | 48. | 35.6 | 13.49 | 2.047 | 0.7105 |
| 130 | 49. | 36.6 | 13.49 | 2.047 | 0.7105 |
| 131 | 50. | 37.6 | 13.49 | 2.047 | 0.7105 |
| 132 | 51. | 38.6 | 13.49 | 2.047 | 0.7105 |
| 133 | 52. | 39.6 | 13.49 | 2.047 | 0.7105 |
| 134 | 53. | 40.6 | 13.49 | 2.047 | 0.7105 |
| 135 | 54. | 41.6 | 13.49 | 2.047 | 0.7105 |
| 136 | 55. | 42.6 | 13.49 | 2.047 | 0.7105 |
| 137 | 56. | 43.6 | 13.49 | 2.047 | 0.7105 |

Coble's Sandrock

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 138 | 57. | 44.6 | 13.49 | 2.047 | 0.7105 |
| 139 | 58. | 45.6 | 13.49 | 2.047 | 0.7105 |
| 140 | 59. | 46.6 | 13.48 | 2.042 | 0.7088 |
| 141 | 60. | 47.6 | 13.48 | 2.042 | 0.7088 |
| 142 | 72. | 59.6 | 13.48 | 2.037 | 0.707 |
| 143 | 84. | 71.6 | 13.48 | 2.037 | 0.707 |
| 144 | 96. | 83.6 | 13.47 | 2.032 | 0.7053 |
| 145 | 108. | 95.6 | 13.47 | 2.028 | 0.7039 |
| 146 | 120. | 107.6 | 13.47 | 2.028 | 0.7039 |
| 147 | 132. | 119.6 | 13.46 | 2.023 | 0.7022 |
| 148 | 144. | 131.6 | 13.46 | 2.018 | 0.7005 |
| 149 | 156. | 143.6 | 13.46 | 2.018 | 0.7005 |
| 150 | 168. | 155.6 | 13.46 | 2.018 | 0.7005 |
| 151 | 180. | 167.6 | 13.45 | 2.013 | 0.6987 |
| 152 | 192. | 179.6 | 13.45 | 2.009 | 0.6973 |
| 153 | 204. | 191.6 | 13.45 | 2.009 | 0.6973 |
| 154 | 216. | 203.6 | 13.44 | 2.004 | 0.6956 |
| 155 | 228. | 215.6 | 13.44 | 2.004 | 0.6956 |
| 156 | 240. | 227.6 | 13.44 | 1.999 | 0.6939 |
| 157 | 252. | 239.6 | 13.44 | 1.999 | 0.6939 |
| 158 | 264. | 251.6 | 13.43 | 1.994 | 0.6921 |
| 159 | 276. | 263.6 | 13.43 | 1.994 | 0.6921 |
| 160 | 288. | 275.6 | 13.43 | 1.994 | 0.6921 |
| 161 | 300. | 287.6 | 13.43 | 1.989 | 0.6904 |
| 162 | 312. | 299.6 | 13.43 | 1.989 | 0.6904 |
| 163 | 324. | 311.6 | 13.43 | 1.985 | 0.689 |
| 164 | 336. | 323.6 | 13.43 | 1.985 | 0.689 |
| 165 | 348. | 335.6 | 13.43 | 1.985 | 0.689 |
| 166 | 360. | 347.6 | 13.42 | 1.98 | 0.6873 |
| 167 | 372. | 359.6 | 13.42 | 1.98 | 0.6873 |
| 168 | 384. | 371.6 | 13.41 | 1.975 | 0.6855 |
| 169 | 396. | 383.6 | 13.41 | 1.975 | 0.6855 |
| 170 | 408. | 395.6 | 13.41 | 1.97 | 0.6838 |
| 171 | 420. | 407.6 | 13.41 | 1.97 | 0.6838 |
| 172 | 432. | 419.6 | 13.41 | 1.97 | 0.6838 |
| 173 | 444. | 431.6 | 13.41 | 1.966 | 0.6824 |
| 174 | 456. | 443.6 | 13.41 | 1.966 | 0.6824 |
| 175 | 468. | 455.6 | 13.41 | 1.966 | 0.6824 |
| 176 | 480. | 467.6 | 13.4 | 1.961 | 0.6807 |
| 177 | 492. | 479.6 | 13.4 | 1.961 | 0.6807 |
| 178 | 504. | 491.6 | 13.4 | 1.956 | 0.6789 |
| 179 | 516. | 503.6 | 13.4 | 1.956 | 0.6789 |
| 180 | 528. | 515.6 | 13.4 | 1.956 | 0.6789 |
| 181 | 540. | 527.6 | 13.39 | 1.951 | 0.6772 |
| 182 | 552. | 539.6 | 13.39 | 1.951 | 0.6772 |
| 183 | 564. | 551.6 | 13.39 | 1.951 | 0.6772 |
| 184 | 576. | 563.6 | 13.39 | 1.947 | 0.6758 |
| 185 | 588. | 575.6 | 13.39 | 1.947 | 0.6758 |
| 186 | 600. | 587.6 | 13.39 | 1.947 | 0.6758 |
| 187 | 720. | 707.6 | 13.37 | 1.927 | 0.6689 |
| 188 | 840. | 827.6 | 13.35 | 1.913 | 0.664 |
| 189 | 960. | 947.6 | 13.34 | 1.899 | 0.6591 |
| 190 | 1080 | 1068 | 13.32 | 1.884 | 0.6539 |

Coble's Sandrock

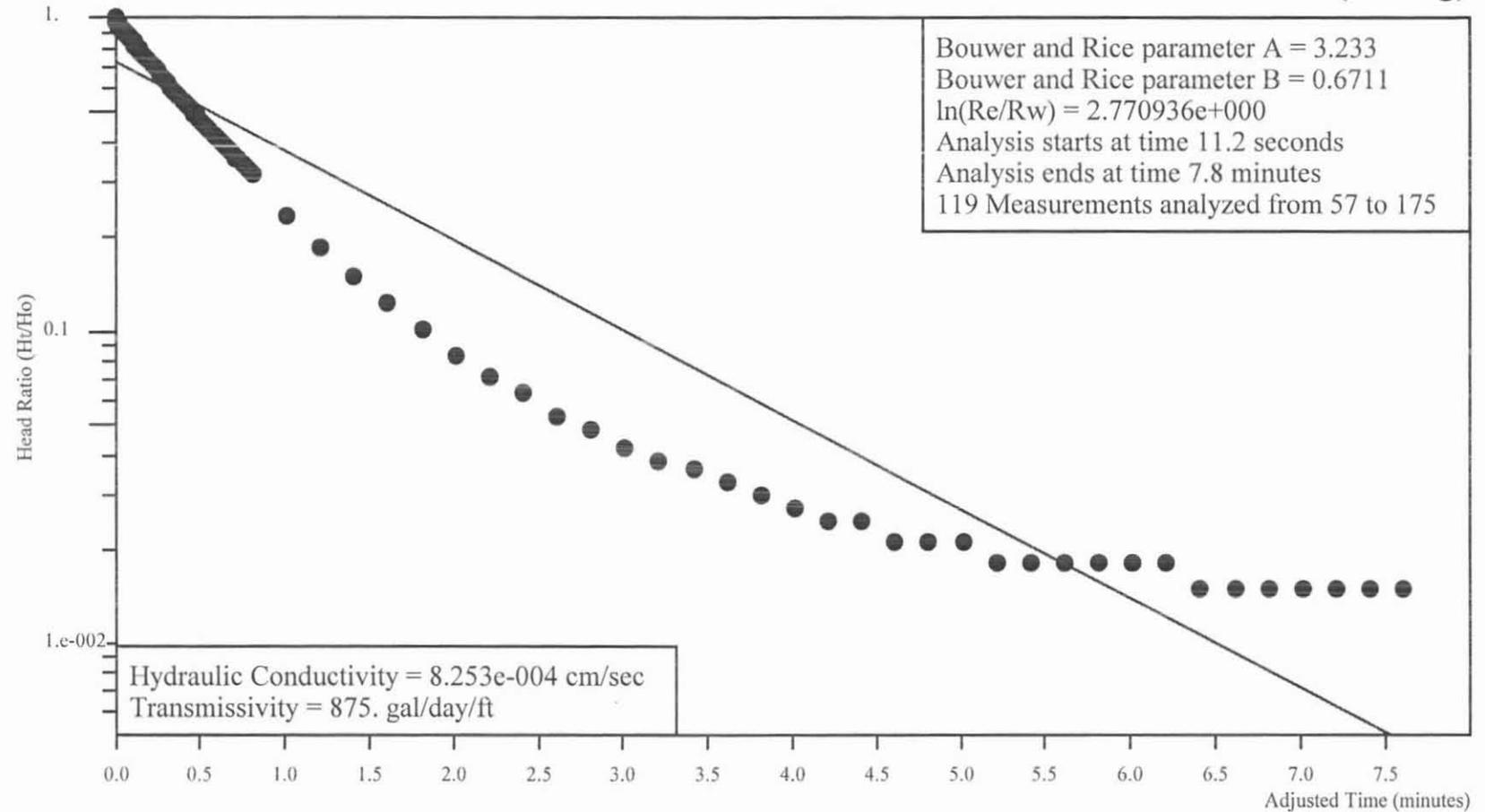
| | | | | | |
|-----|------|------|-------|-------|--------|
| 191 | 1200 | 1188 | 13.31 | 1.87 | 0.6491 |
| 192 | 1320 | 1308 | 13.3 | 1.856 | 0.6442 |
| 193 | 1440 | 1428 | 13.29 | 1.846 | 0.6407 |
| 194 | 1560 | 1548 | 13.27 | 1.832 | 0.6359 |
| 195 | 1680 | 1668 | 13.26 | 1.822 | 0.6324 |
| 196 | 1800 | 1788 | 13.25 | 1.808 | 0.6276 |
| 197 | 1920 | 1908 | 13.24 | 1.799 | 0.6244 |
| 198 | 2040 | 2028 | 13.23 | 1.789 | 0.621 |
| 199 | 2160 | 2148 | 13.22 | 1.78 | 0.6178 |
| 200 | 2280 | 2268 | 13.21 | 1.765 | 0.6126 |
| 201 | 2400 | 2388 | 13.2 | 1.756 | 0.6095 |
| 202 | 2520 | 2508 | 13.19 | 1.746 | 0.606 |
| 203 | 2640 | 2628 | 13.18 | 1.737 | 0.6029 |
| 204 | 2760 | 2748 | 13.17 | 1.727 | 0.5994 |
| 205 | 2880 | 2868 | 13.16 | 1.717 | 0.596 |
| 206 | 3000 | 2988 | 13.15 | 1.708 | 0.5928 |
| 207 | 3120 | 3108 | 13.14 | 1.703 | 0.5911 |
| 208 | 3240 | 3228 | 13.13 | 1.694 | 0.588 |
| 209 | 3360 | 3348 | 13.12 | 1.684 | 0.5845 |
| 210 | 3480 | 3468 | 13.12 | 1.675 | 0.5814 |
| 211 | 3600 | 3588 | 13.11 | 1.67 | 0.5797 |
| 212 | 3720 | 3708 | 13.1 | 1.66 | 0.5762 |
| 213 | 3840 | 3828 | 13.1 | 1.656 | 0.5748 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-17 (Falling)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

Ho is 1.597 feet at 11.2 seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P17FALL

Well Label: P-17 (Falling)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.888 inches
Effective Radius: 3.125 inches
Static Water Level: 17.27 feet
Water Table to Screen Bottom: 21.23 feet
Anisotropy Ratio: 1.
Time Adjustment: 11.2 Seconds

Test starts with trial 30

There are 198 time and drawdown measurements

Maximum head is 2.933 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -11.2 | 17.26 | 1.e-002 | 3.409e-003 |
| 2 | 0.198 | -11. | 17.26 | 1.e-002 | 3.409e-003 |
| 3 | 0.396 | -10.8 | 17.26 | 1.e-002 | 3.409e-003 |
| 4 | 0.6 | -10.6 | 17.26 | 1.e-002 | 3.409e-003 |
| 5 | 0.798 | -10.4 | 17.26 | 1.e-002 | 3.409e-003 |
| 6 | 0.996 | -10.2 | 17.26 | 1.e-002 | 3.409e-003 |
| 7 | 1.2 | -9.996 | 17.25 | 1.5e-002 | 5.114e-003 |
| 8 | 1.398 | -9.798 | 17.25 | 1.5e-002 | 5.114e-003 |
| 9 | 1.596 | -9.6 | 17.25 | 1.5e-002 | 5.114e-003 |
| 10 | 1.8 | -9.396 | 17.27 | 5.e-003 | 1.705e-003 |
| 11 | 1.998 | -9.198 | 17.26 | 1.e-002 | 3.409e-003 |
| 12 | 2.196 | -9. | 17.26 | 1.e-002 | 3.409e-003 |
| 13 | 2.4 | -8.796 | 17.26 | 1.e-002 | 3.409e-003 |
| 14 | 2.598 | -8.598 | 16.77 | 0.501 | 0.1708 |
| 15 | 2.796 | -8.4 | 16.83 | 0.439 | 0.1497 |
| 16 | 3. | -8.196 | 16.43 | 0.844 | 0.2878 |
| 17 | 3.198 | -7.998 | 16.06 | 1.206 | 0.4112 |
| 18 | 3.396 | -7.8 | 16.73 | 0.544 | 0.1855 |
| 19 | 3.6 | -7.596 | 16.68 | 0.587 | 0.2001 |
| 20 | 3.798 | -7.398 | 16.39 | 0.882 | 0.3007 |
| 21 | 3.996 | -7.2 | 15.51 | 1.759 | 0.5997 |
| 22 | 4.2 | -6.996 | 15.62 | 1.65 | 0.5626 |
| 23 | 4.398 | -6.798 | 16.32 | 0.954 | 0.3253 |
| 24 | 4.596 | -6.6 | 16.5 | 0.772 | 0.2632 |
| 25 | 4.8 | -6.396 | 16.08 | 1.187 | 0.4047 |
| 26 | 4.998 | -6.198 | 15.11 | 2.165 | 0.7382 |
| 27 | 5.196 | -6. | 15.41 | 1.855 | 0.6325 |
| 28 | 5.4 | -5.796 | 15.91 | 1.359 | 0.4633 |
| 29 | 5.598 | -5.598 | 15.87 | 1.397 | 0.4763 |
| 30 | 5.796 | -5.4 | 15.17 | 2.098 | 0.7153 |
| 31 | 6. | -5.196 | 14.34 | 2.933 | 1. |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -4.998 | 14.85 | 2.418 | 0.8244 |
| 33 | 6.396 | -4.8 | 15.46 | 1.807 | 0.6161 |
| 34 | 6.6 | -4.596 | 15.85 | 1.416 | 0.4828 |
| 35 | 6.798 | -4.398 | 15.87 | 1.397 | 0.4763 |
| 36 | 6.996 | -4.2 | 15.53 | 1.74 | 0.5932 |
| 37 | 7.2 | -3.996 | 15.18 | 2.089 | 0.7122 |
| 38 | 7.398 | -3.798 | 15.13 | 2.141 | 0.73 |
| 39 | 7.596 | -3.6 | 15.41 | 1.855 | 0.6325 |
| 40 | 7.8 | -3.396 | 15.49 | 1.783 | 0.6079 |
| 41 | 7.998 | -3.198 | 15.58 | 1.688 | 0.5755 |
| 42 | 8.196 | -3. | 15.45 | 1.817 | 0.6195 |
| 43 | 8.4 | -2.796 | 15.58 | 1.693 | 0.5772 |
| 44 | 8.598 | -2.598 | 15.47 | 1.798 | 0.613 |
| 45 | 8.796 | -2.4 | 15.55 | 1.716 | 0.5851 |
| 46 | 9. | -2.196 | 15.91 | 1.359 | 0.4633 |
| 47 | 9.198 | -1.998 | 15.54 | 1.726 | 0.5885 |
| 48 | 9.396 | -1.8 | 15.64 | 1.626 | 0.5544 |
| 49 | 9.6 | -1.596 | 15.82 | 1.454 | 0.4957 |
| 50 | 9.798 | -1.398 | 15.47 | 1.798 | 0.613 |
| 51 | 9.996 | -1.2 | 15.58 | 1.693 | 0.5772 |
| 52 | 10.2 | -0.996 | 15.72 | 1.55 | 0.5285 |
| 53 | 10.4 | -0.798 | 15.76 | 1.511 | 0.5152 |
| 54 | 10.6 | -0.6 | 15.68 | 1.593 | 0.5431 |
| 55 | 10.8 | -0.396 | 15.63 | 1.645 | 0.5609 |
| 56 | 11. | -0.198 | 15.62 | 1.65 | 0.5626 |
| 57 | 11.2 | 0. | 15.67 | 1.597 | 0.5445 |
| 58 | 11.4 | 0.204 | 15.72 | 1.55 | 0.5285 |
| 59 | 11.6 | 0.402 | 15.73 | 1.54 | 0.5251 |
| 60 | 11.8 | 0.6 | 15.73 | 1.545 | 0.5268 |
| 61 | 12. | 0.804 | 15.71 | 1.559 | 0.5315 |
| 62 | 12.2 | 1.002 | 15.73 | 1.545 | 0.5268 |
| 63 | 12.4 | 1.2 | 15.73 | 1.545 | 0.5268 |
| 64 | 12.6 | 1.404 | 15.77 | 1.502 | 0.5121 |
| 65 | 12.8 | 1.602 | 15.77 | 1.497 | 0.5104 |
| 66 | 13. | 1.8 | 15.74 | 1.526 | 0.5203 |
| 67 | 13.2 | 2.004 | 15.78 | 1.492 | 0.5087 |
| 68 | 13.4 | 2.202 | 15.77 | 1.497 | 0.5104 |
| 69 | 13.6 | 2.4 | 15.79 | 1.483 | 0.5056 |
| 70 | 13.8 | 2.604 | 15.79 | 1.478 | 0.5039 |
| 71 | 14. | 2.802 | 15.81 | 1.464 | 0.4991 |
| 72 | 14.2 | 3. | 15.82 | 1.45 | 0.4944 |
| 73 | 14.4 | 3.204 | 15.79 | 1.478 | 0.5039 |
| 74 | 14.6 | 3.402 | 15.82 | 1.45 | 0.4944 |
| 75 | 14.8 | 3.6 | 15.83 | 1.435 | 0.4893 |
| 76 | 15. | 3.804 | 15.84 | 1.43 | 0.4876 |
| 77 | 15.2 | 4.002 | 15.86 | 1.411 | 0.4811 |
| 78 | 15.4 | 4.2 | 15.83 | 1.435 | 0.4893 |
| 79 | 15.6 | 4.404 | 15.86 | 1.406 | 0.4794 |
| 80 | 15.8 | 4.602 | 15.87 | 1.402 | 0.478 |
| 81 | 16. | 4.8 | 15.87 | 1.397 | 0.4763 |
| 82 | 16.2 | 5.004 | 15.88 | 1.392 | 0.4746 |
| 83 | 16.4 | 5.202 | 15.89 | 1.383 | 0.4715 |
| 84 | 16.6 | 5.4 | 15.9 | 1.373 | 0.4681 |

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 85 | 16.8 | 5.604 | 15.9 | 1.368 | 0.4664 |
| 86 | 17. | 5.802 | 15.91 | 1.359 | 0.4633 |
| 87 | 17.2 | 6. | 15.91 | 1.359 | 0.4633 |
| 88 | 17.4 | 6.204 | 15.92 | 1.349 | 0.4599 |
| 89 | 17.6 | 6.402 | 15.92 | 1.349 | 0.4599 |
| 90 | 17.8 | 6.6 | 15.94 | 1.33 | 0.4535 |
| 91 | 18. | 6.804 | 15.93 | 1.34 | 0.4569 |
| 92 | 18.2 | 7.002 | 15.94 | 1.33 | 0.4535 |
| 93 | 18.4 | 7.2 | 15.95 | 1.316 | 0.4487 |
| 94 | 18.6 | 7.404 | 15.97 | 1.302 | 0.4439 |
| 95 | 18.8 | 7.602 | 15.98 | 1.292 | 0.4405 |
| 96 | 19. | 7.8 | 15.98 | 1.292 | 0.4405 |
| 97 | 19.2 | 8.004 | 15.98 | 1.292 | 0.4405 |
| 98 | 19.4 | 8.202 | 15.98 | 1.292 | 0.4405 |
| 99 | 19.6 | 8.4 | 15.99 | 1.283 | 0.4374 |
| 100 | 19.8 | 8.604 | 16. | 1.273 | 0.434 |
| 101 | 20. | 8.802 | 16.01 | 1.263 | 0.4306 |
| 102 | 21. | 9.804 | 16.04 | 1.235 | 0.4211 |
| 103 | 22. | 10.8 | 16.07 | 1.202 | 0.4098 |
| 104 | 23. | 11.8 | 16.1 | 1.173 | 0.3999 |
| 105 | 24. | 12.8 | 16.13 | 1.14 | 0.3887 |
| 106 | 25. | 13.8 | 16.15 | 1.116 | 0.3805 |
| 107 | 26. | 14.8 | 16.18 | 1.087 | 0.3706 |
| 108 | 27. | 15.8 | 16.21 | 1.063 | 0.3624 |
| 109 | 28. | 16.8 | 16.23 | 1.035 | 0.3529 |
| 110 | 29. | 17.8 | 16.26 | 1.011 | 0.3447 |
| 111 | 30. | 18.8 | 16.28 | 0.992 | 0.3382 |
| 112 | 31. | 19.8 | 16.31 | 0.963 | 0.3283 |
| 113 | 32. | 20.8 | 16.33 | 0.939 | 0.3202 |
| 114 | 33. | 21.8 | 16.35 | 0.92 | 0.3137 |
| 115 | 34. | 22.8 | 16.37 | 0.896 | 0.3055 |
| 116 | 35. | 23.8 | 16.4 | 0.873 | 0.2976 |
| 117 | 36. | 24.8 | 16.42 | 0.854 | 0.2912 |
| 118 | 37. | 25.8 | 16.44 | 0.834 | 0.2844 |
| 119 | 38. | 26.8 | 16.45 | 0.815 | 0.2779 |
| 120 | 39. | 27.8 | 16.47 | 0.796 | 0.2714 |
| 121 | 40. | 28.8 | 16.49 | 0.782 | 0.2666 |
| 122 | 41. | 29.8 | 16.51 | 0.763 | 0.2601 |
| 123 | 42. | 30.8 | 16.53 | 0.744 | 0.2537 |
| 124 | 43. | 31.8 | 16.54 | 0.73 | 0.2489 |
| 125 | 44. | 32.8 | 16.56 | 0.715 | 0.2438 |
| 126 | 45. | 33.8 | 16.57 | 0.696 | 0.2373 |
| 127 | 46. | 34.8 | 16.59 | 0.682 | 0.2325 |
| 128 | 47. | 35.8 | 16.6 | 0.668 | 0.2278 |
| 129 | 48. | 36.8 | 16.62 | 0.653 | 0.2226 |
| 130 | 49. | 37.8 | 16.63 | 0.639 | 0.2179 |
| 131 | 50. | 38.8 | 16.65 | 0.625 | 0.2131 |
| 132 | 51. | 39.8 | 16.66 | 0.61 | 0.208 |
| 133 | 52. | 40.8 | 16.67 | 0.601 | 0.2049 |
| 134 | 53. | 41.8 | 16.68 | 0.587 | 0.2001 |
| 135 | 54. | 42.8 | 16.7 | 0.572 | 0.195 |
| 136 | 55. | 43.8 | 16.71 | 0.563 | 0.192 |
| 137 | 56. | 44.8 | 16.72 | 0.548 | 0.1868 |

| | | | | | |
|-----|------|-------|-------|----------|------------|
| 138 | 57. | 45.8 | 16.73 | 0.539 | 0.1838 |
| 139 | 58. | 46.8 | 16.74 | 0.529 | 0.1804 |
| 140 | 59. | 47.8 | 16.75 | 0.515 | 0.1756 |
| 141 | 60. | 48.8 | 16.76 | 0.506 | 0.1725 |
| 142 | 72. | 60.8 | 16.9 | 0.372 | 0.1268 |
| 143 | 84. | 72.8 | 16.97 | 0.296 | 0.1009 |
| 144 | 96. | 84.8 | 17.03 | 0.239 | 8.149e-002 |
| 145 | 108. | 96.8 | 17.07 | 0.196 | 6.683e-002 |
| 146 | 120. | 108.8 | 17.11 | 0.162 | 5.523e-002 |
| 147 | 132. | 120.8 | 17.14 | 0.134 | 4.569e-002 |
| 148 | 144. | 132.8 | 17.16 | 0.115 | 3.921e-002 |
| 149 | 156. | 144.8 | 17.17 | 0.101 | 3.444e-002 |
| 150 | 168. | 156.8 | 17.18 | 8.6e-002 | 2.932e-002 |
| 151 | 180. | 168.8 | 17.19 | 7.7e-002 | 2.625e-002 |
| 152 | 192. | 180.8 | 17.2 | 6.7e-002 | 2.284e-002 |
| 153 | 204. | 192.8 | 17.21 | 6.2e-002 | 2.114e-002 |
| 154 | 216. | 204.8 | 17.21 | 5.8e-002 | 1.977e-002 |
| 155 | 228. | 216.8 | 17.22 | 5.3e-002 | 1.807e-002 |
| 156 | 240. | 228.8 | 17.22 | 4.8e-002 | 1.637e-002 |
| 157 | 252. | 240.8 | 17.23 | 4.3e-002 | 1.466e-002 |
| 158 | 264. | 252.8 | 17.23 | 3.9e-002 | 1.33e-002 |
| 159 | 276. | 264.8 | 17.23 | 3.9e-002 | 1.33e-002 |
| 160 | 288. | 276.8 | 17.24 | 3.4e-002 | 1.159e-002 |
| 161 | 300. | 288.8 | 17.24 | 3.4e-002 | 1.159e-002 |
| 162 | 312. | 300.8 | 17.24 | 3.4e-002 | 1.159e-002 |
| 163 | 324. | 312.8 | 17.24 | 2.9e-002 | 9.887e-003 |
| 164 | 336. | 324.8 | 17.24 | 2.9e-002 | 9.887e-003 |
| 165 | 348. | 336.8 | 17.24 | 2.9e-002 | 9.887e-003 |
| 166 | 360. | 348.8 | 17.24 | 2.9e-002 | 9.887e-003 |
| 167 | 372. | 360.8 | 17.24 | 2.9e-002 | 9.887e-003 |
| 168 | 384. | 372.8 | 17.24 | 2.9e-002 | 9.887e-003 |
| 169 | 396. | 384.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 170 | 408. | 396.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 171 | 420. | 408.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 172 | 432. | 420.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 173 | 444. | 432.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 174 | 456. | 444.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 175 | 468. | 456.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 176 | 480. | 468.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 177 | 492. | 480.8 | 17.25 | 2.4e-002 | 8.183e-003 |
| 178 | 504. | 492.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 179 | 516. | 504.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 180 | 528. | 516.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 181 | 540. | 528.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 182 | 552. | 540.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 183 | 564. | 552.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 184 | 576. | 564.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 185 | 588. | 576.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 186 | 600. | 588.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 187 | 720. | 708.8 | 17.25 | 2.e-002 | 6.819e-003 |
| 188 | 840. | 828.8 | 17.25 | 1.5e-002 | 5.114e-003 |
| 189 | 960. | 948.8 | 17.25 | 1.5e-002 | 5.114e-003 |
| 190 | 1080 | 1069 | 17.25 | 1.5e-002 | 5.114e-003 |

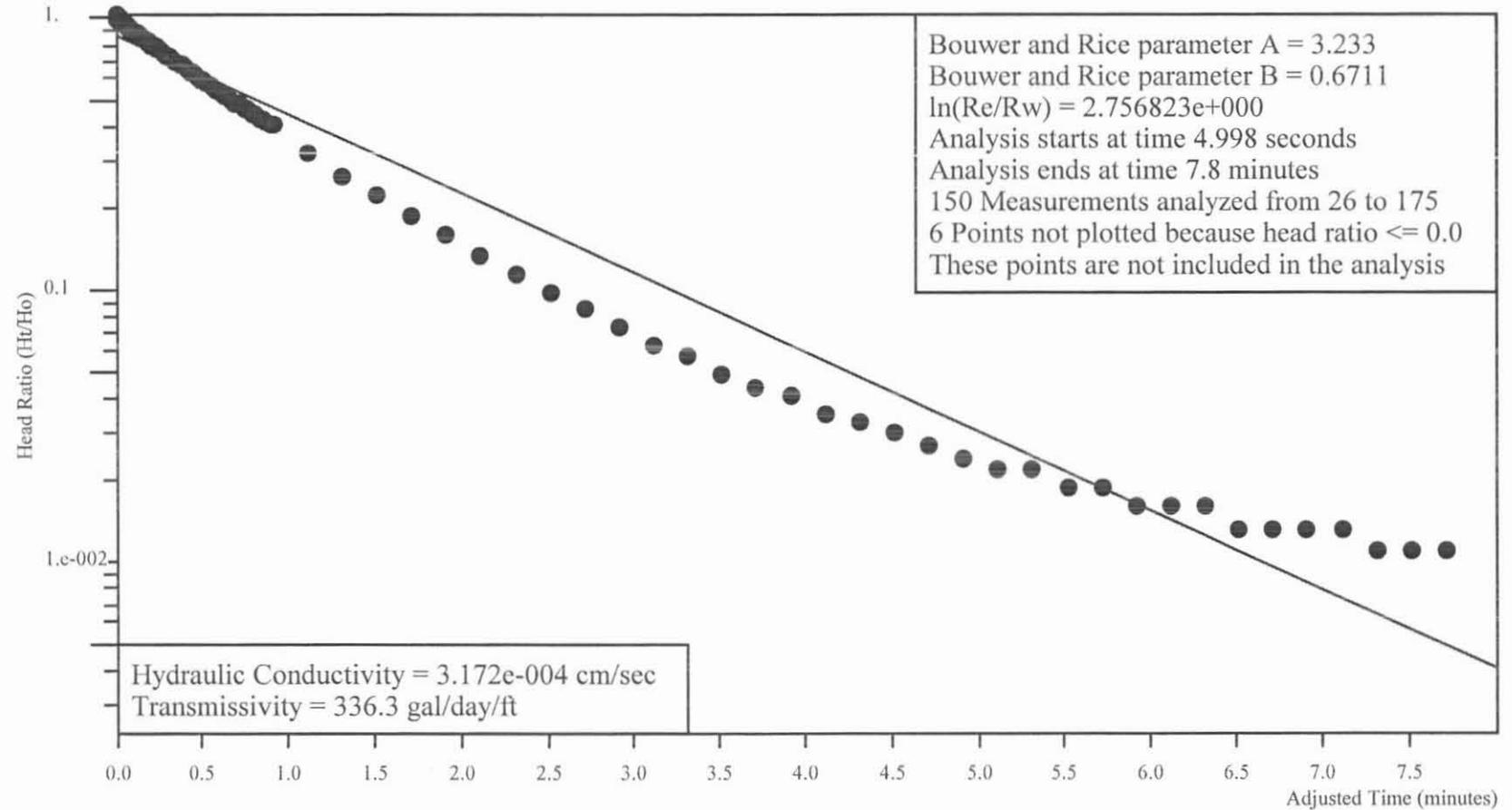
| | | | | | |
|-----|------|------|-------|----------|------------|
| 191 | 1200 | 1189 | 17.25 | 1.5e-002 | 5.114e-003 |
| 192 | 1320 | 1309 | 17.25 | 1.5e-002 | 5.114e-003 |
| 193 | 1440 | 1429 | 17.25 | 1.5e-002 | 5.114e-003 |
| 194 | 1560 | 1549 | 17.25 | 1.5e-002 | 5.114e-003 |
| 195 | 1680 | 1669 | 17.25 | 1.5e-002 | 5.114e-003 |
| 196 | 1800 | 1789 | 17.25 | 1.5e-002 | 5.114e-003 |
| 197 | 1920 | 1909 | 17.26 | 1.e-002 | 3.409e-003 |
| 198 | 2040 | 2029 | 17.25 | 1.5e-002 | 5.114e-003 |

Aquifer Analysis February 5, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-17 (Rising)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

Ho is 1.738 feet at 4.998 seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 5, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P17RISIN

Well Label: P-17 (Rising)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.188 inches
Effective Radius: 3.125 inches
Static Water Level: 17.86 feet
Water Table to Screen Bottom: 20.64 feet
Anisotropy Ratio: 1.
Time Adjustment: 4.998 Seconds

Test starts with trial 9

There are 200 time and drawdown measurements

Maximum head is 2.971 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -4.998 | 19.6 | 1.738 | 0.585 |
| 2 | 0.198 | -4.8 | 19.08 | 1.224 | 0.412 |
| 3 | 0.396 | -4.602 | 18.36 | 0.505 | 0.17 |
| 4 | 0.6 | -4.398 | 18.06 | 0.195 | 6.563e-002 |
| 5 | 0.798 | -4.2 | 19.6 | 1.743 | 0.5867 |
| 6 | 0.996 | -4.002 | 19.21 | 1.352 | 0.4551 |
| 7 | 1.2 | -3.798 | 19.45 | 1.595 | 0.5369 |
| 8 | 1.398 | -3.6 | 18.67 | 0.814 | 0.274 |
| 9 | 1.596 | -3.402 | 19.72 | 1.862 | 0.6267 |
| 10 | 1.8 | -3.198 | 20.83 | 2.971 | 1. |
| 11 | 1.998 | -3. | 20.2 | 2.342 | 0.7883 |
| 12 | 2.196 | -2.802 | 19.37 | 1.509 | 0.5079 |
| 13 | 2.4 | -2.598 | 19.44 | 1.576 | 0.5305 |
| 14 | 2.598 | -2.4 | 19.99 | 2.128 | 0.7163 |
| 15 | 2.796 | -2.202 | 20.1 | 2.238 | 0.7533 |
| 16 | 3. | -1.998 | 19.73 | 1.866 | 0.6281 |
| 17 | 3.198 | -1.8 | 19.53 | 1.666 | 0.5608 |
| 18 | 3.396 | -1.602 | 19.68 | 1.824 | 0.6139 |
| 19 | 3.6 | -1.398 | 19.85 | 1.99 | 0.6698 |
| 20 | 3.798 | -1.2 | 19.77 | 1.914 | 0.6442 |
| 21 | 3.996 | -1.002 | 19.63 | 1.771 | 0.5961 |
| 22 | 4.2 | -0.798 | 19.61 | 1.752 | 0.5897 |
| 23 | 4.398 | -0.6 | 19.69 | 1.833 | 0.617 |
| 24 | 4.596 | -0.402 | 19.72 | 1.857 | 0.625 |
| 25 | 4.8 | -0.198 | 19.66 | 1.8 | 0.6059 |
| 26 | 4.998 | 0. | 19.6 | 1.738 | 0.585 |
| 27 | 5.196 | 0.198 | 19.62 | 1.757 | 0.5914 |
| 28 | 5.4 | 0.402 | 19.64 | 1.776 | 0.5978 |
| 29 | 5.598 | 0.6 | 19.63 | 1.766 | 0.5944 |
| 30 | 5.796 | 0.798 | 19.58 | 1.719 | 0.5786 |
| 31 | 6. | 1.002 | 19.57 | 1.714 | 0.5769 |

| | | | | | |
|----|-------|-------|-------|-------|--------|
| 32 | 6.198 | 1.2 | 19.6 | 1.738 | 0.585 |
| 33 | 6.396 | 1.398 | 19.59 | 1.728 | 0.5816 |
| 34 | 6.6 | 1.602 | 19.57 | 1.714 | 0.5769 |
| 35 | 6.798 | 1.8 | 19.56 | 1.7 | 0.5722 |
| 36 | 6.996 | 1.998 | 19.56 | 1.695 | 0.5705 |
| 37 | 7.2 | 2.202 | 19.55 | 1.69 | 0.5688 |
| 38 | 7.398 | 2.4 | 19.55 | 1.686 | 0.5675 |
| 39 | 7.596 | 2.598 | 19.52 | 1.662 | 0.5594 |
| 40 | 7.8 | 2.802 | 19.53 | 1.666 | 0.5608 |
| 41 | 7.998 | 3. | 19.52 | 1.662 | 0.5594 |
| 42 | 8.196 | 3.198 | 19.51 | 1.652 | 0.556 |
| 43 | 8.4 | 3.402 | 19.5 | 1.643 | 0.553 |
| 44 | 8.598 | 3.6 | 19.49 | 1.633 | 0.5496 |
| 45 | 8.796 | 3.798 | 19.5 | 1.638 | 0.5513 |
| 46 | 9. | 4.002 | 19.49 | 1.628 | 0.548 |
| 47 | 9.198 | 4.2 | 19.48 | 1.619 | 0.5449 |
| 48 | 9.396 | 4.398 | 19.47 | 1.609 | 0.5416 |
| 49 | 9.6 | 4.602 | 19.47 | 1.605 | 0.5402 |
| 50 | 9.798 | 4.8 | 19.46 | 1.6 | 0.5385 |
| 51 | 9.996 | 4.998 | 19.45 | 1.595 | 0.5369 |
| 52 | 10.2 | 5.202 | 19.45 | 1.586 | 0.5338 |
| 53 | 10.4 | 5.4 | 19.44 | 1.581 | 0.5321 |
| 54 | 10.6 | 5.598 | 19.44 | 1.576 | 0.5305 |
| 55 | 10.8 | 5.802 | 19.43 | 1.571 | 0.5288 |
| 56 | 11. | 6. | 19.43 | 1.566 | 0.5271 |
| 57 | 11.2 | 6.198 | 19.42 | 1.557 | 0.5241 |
| 58 | 11.4 | 6.402 | 19.41 | 1.552 | 0.5224 |
| 59 | 11.6 | 6.6 | 19.41 | 1.547 | 0.5207 |
| 60 | 11.8 | 6.798 | 19.4 | 1.543 | 0.5194 |
| 61 | 12. | 7.002 | 19.4 | 1.538 | 0.5177 |
| 62 | 12.2 | 7.2 | 19.39 | 1.528 | 0.5143 |
| 63 | 12.4 | 7.398 | 19.38 | 1.524 | 0.513 |
| 64 | 12.6 | 7.602 | 19.38 | 1.519 | 0.5113 |
| 65 | 12.8 | 7.8 | 19.37 | 1.514 | 0.5096 |
| 66 | 13. | 7.998 | 19.37 | 1.509 | 0.5079 |
| 67 | 13.2 | 8.202 | 19.36 | 1.505 | 0.5066 |
| 68 | 13.4 | 8.4 | 19.36 | 1.5 | 0.5049 |
| 69 | 13.6 | 8.598 | 19.36 | 1.495 | 0.5032 |
| 70 | 13.8 | 8.802 | 19.35 | 1.486 | 0.5002 |
| 71 | 14. | 9. | 19.34 | 1.481 | 0.4985 |
| 72 | 14.2 | 9.198 | 19.34 | 1.476 | 0.4968 |
| 73 | 14.4 | 9.402 | 19.33 | 1.471 | 0.4951 |
| 74 | 14.6 | 9.6 | 19.33 | 1.466 | 0.4934 |
| 75 | 14.8 | 9.798 | 19.32 | 1.462 | 0.4921 |
| 76 | 15. | 10. | 19.32 | 1.457 | 0.4904 |
| 77 | 15.2 | 10.2 | 19.31 | 1.452 | 0.4887 |
| 78 | 15.4 | 10.4 | 19.31 | 1.447 | 0.487 |
| 79 | 15.6 | 10.6 | 19.3 | 1.443 | 0.4857 |
| 80 | 15.8 | 10.8 | 19.3 | 1.438 | 0.484 |
| 81 | 16. | 11. | 19.29 | 1.433 | 0.4823 |
| 82 | 16.2 | 11.2 | 19.29 | 1.428 | 0.4806 |
| 83 | 16.4 | 11.4 | 19.28 | 1.424 | 0.4793 |
| 84 | 16.6 | 11.6 | 19.28 | 1.419 | 0.4776 |

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|-----|------|------|-------|-------|--------|
| 85 | 16.8 | 11.8 | 19.27 | 1.414 | 0.4759 |
| 86 | 17. | 12. | 19.27 | 1.409 | 0.4743 |
| 87 | 17.2 | 12.2 | 19.27 | 1.405 | 0.4729 |
| 88 | 17.4 | 12.4 | 19.26 | 1.4 | 0.4712 |
| 89 | 17.6 | 12.6 | 19.25 | 1.395 | 0.4695 |
| 90 | 17.8 | 12.8 | 19.25 | 1.39 | 0.4679 |
| 91 | 18. | 13. | 19.25 | 1.386 | 0.4665 |
| 92 | 18.2 | 13.2 | 19.24 | 1.381 | 0.4648 |
| 93 | 18.4 | 13.4 | 19.24 | 1.376 | 0.4631 |
| 94 | 18.6 | 13.6 | 19.23 | 1.371 | 0.4615 |
| 95 | 18.8 | 13.8 | 19.23 | 1.366 | 0.4598 |
| 96 | 19. | 14. | 19.22 | 1.362 | 0.4584 |
| 97 | 19.2 | 14.2 | 19.22 | 1.357 | 0.4567 |
| 98 | 19.4 | 14.4 | 19.21 | 1.352 | 0.4551 |
| 99 | 19.6 | 14.6 | 19.21 | 1.347 | 0.4534 |
| 100 | 19.8 | 14.8 | 19.21 | 1.347 | 0.4534 |
| 101 | 20. | 15. | 19.2 | 1.343 | 0.452 |
| 102 | 21. | 16. | 19.17 | 1.314 | 0.4423 |
| 103 | 22. | 17. | 19.15 | 1.29 | 0.4342 |
| 104 | 23. | 18. | 19.13 | 1.271 | 0.4278 |
| 105 | 24. | 19. | 19.11 | 1.247 | 0.4197 |
| 106 | 25. | 20. | 19.08 | 1.224 | 0.412 |
| 107 | 26. | 21. | 19.07 | 1.205 | 0.4056 |
| 108 | 27. | 22. | 19.05 | 1.186 | 0.3992 |
| 109 | 28. | 23. | 19.03 | 1.166 | 0.3925 |
| 110 | 29. | 24. | 19.01 | 1.147 | 0.3861 |
| 111 | 30. | 25. | 18.98 | 1.124 | 0.3783 |
| 112 | 31. | 26. | 18.97 | 1.109 | 0.3733 |
| 113 | 32. | 27. | 18.95 | 1.09 | 0.3669 |
| 114 | 33. | 28. | 18.93 | 1.071 | 0.3605 |
| 115 | 34. | 29. | 18.91 | 1.052 | 0.3541 |
| 116 | 35. | 30. | 18.9 | 1.038 | 0.3494 |
| 117 | 36. | 31. | 18.88 | 1.019 | 0.343 |
| 118 | 37. | 32. | 18.86 | 1. | 0.3366 |
| 119 | 38. | 33. | 18.85 | 0.986 | 0.3319 |
| 120 | 39. | 34. | 18.83 | 0.971 | 0.3268 |
| 121 | 40. | 35. | 18.81 | 0.952 | 0.3204 |
| 122 | 41. | 36. | 18.8 | 0.938 | 0.3157 |
| 123 | 42. | 37. | 18.78 | 0.924 | 0.311 |
| 124 | 43. | 38. | 18.77 | 0.909 | 0.306 |
| 125 | 44. | 39. | 18.75 | 0.895 | 0.3012 |
| 126 | 45. | 40. | 18.74 | 0.881 | 0.2965 |
| 127 | 46. | 41. | 18.73 | 0.866 | 0.2915 |
| 128 | 47. | 42. | 18.71 | 0.852 | 0.2868 |
| 129 | 48. | 43. | 18.7 | 0.843 | 0.2837 |
| 130 | 49. | 44. | 18.69 | 0.828 | 0.2787 |
| 131 | 50. | 45. | 18.67 | 0.814 | 0.274 |
| 132 | 51. | 46. | 18.66 | 0.805 | 0.271 |
| 133 | 52. | 47. | 18.65 | 0.79 | 0.2659 |
| 134 | 53. | 48. | 18.64 | 0.776 | 0.2612 |
| 135 | 54. | 49. | 18.63 | 0.766 | 0.2578 |
| 136 | 55. | 50. | 18.61 | 0.752 | 0.2531 |
| 137 | 56. | 51. | 18.6 | 0.743 | 0.2501 |

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|-----|------|------|-------|----------|------------|
| 138 | 57. | 52. | 18.59 | 0.733 | 0.2467 |
| 139 | 58. | 53. | 18.58 | 0.719 | 0.242 |
| 140 | 59. | 54. | 18.57 | 0.709 | 0.2386 |
| 141 | 60. | 55. | 18.56 | 0.7 | 0.2356 |
| 142 | 72. | 67. | 18.41 | 0.547 | 0.1841 |
| 143 | 84. | 79. | 18.32 | 0.457 | 0.1538 |
| 144 | 96. | 91. | 18.25 | 0.385 | 0.1296 |
| 145 | 108. | 103. | 18.18 | 0.323 | 0.1087 |
| 146 | 120. | 115. | 18.14 | 0.276 | 9.29e-002 |
| 147 | 132. | 127. | 18.09 | 0.233 | 7.842e-002 |
| 148 | 144. | 139. | 18.06 | 0.2 | 6.732e-002 |
| 149 | 156. | 151. | 18.03 | 0.171 | 5.756e-002 |
| 150 | 168. | 163. | 18.01 | 0.147 | 4.948e-002 |
| 151 | 180. | 175. | 17.99 | 0.128 | 4.308e-002 |
| 152 | 192. | 187. | 17.97 | 0.109 | 3.669e-002 |
| 153 | 204. | 199. | 17.96 | 0.1 | 3.366e-002 |
| 154 | 216. | 211. | 17.95 | 8.5e-002 | 2.861e-002 |
| 155 | 228. | 223. | 17.94 | 7.6e-002 | 2.558e-002 |
| 156 | 240. | 235. | 17.93 | 7.1e-002 | 2.39e-002 |
| 157 | 252. | 247. | 17.92 | 6.1e-002 | 2.053e-002 |
| 158 | 264. | 259. | 17.92 | 5.7e-002 | 1.919e-002 |
| 159 | 276. | 271. | 17.91 | 5.2e-002 | 1.75e-002 |
| 160 | 288. | 283. | 17.91 | 4.7e-002 | 1.582e-002 |
| 161 | 300. | 295. | 17.9 | 4.2e-002 | 1.414e-002 |
| 162 | 312. | 307. | 17.9 | 3.8e-002 | 1.279e-002 |
| 163 | 324. | 319. | 17.9 | 3.8e-002 | 1.279e-002 |
| 164 | 336. | 331. | 17.89 | 3.3e-002 | 1.111e-002 |
| 165 | 348. | 343. | 17.89 | 3.3e-002 | 1.111e-002 |
| 166 | 360. | 355. | 17.89 | 2.8e-002 | 9.424e-003 |
| 167 | 372. | 367. | 17.89 | 2.8e-002 | 9.424e-003 |
| 168 | 384. | 379. | 17.89 | 2.8e-002 | 9.424e-003 |
| 169 | 396. | 391. | 17.88 | 2.3e-002 | 7.742e-003 |
| 170 | 408. | 403. | 17.88 | 2.3e-002 | 7.742e-003 |
| 171 | 420. | 415. | 17.88 | 2.3e-002 | 7.742e-003 |
| 172 | 432. | 427. | 17.88 | 2.3e-002 | 7.742e-003 |
| 173 | 444. | 439. | 17.88 | 1.9e-002 | 6.395e-003 |
| 174 | 456. | 451. | 17.88 | 1.9e-002 | 6.395e-003 |
| 175 | 468. | 463. | 17.88 | 1.9e-002 | 6.395e-003 |
| 176 | 480. | 475. | 17.88 | 1.9e-002 | 6.395e-003 |
| 177 | 492. | 487. | 17.88 | 1.9e-002 | 6.395e-003 |
| 178 | 504. | 499. | 17.88 | 1.9e-002 | 6.395e-003 |
| 179 | 516. | 511. | 17.88 | 1.9e-002 | 6.395e-003 |
| 180 | 528. | 523. | 17.88 | 1.9e-002 | 6.395e-003 |
| 181 | 540. | 535. | 17.88 | 1.9e-002 | 6.395e-003 |
| 182 | 552. | 547. | 17.88 | 1.9e-002 | 6.395e-003 |
| 183 | 564. | 559. | 17.88 | 1.9e-002 | 6.395e-003 |
| 184 | 576. | 571. | 17.88 | 1.9e-002 | 6.395e-003 |
| 185 | 588. | 583. | 17.87 | 1.4e-002 | 4.712e-003 |
| 186 | 600. | 595. | 17.87 | 1.4e-002 | 4.712e-003 |
| 187 | 720. | 715. | 17.87 | 1.4e-002 | 4.712e-003 |
| 188 | 840. | 835. | 17.87 | 1.4e-002 | 4.712e-003 |
| 189 | 960. | 955. | 17.87 | 9.e-003 | 3.029e-003 |
| 190 | 1080 | 1075 | 17.87 | 9.e-003 | 3.029e-003 |

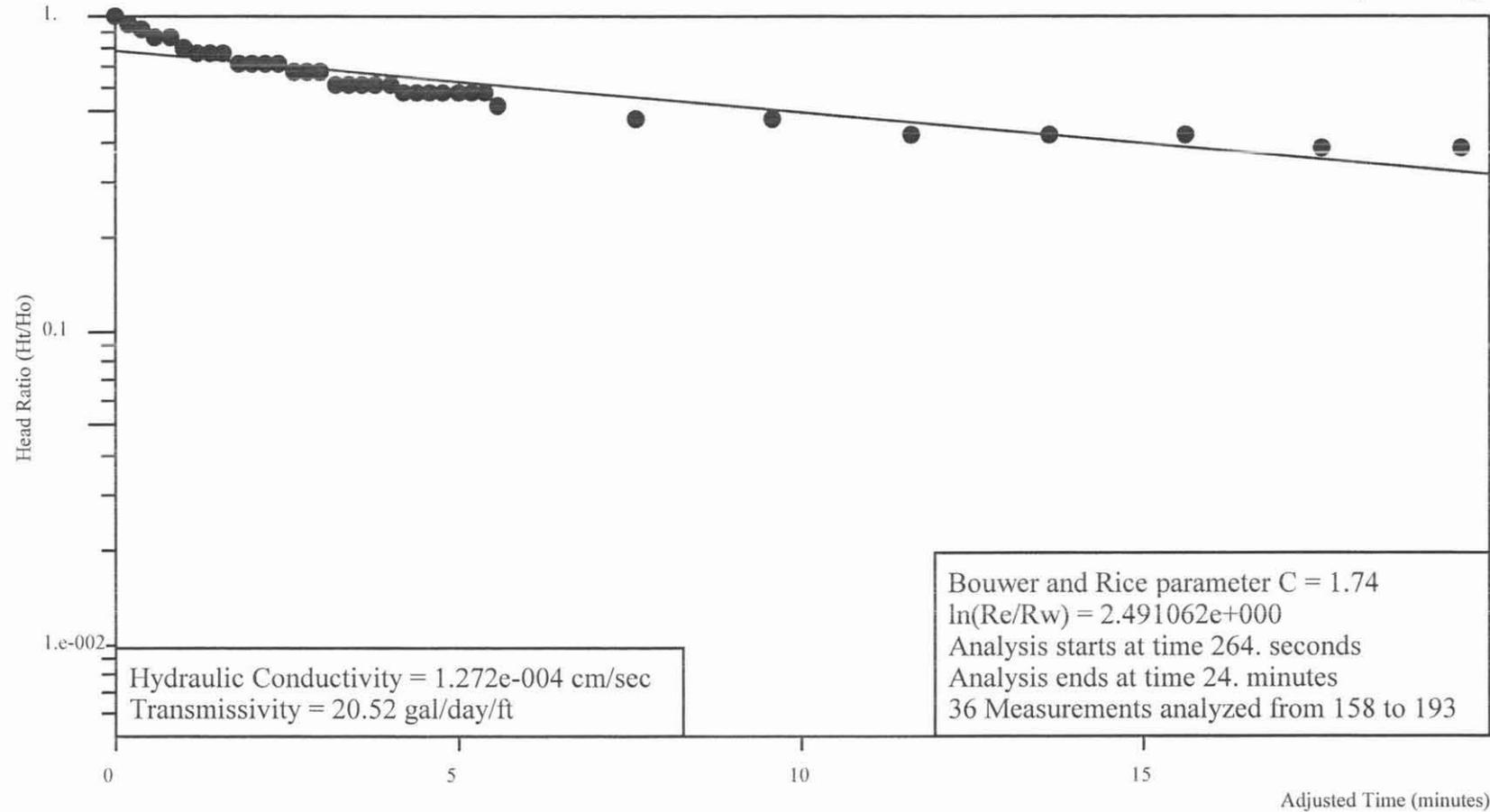
| | | | | | |
|-----|------|------|-------|----------|------------|
| 191 | 1200 | 1195 | 17.87 | 9.e-003 | 3.029e-003 |
| 192 | 1320 | 1315 | 17.87 | 9.e-003 | 3.029e-003 |
| 193 | 1440 | 1435 | 17.87 | 1.4e-002 | 4.712e-003 |
| 194 | 1560 | 1555 | 17.86 | 4.e-003 | 1.346e-003 |
| 195 | 1680 | 1675 | 17.86 | 4.e-003 | 1.346e-003 |
| 196 | 1800 | 1795 | 17.86 | 4.e-003 | 1.346e-003 |
| 197 | 1920 | 1915 | 17.86 | 4.e-003 | 1.346e-003 |
| 198 | 2040 | 2035 | 17.86 | 4.e-003 | 1.346e-003 |
| 199 | 2160 | 2155 | 17.86 | 4.e-003 | 1.346e-003 |
| 200 | 2280 | 2275 | 17.87 | 9.e-003 | 3.029e-003 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-19S (Falling)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

Ho is 9.9e-002 feet at 264. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P19SFALL

Well Label: P-19S (Falling)
Aquifer Thickness: 7.61 feet
Screen Length: 6. feet
Casing Radius: 1.888 inches
Effective Radius: 3.125 inches
Static Water Level: 5.394 feet
Water Table to Screen Bottom: 7.61 feet
Anisotropy Ratio: 1.
Time Adjustment: 264. Seconds

Test starts with trial 28

There are 212 time and drawdown measurements

Maximum head is 1.74 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -264. | 5.371 | 2.3e-002 | 1.322e-002 |
| 2 | 0.198 | -263.8 | 5.371 | 2.3e-002 | 1.322e-002 |
| 3 | 0.396 | -263.6 | 5.366 | 2.8e-002 | 1.609e-002 |
| 4 | 0.6 | -263.4 | 5.371 | 2.3e-002 | 1.322e-002 |
| 5 | 0.798 | -263.2 | 5.366 | 2.8e-002 | 1.609e-002 |
| 6 | 0.996 | -263. | 5.366 | 2.8e-002 | 1.609e-002 |
| 7 | 1.2 | -262.8 | 5.38 | 1.4e-002 | 8.046e-003 |
| 8 | 1.398 | -262.6 | 5.361 | 3.3e-002 | 1.897e-002 |
| 9 | 1.596 | -262.4 | 5.38 | 1.4e-002 | 8.046e-003 |
| 10 | 1.8 | -262.2 | 5.366 | 2.8e-002 | 1.609e-002 |
| 11 | 1.998 | -262. | 5.371 | 2.3e-002 | 1.322e-002 |
| 12 | 2.196 | -261.8 | 5.366 | 2.8e-002 | 1.609e-002 |
| 13 | 2.4 | -261.6 | 5.394 | 0. | 0. |
| 14 | 2.598 | -261.4 | 5.304 | 9.e-002 | 5.172e-002 |
| 15 | 2.796 | -261.2 | 5.053 | 0.341 | 0.196 |
| 16 | 3. | -261. | 4.83 | 0.564 | 0.3241 |
| 17 | 3.198 | -260.8 | 4.679 | 0.715 | 0.4109 |
| 18 | 3.396 | -260.6 | 4.413 | 0.981 | 0.5638 |
| 19 | 3.6 | -260.4 | 4.299 | 1.095 | 0.6293 |
| 20 | 3.798 | -260.2 | 4.356 | 1.038 | 0.5966 |
| 21 | 3.996 | -260. | 4.19 | 1.204 | 0.692 |
| 22 | 4.2 | -259.8 | 4.029 | 1.365 | 0.7845 |
| 23 | 4.398 | -259.6 | 4.067 | 1.327 | 0.7626 |
| 24 | 4.596 | -259.4 | 4.256 | 1.138 | 0.654 |
| 25 | 4.8 | -259.2 | 3.91 | 1.484 | 0.8529 |
| 26 | 4.998 | -259. | 3.778 | 1.616 | 0.9287 |
| 27 | 5.196 | -258.8 | 3.782 | 1.612 | 0.9264 |
| 28 | 5.4 | -258.6 | 3.706 | 1.688 | 0.9701 |
| 29 | 5.598 | -258.4 | 3.654 | 1.74 | 1. |
| 30 | 5.796 | -258.2 | 3.697 | 1.697 | 0.9753 |
| 31 | 6. | -258. | 4.005 | 1.389 | 0.7983 |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -257.8 | 3.962 | 1.432 | 0.823 |
| 33 | 6.396 | -257.6 | 3.901 | 1.493 | 0.858 |
| 34 | 6.6 | -257.4 | 4.015 | 1.379 | 0.7925 |
| 35 | 6.798 | -257.2 | 4.038 | 1.356 | 0.7793 |
| 36 | 6.996 | -257. | 3.91 | 1.484 | 0.8529 |
| 37 | 7.2 | -256.8 | 3.934 | 1.46 | 0.8391 |
| 38 | 7.398 | -256.6 | 3.958 | 1.436 | 0.8253 |
| 39 | 7.596 | -256.4 | 3.815 | 1.579 | 0.9075 |
| 40 | 7.8 | -256.2 | 3.806 | 1.588 | 0.9126 |
| 41 | 7.998 | -256. | 3.896 | 1.498 | 0.8609 |
| 42 | 8.196 | -255.8 | 4.086 | 1.308 | 0.7517 |
| 43 | 8.4 | -255.6 | 4.114 | 1.28 | 0.7356 |
| 44 | 8.598 | -255.4 | 4.062 | 1.332 | 0.7655 |
| 45 | 8.796 | -255.2 | 4.053 | 1.341 | 0.7707 |
| 46 | 9. | -255. | 4.053 | 1.341 | 0.7707 |
| 47 | 9.198 | -254.8 | 4.019 | 1.375 | 0.7902 |
| 48 | 9.396 | -254.6 | 3.991 | 1.403 | 0.8063 |
| 49 | 9.6 | -254.4 | 4.024 | 1.37 | 0.7874 |
| 50 | 9.798 | -254.2 | 4.067 | 1.327 | 0.7626 |
| 51 | 9.996 | -254. | 4.057 | 1.337 | 0.7684 |
| 52 | 10.2 | -253.8 | 4.038 | 1.356 | 0.7793 |
| 53 | 10.4 | -253.6 | 4.1 | 1.294 | 0.7437 |
| 54 | 10.6 | -253.4 | 4.143 | 1.251 | 0.719 |
| 55 | 10.8 | -253.2 | 4.114 | 1.28 | 0.7356 |
| 56 | 11. | -253. | 4.105 | 1.289 | 0.7408 |
| 57 | 11.2 | -252.8 | 4.119 | 1.275 | 0.7328 |
| 58 | 11.4 | -252.6 | 4.143 | 1.251 | 0.719 |
| 59 | 11.6 | -252.4 | 4.034 | 1.36 | 0.7816 |
| 60 | 11.8 | -252.2 | 4.005 | 1.389 | 0.7983 |
| 61 | 12. | -252. | 4.294 | 1.1 | 0.6322 |
| 62 | 12.2 | -251.8 | 4.266 | 1.128 | 0.6483 |
| 63 | 12.4 | -251.6 | 4.147 | 1.247 | 0.7167 |
| 64 | 12.6 | -251.4 | 4.128 | 1.266 | 0.7276 |
| 65 | 12.8 | -251.2 | 4.152 | 1.242 | 0.7138 |
| 66 | 13. | -251. | 4.181 | 1.213 | 0.6971 |
| 67 | 13.2 | -250.8 | 4.19 | 1.204 | 0.692 |
| 68 | 13.4 | -250.6 | 4.195 | 1.199 | 0.6891 |
| 69 | 13.6 | -250.4 | 4.2 | 1.194 | 0.6862 |
| 70 | 13.8 | -250.2 | 4.204 | 1.19 | 0.6839 |
| 71 | 14. | -250. | 4.209 | 1.185 | 0.681 |
| 72 | 14.2 | -249.8 | 4.214 | 1.18 | 0.6782 |
| 73 | 14.4 | -249.6 | 4.209 | 1.185 | 0.681 |
| 74 | 14.6 | -249.4 | 4.228 | 1.166 | 0.6701 |
| 75 | 14.8 | -249.2 | 4.233 | 1.161 | 0.6672 |
| 76 | 15. | -249. | 4.242 | 1.152 | 0.6621 |
| 77 | 15.2 | -248.8 | 4.266 | 1.128 | 0.6483 |
| 78 | 15.4 | -248.6 | 4.256 | 1.138 | 0.654 |
| 79 | 15.6 | -248.4 | 4.109 | 1.285 | 0.7385 |
| 80 | 15.8 | -248.2 | 4.238 | 1.156 | 0.6644 |
| 81 | 16. | -248. | 4.266 | 1.128 | 0.6483 |
| 82 | 16.2 | -247.8 | 4.275 | 1.119 | 0.6431 |
| 83 | 16.4 | -247.6 | 4.275 | 1.119 | 0.6431 |
| 84 | 16.6 | -247.4 | 4.28 | 1.114 | 0.6402 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -247.2 | 4.285 | 1.109 | 0.6374 |
| 86 | 17. | -247. | 4.294 | 1.1 | 0.6322 |
| 87 | 17.2 | -246.8 | 4.299 | 1.095 | 0.6293 |
| 88 | 17.4 | -246.6 | 4.304 | 1.09 | 0.6264 |
| 89 | 17.6 | -246.4 | 4.309 | 1.085 | 0.6236 |
| 90 | 17.8 | -246.2 | 4.313 | 1.081 | 0.6213 |
| 91 | 18. | -246. | 4.318 | 1.076 | 0.6184 |
| 92 | 18.2 | -245.8 | 4.323 | 1.071 | 0.6155 |
| 93 | 18.4 | -245.6 | 4.328 | 1.066 | 0.6126 |
| 94 | 18.6 | -245.4 | 4.332 | 1.062 | 0.6103 |
| 95 | 18.8 | -245.2 | 4.337 | 1.057 | 0.6075 |
| 96 | 19. | -245. | 4.342 | 1.052 | 0.6046 |
| 97 | 19.2 | -244.8 | 4.347 | 1.047 | 0.6017 |
| 98 | 19.4 | -244.6 | 4.351 | 1.043 | 0.5994 |
| 99 | 19.6 | -244.4 | 4.356 | 1.038 | 0.5966 |
| 100 | 19.8 | -244.2 | 4.361 | 1.033 | 0.5937 |
| 101 | 20. | -244. | 4.366 | 1.028 | 0.5908 |
| 102 | 21. | -243. | 4.389 | 1.005 | 0.5776 |
| 103 | 22. | -242. | 4.413 | 0.981 | 0.5638 |
| 104 | 23. | -241. | 4.422 | 0.972 | 0.5586 |
| 105 | 24. | -240. | 4.46 | 0.934 | 0.5368 |
| 106 | 25. | -239. | 4.475 | 0.919 | 0.5282 |
| 107 | 26. | -238. | 4.475 | 0.919 | 0.5282 |
| 108 | 27. | -237. | 4.513 | 0.881 | 0.5063 |
| 109 | 28. | -236. | 4.531 | 0.863 | 0.496 |
| 110 | 29. | -235. | 4.546 | 0.848 | 0.4874 |
| 111 | 30. | -234. | 4.565 | 0.829 | 0.4764 |
| 112 | 31. | -233. | 4.584 | 0.81 | 0.4655 |
| 113 | 32. | -232. | 4.598 | 0.796 | 0.4575 |
| 114 | 33. | -231. | 4.612 | 0.782 | 0.4494 |
| 115 | 34. | -230. | 4.636 | 0.758 | 0.4356 |
| 116 | 35. | -229. | 4.641 | 0.753 | 0.4328 |
| 117 | 36. | -228. | 4.66 | 0.734 | 0.4218 |
| 118 | 37. | -227. | 4.674 | 0.72 | 0.4138 |
| 119 | 38. | -226. | 4.683 | 0.711 | 0.4086 |
| 120 | 39. | -225. | 4.697 | 0.697 | 0.4006 |
| 121 | 40. | -224. | 4.712 | 0.682 | 0.392 |
| 122 | 41. | -223. | 4.721 | 0.673 | 0.3868 |
| 123 | 42. | -222. | 4.735 | 0.659 | 0.3787 |
| 124 | 43. | -221. | 4.745 | 0.649 | 0.373 |
| 125 | 44. | -220. | 4.754 | 0.64 | 0.3678 |
| 126 | 45. | -219. | 4.769 | 0.625 | 0.3592 |
| 127 | 46. | -218. | 4.778 | 0.616 | 0.354 |
| 128 | 47. | -217. | 4.788 | 0.606 | 0.3483 |
| 129 | 48. | -216. | 4.802 | 0.592 | 0.3402 |
| 130 | 49. | -215. | 4.811 | 0.583 | 0.3351 |
| 131 | 50. | -214. | 4.821 | 0.573 | 0.3293 |
| 132 | 51. | -213. | 4.83 | 0.564 | 0.3241 |
| 133 | 52. | -212. | 4.84 | 0.554 | 0.3184 |
| 134 | 53. | -211. | 4.844 | 0.55 | 0.3161 |
| 135 | 54. | -210. | 4.854 | 0.54 | 0.3103 |
| 136 | 55. | -209. | 4.863 | 0.531 | 0.3052 |
| 137 | 56. | -208. | 4.873 | 0.521 | 0.2994 |

| | | | | | |
|-----|------|-------|-------|----------|------------|
| 138 | 57. | -207. | 4.878 | 0.516 | 0.2966 |
| 139 | 58. | -206. | 4.887 | 0.507 | 0.2914 |
| 140 | 59. | -205. | 4.897 | 0.497 | 0.2856 |
| 141 | 60. | -204. | 4.906 | 0.488 | 0.2805 |
| 142 | 72. | -192. | 4.996 | 0.398 | 0.2287 |
| 143 | 84. | -180. | 5.053 | 0.341 | 0.196 |
| 144 | 96. | -168. | 5.1 | 0.294 | 0.169 |
| 145 | 108. | -156. | 5.138 | 0.256 | 0.1471 |
| 146 | 120. | -144. | 5.167 | 0.227 | 0.1305 |
| 147 | 132. | -132. | 5.19 | 0.204 | 0.1172 |
| 148 | 144. | -120. | 5.209 | 0.185 | 0.1063 |
| 149 | 156. | -108. | 5.228 | 0.166 | 9.54e-002 |
| 150 | 168. | -96. | 5.238 | 0.156 | 8.966e-002 |
| 151 | 180. | -84. | 5.252 | 0.142 | 8.161e-002 |
| 152 | 192. | -72. | 5.262 | 0.132 | 7.586e-002 |
| 153 | 204. | -60. | 5.271 | 0.123 | 7.069e-002 |
| 154 | 216. | -48. | 5.276 | 0.118 | 6.782e-002 |
| 155 | 228. | -36. | 5.281 | 0.113 | 6.494e-002 |
| 156 | 240. | -24. | 5.285 | 0.109 | 6.264e-002 |
| 157 | 252. | -12. | 5.295 | 9.9e-002 | 5.69e-002 |
| 158 | 264. | 0. | 5.295 | 9.9e-002 | 5.69e-002 |
| 159 | 276. | 12. | 5.299 | 9.5e-002 | 5.46e-002 |
| 160 | 288. | 24. | 5.304 | 9.e-002 | 5.172e-002 |
| 161 | 300. | 36. | 5.309 | 8.5e-002 | 4.885e-002 |
| 162 | 312. | 48. | 5.309 | 8.5e-002 | 4.885e-002 |
| 163 | 324. | 60. | 5.314 | 8.e-002 | 4.598e-002 |
| 164 | 336. | 72. | 5.318 | 7.6e-002 | 4.368e-002 |
| 165 | 348. | 84. | 5.318 | 7.6e-002 | 4.368e-002 |
| 166 | 360. | 96. | 5.318 | 7.6e-002 | 4.368e-002 |
| 167 | 372. | 108. | 5.323 | 7.1e-002 | 4.08e-002 |
| 168 | 384. | 120. | 5.323 | 7.1e-002 | 4.08e-002 |
| 169 | 396. | 132. | 5.323 | 7.1e-002 | 4.08e-002 |
| 170 | 408. | 144. | 5.323 | 7.1e-002 | 4.08e-002 |
| 171 | 420. | 156. | 5.328 | 6.6e-002 | 3.793e-002 |
| 172 | 432. | 168. | 5.328 | 6.6e-002 | 3.793e-002 |
| 173 | 444. | 180. | 5.328 | 6.6e-002 | 3.793e-002 |
| 174 | 456. | 192. | 5.333 | 6.1e-002 | 3.506e-002 |
| 175 | 468. | 204. | 5.333 | 6.1e-002 | 3.506e-002 |
| 176 | 480. | 216. | 5.333 | 6.1e-002 | 3.506e-002 |
| 177 | 492. | 228. | 5.333 | 6.1e-002 | 3.506e-002 |
| 178 | 504. | 240. | 5.333 | 6.1e-002 | 3.506e-002 |
| 179 | 516. | 252. | 5.337 | 5.7e-002 | 3.276e-002 |
| 180 | 528. | 264. | 5.337 | 5.7e-002 | 3.276e-002 |
| 181 | 540. | 276. | 5.337 | 5.7e-002 | 3.276e-002 |
| 182 | 552. | 288. | 5.337 | 5.7e-002 | 3.276e-002 |
| 183 | 564. | 300. | 5.337 | 5.7e-002 | 3.276e-002 |
| 184 | 576. | 312. | 5.337 | 5.7e-002 | 3.276e-002 |
| 185 | 588. | 324. | 5.337 | 5.7e-002 | 3.276e-002 |
| 186 | 600. | 336. | 5.342 | 5.2e-002 | 2.989e-002 |
| 187 | 720. | 456. | 5.347 | 4.7e-002 | 2.701e-002 |
| 188 | 840. | 576. | 5.347 | 4.7e-002 | 2.701e-002 |
| 189 | 960. | 696. | 5.352 | 4.2e-002 | 2.414e-002 |
| 190 | 1080 | 816. | 5.352 | 4.2e-002 | 2.414e-002 |

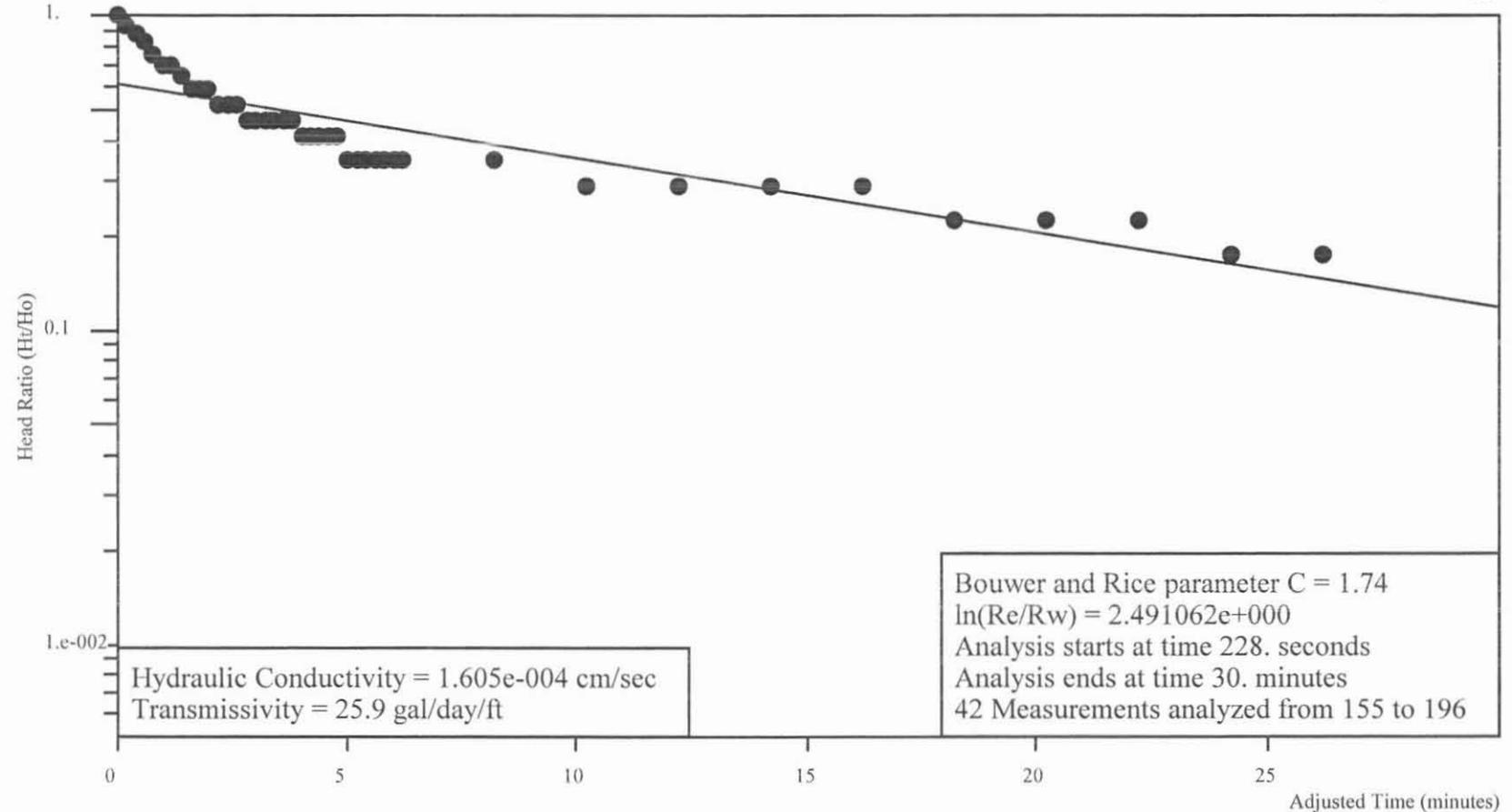
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|-----|------|------|-------|----------|------------|
| 191 | 1200 | 936. | 5.352 | 4.2e-002 | 2.414e-002 |
| 192 | 1320 | 1056 | 5.356 | 3.8e-002 | 2.184e-002 |
| 193 | 1440 | 1176 | 5.356 | 3.8e-002 | 2.184e-002 |
| 194 | 1560 | 1296 | 5.356 | 3.8e-002 | 2.184e-002 |
| 195 | 1680 | 1416 | 5.356 | 3.8e-002 | 2.184e-002 |
| 196 | 1800 | 1536 | 5.356 | 3.8e-002 | 2.184e-002 |
| 197 | 1920 | 1656 | 5.356 | 3.8e-002 | 2.184e-002 |
| 198 | 2040 | 1776 | 5.356 | 3.8e-002 | 2.184e-002 |
| 199 | 2160 | 1896 | 5.356 | 3.8e-002 | 2.184e-002 |
| 200 | 2280 | 2016 | 5.356 | 3.8e-002 | 2.184e-002 |
| 201 | 2400 | 2136 | 5.356 | 3.8e-002 | 2.184e-002 |
| 202 | 2520 | 2256 | 5.356 | 3.8e-002 | 2.184e-002 |
| 203 | 2640 | 2376 | 5.356 | 3.8e-002 | 2.184e-002 |
| 204 | 2760 | 2496 | 5.356 | 3.8e-002 | 2.184e-002 |
| 205 | 2880 | 2616 | 5.356 | 3.8e-002 | 2.184e-002 |
| 206 | 3000 | 2736 | 5.356 | 3.8e-002 | 2.184e-002 |
| 207 | 3120 | 2856 | 5.356 | 3.8e-002 | 2.184e-002 |
| 208 | 3240 | 2976 | 5.356 | 3.8e-002 | 2.184e-002 |
| 209 | 3360 | 3096 | 5.356 | 3.8e-002 | 2.184e-002 |
| 210 | 3480 | 3216 | 5.356 | 3.8e-002 | 2.184e-002 |
| 211 | 3600 | 3336 | 5.356 | 3.8e-002 | 2.184e-002 |
| 212 | 3720 | 3456 | 5.356 | 3.8e-002 | 2.184e-002 |

Aquifer Analysis March 6, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-19S (Rising)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is $8.e-002$ feet at 228. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: March 6, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P19SRIS

Well Label: P-19S (Rising)
Aquifer Thickness: 7.61 feet
Screen Length: 6. feet
Casing Radius: 1.888 inches
Effective Radius: 3.125 inches
Static Water Level: 5.15 feet
Water Table to Screen Bottom: 7.61 feet
Anisotropy Ratio: 1.
Time Adjustment: 228. Seconds

Test starts with trial 9

There are 218 time and drawdown measurements

Maximum head is 1.819 feet

Minimum head is -5.e-003 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|-------------|
| 1 | 0. | -228. | 5.15 | 0. | 0. |
| 2 | 0.198 | -227.8 | 5.145 | -5.e-003 | -2.749e-003 |
| 3 | 0.396 | -227.6 | 6.789 | 1.639 | 0.901 |
| 4 | 0.6 | -227.4 | 6.869 | 1.719 | 0.945 |
| 5 | 0.798 | -227.2 | 5.628 | 0.478 | 0.2628 |
| 6 | 0.996 | -227. | 5.59 | 0.44 | 0.2419 |
| 7 | 1.2 | -226.8 | 6.557 | 1.407 | 0.7735 |
| 8 | 1.398 | -226.6 | 6.737 | 1.587 | 0.8725 |
| 9 | 1.596 | -226.4 | 6.779 | 1.629 | 0.8955 |
| 10 | 1.8 | -226.2 | 6.969 | 1.819 | 1. |
| 11 | 1.998 | -226. | 6.94 | 1.79 | 0.9841 |
| 12 | 2.196 | -225.8 | 6.931 | 1.781 | 0.9791 |
| 13 | 2.4 | -225.6 | 6.926 | 1.776 | 0.9764 |
| 14 | 2.598 | -225.4 | 6.921 | 1.771 | 0.9736 |
| 15 | 2.796 | -225.2 | 6.921 | 1.771 | 0.9736 |
| 16 | 3. | -225. | 6.917 | 1.767 | 0.9714 |
| 17 | 3.198 | -224.8 | 6.912 | 1.762 | 0.9687 |
| 18 | 3.396 | -224.6 | 6.907 | 1.757 | 0.9659 |
| 19 | 3.6 | -224.4 | 6.903 | 1.753 | 0.9637 |
| 20 | 3.798 | -224.2 | 6.879 | 1.729 | 0.9505 |
| 21 | 3.996 | -224. | 6.888 | 1.738 | 0.9555 |
| 22 | 4.2 | -223.8 | 6.879 | 1.729 | 0.9505 |
| 23 | 4.398 | -223.6 | 6.879 | 1.729 | 0.9505 |
| 24 | 4.596 | -223.4 | 6.865 | 1.715 | 0.9428 |
| 25 | 4.8 | -223.2 | 6.855 | 1.705 | 0.9373 |
| 26 | 4.998 | -223. | 6.846 | 1.696 | 0.9324 |
| 27 | 5.196 | -222.8 | 6.836 | 1.686 | 0.9269 |
| 28 | 5.4 | -222.6 | 6.827 | 1.677 | 0.9219 |
| 29 | 5.598 | -222.4 | 6.817 | 1.667 | 0.9164 |
| 30 | 5.796 | -222.2 | 6.808 | 1.658 | 0.9115 |
| 31 | 6. | -222. | 6.798 | 1.648 | 0.906 |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -221.8 | 6.789 | 1.639 | 0.901 |
| 33 | 6.396 | -221.6 | 6.779 | 1.629 | 0.8955 |
| 34 | 6.6 | -221.4 | 6.77 | 1.62 | 0.8906 |
| 35 | 6.798 | -221.2 | 6.76 | 1.61 | 0.8851 |
| 36 | 6.996 | -221. | 6.751 | 1.601 | 0.8802 |
| 37 | 7.2 | -220.8 | 6.742 | 1.592 | 0.8752 |
| 38 | 7.398 | -220.6 | 6.732 | 1.582 | 0.8697 |
| 39 | 7.596 | -220.4 | 6.727 | 1.577 | 0.867 |
| 40 | 7.8 | -220.2 | 6.718 | 1.568 | 0.862 |
| 41 | 7.998 | -220. | 6.708 | 1.558 | 0.8565 |
| 42 | 8.196 | -219.8 | 6.699 | 1.549 | 0.8516 |
| 43 | 8.4 | -219.6 | 6.689 | 1.539 | 0.8461 |
| 44 | 8.598 | -219.4 | 6.685 | 1.535 | 0.8439 |
| 45 | 8.796 | -219.2 | 6.675 | 1.525 | 0.8384 |
| 46 | 9. | -219. | 6.666 | 1.516 | 0.8334 |
| 47 | 9.198 | -218.8 | 6.656 | 1.506 | 0.8279 |
| 48 | 9.396 | -218.6 | 6.652 | 1.502 | 0.8257 |
| 49 | 9.6 | -218.4 | 6.642 | 1.492 | 0.8202 |
| 50 | 9.798 | -218.2 | 6.633 | 1.483 | 0.8153 |
| 51 | 9.996 | -218. | 6.628 | 1.478 | 0.8125 |
| 52 | 10.2 | -217.8 | 6.618 | 1.468 | 0.807 |
| 53 | 10.4 | -217.6 | 6.609 | 1.459 | 0.8021 |
| 54 | 10.6 | -217.4 | 6.604 | 1.454 | 0.7993 |
| 55 | 10.8 | -217.2 | 6.595 | 1.445 | 0.7944 |
| 56 | 11. | -217. | 6.59 | 1.44 | 0.7916 |
| 57 | 11.2 | -216.8 | 6.58 | 1.43 | 0.7861 |
| 58 | 11.4 | -216.6 | 6.571 | 1.421 | 0.7812 |
| 59 | 11.6 | -216.4 | 6.566 | 1.416 | 0.7784 |
| 60 | 11.8 | -216.2 | 6.557 | 1.407 | 0.7735 |
| 61 | 12. | -216. | 6.552 | 1.402 | 0.7708 |
| 62 | 12.2 | -215.8 | 6.543 | 1.393 | 0.7658 |
| 63 | 12.4 | -215.6 | 6.538 | 1.388 | 0.7631 |
| 64 | 12.6 | -215.4 | 6.528 | 1.378 | 0.7576 |
| 65 | 12.8 | -215.2 | 6.524 | 1.374 | 0.7554 |
| 66 | 13. | -215. | 6.519 | 1.369 | 0.7526 |
| 67 | 13.2 | -214.8 | 6.509 | 1.359 | 0.7471 |
| 68 | 13.4 | -214.6 | 6.505 | 1.355 | 0.7449 |
| 69 | 13.6 | -214.4 | 6.5 | 1.35 | 0.7422 |
| 70 | 13.8 | -214.2 | 6.49 | 1.34 | 0.7367 |
| 71 | 14. | -214. | 6.481 | 1.331 | 0.7317 |
| 72 | 14.2 | -213.8 | 6.476 | 1.326 | 0.729 |
| 73 | 14.4 | -213.6 | 6.472 | 1.322 | 0.7268 |
| 74 | 14.6 | -213.4 | 6.467 | 1.317 | 0.724 |
| 75 | 14.8 | -213.2 | 6.457 | 1.307 | 0.7185 |
| 76 | 15. | -213. | 6.453 | 1.303 | 0.7163 |
| 77 | 15.2 | -212.8 | 6.448 | 1.298 | 0.7136 |
| 78 | 15.4 | -212.6 | 6.438 | 1.288 | 0.7081 |
| 79 | 15.6 | -212.4 | 6.434 | 1.284 | 0.7059 |
| 80 | 15.8 | -212.2 | 6.429 | 1.279 | 0.7031 |
| 81 | 16. | -212. | 6.419 | 1.269 | 0.6976 |
| 82 | 16.2 | -211.8 | 6.415 | 1.265 | 0.6954 |
| 83 | 16.4 | -211.6 | 6.41 | 1.26 | 0.6927 |
| 84 | 16.6 | -211.4 | 6.405 | 1.255 | 0.6899 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -211.2 | 6.4 | 1.25 | 0.6872 |
| 86 | 17. | -211. | 6.391 | 1.241 | 0.6822 |
| 87 | 17.2 | -210.8 | 6.386 | 1.236 | 0.6795 |
| 88 | 17.4 | -210.6 | 6.382 | 1.232 | 0.6773 |
| 89 | 17.6 | -210.4 | 6.377 | 1.227 | 0.6745 |
| 90 | 17.8 | -210.2 | 6.367 | 1.217 | 0.669 |
| 91 | 18. | -210. | 6.363 | 1.213 | 0.6668 |
| 92 | 18.2 | -209.8 | 6.358 | 1.208 | 0.6641 |
| 93 | 18.4 | -209.6 | 6.353 | 1.203 | 0.6614 |
| 94 | 18.6 | -209.4 | 6.348 | 1.198 | 0.6586 |
| 95 | 18.8 | -209.2 | 6.339 | 1.189 | 0.6537 |
| 96 | 19. | -209. | 6.334 | 1.184 | 0.6509 |
| 97 | 19.2 | -208.8 | 6.329 | 1.179 | 0.6482 |
| 98 | 19.4 | -208.6 | 6.325 | 1.175 | 0.646 |
| 99 | 19.6 | -208.4 | 6.32 | 1.17 | 0.6432 |
| 100 | 19.8 | -208.2 | 6.315 | 1.165 | 0.6405 |
| 101 | 20. | -208. | 6.31 | 1.16 | 0.6377 |
| 102 | 21. | -207. | 6.282 | 1.132 | 0.6223 |
| 103 | 22. | -206. | 6.258 | 1.108 | 0.6091 |
| 104 | 23. | -205. | 6.23 | 1.08 | 0.5937 |
| 105 | 24. | -204. | 6.206 | 1.056 | 0.5805 |
| 106 | 25. | -203. | 6.183 | 1.033 | 0.5679 |
| 107 | 26. | -202. | 6.159 | 1.009 | 0.5547 |
| 108 | 27. | -201. | 6.135 | 0.985 | 0.5415 |
| 109 | 28. | -200. | 6.116 | 0.966 | 0.5311 |
| 110 | 29. | -199. | 6.093 | 0.943 | 0.5184 |
| 111 | 30. | -198. | 6.074 | 0.924 | 0.508 |
| 112 | 31. | -197. | 6.055 | 0.905 | 0.4975 |
| 113 | 32. | -196. | 6.036 | 0.886 | 0.4871 |
| 114 | 33. | -195. | 6.017 | 0.867 | 0.4766 |
| 115 | 34. | -194. | 5.998 | 0.848 | 0.4662 |
| 116 | 35. | -193. | 5.979 | 0.829 | 0.4557 |
| 117 | 36. | -192. | 5.965 | 0.815 | 0.448 |
| 118 | 37. | -191. | 5.946 | 0.796 | 0.4376 |
| 119 | 38. | -190. | 5.931 | 0.781 | 0.4294 |
| 120 | 39. | -189. | 5.917 | 0.767 | 0.4217 |
| 121 | 40. | -188. | 5.898 | 0.748 | 0.4112 |
| 122 | 41. | -187. | 5.884 | 0.734 | 0.4035 |
| 123 | 42. | -186. | 5.875 | 0.725 | 0.3986 |
| 124 | 43. | -185. | 5.86 | 0.71 | 0.3903 |
| 125 | 44. | -184. | 5.846 | 0.696 | 0.3826 |
| 126 | 45. | -183. | 5.832 | 0.682 | 0.3749 |
| 127 | 46. | -182. | 5.818 | 0.668 | 0.3672 |
| 128 | 47. | -181. | 5.808 | 0.658 | 0.3617 |
| 129 | 48. | -180. | 5.794 | 0.644 | 0.354 |
| 130 | 49. | -179. | 5.785 | 0.635 | 0.3491 |
| 131 | 50. | -178. | 5.77 | 0.62 | 0.3408 |
| 132 | 51. | -177. | 5.761 | 0.611 | 0.3359 |
| 133 | 52. | -176. | 5.751 | 0.601 | 0.3304 |
| 134 | 53. | -175. | 5.737 | 0.587 | 0.3227 |
| 135 | 54. | -174. | 5.728 | 0.578 | 0.3178 |
| 136 | 55. | -173. | 5.718 | 0.568 | 0.3123 |
| 137 | 56. | -172. | 5.709 | 0.559 | 0.3073 |

| | | | | | |
|-----|------|-------|-------|----------|------------|
| 138 | 57. | -171. | 5.699 | 0.549 | 0.3018 |
| 139 | 58. | -170. | 5.69 | 0.54 | 0.2969 |
| 140 | 59. | -169. | 5.68 | 0.53 | 0.2914 |
| 141 | 60. | -168. | 5.671 | 0.521 | 0.2864 |
| 142 | 72. | -156. | 5.567 | 0.417 | 0.2292 |
| 143 | 84. | -144. | 5.5 | 0.35 | 0.1924 |
| 144 | 96. | -132. | 5.443 | 0.293 | 0.1611 |
| 145 | 108. | -120. | 5.401 | 0.251 | 0.138 |
| 146 | 120. | -108. | 5.368 | 0.218 | 0.1198 |
| 147 | 132. | -96. | 5.339 | 0.189 | 0.1039 |
| 148 | 144. | -84. | 5.315 | 0.165 | 9.071e-002 |
| 149 | 156. | -72. | 5.296 | 0.146 | 8.026e-002 |
| 150 | 168. | -60. | 5.277 | 0.127 | 6.982e-002 |
| 151 | 180. | -48. | 5.268 | 0.118 | 6.487e-002 |
| 152 | 192. | -36. | 5.254 | 0.104 | 5.717e-002 |
| 153 | 204. | -24. | 5.244 | 9.4e-002 | 5.168e-002 |
| 154 | 216. | -12. | 5.24 | 9.e-002 | 4.948e-002 |
| 155 | 228. | 0. | 5.23 | 8.e-002 | 4.398e-002 |
| 156 | 240. | 12. | 5.225 | 7.5e-002 | 4.123e-002 |
| 157 | 252. | 24. | 5.221 | 7.1e-002 | 3.903e-002 |
| 158 | 264. | 36. | 5.216 | 6.6e-002 | 3.628e-002 |
| 159 | 276. | 48. | 5.211 | 6.1e-002 | 3.353e-002 |
| 160 | 288. | 60. | 5.206 | 5.6e-002 | 3.079e-002 |
| 161 | 300. | 72. | 5.206 | 5.6e-002 | 3.079e-002 |
| 162 | 312. | 84. | 5.202 | 5.2e-002 | 2.859e-002 |
| 163 | 324. | 96. | 5.197 | 4.7e-002 | 2.584e-002 |
| 164 | 336. | 108. | 5.197 | 4.7e-002 | 2.584e-002 |
| 165 | 348. | 120. | 5.197 | 4.7e-002 | 2.584e-002 |
| 166 | 360. | 132. | 5.192 | 4.2e-002 | 2.309e-002 |
| 167 | 372. | 144. | 5.192 | 4.2e-002 | 2.309e-002 |
| 168 | 384. | 156. | 5.192 | 4.2e-002 | 2.309e-002 |
| 169 | 396. | 168. | 5.187 | 3.7e-002 | 2.034e-002 |
| 170 | 408. | 180. | 5.187 | 3.7e-002 | 2.034e-002 |
| 171 | 420. | 192. | 5.187 | 3.7e-002 | 2.034e-002 |
| 172 | 432. | 204. | 5.187 | 3.7e-002 | 2.034e-002 |
| 173 | 444. | 216. | 5.187 | 3.7e-002 | 2.034e-002 |
| 174 | 456. | 228. | 5.187 | 3.7e-002 | 2.034e-002 |
| 175 | 468. | 240. | 5.183 | 3.3e-002 | 1.814e-002 |
| 176 | 480. | 252. | 5.183 | 3.3e-002 | 1.814e-002 |
| 177 | 492. | 264. | 5.183 | 3.3e-002 | 1.814e-002 |
| 178 | 504. | 276. | 5.183 | 3.3e-002 | 1.814e-002 |
| 179 | 516. | 288. | 5.183 | 3.3e-002 | 1.814e-002 |
| 180 | 528. | 300. | 5.178 | 2.8e-002 | 1.539e-002 |
| 181 | 540. | 312. | 5.178 | 2.8e-002 | 1.539e-002 |
| 182 | 552. | 324. | 5.178 | 2.8e-002 | 1.539e-002 |
| 183 | 564. | 336. | 5.178 | 2.8e-002 | 1.539e-002 |
| 184 | 576. | 348. | 5.178 | 2.8e-002 | 1.539e-002 |
| 185 | 588. | 360. | 5.178 | 2.8e-002 | 1.539e-002 |
| 186 | 600. | 372. | 5.178 | 2.8e-002 | 1.539e-002 |
| 187 | 720. | 492. | 5.178 | 2.8e-002 | 1.539e-002 |
| 188 | 840. | 612. | 5.173 | 2.3e-002 | 1.264e-002 |
| 189 | 960. | 732. | 5.173 | 2.3e-002 | 1.264e-002 |
| 190 | 1080 | 852. | 5.173 | 2.3e-002 | 1.264e-002 |

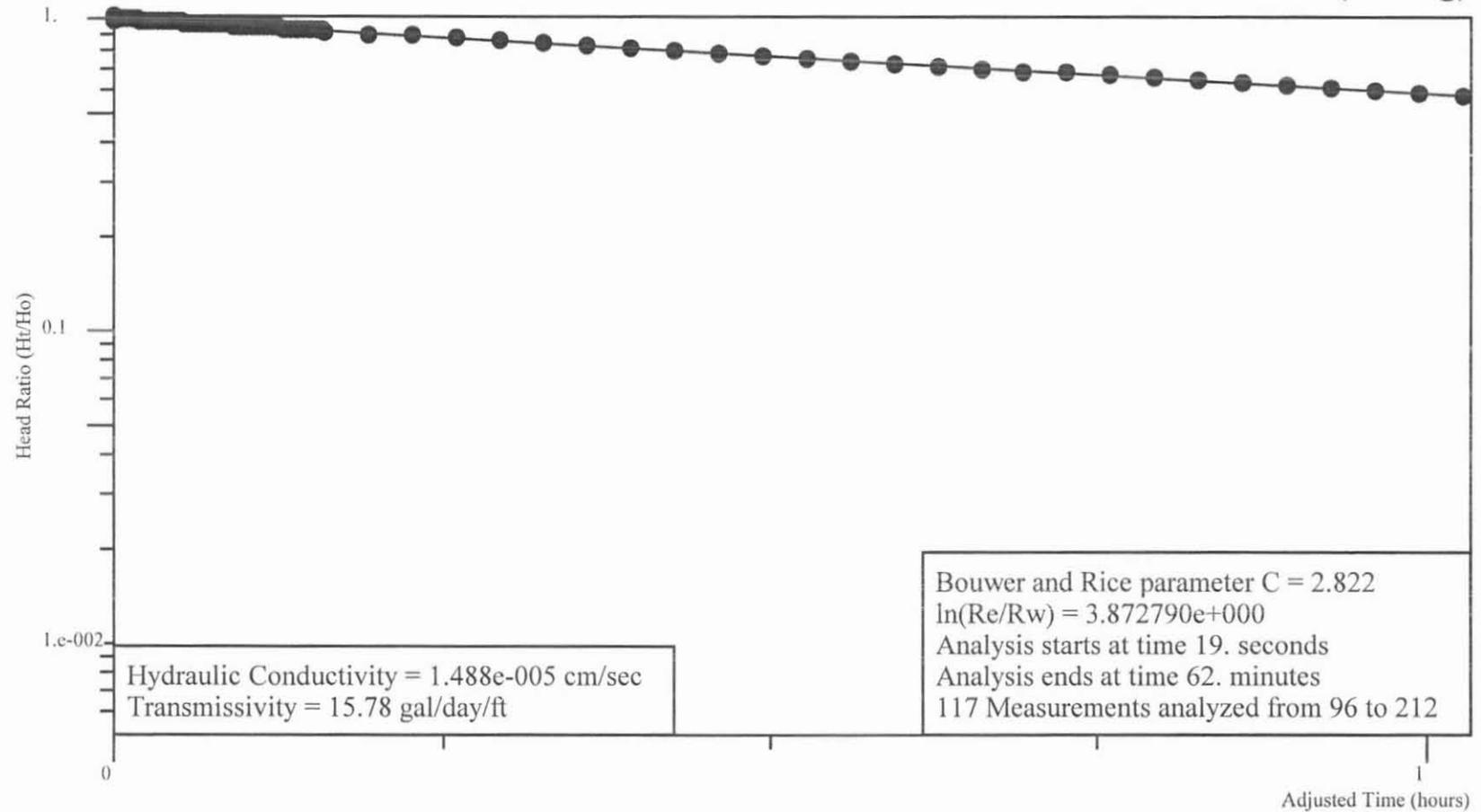
| | | | | | |
|-----|------|------|-------|----------|------------|
| 191 | 1200 | 972. | 5.173 | 2.3e-002 | 1.264e-002 |
| 192 | 1320 | 1092 | 5.168 | 1.8e-002 | 9.896e-003 |
| 193 | 1440 | 1212 | 5.168 | 1.8e-002 | 9.896e-003 |
| 194 | 1560 | 1332 | 5.168 | 1.8e-002 | 9.896e-003 |
| 195 | 1680 | 1452 | 5.164 | 1.4e-002 | 7.697e-003 |
| 196 | 1800 | 1572 | 5.164 | 1.4e-002 | 7.697e-003 |
| 197 | 1920 | 1692 | 5.164 | 1.4e-002 | 7.697e-003 |
| 198 | 2040 | 1812 | 5.164 | 1.4e-002 | 7.697e-003 |
| 199 | 2160 | 1932 | 5.164 | 1.4e-002 | 7.697e-003 |
| 200 | 2280 | 2052 | 5.164 | 1.4e-002 | 7.697e-003 |
| 201 | 2400 | 2172 | 5.164 | 1.4e-002 | 7.697e-003 |
| 202 | 2520 | 2292 | 5.164 | 1.4e-002 | 7.697e-003 |
| 203 | 2640 | 2412 | 5.164 | 1.4e-002 | 7.697e-003 |
| 204 | 2760 | 2532 | 5.164 | 1.4e-002 | 7.697e-003 |
| 205 | 2880 | 2652 | 5.164 | 1.4e-002 | 7.697e-003 |
| 206 | 3000 | 2772 | 5.164 | 1.4e-002 | 7.697e-003 |
| 207 | 3120 | 2892 | 5.164 | 1.4e-002 | 7.697e-003 |
| 208 | 3240 | 3012 | 5.164 | 1.4e-002 | 7.697e-003 |
| 209 | 3360 | 3132 | 5.164 | 1.4e-002 | 7.697e-003 |
| 210 | 3480 | 3252 | 5.159 | 9.e-003 | 4.948e-003 |
| 211 | 3600 | 3372 | 5.164 | 1.4e-002 | 7.697e-003 |
| 212 | 3720 | 3492 | 5.164 | 1.4e-002 | 7.697e-003 |
| 213 | 3840 | 3612 | 5.164 | 1.4e-002 | 7.697e-003 |
| 214 | 3960 | 3732 | 5.164 | 1.4e-002 | 7.697e-003 |
| 215 | 4080 | 3852 | 5.159 | 9.e-003 | 4.948e-003 |
| 216 | 4200 | 3972 | 5.159 | 9.e-003 | 4.948e-003 |
| 217 | 4320 | 4092 | 5.159 | 9.e-003 | 4.948e-003 |
| 218 | 4440 | 4212 | 5.159 | 9.e-003 | 4.948e-003 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-19D (Falling)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 2.085 feet at 19. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P19DFALL

Well Label: P-19D (Falling)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.888 inches
Effective Radius: 3.125 inches
Static Water Level: 4.59 feet
Water Table to Screen Bottom: 57.61 feet
Anisotropy Ratio: 1.
Time Adjustment: 19. Seconds

Test starts with trial 23

There are 212 time and drawdown measurements

Maximum head is 2.877 feet

Minimum head is -0.166 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -19. | 4.575 | 1.5e-002 | 5.214e-003 |
| 2 | 0.198 | -18.8 | 4.575 | 1.5e-002 | 5.214e-003 |
| 3 | 0.396 | -18.6 | 4.556 | 3.4e-002 | 1.182e-002 |
| 4 | 0.6 | -18.4 | 4.59 | 0. | 0. |
| 5 | 0.798 | -18.2 | 4.575 | 1.5e-002 | 5.214e-003 |
| 6 | 0.996 | -18. | 3.979 | 0.611 | 0.2124 |
| 7 | 1.2 | -17.8 | 4.451 | 0.139 | 4.831e-002 |
| 8 | 1.398 | -17.6 | 4.065 | 0.525 | 0.1825 |
| 9 | 1.596 | -17.4 | 4.17 | 0.42 | 0.146 |
| 10 | 1.8 | -17.2 | 3.345 | 1.245 | 0.4327 |
| 11 | 1.998 | -17. | 3.765 | 0.825 | 0.2868 |
| 12 | 2.196 | -16.8 | 3.311 | 1.279 | 0.4446 |
| 13 | 2.4 | -16.6 | 2.882 | 1.708 | 0.5937 |
| 14 | 2.598 | -16.4 | 2.567 | 2.023 | 0.7032 |
| 15 | 2.796 | -16.2 | 1.937 | 2.653 | 0.9221 |
| 16 | 3. | -16. | 1.832 | 2.758 | 0.9586 |
| 17 | 3.198 | -15.8 | 1.775 | 2.815 | 0.9784 |
| 18 | 3.396 | -15.6 | 2.038 | 2.552 | 0.887 |
| 19 | 3.6 | -15.4 | 1.866 | 2.724 | 0.9468 |
| 20 | 3.798 | -15.2 | 1.837 | 2.753 | 0.9569 |
| 21 | 3.996 | -15. | 2.057 | 2.533 | 0.8804 |
| 22 | 4.2 | -14.8 | 1.918 | 2.672 | 0.9287 |
| 23 | 4.398 | -14.6 | 1.89 | 2.7 | 0.9385 |
| 24 | 4.596 | -14.4 | 1.713 | 2.877 | 1. |
| 25 | 4.8 | -14.2 | 1.727 | 2.863 | 0.9951 |
| 26 | 4.998 | -14. | 2.166 | 2.424 | 0.8425 |
| 27 | 5.196 | -13.8 | 2.391 | 2.199 | 0.7643 |
| 28 | 5.4 | -13.6 | 2.4 | 2.19 | 0.7612 |
| 29 | 5.598 | -13.4 | 2.916 | 1.674 | 0.5819 |
| 30 | 5.796 | -13.2 | 2.429 | 2.161 | 0.7511 |
| 31 | 6. | -13. | 2.887 | 1.703 | 0.5919 |

| | | | | | |
|----|-------|--------|-------|--------|------------|
| 32 | 6.198 | -12.8 | 2.648 | 1.942 | 0.675 |
| 33 | 6.396 | -12.6 | 1.894 | 2.696 | 0.9371 |
| 34 | 6.6 | -12.4 | 4.756 | -0.166 | -5.77e-002 |
| 35 | 6.798 | -12.2 | 2.992 | 1.598 | 0.5554 |
| 36 | 6.996 | -12. | 2.352 | 2.238 | 0.7779 |
| 37 | 7.2 | -11.8 | 2.605 | 1.985 | 0.69 |
| 38 | 7.398 | -11.6 | 2.772 | 1.818 | 0.6319 |
| 39 | 7.596 | -11.4 | 2.811 | 1.779 | 0.6184 |
| 40 | 7.8 | -11.2 | 2.648 | 1.942 | 0.675 |
| 41 | 7.998 | -11. | 2.462 | 2.128 | 0.7397 |
| 42 | 8.196 | -10.8 | 2.31 | 2.28 | 0.7925 |
| 43 | 8.4 | -10.6 | 2.257 | 2.333 | 0.8109 |
| 44 | 8.598 | -10.4 | 2.31 | 2.28 | 0.7925 |
| 45 | 8.796 | -10.2 | 2.429 | 2.161 | 0.7511 |
| 46 | 9. | -9.996 | 2.539 | 2.051 | 0.7129 |
| 47 | 9.198 | -9.798 | 2.601 | 1.989 | 0.6913 |
| 48 | 9.396 | -9.6 | 2.591 | 1.999 | 0.6948 |
| 49 | 9.6 | -9.396 | 2.534 | 2.056 | 0.7146 |
| 50 | 9.798 | -9.198 | 2.453 | 2.137 | 0.7428 |
| 51 | 9.996 | -9. | 2.4 | 2.19 | 0.7612 |
| 52 | 10.2 | -8.796 | 2.386 | 2.204 | 0.7661 |
| 53 | 10.4 | -8.598 | 2.415 | 2.175 | 0.756 |
| 54 | 10.6 | -8.4 | 2.467 | 2.123 | 0.7379 |
| 55 | 10.8 | -8.196 | 2.51 | 2.08 | 0.723 |
| 56 | 11. | -7.998 | 2.534 | 2.056 | 0.7146 |
| 57 | 11.2 | -7.8 | 2.524 | 2.066 | 0.7181 |
| 58 | 11.4 | -7.596 | 2.496 | 2.094 | 0.7278 |
| 59 | 11.6 | -7.398 | 2.462 | 2.128 | 0.7397 |
| 60 | 11.8 | -7.2 | 2.443 | 2.147 | 0.7463 |
| 61 | 12. | -6.996 | 2.443 | 2.147 | 0.7463 |
| 62 | 12.2 | -6.798 | 2.457 | 2.133 | 0.7414 |
| 63 | 12.4 | -6.6 | 2.481 | 2.109 | 0.7331 |
| 64 | 12.6 | -6.396 | 2.5 | 2.09 | 0.7265 |
| 65 | 12.8 | -6.198 | 2.505 | 2.085 | 0.7247 |
| 66 | 13. | -6. | 2.505 | 2.085 | 0.7247 |
| 67 | 13.2 | -5.796 | 2.481 | 2.109 | 0.7331 |
| 68 | 13.4 | -5.598 | 2.534 | 2.056 | 0.7146 |
| 69 | 13.6 | -5.4 | 2.472 | 2.118 | 0.7362 |
| 70 | 13.8 | -5.196 | 2.472 | 2.118 | 0.7362 |
| 71 | 14. | -4.998 | 2.481 | 2.109 | 0.7331 |
| 72 | 14.2 | -4.8 | 2.486 | 2.104 | 0.7313 |
| 73 | 14.4 | -4.596 | 2.491 | 2.099 | 0.7296 |
| 74 | 14.6 | -4.398 | 2.491 | 2.099 | 0.7296 |
| 75 | 14.8 | -4.2 | 2.777 | 1.813 | 0.6302 |
| 76 | 15. | -3.996 | 2.295 | 2.295 | 0.7977 |
| 77 | 15.2 | -3.798 | 2.462 | 2.128 | 0.7397 |
| 78 | 15.4 | -3.6 | 2.51 | 2.08 | 0.723 |
| 79 | 15.6 | -3.396 | 2.505 | 2.085 | 0.7247 |
| 80 | 15.8 | -3.198 | 2.51 | 2.08 | 0.723 |
| 81 | 16. | -3. | 2.5 | 2.09 | 0.7265 |
| 82 | 16.2 | -2.796 | 2.477 | 2.113 | 0.7344 |
| 83 | 16.4 | -2.598 | 2.462 | 2.128 | 0.7397 |
| 84 | 16.6 | -2.4 | 2.467 | 2.123 | 0.7379 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -2.196 | 2.477 | 2.113 | 0.7344 |
| 86 | 17. | -1.998 | 2.486 | 2.104 | 0.7313 |
| 87 | 17.2 | -1.8 | 2.496 | 2.094 | 0.7278 |
| 88 | 17.4 | -1.596 | 2.496 | 2.094 | 0.7278 |
| 89 | 17.6 | -1.398 | 2.5 | 2.09 | 0.7265 |
| 90 | 17.8 | -1.2 | 2.486 | 2.104 | 0.7313 |
| 91 | 18. | -0.996 | 2.472 | 2.118 | 0.7362 |
| 92 | 18.2 | -0.798 | 2.486 | 2.104 | 0.7313 |
| 93 | 18.4 | -0.6 | 2.5 | 2.09 | 0.7265 |
| 94 | 18.6 | -0.396 | 2.343 | 2.247 | 0.781 |
| 95 | 18.8 | -0.198 | 2.481 | 2.109 | 0.7331 |
| 96 | 19. | 0. | 2.505 | 2.085 | 0.7247 |
| 97 | 19.2 | 0.204 | 2.486 | 2.104 | 0.7313 |
| 98 | 19.4 | 0.402 | 2.491 | 2.099 | 0.7296 |
| 99 | 19.6 | 0.6 | 2.543 | 2.047 | 0.7115 |
| 100 | 19.8 | 0.804 | 2.477 | 2.113 | 0.7344 |
| 101 | 20. | 1.002 | 2.486 | 2.104 | 0.7313 |
| 102 | 21. | 2.004 | 2.491 | 2.099 | 0.7296 |
| 103 | 22. | 3. | 2.486 | 2.104 | 0.7313 |
| 104 | 23. | 4.002 | 2.491 | 2.099 | 0.7296 |
| 105 | 24. | 5.004 | 2.491 | 2.099 | 0.7296 |
| 106 | 25. | 6. | 2.491 | 2.099 | 0.7296 |
| 107 | 26. | 7.002 | 2.491 | 2.099 | 0.7296 |
| 108 | 27. | 8.004 | 2.491 | 2.099 | 0.7296 |
| 109 | 28. | 9. | 2.491 | 2.099 | 0.7296 |
| 110 | 29. | 10. | 2.491 | 2.099 | 0.7296 |
| 111 | 30. | 11. | 2.491 | 2.099 | 0.7296 |
| 112 | 31. | 12. | 2.496 | 2.094 | 0.7278 |
| 113 | 32. | 13. | 2.496 | 2.094 | 0.7278 |
| 114 | 33. | 14. | 2.496 | 2.094 | 0.7278 |
| 115 | 34. | 15. | 2.496 | 2.094 | 0.7278 |
| 116 | 35. | 16. | 2.496 | 2.094 | 0.7278 |
| 117 | 36. | 17. | 2.496 | 2.094 | 0.7278 |
| 118 | 37. | 18. | 2.496 | 2.094 | 0.7278 |
| 119 | 38. | 19. | 2.496 | 2.094 | 0.7278 |
| 120 | 39. | 20. | 2.496 | 2.094 | 0.7278 |
| 121 | 40. | 21. | 2.5 | 2.09 | 0.7265 |
| 122 | 41. | 22. | 2.5 | 2.09 | 0.7265 |
| 123 | 42. | 23. | 2.5 | 2.09 | 0.7265 |
| 124 | 43. | 24. | 2.5 | 2.09 | 0.7265 |
| 125 | 44. | 25. | 2.5 | 2.09 | 0.7265 |
| 126 | 45. | 26. | 2.5 | 2.09 | 0.7265 |
| 127 | 46. | 27. | 2.5 | 2.09 | 0.7265 |
| 128 | 47. | 28. | 2.5 | 2.09 | 0.7265 |
| 129 | 48. | 29. | 2.5 | 2.09 | 0.7265 |
| 130 | 49. | 30. | 2.5 | 2.09 | 0.7265 |
| 131 | 50. | 31. | 2.5 | 2.09 | 0.7265 |
| 132 | 51. | 32. | 2.505 | 2.085 | 0.7247 |
| 133 | 52. | 33. | 2.505 | 2.085 | 0.7247 |
| 134 | 53. | 34. | 2.505 | 2.085 | 0.7247 |
| 135 | 54. | 35. | 2.505 | 2.085 | 0.7247 |
| 136 | 55. | 36. | 2.505 | 2.085 | 0.7247 |
| 137 | 56. | 37. | 2.505 | 2.085 | 0.7247 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 138 | 57. | 38. | 2.505 | 2.085 | 0.7247 |
| 139 | 58. | 39. | 2.505 | 2.085 | 0.7247 |
| 140 | 59. | 40. | 2.505 | 2.085 | 0.7247 |
| 141 | 60. | 41. | 2.505 | 2.085 | 0.7247 |
| 142 | 72. | 53. | 2.51 | 2.08 | 0.723 |
| 143 | 84. | 65. | 2.515 | 2.075 | 0.7212 |
| 144 | 96. | 77. | 2.52 | 2.07 | 0.7195 |
| 145 | 108. | 89. | 2.524 | 2.066 | 0.7181 |
| 146 | 120. | 101. | 2.529 | 2.061 | 0.7164 |
| 147 | 132. | 113. | 2.534 | 2.056 | 0.7146 |
| 148 | 144. | 125. | 2.534 | 2.056 | 0.7146 |
| 149 | 156. | 137. | 2.539 | 2.051 | 0.7129 |
| 150 | 168. | 149. | 2.543 | 2.047 | 0.7115 |
| 151 | 180. | 161. | 2.548 | 2.042 | 0.7098 |
| 152 | 192. | 173. | 2.553 | 2.037 | 0.708 |
| 153 | 204. | 185. | 2.553 | 2.037 | 0.708 |
| 154 | 216. | 197. | 2.558 | 2.032 | 0.7063 |
| 155 | 228. | 209. | 2.562 | 2.028 | 0.7049 |
| 156 | 240. | 221. | 2.567 | 2.023 | 0.7032 |
| 157 | 252. | 233. | 2.572 | 2.018 | 0.7014 |
| 158 | 264. | 245. | 2.577 | 2.013 | 0.6997 |
| 159 | 276. | 257. | 2.577 | 2.013 | 0.6997 |
| 160 | 288. | 269. | 2.582 | 2.008 | 0.6979 |
| 161 | 300. | 281. | 2.586 | 2.004 | 0.6966 |
| 162 | 312. | 293. | 2.591 | 1.999 | 0.6948 |
| 163 | 324. | 305. | 2.591 | 1.999 | 0.6948 |
| 164 | 336. | 317. | 2.596 | 1.994 | 0.6931 |
| 165 | 348. | 329. | 2.601 | 1.989 | 0.6913 |
| 166 | 360. | 341. | 2.605 | 1.985 | 0.69 |
| 167 | 372. | 353. | 2.61 | 1.98 | 0.6882 |
| 168 | 384. | 365. | 2.61 | 1.98 | 0.6882 |
| 169 | 396. | 377. | 2.615 | 1.975 | 0.6865 |
| 170 | 408. | 389. | 2.62 | 1.97 | 0.6847 |
| 171 | 420. | 401. | 2.625 | 1.965 | 0.683 |
| 172 | 432. | 413. | 2.625 | 1.965 | 0.683 |
| 173 | 444. | 425. | 2.629 | 1.961 | 0.6816 |
| 174 | 456. | 437. | 2.634 | 1.956 | 0.6799 |
| 175 | 468. | 449. | 2.634 | 1.956 | 0.6799 |
| 176 | 480. | 461. | 2.639 | 1.951 | 0.6781 |
| 177 | 492. | 473. | 2.643 | 1.947 | 0.6767 |
| 178 | 504. | 485. | 2.648 | 1.942 | 0.675 |
| 179 | 516. | 497. | 2.653 | 1.937 | 0.6733 |
| 180 | 528. | 509. | 2.653 | 1.937 | 0.6733 |
| 181 | 540. | 521. | 2.658 | 1.932 | 0.6715 |
| 182 | 552. | 533. | 2.663 | 1.927 | 0.6698 |
| 183 | 564. | 545. | 2.663 | 1.927 | 0.6698 |
| 184 | 576. | 557. | 2.667 | 1.923 | 0.6684 |
| 185 | 588. | 569. | 2.672 | 1.918 | 0.6667 |
| 186 | 600. | 581. | 2.677 | 1.913 | 0.6649 |
| 187 | 720. | 701. | 2.71 | 1.88 | 0.6535 |
| 188 | 840. | 821. | 2.744 | 1.846 | 0.6416 |
| 189 | 960. | 941. | 2.772 | 1.818 | 0.6319 |
| 190 | 1080 | 1061 | 2.806 | 1.784 | 0.6201 |

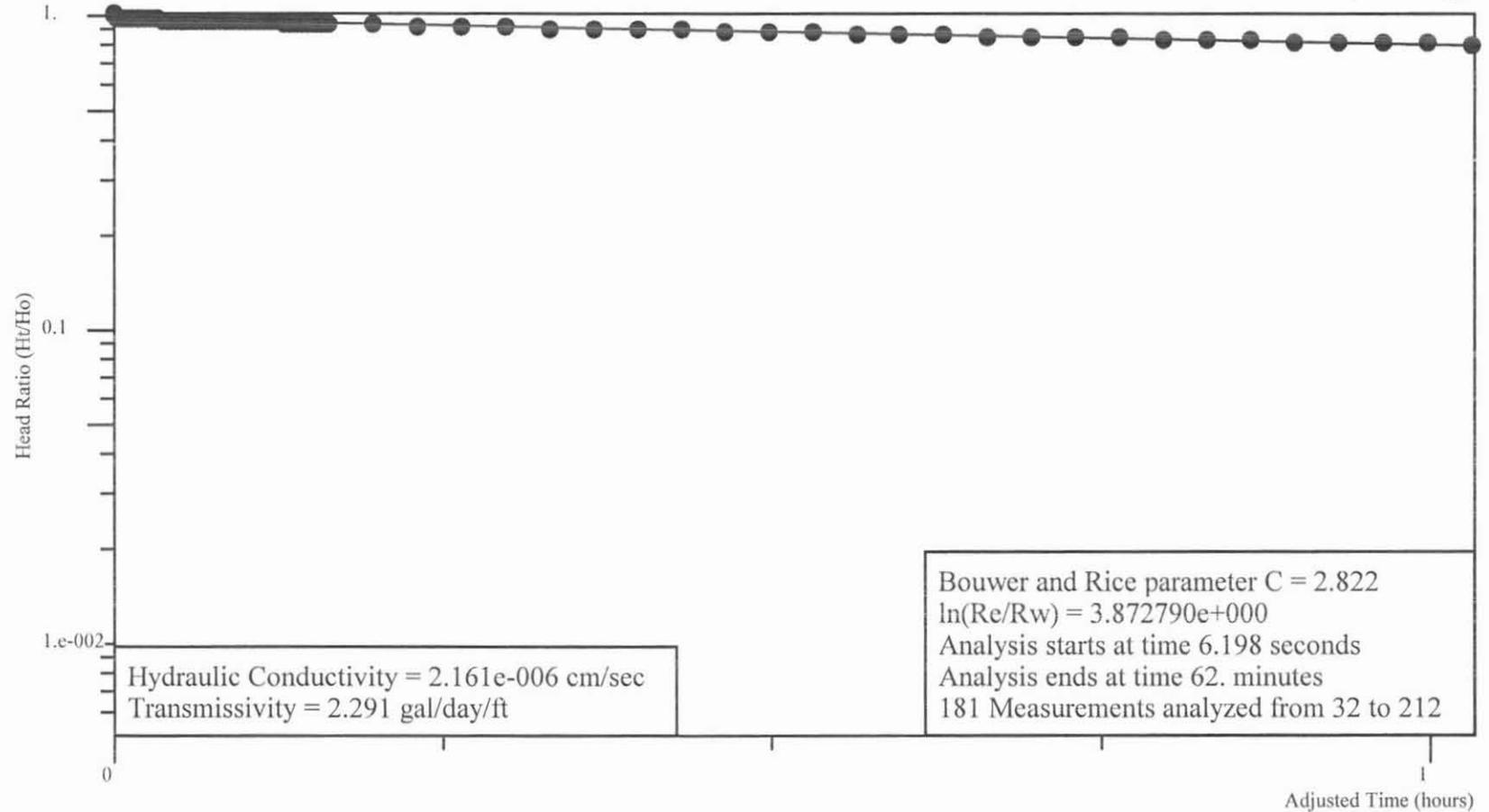
| | | | | | |
|-----|------|------|-------|-------|--------|
| 191 | 1200 | 1181 | 2.839 | 1.751 | 0.6086 |
| 192 | 1320 | 1301 | 2.868 | 1.722 | 0.5985 |
| 193 | 1440 | 1421 | 2.901 | 1.689 | 0.5871 |
| 194 | 1560 | 1541 | 2.93 | 1.66 | 0.577 |
| 195 | 1680 | 1661 | 2.958 | 1.632 | 0.5673 |
| 196 | 1800 | 1781 | 2.987 | 1.603 | 0.5572 |
| 197 | 1920 | 1901 | 3.021 | 1.569 | 0.5454 |
| 198 | 2040 | 2021 | 3.044 | 1.546 | 0.5374 |
| 199 | 2160 | 2141 | 3.073 | 1.517 | 0.5273 |
| 200 | 2280 | 2261 | 3.102 | 1.488 | 0.5172 |
| 201 | 2400 | 2381 | 3.13 | 1.46 | 0.5075 |
| 202 | 2520 | 2501 | 3.159 | 1.431 | 0.4974 |
| 203 | 2640 | 2621 | 3.183 | 1.407 | 0.4891 |
| 204 | 2760 | 2741 | 3.207 | 1.383 | 0.4807 |
| 205 | 2880 | 2861 | 3.235 | 1.355 | 0.471 |
| 206 | 3000 | 2981 | 3.259 | 1.331 | 0.4626 |
| 207 | 3120 | 3101 | 3.288 | 1.302 | 0.4526 |
| 208 | 3240 | 3221 | 3.311 | 1.279 | 0.4446 |
| 209 | 3360 | 3341 | 3.335 | 1.255 | 0.4362 |
| 210 | 3480 | 3461 | 3.359 | 1.231 | 0.4279 |
| 211 | 3600 | 3581 | 3.383 | 1.207 | 0.4195 |
| 212 | 3720 | 3701 | 3.407 | 1.183 | 0.4112 |

Aquifer Analysis February 13, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-19D (Rising)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 2.111 feet at 6.198 seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 13, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P19DRISI

Well Label: P-19D (Rising)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.188 inches
Effective Radius: 3.125 inches
Static Water Level: 3.759 feet
Water Table to Screen Bottom: 58.45 feet
Anisotropy Ratio: 1.
Time Adjustment: 6.198 Seconds

Test starts with trial 11

There are 212 time and drawdown measurements

Maximum head is 2.339 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -6.198 | 3.759 | 0. | 0. |
| 2 | 0.198 | -6. | 4.531 | 0.772 | 0.3301 |
| 3 | 0.396 | -5.802 | 4.922 | 1.163 | 0.4972 |
| 4 | 0.6 | -5.598 | 5.136 | 1.377 | 0.5887 |
| 5 | 0.798 | -5.4 | 5.122 | 1.363 | 0.5827 |
| 6 | 0.996 | -5.202 | 5.627 | 1.868 | 0.7986 |
| 7 | 1.2 | -4.998 | 5.598 | 1.839 | 0.7862 |
| 8 | 1.398 | -4.8 | 5.922 | 2.163 | 0.9248 |
| 9 | 1.596 | -4.602 | 5.903 | 2.144 | 0.9166 |
| 10 | 1.8 | -4.398 | 5.979 | 2.22 | 0.9491 |
| 11 | 1.998 | -4.2 | 6.065 | 2.306 | 0.9859 |
| 12 | 2.196 | -4.002 | 6.098 | 2.339 | 1. |
| 13 | 2.4 | -3.798 | 6.06 | 2.301 | 0.9838 |
| 14 | 2.598 | -3.6 | 5.979 | 2.22 | 0.9491 |
| 15 | 2.796 | -3.402 | 5.884 | 2.125 | 0.9085 |
| 16 | 3. | -3.198 | 5.841 | 2.082 | 0.8901 |
| 17 | 3.198 | -3. | 5.832 | 2.073 | 0.8863 |
| 18 | 3.396 | -2.802 | 5.875 | 2.116 | 0.9047 |
| 19 | 3.6 | -2.598 | 5.936 | 2.177 | 0.9307 |
| 20 | 3.798 | -2.4 | 5.97 | 2.211 | 0.9453 |
| 21 | 3.996 | -2.202 | 5.984 | 2.225 | 0.9513 |
| 22 | 4.2 | -1.998 | 5.979 | 2.22 | 0.9491 |
| 23 | 4.398 | -1.8 | 5.898 | 2.139 | 0.9145 |
| 24 | 4.596 | -1.602 | 5.86 | 2.101 | 0.8982 |
| 25 | 4.8 | -1.398 | 5.836 | 2.077 | 0.888 |
| 26 | 4.998 | -1.2 | 5.846 | 2.087 | 0.8923 |
| 27 | 5.196 | -1.002 | 5.87 | 2.111 | 0.9025 |
| 28 | 5.4 | -0.798 | 5.898 | 2.139 | 0.9145 |
| 29 | 5.598 | -0.6 | 5.913 | 2.154 | 0.9209 |
| 30 | 5.796 | -0.402 | 5.913 | 2.154 | 0.9209 |
| 31 | 6. | -0.198 | 5.898 | 2.139 | 0.9145 |

| | | | | | |
|----|-------|-------|-------|-------|--------|
| 32 | 6.198 | 0. | 5.87 | 2.111 | 0.9025 |
| 33 | 6.396 | 0.198 | 5.855 | 2.096 | 0.8961 |
| 34 | 6.6 | 0.402 | 5.846 | 2.087 | 0.8923 |
| 35 | 6.798 | 0.6 | 5.851 | 2.092 | 0.8944 |
| 36 | 6.996 | 0.798 | 5.865 | 2.106 | 0.9004 |
| 37 | 7.2 | 1.002 | 5.879 | 2.12 | 0.9064 |
| 38 | 7.398 | 1.2 | 5.884 | 2.125 | 0.9085 |
| 39 | 7.596 | 1.398 | 5.879 | 2.12 | 0.9064 |
| 40 | 7.8 | 1.602 | 5.87 | 2.111 | 0.9025 |
| 41 | 7.998 | 1.8 | 5.86 | 2.101 | 0.8982 |
| 42 | 8.196 | 1.998 | 5.851 | 2.092 | 0.8944 |
| 43 | 8.4 | 2.202 | 5.851 | 2.092 | 0.8944 |
| 44 | 8.598 | 2.4 | 5.851 | 2.092 | 0.8944 |
| 45 | 8.796 | 2.598 | 5.86 | 2.101 | 0.8982 |
| 46 | 9. | 2.802 | 5.865 | 2.106 | 0.9004 |
| 47 | 9.198 | 3. | 5.865 | 2.106 | 0.9004 |
| 48 | 9.396 | 3.198 | 5.865 | 2.106 | 0.9004 |
| 49 | 9.6 | 3.402 | 5.86 | 2.101 | 0.8982 |
| 50 | 9.798 | 3.6 | 5.855 | 2.096 | 0.8961 |
| 51 | 9.996 | 3.798 | 5.851 | 2.092 | 0.8944 |
| 52 | 10.2 | 4.002 | 5.851 | 2.092 | 0.8944 |
| 53 | 10.4 | 4.2 | 5.851 | 2.092 | 0.8944 |
| 54 | 10.6 | 4.398 | 5.855 | 2.096 | 0.8961 |
| 55 | 10.8 | 4.602 | 5.855 | 2.096 | 0.8961 |
| 56 | 11. | 4.8 | 5.855 | 2.096 | 0.8961 |
| 57 | 11.2 | 4.998 | 5.855 | 2.096 | 0.8961 |
| 58 | 11.4 | 5.202 | 5.851 | 2.092 | 0.8944 |
| 59 | 11.6 | 5.4 | 5.851 | 2.092 | 0.8944 |
| 60 | 11.8 | 5.598 | 5.851 | 2.092 | 0.8944 |
| 61 | 12. | 5.802 | 5.846 | 2.087 | 0.8923 |
| 62 | 12.2 | 6. | 5.851 | 2.092 | 0.8944 |
| 63 | 12.4 | 6.198 | 5.851 | 2.092 | 0.8944 |
| 64 | 12.6 | 6.402 | 5.851 | 2.092 | 0.8944 |
| 65 | 12.8 | 6.6 | 5.851 | 2.092 | 0.8944 |
| 66 | 13. | 6.798 | 5.851 | 2.092 | 0.8944 |
| 67 | 13.2 | 7.002 | 5.846 | 2.087 | 0.8923 |
| 68 | 13.4 | 7.2 | 5.846 | 2.087 | 0.8923 |
| 69 | 13.6 | 7.398 | 5.846 | 2.087 | 0.8923 |
| 70 | 13.8 | 7.602 | 5.846 | 2.087 | 0.8923 |
| 71 | 14. | 7.8 | 5.846 | 2.087 | 0.8923 |
| 72 | 14.2 | 7.998 | 5.846 | 2.087 | 0.8923 |
| 73 | 14.4 | 8.202 | 5.846 | 2.087 | 0.8923 |
| 74 | 14.6 | 8.4 | 5.846 | 2.087 | 0.8923 |
| 75 | 14.8 | 8.598 | 5.846 | 2.087 | 0.8923 |
| 76 | 15. | 8.802 | 5.846 | 2.087 | 0.8923 |
| 77 | 15.2 | 9. | 5.846 | 2.087 | 0.8923 |
| 78 | 15.4 | 9.198 | 5.846 | 2.087 | 0.8923 |
| 79 | 15.6 | 9.402 | 5.846 | 2.087 | 0.8923 |
| 80 | 15.8 | 9.6 | 5.846 | 2.087 | 0.8923 |
| 81 | 16. | 9.798 | 5.846 | 2.087 | 0.8923 |
| 82 | 16.2 | 10. | 5.846 | 2.087 | 0.8923 |
| 83 | 16.4 | 10.2 | 5.846 | 2.087 | 0.8923 |
| 84 | 16.6 | 10.4 | 5.841 | 2.082 | 0.8901 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 85 | 16.8 | 10.6 | 5.841 | 2.082 | 0.8901 |
| 86 | 17. | 10.8 | 5.841 | 2.082 | 0.8901 |
| 87 | 17.2 | 11. | 5.841 | 2.082 | 0.8901 |
| 88 | 17.4 | 11.2 | 5.841 | 2.082 | 0.8901 |
| 89 | 17.6 | 11.4 | 5.841 | 2.082 | 0.8901 |
| 90 | 17.8 | 11.6 | 5.841 | 2.082 | 0.8901 |
| 91 | 18. | 11.8 | 5.841 | 2.082 | 0.8901 |
| 92 | 18.2 | 12. | 5.841 | 2.082 | 0.8901 |
| 93 | 18.4 | 12.2 | 5.841 | 2.082 | 0.8901 |
| 94 | 18.6 | 12.4 | 5.841 | 2.082 | 0.8901 |
| 95 | 18.8 | 12.6 | 5.841 | 2.082 | 0.8901 |
| 96 | 19. | 12.8 | 5.841 | 2.082 | 0.8901 |
| 97 | 19.2 | 13. | 5.841 | 2.082 | 0.8901 |
| 98 | 19.4 | 13.2 | 5.841 | 2.082 | 0.8901 |
| 99 | 19.6 | 13.4 | 5.841 | 2.082 | 0.8901 |
| 100 | 19.8 | 13.6 | 5.841 | 2.082 | 0.8901 |
| 101 | 20. | 13.8 | 5.841 | 2.082 | 0.8901 |
| 102 | 21. | 14.8 | 5.836 | 2.077 | 0.888 |
| 103 | 22. | 15.8 | 5.836 | 2.077 | 0.888 |
| 104 | 23. | 16.8 | 5.836 | 2.077 | 0.888 |
| 105 | 24. | 17.8 | 5.836 | 2.077 | 0.888 |
| 106 | 25. | 18.8 | 5.836 | 2.077 | 0.888 |
| 107 | 26. | 19.8 | 5.832 | 2.073 | 0.8863 |
| 108 | 27. | 20.8 | 5.832 | 2.073 | 0.8863 |
| 109 | 28. | 21.8 | 5.832 | 2.073 | 0.8863 |
| 110 | 29. | 22.8 | 5.832 | 2.073 | 0.8863 |
| 111 | 30. | 23.8 | 5.832 | 2.073 | 0.8863 |
| 112 | 31. | 24.8 | 5.832 | 2.073 | 0.8863 |
| 113 | 32. | 25.8 | 5.832 | 2.073 | 0.8863 |
| 114 | 33. | 26.8 | 5.827 | 2.068 | 0.8841 |
| 115 | 34. | 27.8 | 5.827 | 2.068 | 0.8841 |
| 116 | 35. | 28.8 | 5.827 | 2.068 | 0.8841 |
| 117 | 36. | 29.8 | 5.827 | 2.068 | 0.8841 |
| 118 | 37. | 30.8 | 5.827 | 2.068 | 0.8841 |
| 119 | 38. | 31.8 | 5.827 | 2.068 | 0.8841 |
| 120 | 39. | 32.8 | 5.827 | 2.068 | 0.8841 |
| 121 | 40. | 33.8 | 5.827 | 2.068 | 0.8841 |
| 122 | 41. | 34.8 | 5.827 | 2.068 | 0.8841 |
| 123 | 42. | 35.8 | 5.827 | 2.068 | 0.8841 |
| 124 | 43. | 36.8 | 5.827 | 2.068 | 0.8841 |
| 125 | 44. | 37.8 | 5.827 | 2.068 | 0.8841 |
| 126 | 45. | 38.8 | 5.827 | 2.068 | 0.8841 |
| 127 | 46. | 39.8 | 5.827 | 2.068 | 0.8841 |
| 128 | 47. | 40.8 | 5.827 | 2.068 | 0.8841 |
| 129 | 48. | 41.8 | 5.822 | 2.063 | 0.882 |
| 130 | 49. | 42.8 | 5.822 | 2.063 | 0.882 |
| 131 | 50. | 43.8 | 5.822 | 2.063 | 0.882 |
| 132 | 51. | 44.8 | 5.822 | 2.063 | 0.882 |
| 133 | 52. | 45.8 | 5.822 | 2.063 | 0.882 |
| 134 | 53. | 46.8 | 5.822 | 2.063 | 0.882 |
| 135 | 54. | 47.8 | 5.822 | 2.063 | 0.882 |
| 136 | 55. | 48.8 | 5.822 | 2.063 | 0.882 |
| 137 | 56. | 49.8 | 5.822 | 2.063 | 0.882 |

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 138 | 57. | 50.8 | 5.822 | 2.063 | 0.882 |
| 139 | 58. | 51.8 | 5.822 | 2.063 | 0.882 |
| 140 | 59. | 52.8 | 5.822 | 2.063 | 0.882 |
| 141 | 60. | 53.8 | 5.822 | 2.063 | 0.882 |
| 142 | 72. | 65.8 | 5.817 | 2.058 | 0.8799 |
| 143 | 84. | 77.8 | 5.817 | 2.058 | 0.8799 |
| 144 | 96. | 89.8 | 5.813 | 2.054 | 0.8782 |
| 145 | 108. | 101.8 | 5.813 | 2.054 | 0.8782 |
| 146 | 120. | 113.8 | 5.808 | 2.049 | 0.876 |
| 147 | 132. | 125.8 | 5.808 | 2.049 | 0.876 |
| 148 | 144. | 137.8 | 5.803 | 2.044 | 0.8739 |
| 149 | 156. | 149.8 | 5.803 | 2.044 | 0.8739 |
| 150 | 168. | 161.8 | 5.803 | 2.044 | 0.8739 |
| 151 | 180. | 173.8 | 5.798 | 2.039 | 0.8717 |
| 152 | 192. | 185.8 | 5.798 | 2.039 | 0.8717 |
| 153 | 204. | 197.8 | 5.798 | 2.039 | 0.8717 |
| 154 | 216. | 209.8 | 5.794 | 2.035 | 0.87 |
| 155 | 228. | 221.8 | 5.794 | 2.035 | 0.87 |
| 156 | 240. | 233.8 | 5.794 | 2.035 | 0.87 |
| 157 | 252. | 245.8 | 5.789 | 2.03 | 0.8679 |
| 158 | 264. | 257.8 | 5.789 | 2.03 | 0.8679 |
| 159 | 276. | 269.8 | 5.789 | 2.03 | 0.8679 |
| 160 | 288. | 281.8 | 5.784 | 2.025 | 0.8658 |
| 161 | 300. | 293.8 | 5.784 | 2.025 | 0.8658 |
| 162 | 312. | 305.8 | 5.779 | 2.02 | 0.8636 |
| 163 | 324. | 317.8 | 5.779 | 2.02 | 0.8636 |
| 164 | 336. | 329.8 | 5.779 | 2.02 | 0.8636 |
| 165 | 348. | 341.8 | 5.779 | 2.02 | 0.8636 |
| 166 | 360. | 353.8 | 5.775 | 2.016 | 0.8619 |
| 167 | 372. | 365.8 | 5.775 | 2.016 | 0.8619 |
| 168 | 384. | 377.8 | 5.775 | 2.016 | 0.8619 |
| 169 | 396. | 389.8 | 5.77 | 2.011 | 0.8598 |
| 170 | 408. | 401.8 | 5.77 | 2.011 | 0.8598 |
| 171 | 420. | 413.8 | 5.77 | 2.011 | 0.8598 |
| 172 | 432. | 425.8 | 5.765 | 2.006 | 0.8576 |
| 173 | 444. | 437.8 | 5.765 | 2.006 | 0.8576 |
| 174 | 456. | 449.8 | 5.765 | 2.006 | 0.8576 |
| 175 | 468. | 461.8 | 5.765 | 2.006 | 0.8576 |
| 176 | 480. | 473.8 | 5.76 | 2.001 | 0.8555 |
| 177 | 492. | 485.8 | 5.76 | 2.001 | 0.8555 |
| 178 | 504. | 497.8 | 5.76 | 2.001 | 0.8555 |
| 179 | 516. | 509.8 | 5.755 | 1.996 | 0.8534 |
| 180 | 528. | 521.8 | 5.755 | 1.996 | 0.8534 |
| 181 | 540. | 533.8 | 5.755 | 1.996 | 0.8534 |
| 182 | 552. | 545.8 | 5.751 | 1.992 | 0.8516 |
| 183 | 564. | 557.8 | 5.751 | 1.992 | 0.8516 |
| 184 | 576. | 569.8 | 5.751 | 1.992 | 0.8516 |
| 185 | 588. | 581.8 | 5.751 | 1.992 | 0.8516 |
| 186 | 600. | 593.8 | 5.746 | 1.987 | 0.8495 |
| 187 | 720. | 713.8 | 5.732 | 1.973 | 0.8435 |
| 188 | 840. | 833.8 | 5.722 | 1.963 | 0.8392 |
| 189 | 960. | 953.8 | 5.708 | 1.949 | 0.8333 |
| 190 | 1080 | 1074 | 5.694 | 1.935 | 0.8273 |

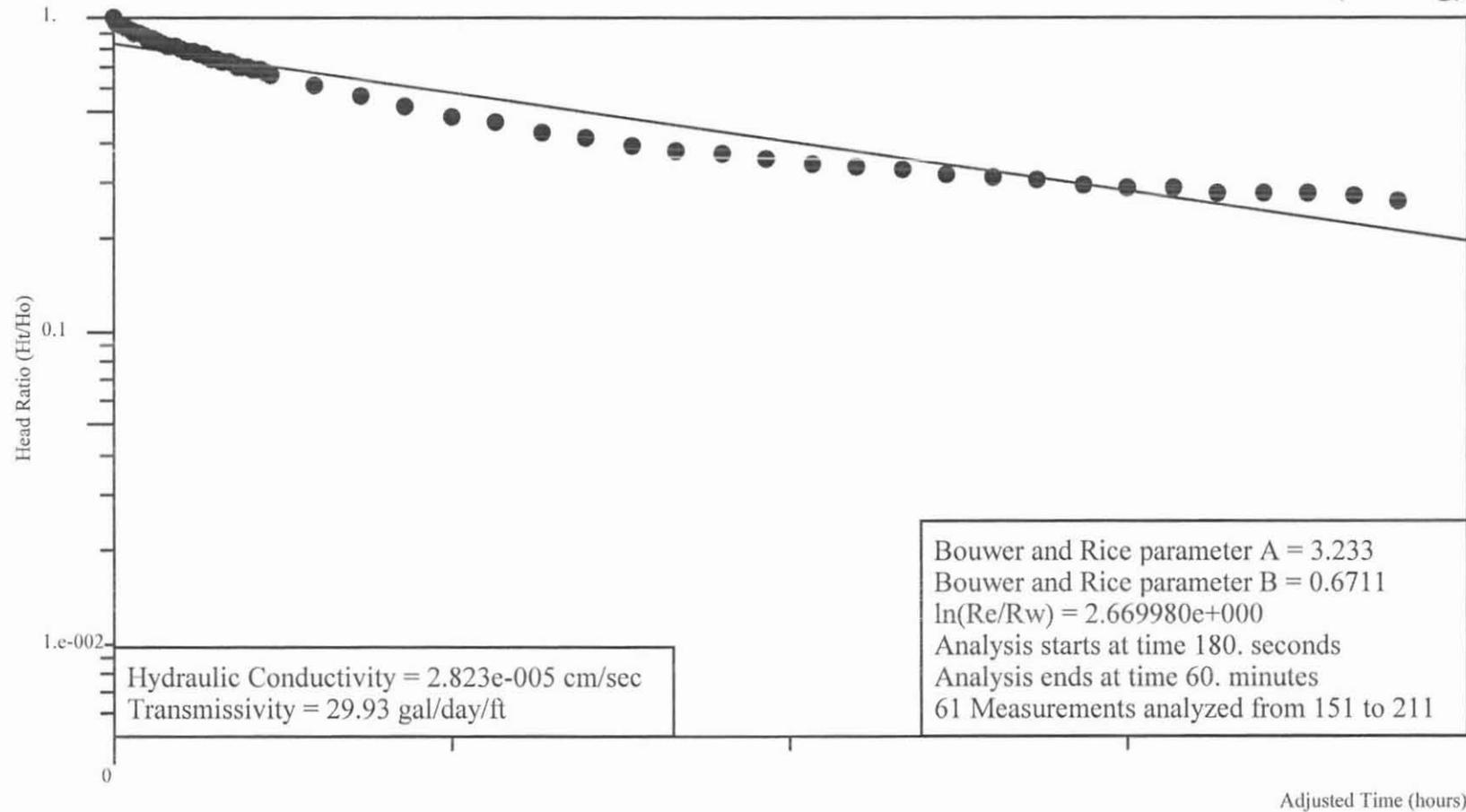
| | | | | | |
|-----|------|------|-------|-------|--------|
| 191 | 1200 | 1194 | 5.684 | 1.925 | 0.823 |
| 192 | 1320 | 1314 | 5.675 | 1.916 | 0.8192 |
| 193 | 1440 | 1434 | 5.66 | 1.901 | 0.8127 |
| 194 | 1560 | 1554 | 5.651 | 1.892 | 0.8089 |
| 195 | 1680 | 1674 | 5.641 | 1.882 | 0.8046 |
| 196 | 1800 | 1794 | 5.627 | 1.868 | 0.7986 |
| 197 | 1920 | 1914 | 5.617 | 1.858 | 0.7944 |
| 198 | 2040 | 2034 | 5.608 | 1.849 | 0.7905 |
| 199 | 2160 | 2154 | 5.598 | 1.839 | 0.7862 |
| 200 | 2280 | 2274 | 5.584 | 1.825 | 0.7802 |
| 201 | 2400 | 2394 | 5.574 | 1.815 | 0.776 |
| 202 | 2520 | 2514 | 5.565 | 1.806 | 0.7721 |
| 203 | 2640 | 2634 | 5.555 | 1.796 | 0.7678 |
| 204 | 2760 | 2754 | 5.546 | 1.787 | 0.764 |
| 205 | 2880 | 2874 | 5.536 | 1.777 | 0.7597 |
| 206 | 3000 | 2994 | 5.527 | 1.768 | 0.7559 |
| 207 | 3120 | 3114 | 5.517 | 1.758 | 0.7516 |
| 208 | 3240 | 3234 | 5.508 | 1.749 | 0.7478 |
| 209 | 3360 | 3354 | 5.498 | 1.739 | 0.7435 |
| 210 | 3480 | 3474 | 5.489 | 1.73 | 0.7396 |
| 211 | 3600 | 3594 | 5.479 | 1.72 | 0.7354 |
| 212 | 3720 | 3714 | 5.474 | 1.715 | 0.7332 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-21 (Falling)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 0.567 feet at 180. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P21FALL

Well Label: P-21 (Falling)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.888 inches
Effective Radius: 3.125 inches
Static Water Level: 47.94 feet
Water Table to Screen Bottom: 17.31 feet
Anisotropy Ratio: 1.
Time Adjustment: 180. Seconds

Test starts with trial 44

There are 211 time and drawdown measurements

Maximum head is 2.319 feet

Minimum head is -1.9e-002 feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|-------------|
| 1 | 0. | -180. | 47.94 | 0. | 0. |
| 2 | 0.198 | -179.8 | 47.94 | 5.e-003 | 2.156e-003 |
| 3 | 0.396 | -179.6 | 47.94 | 5.e-003 | 2.156e-003 |
| 4 | 0.6 | -179.4 | 47.94 | 5.e-003 | 2.156e-003 |
| 5 | 0.798 | -179.2 | 47.94 | 5.e-003 | 2.156e-003 |
| 6 | 0.996 | -179. | 47.94 | 5.e-003 | 2.156e-003 |
| 7 | 1.2 | -178.8 | 47.94 | 5.e-003 | 2.156e-003 |
| 8 | 1.398 | -178.6 | 47.94 | 0. | 0. |
| 9 | 1.596 | -178.4 | 47.94 | 0. | 0. |
| 10 | 1.8 | -178.2 | 47.94 | 5.e-003 | 2.156e-003 |
| 11 | 1.998 | -178. | 47.93 | 1.e-002 | 4.312e-003 |
| 12 | 2.196 | -177.8 | 47.94 | 5.e-003 | 2.156e-003 |
| 13 | 2.4 | -177.6 | 47.94 | -4.e-003 | -1.725e-003 |
| 14 | 2.598 | -177.4 | 47.94 | 5.e-003 | 2.156e-003 |
| 15 | 2.796 | -177.2 | 47.94 | 0. | 0. |
| 16 | 3. | -177. | 47.94 | 0. | 0. |
| 17 | 3.198 | -176.8 | 47.93 | 1.e-002 | 4.312e-003 |
| 18 | 3.396 | -176.6 | 47.92 | 1.5e-002 | 6.468e-003 |
| 19 | 3.6 | -176.4 | 47.94 | -4.e-003 | -1.725e-003 |
| 20 | 3.798 | -176.2 | 47.94 | 5.e-003 | 2.156e-003 |
| 21 | 3.996 | -176. | 47.95 | -1.4e-002 | -6.037e-003 |
| 22 | 4.2 | -175.8 | 47.96 | -1.9e-002 | -8.193e-003 |
| 23 | 4.398 | -175.6 | 47.94 | 0. | 0. |
| 24 | 4.596 | -175.4 | 47.94 | 5.e-003 | 2.156e-003 |
| 25 | 4.8 | -175.2 | 47.91 | 3.4e-002 | 1.466e-002 |
| 26 | 4.998 | -175. | 47.94 | -4.e-003 | -1.725e-003 |
| 27 | 5.196 | -174.8 | 47.91 | 3.4e-002 | 1.466e-002 |
| 28 | 5.4 | -174.6 | 47.61 | 0.333 | 0.1436 |
| 29 | 5.598 | -174.4 | 47.4 | 0.543 | 0.2342 |
| 30 | 5.796 | -174.2 | 46.93 | 1.009 | 0.4351 |
| 31 | 6. | -174. | 46.8 | 1.138 | 0.4907 |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -173.8 | 46.52 | 1.419 | 0.6119 |
| 33 | 6.396 | -173.6 | 46.42 | 1.519 | 0.655 |
| 34 | 6.6 | -173.4 | 46.27 | 1.666 | 0.7184 |
| 35 | 6.798 | -173.2 | 46.32 | 1.619 | 0.6981 |
| 36 | 6.996 | -173. | 46.16 | 1.785 | 0.7697 |
| 37 | 7.2 | -172.8 | 46.15 | 1.795 | 0.774 |
| 38 | 7.398 | -172.6 | 46.03 | 1.914 | 0.8254 |
| 39 | 7.596 | -172.4 | 45.8 | 2.138 | 0.9219 |
| 40 | 7.8 | -172.2 | 45.81 | 2.128 | 0.9176 |
| 41 | 7.998 | -172. | 46.24 | 1.704 | 0.7348 |
| 42 | 8.196 | -171.8 | 46.73 | 1.214 | 0.5235 |
| 43 | 8.4 | -171.6 | 46.59 | 1.347 | 0.5809 |
| 44 | 8.598 | -171.4 | 46.24 | 1.695 | 0.7309 |
| 45 | 8.796 | -171.2 | 45.62 | 2.319 | 1. |
| 46 | 9. | -171. | 45.9 | 2.042 | 0.8806 |
| 47 | 9.198 | -170.8 | 45.89 | 2.047 | 0.8827 |
| 48 | 9.396 | -170.6 | 45.81 | 2.128 | 0.9176 |
| 49 | 9.6 | -170.4 | 46.03 | 1.909 | 0.8232 |
| 50 | 9.798 | -170.2 | 46.17 | 1.766 | 0.7615 |
| 51 | 9.996 | -170. | 46.56 | 1.376 | 0.5934 |
| 52 | 10.2 | -169.8 | 46.13 | 1.809 | 0.7801 |
| 53 | 10.4 | -169.6 | 45.65 | 2.29 | 0.9875 |
| 54 | 10.6 | -169.4 | 46.16 | 1.776 | 0.7658 |
| 55 | 10.8 | -169.2 | 46.69 | 1.247 | 0.5377 |
| 56 | 11. | -169. | 46.53 | 1.409 | 0.6076 |
| 57 | 11.2 | -168.8 | 46.72 | 1.219 | 0.5257 |
| 58 | 11.4 | -168.6 | 46.41 | 1.528 | 0.6589 |
| 59 | 11.6 | -168.4 | 46.16 | 1.785 | 0.7697 |
| 60 | 11.8 | -168.2 | 45.97 | 1.966 | 0.8478 |
| 61 | 12. | -168. | 45.89 | 2.047 | 0.8827 |
| 62 | 12.2 | -167.8 | 45.95 | 1.99 | 0.8581 |
| 63 | 12.4 | -167.6 | 46.16 | 1.78 | 0.7676 |
| 64 | 12.6 | -167.4 | 46.4 | 1.538 | 0.6632 |
| 65 | 12.8 | -167.2 | 46.53 | 1.414 | 0.6097 |
| 66 | 13. | -167. | 46.53 | 1.409 | 0.6076 |
| 67 | 13.2 | -166.8 | 46.41 | 1.528 | 0.6589 |
| 68 | 13.4 | -166.6 | 46.26 | 1.676 | 0.7227 |
| 69 | 13.6 | -166.4 | 46.17 | 1.771 | 0.7637 |
| 70 | 13.8 | -166.2 | 46.07 | 1.866 | 0.8047 |
| 71 | 14. | -166. | 45.98 | 1.957 | 0.8439 |
| 72 | 14.2 | -165.8 | 46.14 | 1.804 | 0.7779 |
| 73 | 14.4 | -165.6 | 46.39 | 1.552 | 0.6693 |
| 74 | 14.6 | -165.4 | 46.53 | 1.414 | 0.6097 |
| 75 | 14.8 | -165.2 | 46.56 | 1.381 | 0.5955 |
| 76 | 15. | -165. | 46.46 | 1.481 | 0.6386 |
| 77 | 15.2 | -164.8 | 46.3 | 1.642 | 0.7081 |
| 78 | 15.4 | -164.6 | 46.15 | 1.79 | 0.7719 |
| 79 | 15.6 | -164.4 | 46.06 | 1.88 | 0.8107 |
| 80 | 15.8 | -164.2 | 46.16 | 1.776 | 0.7658 |
| 81 | 16. | -164. | 46.3 | 1.638 | 0.7063 |
| 82 | 16.2 | -163.8 | 46.44 | 1.504 | 0.6486 |
| 83 | 16.4 | -163.6 | 46.5 | 1.438 | 0.6201 |
| 84 | 16.6 | -163.4 | 46.48 | 1.461 | 0.63 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -163.2 | 46.4 | 1.542 | 0.6649 |
| 86 | 17. | -163. | 46.29 | 1.647 | 0.7102 |
| 87 | 17.2 | -162.8 | 46.23 | 1.714 | 0.7391 |
| 88 | 17.4 | -162.6 | 46.23 | 1.714 | 0.7391 |
| 89 | 17.6 | -162.4 | 46.28 | 1.661 | 0.7163 |
| 90 | 17.8 | -162.2 | 46.36 | 1.576 | 0.6796 |
| 91 | 18. | -162. | 46.43 | 1.509 | 0.6507 |
| 92 | 18.2 | -161.8 | 46.46 | 1.481 | 0.6386 |
| 93 | 18.4 | -161.6 | 46.44 | 1.5 | 0.6468 |
| 94 | 18.6 | -161.4 | 46.39 | 1.552 | 0.6693 |
| 95 | 18.8 | -161.2 | 46.34 | 1.604 | 0.6917 |
| 96 | 19. | -161. | 46.31 | 1.633 | 0.7042 |
| 97 | 19.2 | -160.8 | 46.32 | 1.623 | 0.6999 |
| 98 | 19.4 | -160.6 | 46.35 | 1.585 | 0.6835 |
| 99 | 19.6 | -160.4 | 46.4 | 1.538 | 0.6632 |
| 100 | 19.8 | -160.2 | 46.44 | 1.5 | 0.6468 |
| 101 | 20. | -160. | 46.45 | 1.49 | 0.6425 |
| 102 | 21. | -159. | 46.39 | 1.547 | 0.6671 |
| 103 | 22. | -158. | 46.43 | 1.514 | 0.6529 |
| 104 | 23. | -157. | 46.46 | 1.476 | 0.6365 |
| 105 | 24. | -156. | 46.45 | 1.485 | 0.6404 |
| 106 | 25. | -155. | 46.48 | 1.457 | 0.6283 |
| 107 | 26. | -154. | 46.5 | 1.438 | 0.6201 |
| 108 | 27. | -153. | 46.52 | 1.419 | 0.6119 |
| 109 | 28. | -152. | 46.53 | 1.414 | 0.6097 |
| 110 | 29. | -151. | 46.55 | 1.39 | 0.5994 |
| 111 | 30. | -150. | 46.56 | 1.376 | 0.5934 |
| 112 | 31. | -149. | 46.58 | 1.362 | 0.5873 |
| 113 | 32. | -148. | 46.59 | 1.347 | 0.5809 |
| 114 | 33. | -147. | 46.61 | 1.333 | 0.5748 |
| 115 | 34. | -146. | 46.63 | 1.314 | 0.5666 |
| 116 | 35. | -145. | 46.63 | 1.309 | 0.5645 |
| 117 | 36. | -144. | 46.65 | 1.29 | 0.5563 |
| 118 | 37. | -143. | 46.66 | 1.276 | 0.5502 |
| 119 | 38. | -142. | 46.67 | 1.266 | 0.5459 |
| 120 | 39. | -141. | 46.69 | 1.252 | 0.5399 |
| 121 | 40. | -140. | 46.7 | 1.238 | 0.5339 |
| 122 | 41. | -139. | 46.71 | 1.228 | 0.5295 |
| 123 | 42. | -138. | 46.73 | 1.214 | 0.5235 |
| 124 | 43. | -137. | 46.74 | 1.204 | 0.5192 |
| 125 | 44. | -136. | 46.75 | 1.19 | 0.5132 |
| 126 | 45. | -135. | 46.76 | 1.181 | 0.5093 |
| 127 | 46. | -134. | 46.77 | 1.171 | 0.505 |
| 128 | 47. | -133. | 46.78 | 1.157 | 0.4989 |
| 129 | 48. | -132. | 46.79 | 1.147 | 0.4946 |
| 130 | 49. | -131. | 46.8 | 1.138 | 0.4907 |
| 131 | 50. | -130. | 46.81 | 1.128 | 0.4864 |
| 132 | 51. | -129. | 46.83 | 1.114 | 0.4804 |
| 133 | 52. | -128. | 46.84 | 1.104 | 0.4761 |
| 134 | 53. | -127. | 46.84 | 1.095 | 0.4722 |
| 135 | 54. | -126. | 46.85 | 1.085 | 0.4679 |
| 136 | 55. | -125. | 46.86 | 1.076 | 0.464 |
| 137 | 56. | -124. | 46.87 | 1.066 | 0.4597 |

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 138 | 57. | -123. | 46.88 | 1.057 | 0.4558 |
| 139 | 58. | -122. | 46.89 | 1.047 | 0.4515 |
| 140 | 59. | -121. | 46.9 | 1.043 | 0.4498 |
| 141 | 60. | -120. | 46.91 | 1.033 | 0.4455 |
| 142 | 72. | -108. | 47.03 | 0.914 | 0.3941 |
| 143 | 84. | -96. | 47.1 | 0.838 | 0.3614 |
| 144 | 96. | -84. | 47.16 | 0.781 | 0.3368 |
| 145 | 108. | -72. | 47.21 | 0.728 | 0.3139 |
| 146 | 120. | -60. | 47.25 | 0.69 | 0.2975 |
| 147 | 132. | -48. | 47.28 | 0.657 | 0.2833 |
| 148 | 144. | -36. | 47.31 | 0.629 | 0.2712 |
| 149 | 156. | -24. | 47.34 | 0.605 | 0.2609 |
| 150 | 168. | -12. | 47.35 | 0.586 | 0.2527 |
| 151 | 180. | 0. | 47.37 | 0.567 | 0.2445 |
| 152 | 192. | 12. | 47.39 | 0.552 | 0.238 |
| 153 | 204. | 24. | 47.4 | 0.543 | 0.2342 |
| 154 | 216. | 36. | 47.41 | 0.529 | 0.2281 |
| 155 | 228. | 48. | 47.42 | 0.524 | 0.226 |
| 156 | 240. | 60. | 47.43 | 0.514 | 0.2216 |
| 157 | 252. | 72. | 47.44 | 0.505 | 0.2178 |
| 158 | 264. | 84. | 47.44 | 0.5 | 0.2156 |
| 159 | 276. | 96. | 47.45 | 0.49 | 0.2113 |
| 160 | 288. | 108. | 47.45 | 0.486 | 0.2096 |
| 161 | 300. | 120. | 47.46 | 0.481 | 0.2074 |
| 162 | 312. | 132. | 47.47 | 0.471 | 0.2031 |
| 163 | 324. | 144. | 47.47 | 0.467 | 0.2014 |
| 164 | 336. | 156. | 47.48 | 0.462 | 0.1992 |
| 165 | 348. | 168. | 47.48 | 0.462 | 0.1992 |
| 166 | 360. | 180. | 47.49 | 0.452 | 0.1949 |
| 167 | 372. | 192. | 47.49 | 0.448 | 0.1932 |
| 168 | 384. | 204. | 47.5 | 0.443 | 0.191 |
| 169 | 396. | 216. | 47.5 | 0.443 | 0.191 |
| 170 | 408. | 228. | 47.5 | 0.438 | 0.1889 |
| 171 | 420. | 240. | 47.51 | 0.433 | 0.1867 |
| 172 | 432. | 252. | 47.51 | 0.429 | 0.185 |
| 173 | 444. | 264. | 47.52 | 0.424 | 0.1828 |
| 174 | 456. | 276. | 47.52 | 0.419 | 0.1807 |
| 175 | 468. | 288. | 47.53 | 0.414 | 0.1785 |
| 176 | 480. | 300. | 47.53 | 0.41 | 0.1768 |
| 177 | 492. | 312. | 47.53 | 0.41 | 0.1768 |
| 178 | 504. | 324. | 47.53 | 0.405 | 0.1746 |
| 179 | 516. | 336. | 47.54 | 0.4 | 0.1725 |
| 180 | 528. | 348. | 47.55 | 0.395 | 0.1703 |
| 181 | 540. | 360. | 47.55 | 0.395 | 0.1703 |
| 182 | 552. | 372. | 47.55 | 0.391 | 0.1686 |
| 183 | 564. | 384. | 47.55 | 0.386 | 0.1665 |
| 184 | 576. | 396. | 47.55 | 0.386 | 0.1665 |
| 185 | 588. | 408. | 47.56 | 0.381 | 0.1643 |
| 186 | 600. | 420. | 47.56 | 0.376 | 0.1621 |
| 187 | 720. | 540. | 47.6 | 0.343 | 0.1479 |
| 188 | 840. | 660. | 47.62 | 0.319 | 0.1376 |
| 189 | 960. | 780. | 47.65 | 0.295 | 0.1272 |
| 190 | 1080 | 900. | 47.66 | 0.276 | 0.119 |

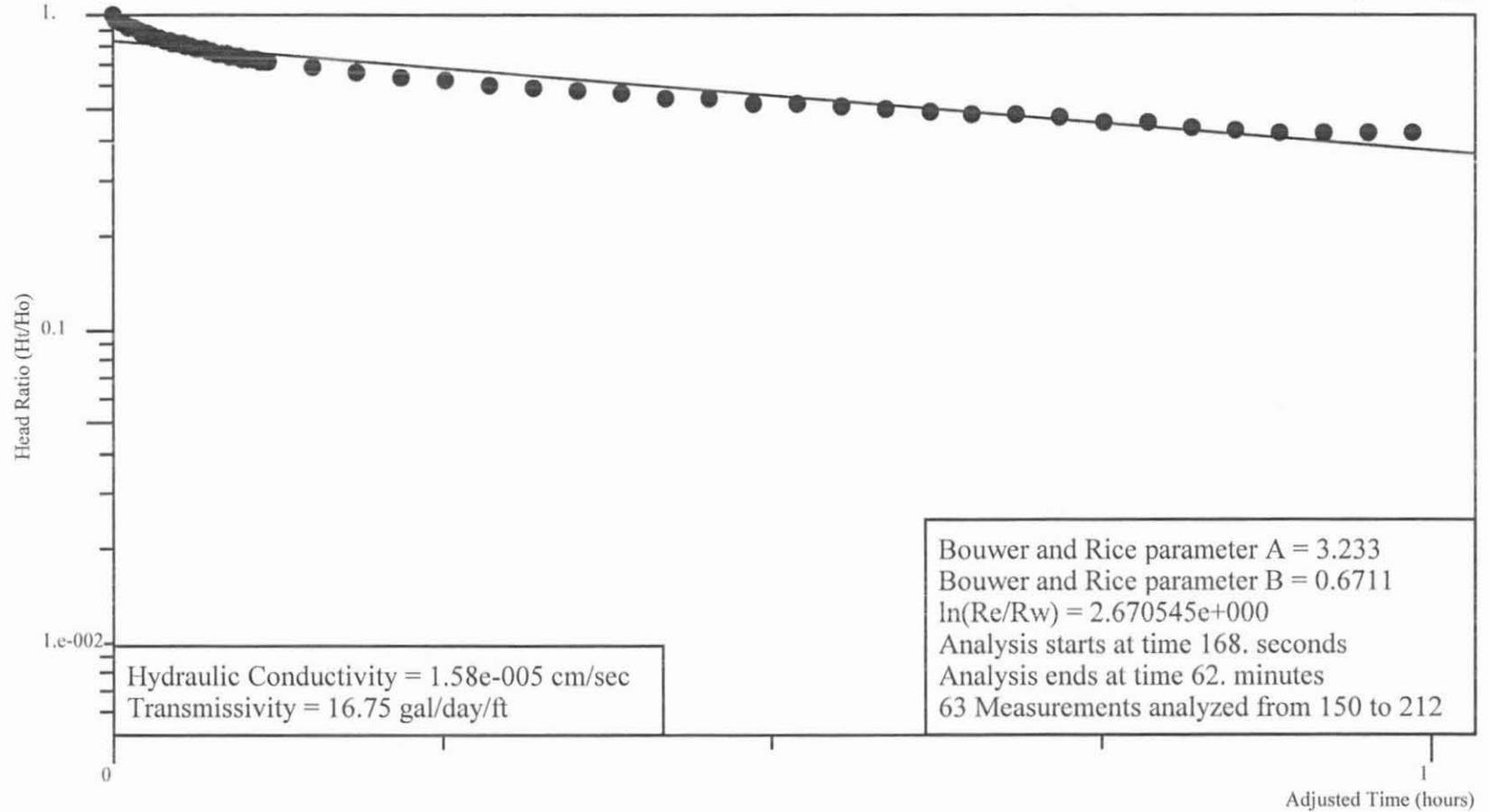
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|-----|------|------|-------|-------|------------|
| 191 | 1200 | 1020 | 47.68 | 0.262 | 0.113 |
| 192 | 1320 | 1140 | 47.7 | 0.243 | 0.1048 |
| 193 | 1440 | 1260 | 47.71 | 0.234 | 0.1009 |
| 194 | 1560 | 1380 | 47.72 | 0.224 | 9.659e-002 |
| 195 | 1680 | 1500 | 47.73 | 0.215 | 9.271e-002 |
| 196 | 1800 | 1620 | 47.73 | 0.21 | 9.056e-002 |
| 197 | 1920 | 1740 | 47.74 | 0.2 | 8.624e-002 |
| 198 | 2040 | 1860 | 47.74 | 0.195 | 8.409e-002 |
| 199 | 2160 | 1980 | 47.75 | 0.191 | 8.236e-002 |
| 200 | 2280 | 2100 | 47.75 | 0.186 | 8.021e-002 |
| 201 | 2400 | 2220 | 47.76 | 0.181 | 7.805e-002 |
| 202 | 2520 | 2340 | 47.76 | 0.176 | 7.589e-002 |
| 203 | 2640 | 2460 | 47.77 | 0.172 | 7.417e-002 |
| 204 | 2760 | 2580 | 47.77 | 0.167 | 7.201e-002 |
| 205 | 2880 | 2700 | 47.78 | 0.162 | 6.986e-002 |
| 206 | 3000 | 2820 | 47.78 | 0.162 | 6.986e-002 |
| 207 | 3120 | 2940 | 47.78 | 0.157 | 6.77e-002 |
| 208 | 3240 | 3060 | 47.78 | 0.157 | 6.77e-002 |
| 209 | 3360 | 3180 | 47.78 | 0.157 | 6.77e-002 |
| 210 | 3480 | 3300 | 47.79 | 0.153 | 6.598e-002 |
| 211 | 3600 | 3420 | 47.79 | 0.148 | 6.382e-002 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-21 (Rising)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 0.623 feet at 168. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P21RISE

Well Label: P-21 (Rising)
Aquifer Thickness: 50. feet
Screen Length: 15. feet
Casing Radius: 1.888 inches
Effective Radius: 3.125 inches
Static Water Level: 47.92 feet
Water Table to Screen Bottom: 17.33 feet
Anisotropy Ratio: 1.
Time Adjustment: 168. Seconds

Test starts with trial 11

There are 212 time and drawdown measurements

Maximum head is 3.352 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -168. | 47.92 | 0. | 0. |
| 2 | 0.198 | -167.8 | 47.92 | 0. | 0. |
| 3 | 0.396 | -167.6 | 47.92 | 0. | 0. |
| 4 | 0.6 | -167.4 | 48.61 | 0.689 | 0.2055 |
| 5 | 0.798 | -167.2 | 50.01 | 2.087 | 0.6226 |
| 6 | 0.996 | -167. | 50.75 | 2.834 | 0.8455 |
| 7 | 1.2 | -166.8 | 50.22 | 2.297 | 0.6853 |
| 8 | 1.398 | -166.6 | 48.4 | 0.475 | 0.1417 |
| 9 | 1.596 | -166.4 | 48.06 | 0.138 | 4.117e-002 |
| 10 | 1.8 | -166.2 | 48.94 | 1.018 | 0.3037 |
| 11 | 1.998 | -166. | 51.12 | 3.2 | 0.9547 |
| 12 | 2.196 | -165.8 | 51.27 | 3.352 | 1. |
| 13 | 2.4 | -165.6 | 50.32 | 2.401 | 0.7163 |
| 14 | 2.598 | -165.4 | 48.9 | 0.984 | 0.2936 |
| 15 | 2.796 | -165.2 | 48.52 | 0.599 | 0.1787 |
| 16 | 3. | -165. | 49.48 | 1.564 | 0.4666 |
| 17 | 3.198 | -164.8 | 50.51 | 2.587 | 0.7718 |
| 18 | 3.396 | -164.6 | 50.69 | 2.767 | 0.8255 |
| 19 | 3.6 | -164.4 | 49.99 | 2.073 | 0.6184 |
| 20 | 3.798 | -164.2 | 49.14 | 1.222 | 0.3646 |
| 21 | 3.996 | -164. | 48.98 | 1.065 | 0.3177 |
| 22 | 4.2 | -163.8 | 49.58 | 1.664 | 0.4964 |
| 23 | 4.398 | -163.6 | 50.2 | 2.278 | 0.6796 |
| 24 | 4.596 | -163.4 | 50.3 | 2.382 | 0.7106 |
| 25 | 4.8 | -163.2 | 49.83 | 1.907 | 0.5689 |
| 26 | 4.998 | -163. | 49.31 | 1.393 | 0.4156 |
| 27 | 5.196 | -162.8 | 49.25 | 1.327 | 0.3959 |
| 28 | 5.4 | -162.6 | 49.63 | 1.707 | 0.5092 |
| 29 | 5.598 | -162.4 | 50.01 | 2.087 | 0.6226 |
| 30 | 5.796 | -162.2 | 50.04 | 2.121 | 0.6328 |
| 31 | 6. | -162. | 49.75 | 1.826 | 0.5447 |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -161.8 | 49.42 | 1.503 | 0.4484 |
| 33 | 6.396 | -161.6 | 49.39 | 1.474 | 0.4397 |
| 34 | 6.6 | -161.4 | 49.63 | 1.707 | 0.5092 |
| 35 | 6.798 | -161.2 | 49.86 | 1.94 | 0.5788 |
| 36 | 6.996 | -161. | 49.88 | 1.964 | 0.5859 |
| 37 | 7.2 | -160.8 | 49.69 | 1.769 | 0.5277 |
| 38 | 7.398 | -160.6 | 49.49 | 1.569 | 0.4681 |
| 39 | 7.596 | -160.4 | 49.47 | 1.545 | 0.4609 |
| 40 | 7.8 | -160.2 | 49.62 | 1.698 | 0.5066 |
| 41 | 7.998 | -160. | 49.77 | 1.845 | 0.5504 |
| 42 | 8.196 | -159.8 | 49.77 | 1.855 | 0.5534 |
| 43 | 8.4 | -159.6 | 49.65 | 1.731 | 0.5164 |
| 44 | 8.598 | -159.4 | 49.52 | 1.603 | 0.4782 |
| 45 | 8.796 | -159.2 | 49.51 | 1.588 | 0.4737 |
| 46 | 9. | -159. | 49.59 | 1.674 | 0.4994 |
| 47 | 9.198 | -158.8 | 49.69 | 1.769 | 0.5277 |
| 48 | 9.396 | -158.6 | 49.69 | 1.774 | 0.5292 |
| 49 | 9.6 | -158.4 | 49.62 | 1.702 | 0.5078 |
| 50 | 9.798 | -158.2 | 49.53 | 1.612 | 0.4809 |
| 51 | 9.996 | -158. | 49.52 | 1.598 | 0.4767 |
| 52 | 10.2 | -157.8 | 49.58 | 1.655 | 0.4937 |
| 53 | 10.4 | -157.6 | 49.64 | 1.717 | 0.5122 |
| 54 | 10.6 | -157.4 | 49.64 | 1.721 | 0.5134 |
| 55 | 10.8 | -157.2 | 49.59 | 1.674 | 0.4994 |
| 56 | 11. | -157. | 49.54 | 1.617 | 0.4824 |
| 57 | 11.2 | -156.8 | 49.52 | 1.603 | 0.4782 |
| 58 | 11.4 | -156.6 | 49.55 | 1.631 | 0.4866 |
| 59 | 11.6 | -156.4 | 49.59 | 1.669 | 0.4979 |
| 60 | 11.8 | -156.2 | 49.59 | 1.674 | 0.4994 |
| 61 | 12. | -156. | 49.57 | 1.65 | 0.4922 |
| 62 | 12.2 | -155.8 | 49.54 | 1.617 | 0.4824 |
| 63 | 12.4 | -155.6 | 49.52 | 1.598 | 0.4767 |
| 64 | 12.6 | -155.4 | 49.53 | 1.607 | 0.4794 |
| 65 | 12.8 | -155.2 | 49.56 | 1.636 | 0.4881 |
| 66 | 13. | -155. | 49.56 | 1.645 | 0.4908 |
| 67 | 13.2 | -154.8 | 49.55 | 1.626 | 0.4851 |
| 68 | 13.4 | -154.6 | 49.52 | 1.598 | 0.4767 |
| 69 | 13.6 | -154.4 | 49.5 | 1.584 | 0.4726 |
| 70 | 13.8 | -154.2 | 49.51 | 1.588 | 0.4737 |
| 71 | 14. | -154. | 49.52 | 1.603 | 0.4782 |
| 72 | 14.2 | -153.8 | 49.53 | 1.612 | 0.4809 |
| 73 | 14.4 | -153.6 | 49.52 | 1.603 | 0.4782 |
| 74 | 14.6 | -153.4 | 49.51 | 1.588 | 0.4737 |
| 75 | 14.8 | -153.2 | 49.49 | 1.574 | 0.4696 |
| 76 | 15. | -153. | 49.49 | 1.569 | 0.4681 |
| 77 | 15.2 | -152.8 | 49.49 | 1.574 | 0.4696 |
| 78 | 15.4 | -152.6 | 49.5 | 1.579 | 0.4711 |
| 79 | 15.6 | -152.4 | 49.5 | 1.584 | 0.4726 |
| 80 | 15.8 | -152.2 | 49.49 | 1.574 | 0.4696 |
| 81 | 16. | -152. | 49.48 | 1.56 | 0.4654 |
| 82 | 16.2 | -151.8 | 49.46 | 1.541 | 0.4597 |
| 83 | 16.4 | -151.6 | 49.47 | 1.545 | 0.4609 |
| 84 | 16.6 | -151.4 | 49.47 | 1.55 | 0.4624 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -151.2 | 49.48 | 1.564 | 0.4666 |
| 86 | 17. | -151. | 49.48 | 1.56 | 0.4654 |
| 87 | 17.2 | -150.8 | 49.46 | 1.541 | 0.4597 |
| 88 | 17.4 | -150.6 | 49.44 | 1.522 | 0.4541 |
| 89 | 17.6 | -150.4 | 49.45 | 1.526 | 0.4553 |
| 90 | 17.8 | -150.2 | 49.45 | 1.531 | 0.4567 |
| 91 | 18. | -150. | 49.47 | 1.545 | 0.4609 |
| 92 | 18.2 | -149.8 | 49.47 | 1.545 | 0.4609 |
| 93 | 18.4 | -149.6 | 49.45 | 1.526 | 0.4553 |
| 94 | 18.6 | -149.4 | 49.42 | 1.503 | 0.4484 |
| 95 | 18.8 | -149.2 | 49.42 | 1.498 | 0.4469 |
| 96 | 19. | -149. | 49.44 | 1.517 | 0.4526 |
| 97 | 19.2 | -148.8 | 49.45 | 1.526 | 0.4553 |
| 98 | 19.4 | -148.6 | 49.47 | 1.55 | 0.4624 |
| 99 | 19.6 | -148.4 | 49.31 | 1.393 | 0.4156 |
| 100 | 19.8 | -148.2 | 49.32 | 1.403 | 0.4186 |
| 101 | 20. | -148. | 49.37 | 1.45 | 0.4326 |
| 102 | 21. | -147. | 49.38 | 1.465 | 0.4371 |
| 103 | 22. | -146. | 49.38 | 1.455 | 0.4341 |
| 104 | 23. | -145. | 49.36 | 1.441 | 0.4299 |
| 105 | 24. | -144. | 49.35 | 1.431 | 0.4269 |
| 106 | 25. | -143. | 49.34 | 1.417 | 0.4227 |
| 107 | 26. | -142. | 49.32 | 1.403 | 0.4186 |
| 108 | 27. | -141. | 49.3 | 1.384 | 0.4129 |
| 109 | 28. | -140. | 49.29 | 1.37 | 0.4087 |
| 110 | 29. | -139. | 49.27 | 1.355 | 0.4042 |
| 111 | 30. | -138. | 49.26 | 1.341 | 0.4001 |
| 112 | 31. | -137. | 49.25 | 1.327 | 0.3959 |
| 113 | 32. | -136. | 49.23 | 1.312 | 0.3914 |
| 114 | 33. | -135. | 49.22 | 1.303 | 0.3887 |
| 115 | 34. | -134. | 49.21 | 1.289 | 0.3845 |
| 116 | 35. | -133. | 49.19 | 1.274 | 0.3801 |
| 117 | 36. | -132. | 49.19 | 1.265 | 0.3774 |
| 118 | 37. | -131. | 49.17 | 1.251 | 0.3732 |
| 119 | 38. | -130. | 49.16 | 1.241 | 0.3702 |
| 120 | 39. | -129. | 49.15 | 1.227 | 0.3661 |
| 121 | 40. | -128. | 49.14 | 1.217 | 0.3631 |
| 122 | 41. | -127. | 49.13 | 1.208 | 0.3604 |
| 123 | 42. | -126. | 49.11 | 1.194 | 0.3562 |
| 124 | 43. | -125. | 49.1 | 1.184 | 0.3532 |
| 125 | 44. | -124. | 49.09 | 1.175 | 0.3505 |
| 126 | 45. | -123. | 49.09 | 1.165 | 0.3476 |
| 127 | 46. | -122. | 49.07 | 1.151 | 0.3434 |
| 128 | 47. | -121. | 49.06 | 1.141 | 0.3404 |
| 129 | 48. | -120. | 49.05 | 1.132 | 0.3377 |
| 130 | 49. | -119. | 49.04 | 1.122 | 0.3347 |
| 131 | 50. | -118. | 49.03 | 1.113 | 0.332 |
| 132 | 51. | -117. | 49.02 | 1.103 | 0.3291 |
| 133 | 52. | -116. | 49.01 | 1.094 | 0.3264 |
| 134 | 53. | -115. | 49. | 1.084 | 0.3234 |
| 135 | 54. | -114. | 48.99 | 1.075 | 0.3207 |
| 136 | 55. | -113. | 48.99 | 1.07 | 0.3192 |
| 137 | 56. | -112. | 48.98 | 1.06 | 0.3162 |

| | | | | | |
|-----|------|-------|-------|-------|--------|
| 138 | 57. | -111. | 48.97 | 1.051 | 0.3135 |
| 139 | 58. | -110. | 48.96 | 1.041 | 0.3106 |
| 140 | 59. | -109. | 48.95 | 1.032 | 0.3079 |
| 141 | 60. | -108. | 48.95 | 1.027 | 0.3064 |
| 142 | 72. | -96. | 48.84 | 0.918 | 0.2739 |
| 143 | 84. | -84. | 48.77 | 0.851 | 0.2539 |
| 144 | 96. | -72. | 48.71 | 0.794 | 0.2369 |
| 145 | 108. | -60. | 48.67 | 0.751 | 0.224 |
| 146 | 120. | -48. | 48.63 | 0.713 | 0.2127 |
| 147 | 132. | -36. | 48.6 | 0.685 | 0.2044 |
| 148 | 144. | -24. | 48.58 | 0.656 | 0.1957 |
| 149 | 156. | -12. | 48.56 | 0.637 | 0.19 |
| 150 | 168. | 0. | 48.54 | 0.623 | 0.1859 |
| 151 | 180. | 12. | 48.53 | 0.609 | 0.1817 |
| 152 | 192. | 24. | 48.51 | 0.594 | 0.1772 |
| 153 | 204. | 36. | 48.51 | 0.585 | 0.1745 |
| 154 | 216. | 48. | 48.49 | 0.575 | 0.1715 |
| 155 | 228. | 60. | 48.49 | 0.566 | 0.1689 |
| 156 | 240. | 72. | 48.48 | 0.556 | 0.1659 |
| 157 | 252. | 84. | 48.47 | 0.551 | 0.1644 |
| 158 | 264. | 96. | 48.47 | 0.547 | 0.1632 |
| 159 | 276. | 108. | 48.46 | 0.537 | 0.1602 |
| 160 | 288. | 120. | 48.45 | 0.532 | 0.1587 |
| 161 | 300. | 132. | 48.45 | 0.528 | 0.1575 |
| 162 | 312. | 144. | 48.44 | 0.523 | 0.156 |
| 163 | 324. | 156. | 48.44 | 0.518 | 0.1545 |
| 164 | 336. | 168. | 48.43 | 0.513 | 0.153 |
| 165 | 348. | 180. | 48.43 | 0.509 | 0.1518 |
| 166 | 360. | 192. | 48.42 | 0.504 | 0.1504 |
| 167 | 372. | 204. | 48.42 | 0.499 | 0.1489 |
| 168 | 384. | 216. | 48.41 | 0.494 | 0.1474 |
| 169 | 396. | 228. | 48.41 | 0.49 | 0.1462 |
| 170 | 408. | 240. | 48.41 | 0.49 | 0.1462 |
| 171 | 420. | 252. | 48.41 | 0.485 | 0.1447 |
| 172 | 432. | 264. | 48.4 | 0.48 | 0.1432 |
| 173 | 444. | 276. | 48.4 | 0.48 | 0.1432 |
| 174 | 456. | 288. | 48.4 | 0.475 | 0.1417 |
| 175 | 468. | 300. | 48.39 | 0.471 | 0.1405 |
| 176 | 480. | 312. | 48.39 | 0.471 | 0.1405 |
| 177 | 492. | 324. | 48.39 | 0.466 | 0.139 |
| 178 | 504. | 336. | 48.38 | 0.461 | 0.1375 |
| 179 | 516. | 348. | 48.38 | 0.461 | 0.1375 |
| 180 | 528. | 360. | 48.38 | 0.456 | 0.136 |
| 181 | 540. | 372. | 48.38 | 0.456 | 0.136 |
| 182 | 552. | 384. | 48.37 | 0.452 | 0.1348 |
| 183 | 564. | 396. | 48.37 | 0.452 | 0.1348 |
| 184 | 576. | 408. | 48.37 | 0.447 | 0.1334 |
| 185 | 588. | 420. | 48.37 | 0.447 | 0.1334 |
| 186 | 600. | 432. | 48.36 | 0.442 | 0.1319 |
| 187 | 720. | 552. | 48.35 | 0.428 | 0.1277 |
| 188 | 840. | 672. | 48.33 | 0.409 | 0.122 |
| 189 | 960. | 792. | 48.31 | 0.394 | 0.1175 |
| 190 | 1080 | 912. | 48.31 | 0.385 | 0.1149 |

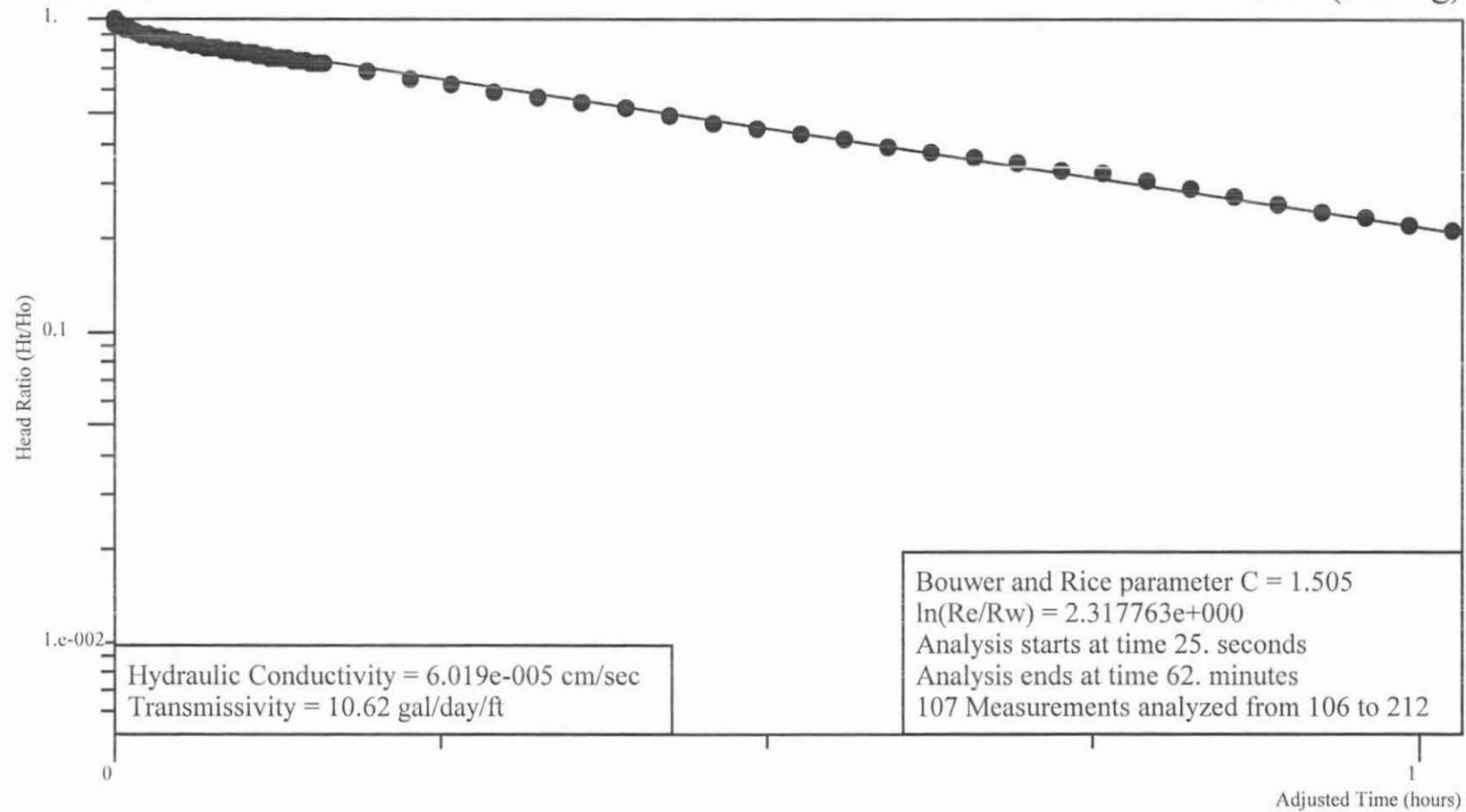
| | | | | | |
|-----|------|------|-------|-------|------------|
| 191 | 1200 | 1032 | 48.3 | 0.375 | 0.1119 |
| 192 | 1320 | 1152 | 48.29 | 0.366 | 0.1092 |
| 193 | 1440 | 1272 | 48.28 | 0.356 | 0.1062 |
| 194 | 1560 | 1392 | 48.27 | 0.352 | 0.105 |
| 195 | 1680 | 1512 | 48.26 | 0.342 | 0.102 |
| 196 | 1800 | 1632 | 48.26 | 0.337 | 0.1005 |
| 197 | 1920 | 1752 | 48.25 | 0.328 | 9.785e-002 |
| 198 | 2040 | 1872 | 48.24 | 0.323 | 9.636e-002 |
| 199 | 2160 | 1992 | 48.24 | 0.318 | 9.487e-002 |
| 200 | 2280 | 2112 | 48.23 | 0.314 | 9.368e-002 |
| 201 | 2400 | 2232 | 48.23 | 0.309 | 9.218e-002 |
| 202 | 2520 | 2352 | 48.22 | 0.304 | 9.069e-002 |
| 203 | 2640 | 2472 | 48.22 | 0.299 | 8.92e-002 |
| 204 | 2760 | 2592 | 48.22 | 0.295 | 8.801e-002 |
| 205 | 2880 | 2712 | 48.2 | 0.285 | 8.502e-002 |
| 206 | 3000 | 2832 | 48.2 | 0.285 | 8.502e-002 |
| 207 | 3120 | 2952 | 48.2 | 0.276 | 8.234e-002 |
| 208 | 3240 | 3072 | 48.19 | 0.271 | 8.085e-002 |
| 209 | 3360 | 3192 | 48.19 | 0.266 | 7.936e-002 |
| 210 | 3480 | 3312 | 48.19 | 0.266 | 7.936e-002 |
| 211 | 3600 | 3432 | 48.18 | 0.261 | 7.786e-002 |
| 212 | 3720 | 3552 | 48.18 | 0.261 | 7.786e-002 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-22 (Falling)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 1.736 feet at 25. seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P22FALL

Well Label: P-22 (Falling)
Aquifer Thickness: 8.32 feet
Screen Length: 6. feet
Casing Radius: 1.888 inches
Effective Radius: 4.125 inches
Static Water Level: 3.68 feet
Water Table to Screen Bottom: 8.32 feet
Anisotropy Ratio: 1.
Time Adjustment: 25. Seconds

Test starts with trial 45

There are 212 time and drawdown measurements

Maximum head is 1.921 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -25. | 3.68 | 0. | 0. |
| 2 | 0.198 | -24.8 | 3.675 | 5.e-003 | 2.603e-003 |
| 3 | 0.396 | -24.6 | 3.675 | 5.e-003 | 2.603e-003 |
| 4 | 0.6 | -24.4 | 3.67 | 1.e-002 | 5.206e-003 |
| 5 | 0.798 | -24.2 | 3.675 | 5.e-003 | 2.603e-003 |
| 6 | 0.996 | -24. | 3.675 | 5.e-003 | 2.603e-003 |
| 7 | 1.2 | -23.8 | 3.675 | 5.e-003 | 2.603e-003 |
| 8 | 1.398 | -23.6 | 3.675 | 5.e-003 | 2.603e-003 |
| 9 | 1.596 | -23.4 | 3.637 | 4.3e-002 | 2.238e-002 |
| 10 | 1.8 | -23.2 | 3.533 | 0.147 | 7.652e-002 |
| 11 | 1.998 | -23. | 3.447 | 0.233 | 0.1213 |
| 12 | 2.196 | -22.8 | 3.381 | 0.299 | 0.1556 |
| 13 | 2.4 | -22.6 | 3.31 | 0.37 | 0.1926 |
| 14 | 2.598 | -22.4 | 3.13 | 0.55 | 0.2863 |
| 15 | 2.796 | -22.2 | 3.172 | 0.508 | 0.2644 |
| 16 | 3. | -22. | 3.077 | 0.603 | 0.3139 |
| 17 | 3.198 | -21.8 | 2.499 | 1.181 | 0.6148 |
| 18 | 3.396 | -21.6 | 2.447 | 1.233 | 0.6419 |
| 19 | 3.6 | -21.4 | 2.485 | 1.195 | 0.6221 |
| 20 | 3.798 | -21.2 | 2.366 | 1.314 | 0.684 |
| 21 | 3.996 | -21. | 2.058 | 1.622 | 0.8444 |
| 22 | 4.2 | -20.8 | 1.911 | 1.769 | 0.9209 |
| 23 | 4.398 | -20.6 | 1.977 | 1.703 | 0.8865 |
| 24 | 4.596 | -20.4 | 1.949 | 1.731 | 0.9011 |
| 25 | 4.8 | -20.2 | 1.873 | 1.807 | 0.9407 |
| 26 | 4.998 | -20. | 1.797 | 1.883 | 0.9802 |
| 27 | 5.196 | -19.8 | 2.186 | 1.494 | 0.7777 |
| 28 | 5.4 | -19.6 | 2.029 | 1.651 | 0.8594 |
| 29 | 5.598 | -19.4 | 1.93 | 1.75 | 0.911 |
| 30 | 5.796 | -19.2 | 1.882 | 1.798 | 0.936 |
| 31 | 6. | -19. | 1.868 | 1.812 | 0.9433 |

| | | | | | |
|----|-------|--------|-------|-------|--------|
| 32 | 6.198 | -18.8 | 1.816 | 1.864 | 0.9703 |
| 33 | 6.396 | -18.6 | 1.811 | 1.869 | 0.9729 |
| 34 | 6.6 | -18.4 | 1.816 | 1.864 | 0.9703 |
| 35 | 6.798 | -18.2 | 1.826 | 1.854 | 0.9651 |
| 36 | 6.996 | -18. | 1.802 | 1.878 | 0.9776 |
| 37 | 7.2 | -17.8 | 1.788 | 1.892 | 0.9849 |
| 38 | 7.398 | -17.6 | 1.783 | 1.897 | 0.9875 |
| 39 | 7.596 | -17.4 | 1.788 | 1.892 | 0.9849 |
| 40 | 7.8 | -17.2 | 1.783 | 1.897 | 0.9875 |
| 41 | 7.998 | -17. | 1.778 | 1.902 | 0.9901 |
| 42 | 8.196 | -16.8 | 1.773 | 1.907 | 0.9927 |
| 43 | 8.4 | -16.6 | 1.778 | 1.902 | 0.9901 |
| 44 | 8.598 | -16.4 | 1.778 | 1.902 | 0.9901 |
| 45 | 8.796 | -16.2 | 1.773 | 1.907 | 0.9927 |
| 46 | 9. | -16. | 1.759 | 1.921 | 1. |
| 47 | 9.198 | -15.8 | 1.783 | 1.897 | 0.9875 |
| 48 | 9.396 | -15.6 | 1.792 | 1.888 | 0.9828 |
| 49 | 9.6 | -15.4 | 1.783 | 1.897 | 0.9875 |
| 50 | 9.798 | -15.2 | 1.778 | 1.902 | 0.9901 |
| 51 | 9.996 | -15. | 1.783 | 1.897 | 0.9875 |
| 52 | 10.2 | -14.8 | 1.792 | 1.888 | 0.9828 |
| 53 | 10.4 | -14.6 | 1.792 | 1.888 | 0.9828 |
| 54 | 10.6 | -14.4 | 1.788 | 1.892 | 0.9849 |
| 55 | 10.8 | -14.2 | 1.792 | 1.888 | 0.9828 |
| 56 | 11. | -14. | 1.797 | 1.883 | 0.9802 |
| 57 | 11.2 | -13.8 | 1.802 | 1.878 | 0.9776 |
| 58 | 11.4 | -13.6 | 1.802 | 1.878 | 0.9776 |
| 59 | 11.6 | -13.4 | 1.802 | 1.878 | 0.9776 |
| 60 | 11.8 | -13.2 | 1.806 | 1.874 | 0.9755 |
| 61 | 12. | -13. | 1.811 | 1.869 | 0.9729 |
| 62 | 12.2 | -12.8 | 1.816 | 1.864 | 0.9703 |
| 63 | 12.4 | -12.6 | 1.816 | 1.864 | 0.9703 |
| 64 | 12.6 | -12.4 | 1.826 | 1.854 | 0.9651 |
| 65 | 12.8 | -12.2 | 1.821 | 1.859 | 0.9677 |
| 66 | 13. | -12. | 1.83 | 1.85 | 0.963 |
| 67 | 13.2 | -11.8 | 1.826 | 1.854 | 0.9651 |
| 68 | 13.4 | -11.6 | 1.83 | 1.85 | 0.963 |
| 69 | 13.6 | -11.4 | 1.835 | 1.845 | 0.9604 |
| 70 | 13.8 | -11.2 | 1.835 | 1.845 | 0.9604 |
| 71 | 14. | -11. | 1.84 | 1.84 | 0.9578 |
| 72 | 14.2 | -10.8 | 1.84 | 1.84 | 0.9578 |
| 73 | 14.4 | -10.6 | 1.84 | 1.84 | 0.9578 |
| 74 | 14.6 | -10.4 | 1.83 | 1.85 | 0.963 |
| 75 | 14.8 | -10.2 | 1.84 | 1.84 | 0.9578 |
| 76 | 15. | -9.996 | 1.849 | 1.831 | 0.9531 |
| 77 | 15.2 | -9.798 | 1.859 | 1.821 | 0.9479 |
| 78 | 15.4 | -9.6 | 1.863 | 1.817 | 0.9459 |
| 79 | 15.6 | -9.396 | 1.863 | 1.817 | 0.9459 |
| 80 | 15.8 | -9.198 | 1.863 | 1.817 | 0.9459 |
| 81 | 16. | -9. | 1.868 | 1.812 | 0.9433 |
| 82 | 16.2 | -8.796 | 1.873 | 1.807 | 0.9407 |
| 83 | 16.4 | -8.598 | 1.873 | 1.807 | 0.9407 |
| 84 | 16.6 | -8.4 | 1.878 | 1.802 | 0.9381 |

| | | | | | |
|-----|------|--------|-------|-------|--------|
| 85 | 16.8 | -8.196 | 1.878 | 1.802 | 0.9381 |
| 86 | 17. | -7.998 | 1.868 | 1.812 | 0.9433 |
| 87 | 17.2 | -7.8 | 1.878 | 1.802 | 0.9381 |
| 88 | 17.4 | -7.596 | 1.882 | 1.798 | 0.936 |
| 89 | 17.6 | -7.398 | 1.887 | 1.793 | 0.9334 |
| 90 | 17.8 | -7.2 | 1.882 | 1.798 | 0.936 |
| 91 | 18. | -6.996 | 1.878 | 1.802 | 0.9381 |
| 92 | 18.2 | -6.798 | 1.887 | 1.793 | 0.9334 |
| 93 | 18.4 | -6.6 | 1.892 | 1.788 | 0.9308 |
| 94 | 18.6 | -6.396 | 1.901 | 1.779 | 0.9261 |
| 95 | 18.8 | -6.198 | 1.897 | 1.783 | 0.9282 |
| 96 | 19. | -6. | 1.892 | 1.788 | 0.9308 |
| 97 | 19.2 | -5.796 | 1.897 | 1.783 | 0.9282 |
| 98 | 19.4 | -5.598 | 1.897 | 1.783 | 0.9282 |
| 99 | 19.6 | -5.4 | 1.901 | 1.779 | 0.9261 |
| 100 | 19.8 | -5.196 | 1.906 | 1.774 | 0.9235 |
| 101 | 20. | -4.998 | 1.906 | 1.774 | 0.9235 |
| 102 | 21. | -3.996 | 1.916 | 1.764 | 0.9183 |
| 103 | 22. | -3. | 1.925 | 1.755 | 0.9136 |
| 104 | 23. | -1.998 | 1.93 | 1.75 | 0.911 |
| 105 | 24. | -0.996 | 1.939 | 1.741 | 0.9063 |
| 106 | 25. | 0. | 1.944 | 1.736 | 0.9037 |
| 107 | 26. | 1.002 | 1.954 | 1.726 | 0.8985 |
| 108 | 27. | 2.004 | 1.958 | 1.722 | 0.8964 |
| 109 | 28. | 3. | 1.963 | 1.717 | 0.8938 |
| 110 | 29. | 4.002 | 1.973 | 1.707 | 0.8886 |
| 111 | 30. | 5.004 | 1.973 | 1.707 | 0.8886 |
| 112 | 31. | 6. | 1.977 | 1.703 | 0.8865 |
| 113 | 32. | 7.002 | 1.982 | 1.698 | 0.8839 |
| 114 | 33. | 8.004 | 1.987 | 1.693 | 0.8813 |
| 115 | 34. | 9. | 1.987 | 1.693 | 0.8813 |
| 116 | 35. | 10. | 1.992 | 1.688 | 0.8787 |
| 117 | 36. | 11. | 1.996 | 1.684 | 0.8766 |
| 118 | 37. | 12. | 1.996 | 1.684 | 0.8766 |
| 119 | 38. | 13. | 1.996 | 1.684 | 0.8766 |
| 120 | 39. | 14. | 2.001 | 1.679 | 0.874 |
| 121 | 40. | 15. | 2.006 | 1.674 | 0.8714 |
| 122 | 41. | 16. | 2.006 | 1.674 | 0.8714 |
| 123 | 42. | 17. | 2.006 | 1.674 | 0.8714 |
| 124 | 43. | 18. | 2.01 | 1.67 | 0.8693 |
| 125 | 44. | 19. | 2.015 | 1.665 | 0.8667 |
| 126 | 45. | 20. | 2.015 | 1.665 | 0.8667 |
| 127 | 46. | 21. | 2.02 | 1.66 | 0.8641 |
| 128 | 47. | 22. | 2.02 | 1.66 | 0.8641 |
| 129 | 48. | 23. | 2.02 | 1.66 | 0.8641 |
| 130 | 49. | 24. | 2.025 | 1.655 | 0.8615 |
| 131 | 50. | 25. | 2.025 | 1.655 | 0.8615 |
| 132 | 51. | 26. | 2.025 | 1.655 | 0.8615 |
| 133 | 52. | 27. | 2.029 | 1.651 | 0.8594 |
| 134 | 53. | 28. | 2.034 | 1.646 | 0.8568 |
| 135 | 54. | 29. | 2.034 | 1.646 | 0.8568 |
| 136 | 55. | 30. | 2.039 | 1.641 | 0.8542 |
| 137 | 56. | 31. | 2.039 | 1.641 | 0.8542 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 138 | 57. | 32. | 2.044 | 1.636 | 0.8516 |
| 139 | 58. | 33. | 2.044 | 1.636 | 0.8516 |
| 140 | 59. | 34. | 2.044 | 1.636 | 0.8516 |
| 141 | 60. | 35. | 2.048 | 1.632 | 0.8496 |
| 142 | 72. | 47. | 2.072 | 1.608 | 0.8371 |
| 143 | 84. | 59. | 2.091 | 1.589 | 0.8272 |
| 144 | 96. | 71. | 2.105 | 1.575 | 0.8199 |
| 145 | 108. | 83. | 2.124 | 1.556 | 0.81 |
| 146 | 120. | 95. | 2.134 | 1.546 | 0.8048 |
| 147 | 132. | 107. | 2.148 | 1.532 | 0.7975 |
| 148 | 144. | 119. | 2.153 | 1.527 | 0.7949 |
| 149 | 156. | 131. | 2.162 | 1.518 | 0.7902 |
| 150 | 168. | 143. | 2.172 | 1.508 | 0.785 |
| 151 | 180. | 155. | 2.181 | 1.499 | 0.7803 |
| 152 | 192. | 167. | 2.191 | 1.489 | 0.7751 |
| 153 | 204. | 179. | 2.2 | 1.48 | 0.7704 |
| 154 | 216. | 191. | 2.21 | 1.47 | 0.7652 |
| 155 | 228. | 203. | 2.219 | 1.461 | 0.7605 |
| 156 | 240. | 215. | 2.224 | 1.456 | 0.7579 |
| 157 | 252. | 227. | 2.233 | 1.447 | 0.7533 |
| 158 | 264. | 239. | 2.243 | 1.437 | 0.748 |
| 159 | 276. | 251. | 2.252 | 1.428 | 0.7434 |
| 160 | 288. | 263. | 2.257 | 1.423 | 0.7408 |
| 161 | 300. | 275. | 2.267 | 1.413 | 0.7356 |
| 162 | 312. | 287. | 2.271 | 1.409 | 0.7335 |
| 163 | 324. | 299. | 2.281 | 1.399 | 0.7283 |
| 164 | 336. | 311. | 2.286 | 1.394 | 0.7257 |
| 165 | 348. | 323. | 2.295 | 1.385 | 0.721 |
| 166 | 360. | 335. | 2.3 | 1.38 | 0.7184 |
| 167 | 372. | 347. | 2.309 | 1.371 | 0.7137 |
| 168 | 384. | 359. | 2.314 | 1.366 | 0.7111 |
| 169 | 396. | 371. | 2.324 | 1.356 | 0.7059 |
| 170 | 408. | 383. | 2.328 | 1.352 | 0.7038 |
| 171 | 420. | 395. | 2.333 | 1.347 | 0.7012 |
| 172 | 432. | 407. | 2.342 | 1.338 | 0.6965 |
| 173 | 444. | 419. | 2.347 | 1.333 | 0.6939 |
| 174 | 456. | 431. | 2.357 | 1.323 | 0.6887 |
| 175 | 468. | 443. | 2.361 | 1.319 | 0.6866 |
| 176 | 480. | 455. | 2.371 | 1.309 | 0.6814 |
| 177 | 492. | 467. | 2.376 | 1.304 | 0.6788 |
| 178 | 504. | 479. | 2.38 | 1.3 | 0.6767 |
| 179 | 516. | 491. | 2.385 | 1.295 | 0.6741 |
| 180 | 528. | 503. | 2.395 | 1.285 | 0.6689 |
| 181 | 540. | 515. | 2.399 | 1.281 | 0.6668 |
| 182 | 552. | 527. | 2.404 | 1.276 | 0.6642 |
| 183 | 564. | 539. | 2.414 | 1.266 | 0.659 |
| 184 | 576. | 551. | 2.418 | 1.262 | 0.6569 |
| 185 | 588. | 563. | 2.423 | 1.257 | 0.6543 |
| 186 | 600. | 575. | 2.428 | 1.252 | 0.6517 |
| 187 | 720. | 695. | 2.49 | 1.19 | 0.6195 |
| 188 | 840. | 815. | 2.546 | 1.134 | 0.5903 |
| 189 | 960. | 935. | 2.599 | 1.081 | 0.5627 |
| 190 | 1080 | 1055 | 2.651 | 1.029 | 0.5357 |

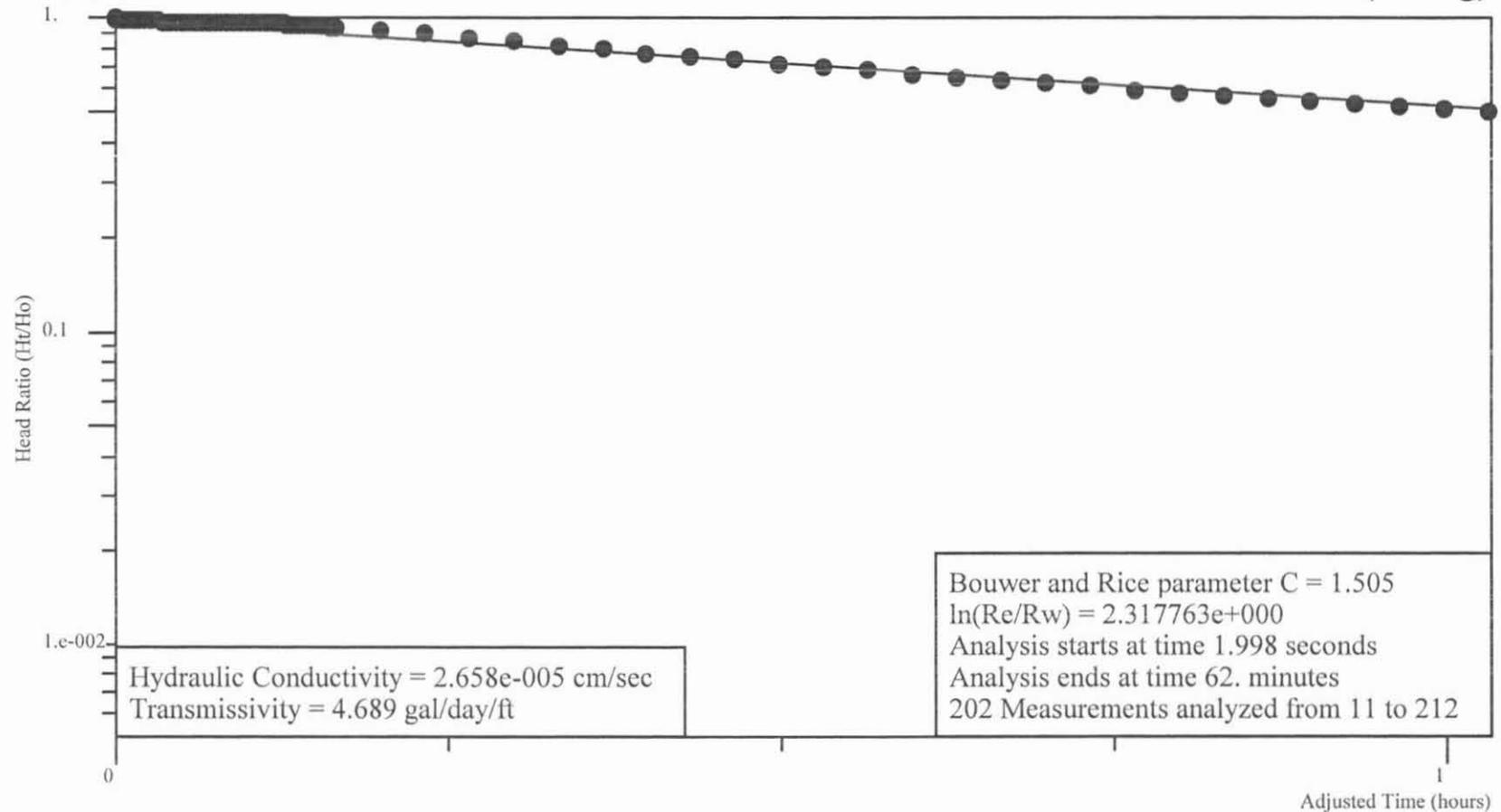
| | | | | | |
|-----|------|------|-------|-------|--------|
| 191 | 1200 | 1175 | 2.693 | 0.987 | 0.5138 |
| 192 | 1320 | 1295 | 2.736 | 0.944 | 0.4914 |
| 193 | 1440 | 1415 | 2.779 | 0.901 | 0.469 |
| 194 | 1560 | 1535 | 2.826 | 0.854 | 0.4446 |
| 195 | 1680 | 1655 | 2.869 | 0.811 | 0.4222 |
| 196 | 1800 | 1775 | 2.902 | 0.778 | 0.405 |
| 197 | 1920 | 1895 | 2.931 | 0.749 | 0.3899 |
| 198 | 2040 | 2015 | 2.964 | 0.716 | 0.3727 |
| 199 | 2160 | 2135 | 3.002 | 0.678 | 0.3529 |
| 200 | 2280 | 2255 | 3.03 | 0.65 | 0.3384 |
| 201 | 2400 | 2375 | 3.054 | 0.626 | 0.3259 |
| 202 | 2520 | 2495 | 3.077 | 0.603 | 0.3139 |
| 203 | 2640 | 2615 | 3.106 | 0.574 | 0.2988 |
| 204 | 2760 | 2735 | 3.125 | 0.555 | 0.2889 |
| 205 | 2880 | 2855 | 3.149 | 0.531 | 0.2764 |
| 206 | 3000 | 2975 | 3.177 | 0.503 | 0.2618 |
| 207 | 3120 | 3095 | 3.205 | 0.475 | 0.2473 |
| 208 | 3240 | 3215 | 3.234 | 0.446 | 0.2322 |
| 209 | 3360 | 3335 | 3.258 | 0.422 | 0.2197 |
| 210 | 3480 | 3455 | 3.277 | 0.403 | 0.2098 |
| 211 | 3600 | 3575 | 3.296 | 0.384 | 0.1999 |
| 212 | 3720 | 3695 | 3.315 | 0.365 | 0.19 |

Aquifer Analysis February 18, 2002

Coble's Sandrock

Bouwer and Rice Graph

P-22 (Rising)



Project Number 419.06

Analysis by D. Reedy of Joyce Engineering, Inc.

H_o is 1.644 feet at 1.998 seconds

Aquifer Analysis

Site Name: Coble's Sandrock
Test Date: February 18, 2002
Project Number: 419.06
Import File: P:\Coble's Sandrock\Hydrogeologic\Big Site Application\HG and GMP Report\Slug Tests\P22RISE

Well Label: P-22 (Rising)
Aquifer Thickness: 8.32 feet
Screen Length: 6. feet
Casing Radius: 1.888 inches
Effective Radius: 4.125 inches
Static Water Level: 3.68 feet
Water Table to Screen Bottom: 8.32 feet
Anisotropy Ratio: 1.
Time Adjustment: 1.998 Seconds

Test starts with trial 9

There are 212 time and drawdown measurements

Maximum head is 1.701 feet

Minimum head is 0. feet

| Trial | Time (seconds) | Adjusted Time (seconds) | Drawdown (feet) | Head (feet) | Head Ratio |
|-------|-------------------|----------------------------|--------------------|----------------|------------|
| 1 | 0. | -1.998 | 3.698 | 1.8e-002 | 1.058e-002 |
| 2 | 0.198 | -1.8 | 3.722 | 4.2e-002 | 2.469e-002 |
| 3 | 0.396 | -1.602 | 3.741 | 6.1e-002 | 3.586e-002 |
| 4 | 0.6 | -1.398 | 4.528 | 0.848 | 0.4985 |
| 5 | 0.798 | -1.2 | 4.571 | 0.891 | 0.5238 |
| 6 | 0.996 | -1.002 | 4.499 | 0.819 | 0.4815 |
| 7 | 1.2 | -0.798 | 4.552 | 0.872 | 0.5126 |
| 8 | 1.398 | -0.6 | 4.561 | 0.881 | 0.5179 |
| 9 | 1.596 | -0.402 | 4.561 | 0.881 | 0.5179 |
| 10 | 1.8 | -0.198 | 5.381 | 1.701 | 1. |
| 11 | 1.998 | 0. | 5.324 | 1.644 | 0.9665 |
| 12 | 2.196 | 0.198 | 5.314 | 1.634 | 0.9606 |
| 13 | 2.4 | 0.402 | 5.305 | 1.625 | 0.9553 |
| 14 | 2.598 | 0.6 | 5.305 | 1.625 | 0.9553 |
| 15 | 2.796 | 0.798 | 5.305 | 1.625 | 0.9553 |
| 16 | 3. | 1.002 | 5.3 | 1.62 | 0.9524 |
| 17 | 3.198 | 1.2 | 5.3 | 1.62 | 0.9524 |
| 18 | 3.396 | 1.398 | 5.3 | 1.62 | 0.9524 |
| 19 | 3.6 | 1.602 | 5.3 | 1.62 | 0.9524 |
| 20 | 3.798 | 1.8 | 5.3 | 1.62 | 0.9524 |
| 21 | 3.996 | 1.998 | 5.3 | 1.62 | 0.9524 |
| 22 | 4.2 | 2.202 | 5.3 | 1.62 | 0.9524 |
| 23 | 4.398 | 2.4 | 5.3 | 1.62 | 0.9524 |
| 24 | 4.596 | 2.598 | 5.3 | 1.62 | 0.9524 |
| 25 | 4.8 | 2.802 | 5.3 | 1.62 | 0.9524 |
| 26 | 4.998 | 3. | 5.3 | 1.62 | 0.9524 |
| 27 | 5.196 | 3.198 | 5.3 | 1.62 | 0.9524 |
| 28 | 5.4 | 3.402 | 5.3 | 1.62 | 0.9524 |
| 29 | 5.598 | 3.6 | 5.3 | 1.62 | 0.9524 |
| 30 | 5.796 | 3.798 | 5.3 | 1.62 | 0.9524 |
| 31 | 6. | 4.002 | 5.3 | 1.62 | 0.9524 |

| | | | | | |
|----|-------|-------|-----|------|--------|
| 32 | 6.198 | 4.2 | 5.3 | 1.62 | 0.9524 |
| 33 | 6.396 | 4.398 | 5.3 | 1.62 | 0.9524 |
| 34 | 6.6 | 4.602 | 5.3 | 1.62 | 0.9524 |
| 35 | 6.798 | 4.8 | 5.3 | 1.62 | 0.9524 |
| 36 | 6.996 | 4.998 | 5.3 | 1.62 | 0.9524 |
| 37 | 7.2 | 5.202 | 5.3 | 1.62 | 0.9524 |
| 38 | 7.398 | 5.4 | 5.3 | 1.62 | 0.9524 |
| 39 | 7.596 | 5.598 | 5.3 | 1.62 | 0.9524 |
| 40 | 7.8 | 5.802 | 5.3 | 1.62 | 0.9524 |
| 41 | 7.998 | 6. | 5.3 | 1.62 | 0.9524 |
| 42 | 8.196 | 6.198 | 5.3 | 1.62 | 0.9524 |
| 43 | 8.4 | 6.402 | 5.3 | 1.62 | 0.9524 |
| 44 | 8.598 | 6.6 | 5.3 | 1.62 | 0.9524 |
| 45 | 8.796 | 6.798 | 5.3 | 1.62 | 0.9524 |
| 46 | 9. | 7.002 | 5.3 | 1.62 | 0.9524 |
| 47 | 9.198 | 7.2 | 5.3 | 1.62 | 0.9524 |
| 48 | 9.396 | 7.398 | 5.3 | 1.62 | 0.9524 |
| 49 | 9.6 | 7.602 | 5.3 | 1.62 | 0.9524 |
| 50 | 9.798 | 7.8 | 5.3 | 1.62 | 0.9524 |
| 51 | 9.996 | 7.998 | 5.3 | 1.62 | 0.9524 |
| 52 | 10.2 | 8.202 | 5.3 | 1.62 | 0.9524 |
| 53 | 10.4 | 8.4 | 5.3 | 1.62 | 0.9524 |
| 54 | 10.6 | 8.598 | 5.3 | 1.62 | 0.9524 |
| 55 | 10.8 | 8.802 | 5.3 | 1.62 | 0.9524 |
| 56 | 11. | 9. | 5.3 | 1.62 | 0.9524 |
| 57 | 11.2 | 9.198 | 5.3 | 1.62 | 0.9524 |
| 58 | 11.4 | 9.402 | 5.3 | 1.62 | 0.9524 |
| 59 | 11.6 | 9.6 | 5.3 | 1.62 | 0.9524 |
| 60 | 11.8 | 9.798 | 5.3 | 1.62 | 0.9524 |
| 61 | 12. | 10. | 5.3 | 1.62 | 0.9524 |
| 62 | 12.2 | 10.2 | 5.3 | 1.62 | 0.9524 |
| 63 | 12.4 | 10.4 | 5.3 | 1.62 | 0.9524 |
| 64 | 12.6 | 10.6 | 5.3 | 1.62 | 0.9524 |
| 65 | 12.8 | 10.8 | 5.3 | 1.62 | 0.9524 |
| 66 | 13. | 11. | 5.3 | 1.62 | 0.9524 |
| 67 | 13.2 | 11.2 | 5.3 | 1.62 | 0.9524 |
| 68 | 13.4 | 11.4 | 5.3 | 1.62 | 0.9524 |
| 69 | 13.6 | 11.6 | 5.3 | 1.62 | 0.9524 |
| 70 | 13.8 | 11.8 | 5.3 | 1.62 | 0.9524 |
| 71 | 14. | 12. | 5.3 | 1.62 | 0.9524 |
| 72 | 14.2 | 12.2 | 5.3 | 1.62 | 0.9524 |
| 73 | 14.4 | 12.4 | 5.3 | 1.62 | 0.9524 |
| 74 | 14.6 | 12.6 | 5.3 | 1.62 | 0.9524 |
| 75 | 14.8 | 12.8 | 5.3 | 1.62 | 0.9524 |
| 76 | 15. | 13. | 5.3 | 1.62 | 0.9524 |
| 77 | 15.2 | 13.2 | 5.3 | 1.62 | 0.9524 |
| 78 | 15.4 | 13.4 | 5.3 | 1.62 | 0.9524 |
| 79 | 15.6 | 13.6 | 5.3 | 1.62 | 0.9524 |
| 80 | 15.8 | 13.8 | 5.3 | 1.62 | 0.9524 |
| 81 | 16. | 14. | 5.3 | 1.62 | 0.9524 |
| 82 | 16.2 | 14.2 | 5.3 | 1.62 | 0.9524 |
| 83 | 16.4 | 14.4 | 5.3 | 1.62 | 0.9524 |
| 84 | 16.6 | 14.6 | 5.3 | 1.62 | 0.9524 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 85 | 16.8 | 14.8 | 5.3 | 1.62 | 0.9524 |
| 86 | 17. | 15. | 5.3 | 1.62 | 0.9524 |
| 87 | 17.2 | 15.2 | 5.3 | 1.62 | 0.9524 |
| 88 | 17.4 | 15.4 | 5.3 | 1.62 | 0.9524 |
| 89 | 17.6 | 15.6 | 5.3 | 1.62 | 0.9524 |
| 90 | 17.8 | 15.8 | 5.3 | 1.62 | 0.9524 |
| 91 | 18. | 16. | 5.3 | 1.62 | 0.9524 |
| 92 | 18.2 | 16.2 | 5.3 | 1.62 | 0.9524 |
| 93 | 18.4 | 16.4 | 5.3 | 1.62 | 0.9524 |
| 94 | 18.6 | 16.6 | 5.3 | 1.62 | 0.9524 |
| 95 | 18.8 | 16.8 | 5.3 | 1.62 | 0.9524 |
| 96 | 19. | 17. | 5.3 | 1.62 | 0.9524 |
| 97 | 19.2 | 17.2 | 5.3 | 1.62 | 0.9524 |
| 98 | 19.4 | 17.4 | 5.3 | 1.62 | 0.9524 |
| 99 | 19.6 | 17.6 | 5.3 | 1.62 | 0.9524 |
| 100 | 19.8 | 17.8 | 5.3 | 1.62 | 0.9524 |
| 101 | 20. | 18. | 5.3 | 1.62 | 0.9524 |
| 102 | 21. | 19. | 5.3 | 1.62 | 0.9524 |
| 103 | 22. | 20. | 5.3 | 1.62 | 0.9524 |
| 104 | 23. | 21. | 5.3 | 1.62 | 0.9524 |
| 105 | 24. | 22. | 5.3 | 1.62 | 0.9524 |
| 106 | 25. | 23. | 5.3 | 1.62 | 0.9524 |
| 107 | 26. | 24. | 5.3 | 1.62 | 0.9524 |
| 108 | 27. | 25. | 5.3 | 1.62 | 0.9524 |
| 109 | 28. | 26. | 5.3 | 1.62 | 0.9524 |
| 110 | 29. | 27. | 5.3 | 1.62 | 0.9524 |
| 111 | 30. | 28. | 5.3 | 1.62 | 0.9524 |
| 112 | 31. | 29. | 5.3 | 1.62 | 0.9524 |
| 113 | 32. | 30. | 5.3 | 1.62 | 0.9524 |
| 114 | 33. | 31. | 5.3 | 1.62 | 0.9524 |
| 115 | 34. | 32. | 5.3 | 1.62 | 0.9524 |
| 116 | 35. | 33. | 5.3 | 1.62 | 0.9524 |
| 117 | 36. | 34. | 5.3 | 1.62 | 0.9524 |
| 118 | 37. | 35. | 5.3 | 1.62 | 0.9524 |
| 119 | 38. | 36. | 5.3 | 1.62 | 0.9524 |
| 120 | 39. | 37. | 5.3 | 1.62 | 0.9524 |
| 121 | 40. | 38. | 5.3 | 1.62 | 0.9524 |
| 122 | 41. | 39. | 5.3 | 1.62 | 0.9524 |
| 123 | 42. | 40. | 5.3 | 1.62 | 0.9524 |
| 124 | 43. | 41. | 5.3 | 1.62 | 0.9524 |
| 125 | 44. | 42. | 5.3 | 1.62 | 0.9524 |
| 126 | 45. | 43. | 5.295 | 1.615 | 0.9494 |
| 127 | 46. | 44. | 5.3 | 1.62 | 0.9524 |
| 128 | 47. | 45. | 5.295 | 1.615 | 0.9494 |
| 129 | 48. | 46. | 5.295 | 1.615 | 0.9494 |
| 130 | 49. | 47. | 5.3 | 1.62 | 0.9524 |
| 131 | 50. | 48. | 5.295 | 1.615 | 0.9494 |
| 132 | 51. | 49. | 5.3 | 1.62 | 0.9524 |
| 133 | 52. | 50. | 5.295 | 1.615 | 0.9494 |
| 134 | 53. | 51. | 5.295 | 1.615 | 0.9494 |
| 135 | 54. | 52. | 5.295 | 1.615 | 0.9494 |
| 136 | 55. | 53. | 5.3 | 1.62 | 0.9524 |
| 137 | 56. | 54. | 5.295 | 1.615 | 0.9494 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 138 | 57. | 55. | 5.295 | 1.615 | 0.9494 |
| 139 | 58. | 56. | 5.3 | 1.62 | 0.9524 |
| 140 | 59. | 57. | 5.295 | 1.615 | 0.9494 |
| 141 | 60. | 58. | 5.295 | 1.615 | 0.9494 |
| 142 | 72. | 70. | 5.3 | 1.62 | 0.9524 |
| 143 | 84. | 82. | 5.295 | 1.615 | 0.9494 |
| 144 | 96. | 94. | 5.295 | 1.615 | 0.9494 |
| 145 | 108. | 106. | 5.295 | 1.615 | 0.9494 |
| 146 | 120. | 118. | 5.295 | 1.615 | 0.9494 |
| 147 | 132. | 130. | 5.291 | 1.611 | 0.9471 |
| 148 | 144. | 142. | 5.291 | 1.611 | 0.9471 |
| 149 | 156. | 154. | 5.291 | 1.611 | 0.9471 |
| 150 | 168. | 166. | 5.291 | 1.611 | 0.9471 |
| 151 | 180. | 178. | 5.291 | 1.611 | 0.9471 |
| 152 | 192. | 190. | 5.291 | 1.611 | 0.9471 |
| 153 | 204. | 202. | 5.286 | 1.606 | 0.9442 |
| 154 | 216. | 214. | 5.286 | 1.606 | 0.9442 |
| 155 | 228. | 226. | 5.286 | 1.606 | 0.9442 |
| 156 | 240. | 238. | 5.286 | 1.606 | 0.9442 |
| 157 | 252. | 250. | 5.286 | 1.606 | 0.9442 |
| 158 | 264. | 262. | 5.286 | 1.606 | 0.9442 |
| 159 | 276. | 274. | 5.281 | 1.601 | 0.9412 |
| 160 | 288. | 286. | 5.281 | 1.601 | 0.9412 |
| 161 | 300. | 298. | 5.281 | 1.601 | 0.9412 |
| 162 | 312. | 310. | 5.281 | 1.601 | 0.9412 |
| 163 | 324. | 322. | 5.277 | 1.597 | 0.9389 |
| 164 | 336. | 334. | 5.277 | 1.597 | 0.9389 |
| 165 | 348. | 346. | 5.272 | 1.592 | 0.9359 |
| 166 | 360. | 358. | 5.272 | 1.592 | 0.9359 |
| 167 | 372. | 370. | 5.272 | 1.592 | 0.9359 |
| 168 | 384. | 382. | 5.272 | 1.592 | 0.9359 |
| 169 | 396. | 394. | 5.267 | 1.587 | 0.933 |
| 170 | 408. | 406. | 5.267 | 1.587 | 0.933 |
| 171 | 420. | 418. | 5.267 | 1.587 | 0.933 |
| 172 | 432. | 430. | 5.262 | 1.582 | 0.93 |
| 173 | 444. | 442. | 5.262 | 1.582 | 0.93 |
| 174 | 456. | 454. | 5.262 | 1.582 | 0.93 |
| 175 | 468. | 466. | 5.258 | 1.578 | 0.9277 |
| 176 | 480. | 478. | 5.253 | 1.573 | 0.9248 |
| 177 | 492. | 490. | 5.253 | 1.573 | 0.9248 |
| 178 | 504. | 502. | 5.248 | 1.568 | 0.9218 |
| 179 | 516. | 514. | 5.248 | 1.568 | 0.9218 |
| 180 | 528. | 526. | 5.243 | 1.563 | 0.9189 |
| 181 | 540. | 538. | 5.239 | 1.559 | 0.9165 |
| 182 | 552. | 550. | 5.239 | 1.559 | 0.9165 |
| 183 | 564. | 562. | 5.239 | 1.559 | 0.9165 |
| 184 | 576. | 574. | 5.234 | 1.554 | 0.9136 |
| 185 | 588. | 586. | 5.229 | 1.549 | 0.9106 |
| 186 | 600. | 598. | 5.229 | 1.549 | 0.9106 |
| 187 | 720. | 718. | 5.191 | 1.511 | 0.8883 |
| 188 | 840. | 838. | 5.149 | 1.469 | 0.8636 |
| 189 | 960. | 958. | 5.106 | 1.426 | 0.8383 |
| 190 | 1080 | 1078 | 5.063 | 1.383 | 0.8131 |

| | | | | | |
|-----|------|------|-------|-------|--------|
| 191 | 1200 | 1198 | 5.025 | 1.345 | 0.7907 |
| 192 | 1320 | 1318 | 4.992 | 1.312 | 0.7713 |
| 193 | 1440 | 1438 | 4.954 | 1.274 | 0.749 |
| 194 | 1560 | 1558 | 4.921 | 1.241 | 0.7296 |
| 195 | 1680 | 1678 | 4.888 | 1.208 | 0.7102 |
| 196 | 1800 | 1798 | 4.86 | 1.18 | 0.6937 |
| 197 | 1920 | 1918 | 4.831 | 1.151 | 0.6767 |
| 198 | 2040 | 2038 | 4.803 | 1.123 | 0.6602 |
| 199 | 2160 | 2158 | 4.774 | 1.094 | 0.6432 |
| 200 | 2280 | 2278 | 4.751 | 1.071 | 0.6296 |
| 201 | 2400 | 2398 | 4.722 | 1.042 | 0.6126 |
| 202 | 2520 | 2518 | 4.699 | 1.019 | 0.5991 |
| 203 | 2640 | 2638 | 4.675 | 0.995 | 0.585 |
| 204 | 2760 | 2758 | 4.651 | 0.971 | 0.5708 |
| 205 | 2880 | 2878 | 4.632 | 0.952 | 0.5597 |
| 206 | 3000 | 2998 | 4.613 | 0.933 | 0.5485 |
| 207 | 3120 | 3118 | 4.59 | 0.91 | 0.535 |
| 208 | 3240 | 3238 | 4.571 | 0.891 | 0.5238 |
| 209 | 3360 | 3358 | 4.556 | 0.876 | 0.515 |
| 210 | 3480 | 3478 | 4.537 | 0.857 | 0.5038 |
| 211 | 3600 | 3598 | 4.518 | 0.838 | 0.4927 |
| 212 | 3720 | 3718 | 4.504 | 0.824 | 0.4844 |

APPENDIX DH-6

Photographs from the Current Investigation



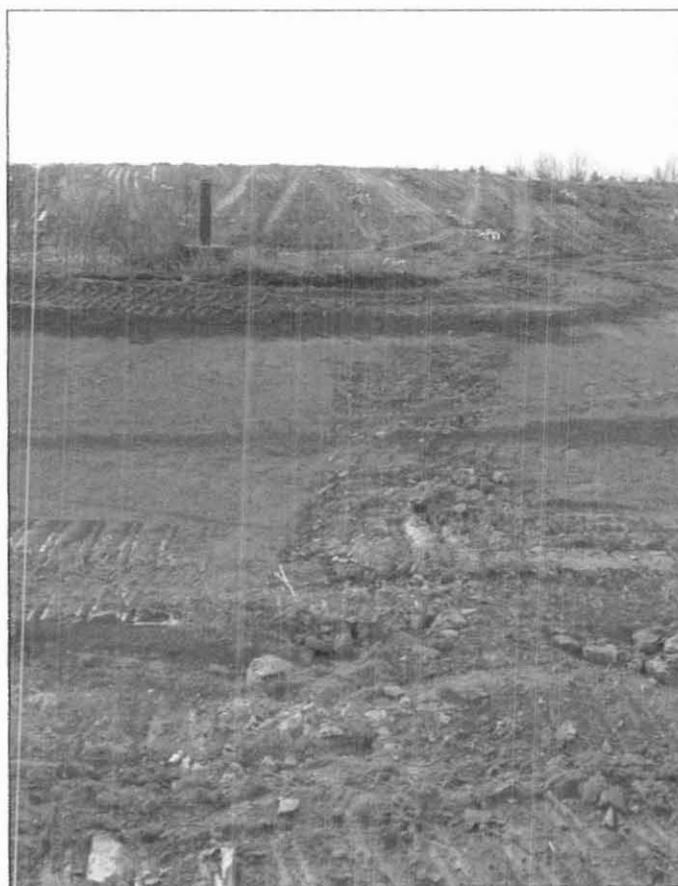
Photograph 1. Outcrop in drainage southeast of MW-3.



Photograph 2. Outcrop in drainage near MW-3. Fractures present, but rock not in place.



Photograph 3. Outcrop near P-5, picture oriented due south.



Photograph 4. Dike near MW-1. Picture oriented due south.



Photograph 5. Dike near MW-3. Picture oriented due east.



Photograph 6. Small dikes between MW-1 and MW-3. Picture oriented to northeast.

APPENDIX DH-7
Magnetometer Survey

Prepared for:

**Coble's Sandrock
5833 Foster Store Road
Liberty, North Carolina 27298**

JEI PROJECT NO. 419.00, TASK 19

MAGNETOMETER SURVEY REPORT

**COBLE'S SANDROCK
CONSTRUCTION AND DEMOLITION LANDFILL
ALAMANCE COUNTY, NORTH CAROLINA**

DECEMBER 2005

Prepared by:



**2301 West Meadowview Road, Suite 203
Greensboro, North Carolina 27407
(336) 323-0092**

**MAGNETOMETER SURVEY REPORT
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| 2.0 | DATA COLLECTION & PROCESSING | 1 |
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| 2.2 | Survey Layout | 1 |
| 2.3 | Data Acquisition | 2 |
| 2.4 | Data Processing..... | 2 |
| 3.0 | RESULTS AND CONCLUSIONS..... | 3 |

Drawing:

Drawing 1: Magnetometer Survey Plan

MAGNETOMETER SURVEY REPORT

COBLE'S SANDROCK CONSTRUCTION AND DEMOLITION LANDFILL ALAMANCE COUNTY, NORTH CAROLINA

1.0 INTRODUCTION

Joyce Engineering, Inc. performed a magnetometer survey at the Cobles Sandrock Construction and Demolition Landfill site on April 19-20, 2005. The purpose of this geophysical investigation was to determine whether there are large diabase dikes present at the site which could have potential impact upon the groundwater flow regime. Small-scale dikes were identified in surface exposures and drill cuttings at the site prior to the survey. These dikes are composed of light-green volcanic or meta-volcanic rock. No diabase has been observed on this site; however, diabase dikes are common in this region. This survey was requested by NCDENR to determine the extent of observed volcanic dikes and to identify any diabase dikes on the site.

Local anomalies in the Earth's magnetic field can be produced by the distribution of different rock types in the subsurface. Ferrous metal objects or deposits of magnetic minerals such as magnetite can sustain significant remnant (permanent) magnetization and produce strong magnetic anomalies. Magnetic anomalies can also be produced near contacts between different rock types with very different magnetic susceptibilities. The magnetic susceptibility of any rock is dependant on its mineralogy. Rocks with abundant mafic minerals have greater magnetic susceptibility than rocks with predominantly felsic minerals.

Diabase has a very high magnetic susceptibility compared to the typical granitic country rock in this area, so a diabase dike normally produces a strong magnetic anomaly. The magnetic susceptibility of the meta-volcanic dikes observed on this site is probably not as high as diabase, but may still provide enough contrast to produce an observable anomaly.

2.0 DATA COLLECTION & PROCESSING

2.1 Instrumentation

A Geometrics G-858 Cesium Magnetometer/Gradiometer was used to locate magnetic anomalies by measuring total magnetic field strength and the vertical magnetic gradient. The G-858 was calibrated and both the instrument and operator were degaussed in the field in accordance with the manufacturer's recommendations. A backpack-mounted Trimble AG-132 differential GPS receiver was used to collect GPS locations which were recorded by the G-858 along with the magnetometer data.

2.2 Survey Layout

Since the dominant orientation of both diabase dikes in the region and the meta-volcanic dikes observed on the site is northeast-southwest, lines for the magnetometer survey were laid out in a roughly northwest-southeast orientation across the site. There were many areas on the site which

had to be avoided due to physical obstructions or magnetic interference from buildings, equipment, debris, fences, and the C&D landfill. Some areas of the site property are heavily wooded and/or overgrown and paths for data acquisition had to be cleared prior to the survey. The primary survey lines were marked with wooden stakes at 200-foot intervals to aid in data acquisition and in taking field notes.

2.3 Data Acquisition

A base station was set up in a central location which reconnaissance with the magnetometer showed to have a very low magnetic gradient. In order to adjust the survey data for diurnal variations of the Earth's magnetic field, base station readings were obtained at the beginning and end of the survey and at approximately 20-40 minute intervals during the survey.

Data was collected in "Simple Survey" mode by walking the primary survey lines with the G-858 magnetometer/gradiometer and integrated GPS unit. The G-858 recorded data from both the top and bottom magnetometer sensors along with differential GPS locations. Data was collected continuously with a cycle time of one reading every 2.0 seconds. In many cases, when the operator was finished walking one of the primary survey lines and had to return to the base station, the G-858 was allowed to continue collecting data as the operator returned along a secondary line, generally parallel with the primary lines. After all the primary data was collected, additional secondary lines were collected in areas where there was easy access to augment the primary data. A total of over 14,000 linear feet of magnetometer data was collected on the site.

2.4 Data Processing

The magnetometer data was downloaded from the G-858 to a laptop computer in the field and later transferred to a desktop PC for processing using Geometric's MAGPIC software (ver. 2.77). First, the base station data was used to adjust the magnetometer data for normal diurnal variations in the Earth's magnetic field. Second, a despiking filter was applied to remove anomalous single points or zero-readings that may have been due to the sensor being out of alignment at the moment the data were recorded.

There were many areas on this site where there was metal debris, equipment, or other near-surface magnetic interference. Some of the lines crossed portions of the C&D landfill and thus had considerable near surface interference. Near surface metal debris creates a very high magnetic gradient. To remove data affected by near surface interference, the magnetometer data was filtered to remove any data with a vertical magnetic gradient of greater than 500 gammas/meter. This created some apparent gaps in a few of the lines where they passed over areas with considerable metal debris either at the surface or in the shallow subsurface.

The magnetometer data were then output for gridding and contouring using SURFER. The data were gridded using linear point kriging with a latitude/longitude grid spacing of 2.0E-05 degrees using a search radius of 7.0E-05 degrees. The data were contoured using non-linear contour intervals chosen to best represent important features in the data.

The GPS receiver recorded the locations of the magnetometer data in latitude/longitude coordinates; however, the site maps are drafted in North Carolina State Plane coordinates. A data conversion routine was applied to the SURFER output to convert the location data into the proper coordinates for plotting on the site map. Drawing 1 shows the results of the magnetometer survey plotted on the site map.

3.0 RESULTS & CONCLUSIONS

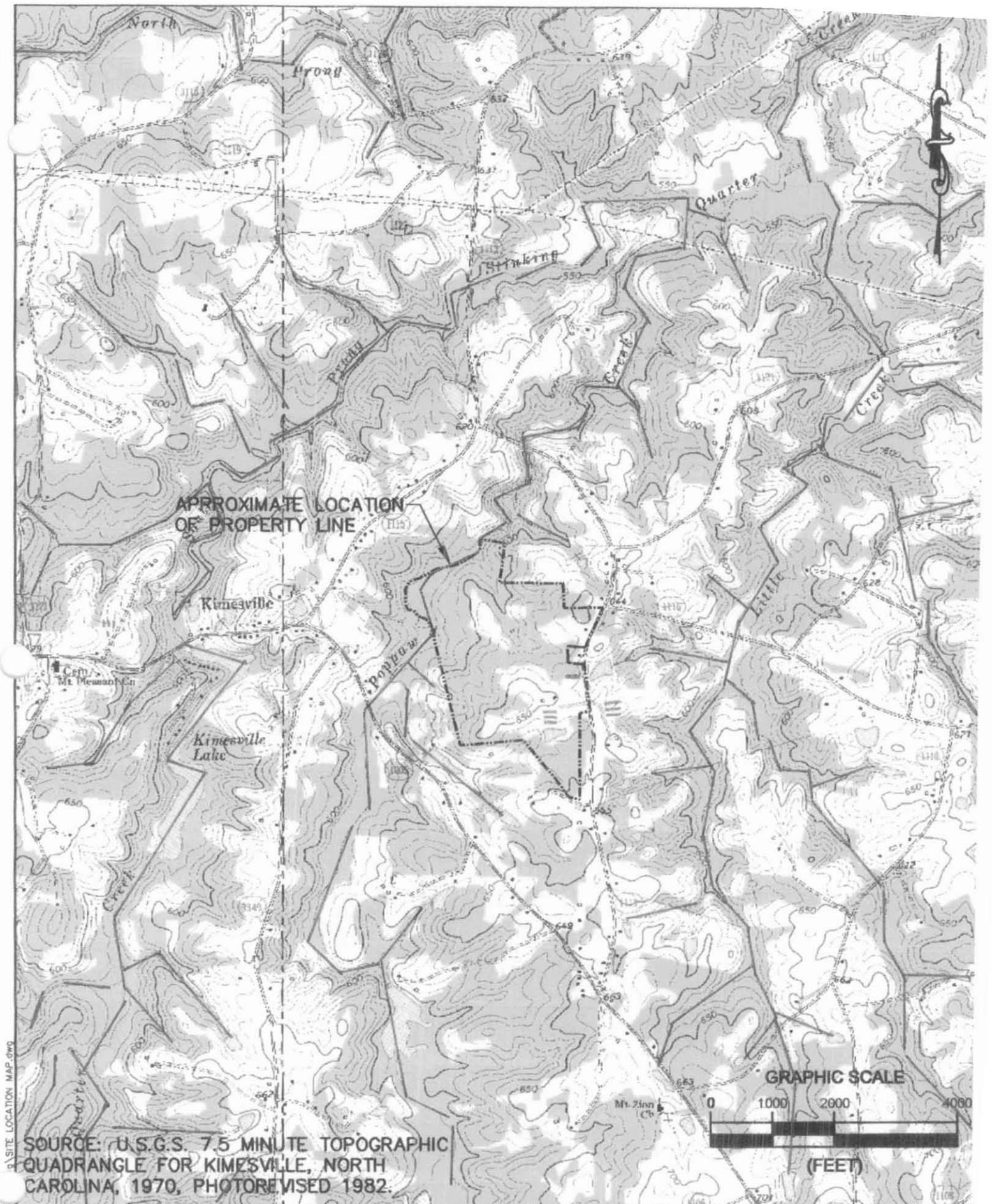
Parts of the magnetometer survey that crossed over or near the C&D landfill showed highly irregular, but generally low (50,500-51,300 gammas) magnetic field strength. This is almost certainly due to the waste and is not indicative of geologic features. The areas away from the landfill areas showed a normal range of magnetic field strength for this geographic area (51,300-51,500 gammas).

Within these "normal" areas there were a few small areas of slightly elevated magnetic field strength (51,500-51,700). The most pronounced of these anomalies is located in the west-central part of the site between piezometers P-16 and P-5, and may correlate with an area of similar values to the north-northeast. These anomalies may represent meta-volcanic dikes; however, they are far too weak to represent diabase dikes. Even small diabase dikes (< 20 feet across) would be expected to produce anomalies of at least 400-500 gammas above the ambient field.

JEI concludes that the magnetometer survey found no evidence of significant diabase dikes on the subject property. Small, low-amplitude anomalies with weak correlation in the central part of the site may be due to small meta-volcanic dikes previously observed on the site in outcrops.

APPENDIX DH-8

Fracture Trace and Rose Diagram



SITE LOCATION MAP.dwg

| | | | | | |
|---------------------|--|---|-----------------------------|-------------------------------|--|
| <p>FIGURE NO. 1</p> | | <p>2301 WEST MEADOWVIEW ROAD GREENSBORO, N.C. 27407 PHONE: (336) 323-0092 © 2005 Joe Engineering, Inc. All rights reserved.</p> | <p>SCALE 1" = 2000'</p> | <p>PROJECT NO. 419.19</p> | <p>COBLE'S SANDROCK KIMESVILLE, NORTH CAROLINA SITE LOCATION MAP</p> |
|---------------------|--|---|-----------------------------|-------------------------------|--|



n=14
large:
large:

Dip Direction: 10 ° classes

APPENDIX DH-9

Laboratory Test Results for Soil Samples



ENGINEERING CONSULTANTS, INC.

P.O. Box 18846 • Zip 27419-8846 • 313 Gallimore Dairy Road • Greensboro, NC 27409 • (336) 668-0093 • FAX (336) 668-3868

LETTER OF TRANSMITTAL

TO: Mr. David Reedy II
Joyce Engineering, Inc.
Henderson Building, Suite 203
2301 West Meadowview Road
Greensboro, North Carolina 27407

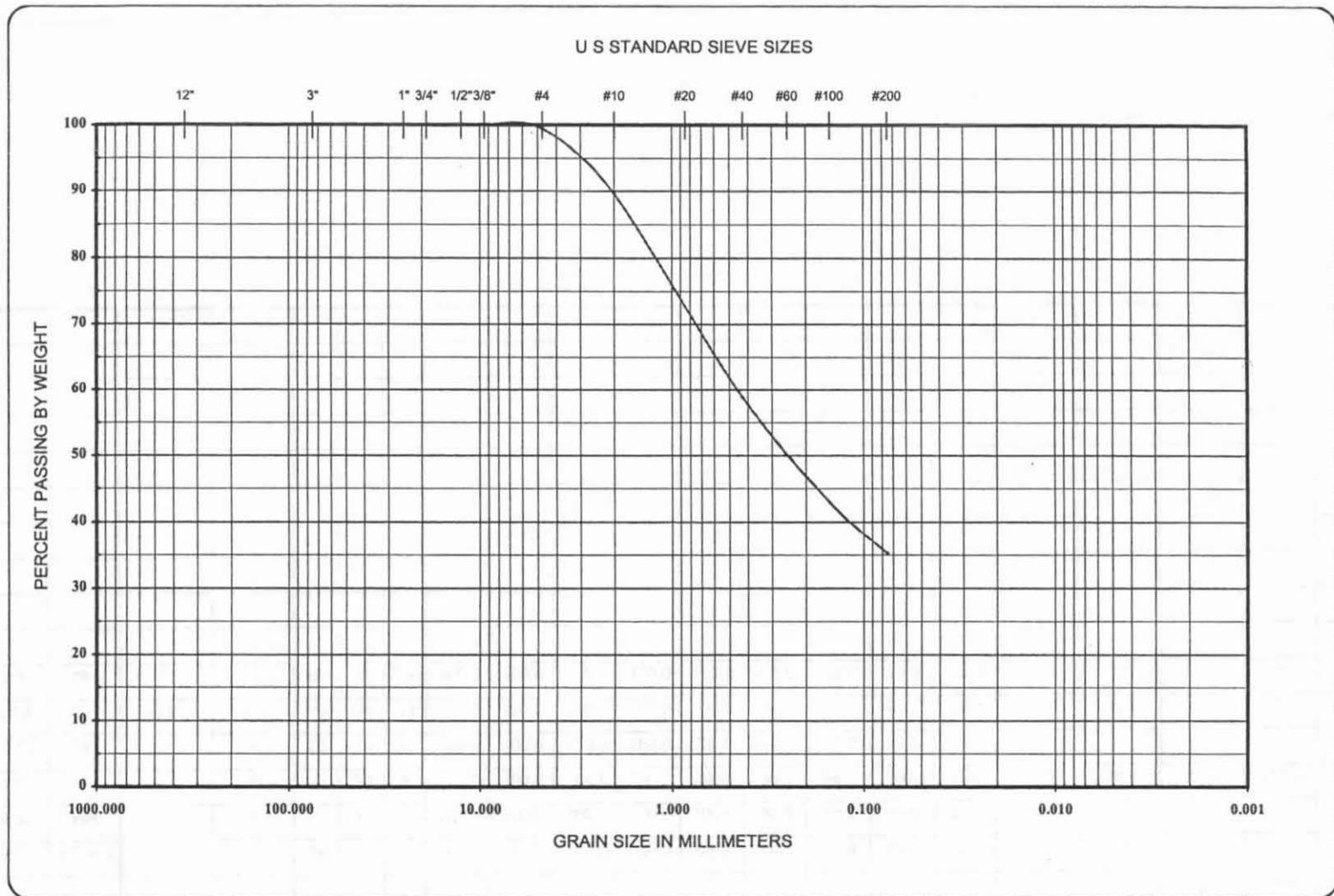
Date: 04/11/02
Regular Mail: XXX
Express Mail:
Federal Express:
Hand Carried:
Other:

| COPIES | PAGES | DESCRIPTION | COMMENTS |
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| 1 | 8 | Laboratory Test Data Summary | |
| | | | |
| | | | |
| | | | |

Job Number: 013-02-046

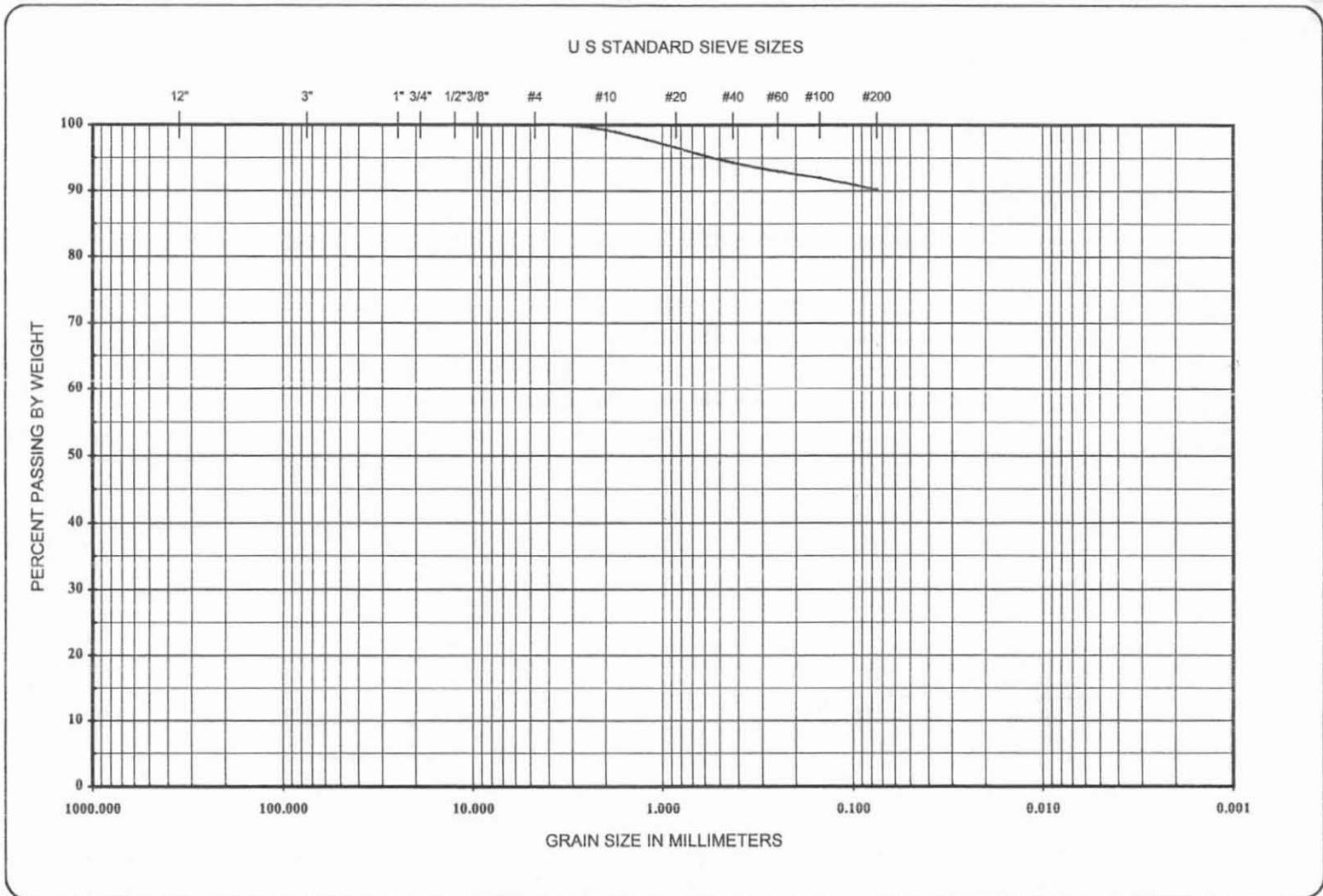
SIGNATURE: _____

Steve Pistole
Construction Services Manager



| | | | | | | | | |
|----------|---------|--------|------|--------|--------|------|-------|------|
| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT | CLAY |

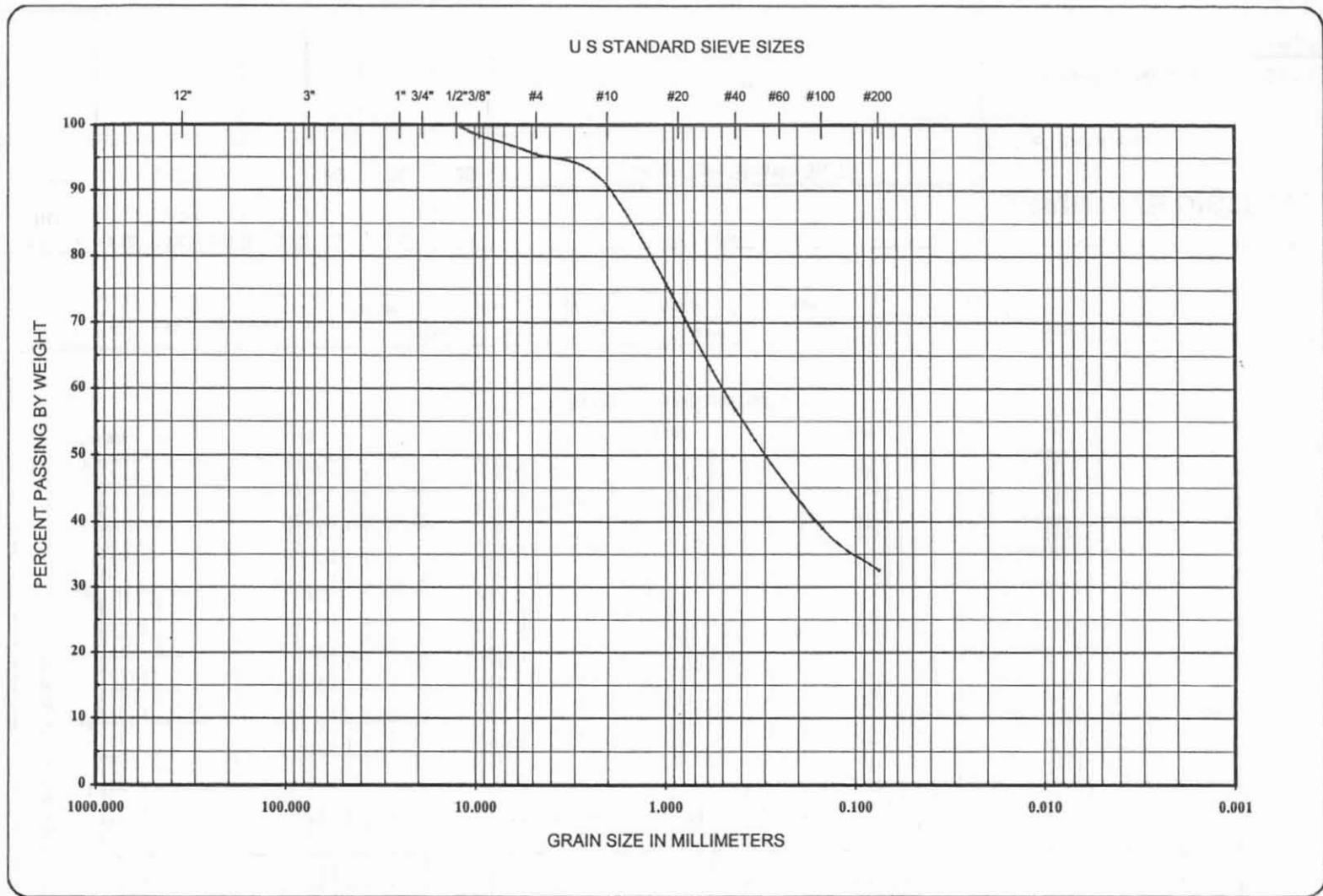
| BORING NO. | SAMPLE NO. | ELEVATION OR DEPTH | NMC % | LL | PL | PI | CLASSIFICATION | GRAIN SIZE DISTRIBUTION |
|------------|------------|--------------------|-------|----|----|----|---|--|
| | P-15 | 5-7' | | 26 | 19 | 7 | Light Tan-Orange Silty Clayey SAND SC-SM | <p>Coble' Sandrock</p> <p>Trigon Project Number 013-02-046</p> <p>Date 3/29/02</p> |



| | | | | | | | | |
|----------|---------|--------|------|--------|--------|------|-------|------|
| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT | CLAY |

| BORING NO. | SAMPLE NO. | ELEVATION OR DEPTH | NMC % | LL | PL | PI | CLASSIFICATION | GRAIN SIZE DISTRIBUTION |
|------------|------------|--------------------|-------|----|----|----|---|---|
| | P-17 | 5-7' | | 62 | 36 | 26 | Grey-Tan Elastic SILT MH | Coble' Sandrock Trigon Project Number 013-02-046 Date 3/29/02 |

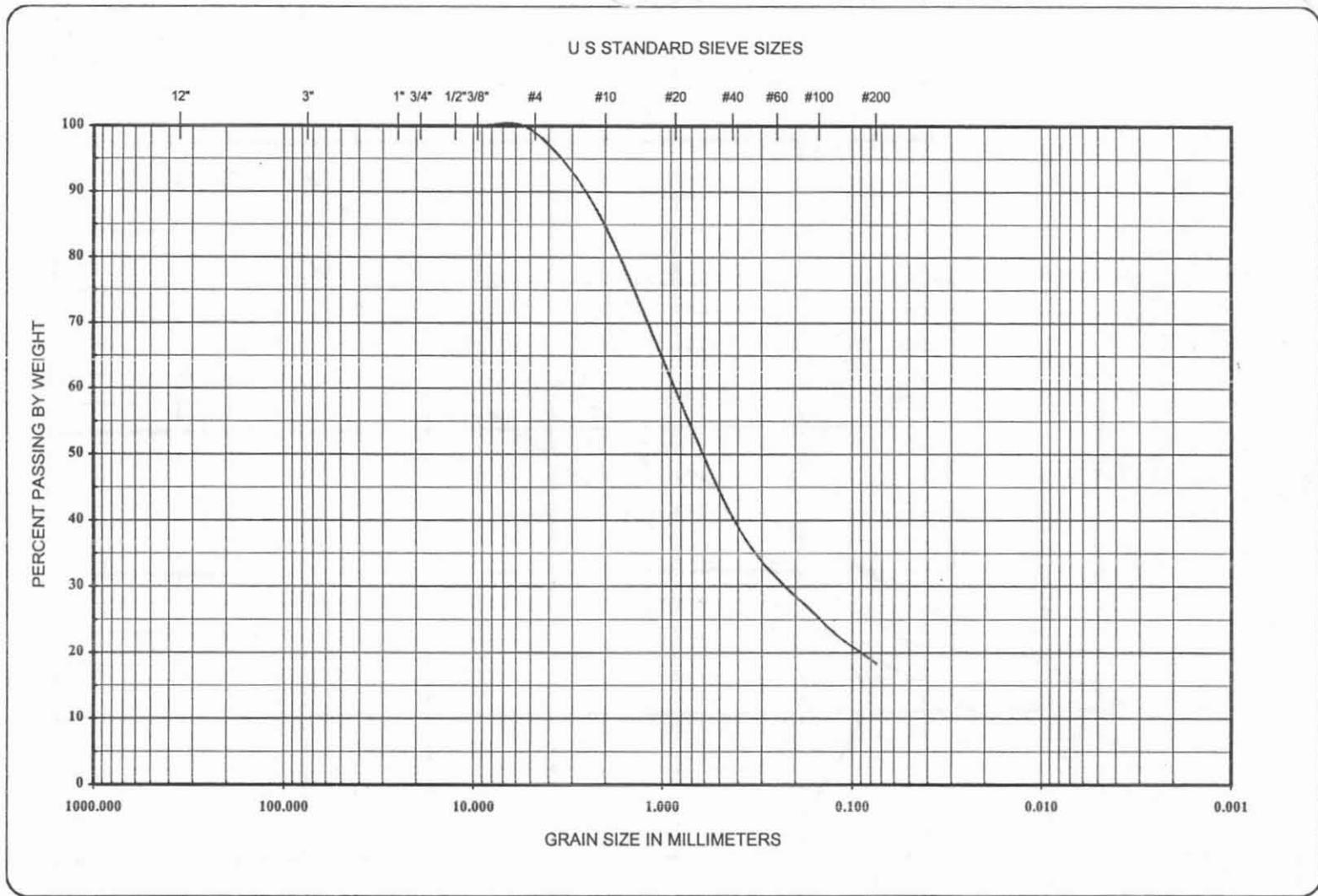




| | | | | | | | | |
|----------|---------|--------|------|--------|--------|------|-------|------|
| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT | CLAY |

| BORING NO. | SAMPLE NO. | ELEVATION OR DEPTH | NMC % | LL | PL | PI | CLASSIFICATION | GRAIN SIZE DISTRIBUTION |
|------------|-------------|--------------------|-------|----|----|----|--------------------------------|---|
| | P-19S UD | 4-6' | | 31 | 23 | 8 | Dark Grey Silty SAND SM | Coble' Sandrock Trigon Project Number 013-02-046 Date 3/29/02 |

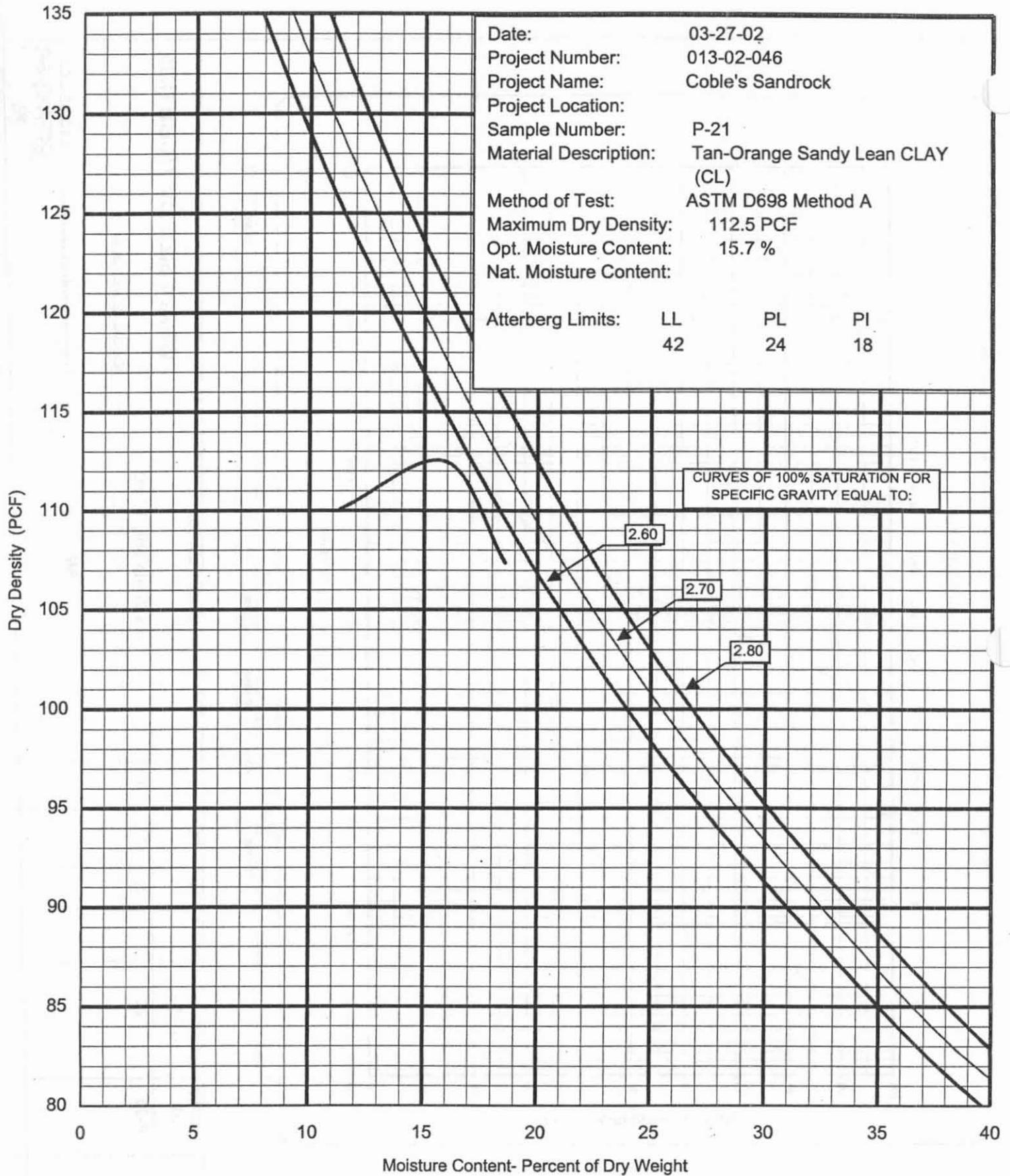




| | | | | | | | | |
|----------|---------|--------|------|--------|--------|------|-------|------|
| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT | CLAY |

| BORING NO. | SAMPLE NO. | ELEVATION OR DEPTH | NMC % | LL | PL | PI | CLASSIFICATION | GRAIN SIZE DISTRIBUTION |
|------------|------------|--------------------|-------|----|----|----|----------------------------------|-------------------------|
| | P-20 | 20-22' | | 27 | 27 | 0 | Tan & White Silty SAND SM | |

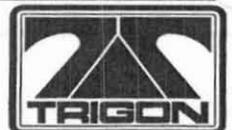


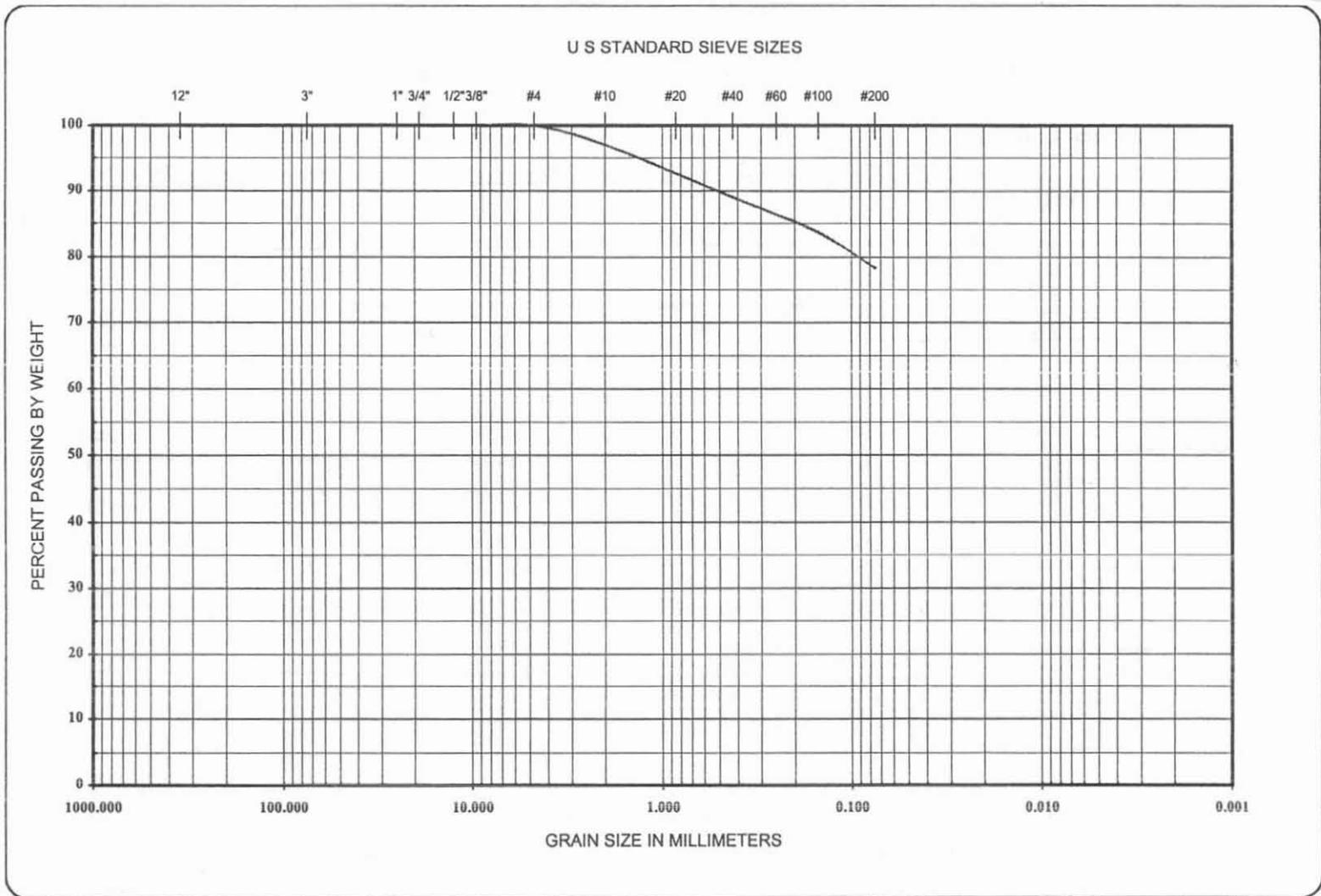


MOISTURE-DENSITY RELATIONSHIP

TRIGON ENGINEERING CONSULTANTS, INC.

Greensboro, NC





| | | | | | | | | |
|----------|---------|--------|------|--------|--------|------|-------|------|
| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT | CLAY |

| BORING NO. | SAMPLE NO. | ELEVATION OR DEPTH | NMC % | LL | PL | PI | CLASSIFICATION |
|------------|------------|--------------------|-------|----|----|----|--------------------------------------|
| | P-21 | 2-10' | | 42 | 24 | 18 | Tan-Orange Sandy Lean CLAY CL |

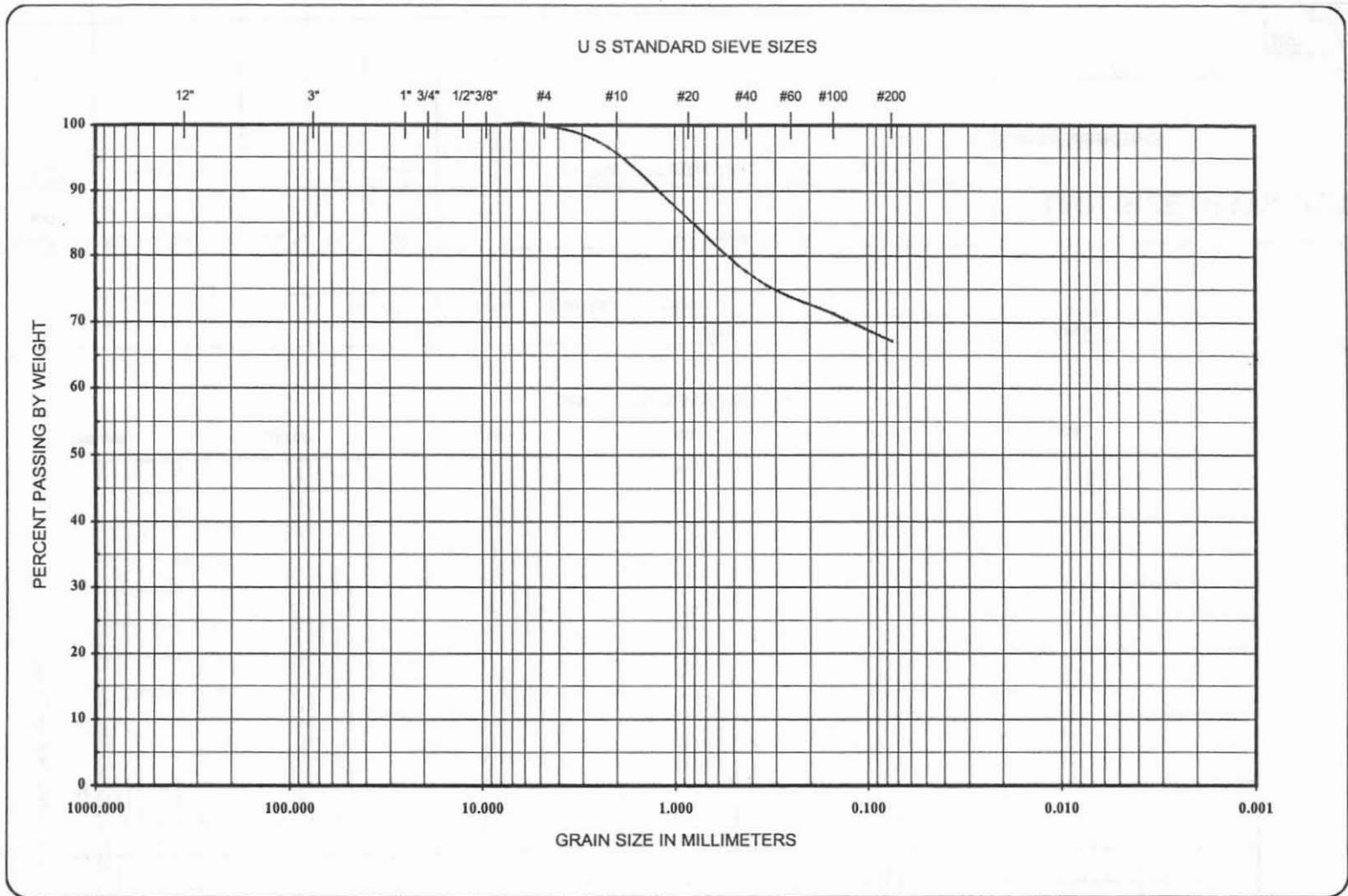
GRAIN SIZE DISTRIBUTION

Coble' Sandrock

Trigon Project Number 013-02-046

Date 3/29/02





| | | | | | | | | |
|----------|---------|--------|------|--------|--------|------|-------|------|
| BOULDERS | COBBLES | GRAVEL | | SAND | | | FINES | |
| | | COARSE | FINE | COARSE | MEDIUM | FINE | SILT | CLAY |

| BORING NO. | SAMPLE NO. | ELEVATION OR DEPTH | NMC % | LL | PL | PI | CLASSIFICATION | GRAIN SIZE DISTRIBUTION |
|------------|------------|--------------------|-------|----|----|----|---|-------------------------|
| | P-23 | 0-2' | | 60 | 32 | 28 | <p>Grey-Tan & Orange Sandy Elastic Silt</p> <p>MH</p> | |





September 15, 2005

Project No. 2005-584-01

Mr. Dusty Reedy
Joyce Engineering, Inc.
2301 W. Meadowview Rd. Suite 203
Greensboro, NC 27407

Transmittal
Laboratory Test Results
Coble's Sandrock C & D Landfill

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was faxed to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

***We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.***

ATTERBERG LIMITS

ASTM D 4318-98 / AASHTO T89 (SOP - S4A)

| | | | |
|------------------|-------------------------|------------------|------------------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 2'-6" |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-01 | Soil Description | BROWN LEAN CLAY |

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

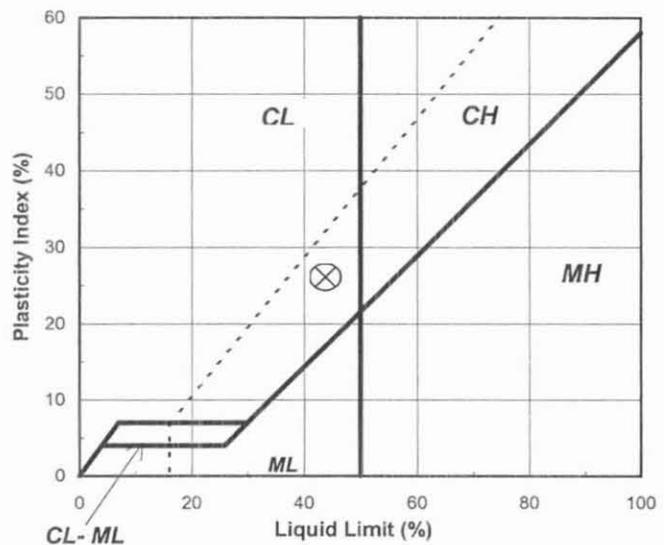
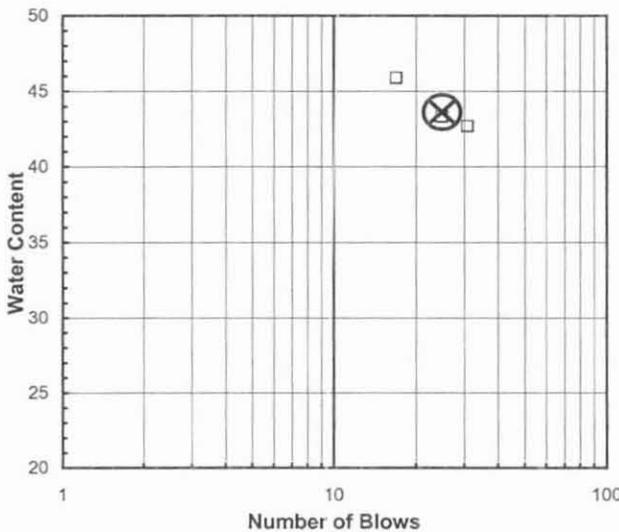
| Liquid Limit Test | 1 | 2 | 3 | |
|-----------------------------|-------------|-------------|-------------|----------|
| Tare Number | I | H | A-I | M |
| Wt. of Tare & WS (gm) | 29.10 | 28.70 | 31.41 | U |
| Wt. of Tare & DS (gm) | 24.75 | 24.62 | 26.67 | L |
| Wt. of Tare (gm) | 15.26 | 15.20 | 15.56 | T |
| Wt. of Water (gm) | 4.4 | 4.1 | 4.7 | I |
| Wt. of DS (gm) | 9.5 | 9.4 | 11.1 | P |
| Moisture Content (%) | 45.8 | 43.3 | 42.7 | O |
| Number of Blows | 17 | 25 | 31 | I |
| | | | | N |
| | | | | T |

| Plastic Limit Test | 1 | 2 | Range | Test Results |
|-----------------------------|-------------|-------------|------------|--------------------------------|
| Tare Number | A-P | G | | Liquid Limit (%) 44 |
| Wt. of Tare & WS (gm) | 22.06 | 20.92 | | Plastic Limit (%) 18 |
| Wt. of Tare & DS (gm) | 21.08 | 20.03 | | Plasticity Index (%) 26 |
| Wt. of Tare (gm) | 15.64 | 15.08 | | USCS Symbol CL |
| Wt. of Water (gm) | 1.0 | 0.9 | | |
| Wt. of DS (gm) | 5.4 | 5.0 | | |
| Moisture Content (%) | 18.0 | 18.0 | 0.0 | |

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By MCW Date 9/14/2005 Checked By GEM Date 9-15-05

page 1 of 1 DCN: CT-S4B DATE: 10/8/2001 REVISION: 2

\\Lab1\c\2005 Projects\2005-584 JOYCE\2005-584-01-01 LIMIT.xls\Sheet1

ATTERBERG LIMITS

ASTM D 4318-98 / AASHTO T89 (SOP - S4A)

| | | | |
|------------------|-------------------------|------------------|------------------------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 15'-22' |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-02 | Soil Description | LIGHT BROWN LEAN CLAY |

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

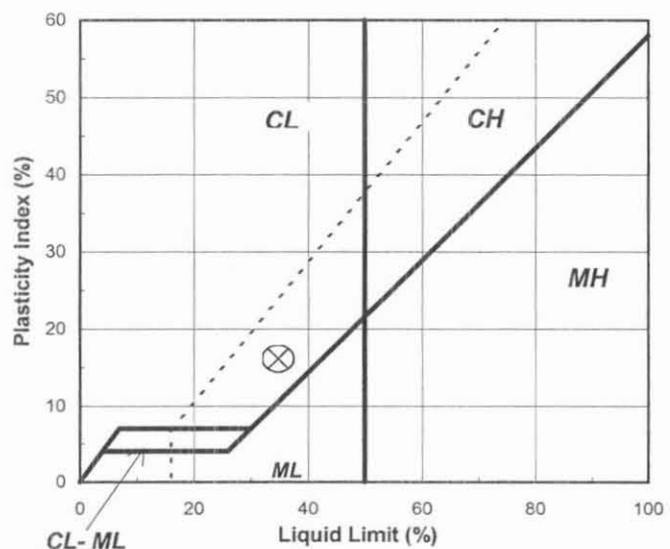
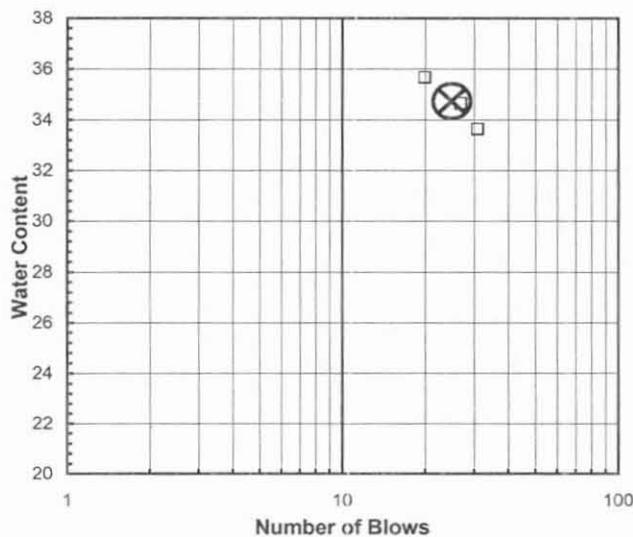
| Liquid Limit Test | 1 | 2 | 3 | M U L T I P O I N T |
|-----------------------------|-------------|-------------|-------------|--|
| Tare Number | A-V | B-B | A-M | |
| Wt. of Tare & WS (gm) | 26.80 | 24.87 | 26.39 | |
| Wt. of Tare & DS (gm) | 23.87 | 22.48 | 23.62 | |
| Wt. of Tare (gm) | 15.65 | 15.58 | 15.38 | |
| Wt. of Water (gm) | 2.9 | 2.4 | 2.8 | |
| Wt. of DS (gm) | 8.2 | 6.9 | 8.2 | |
| Moisture Content (%) | 35.6 | 34.6 | 33.6 | |
| Number of Blows | 20 | 27 | 31 | |

| Plastic Limit Test | 1 | 2 | Range | Test Results |
|-----------------------------|-------------|-------------|------------|--------------------------------|
| Tare Number | W | A-N | | Liquid Limit (%) 35 |
| Wt. of Tare & WS (gm) | 23.41 | 24.34 | | Plastic Limit (%) 19 |
| Wt. of Tare & DS (gm) | 22.05 | 22.95 | | Plasticity Index (%) 16 |
| Wt. of Tare (gm) | 15.22 | 15.50 | | USCS Symbol CL |
| Wt. of Water (gm) | 1.4 | 1.4 | | |
| Wt. of DS (gm) | 6.8 | 7.5 | | |
| Moisture Content (%) | 19.9 | 18.7 | 1.3 | |

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



Tested By AHF Date 09/14/05 Checked By GEM Date 9-15-05

ATTERBERG LIMITS

ASTM D 4318-98 / AASHTO T89 (SOP - S4A)

| | | | |
|------------------|-------------------------|------------------|---|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 5'-12' |
| Project No. | 2005-584-01 | Sample No. | P-24 |
| Lab ID | 2005-584-01-03 | Soil Description | BROWN LEAN CLAY (Minus No. 40 sieve material, Airdried) |

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

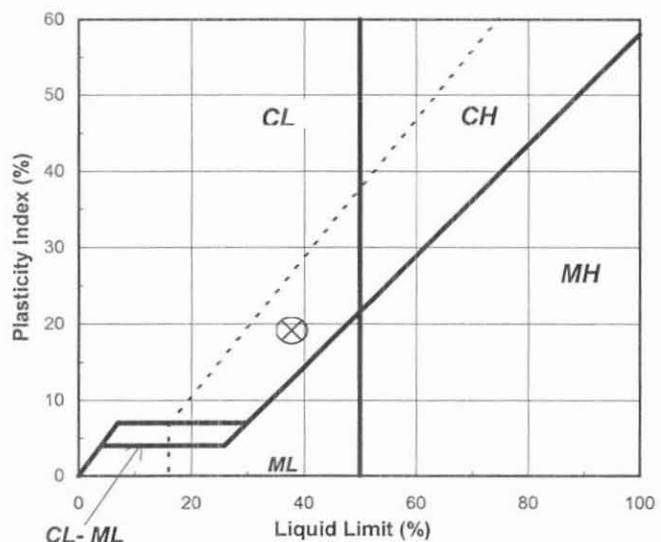
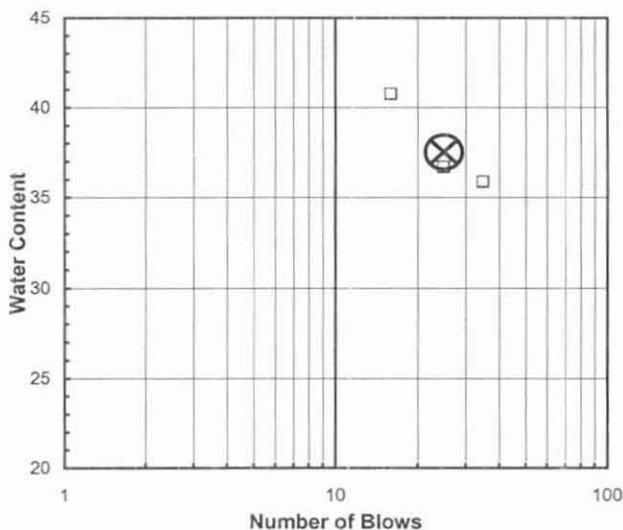
| Liquid Limit Test | 1 | 2 | 3 | |
|-----------------------------|-------------|-------------|-------------|--|
| Tare Number | A-F | A-T | F | M U L T I P O I N T |
| Wt. of Tare & WS (gm) | 28.29 | 28.10 | 28.32 | |
| Wt. of Tare & DS (gm) | 24.60 | 24.76 | 24.86 | |
| Wt. of Tare (gm) | 15.54 | 15.65 | 15.21 | |
| Wt. of Water (gm) | 3.7 | 3.3 | 3.5 | |
| Wt. of DS (gm) | 9.1 | 9.1 | 9.7 | |
| Moisture Content (%) | 40.7 | 36.7 | 35.9 | |
| Number of Blows | 16 | 25 | 35 | |

| Plastic Limit Test | 1 | 2 | Range | Test Results |
|-----------------------------|-------------|-------------|-------------|----------------------------|
| Tare Number | J | A-D | | Liquid Limit (%) 38 |
| Wt. of Tare & WS (gm) | 22.95 | 23.77 | | Plastic Limit (%) 19 |
| Wt. of Tare & DS (gm) | 21.74 | 22.45 | | Plasticity Index (%) 19 |
| Wt. of Tare (gm) | 15.24 | 15.45 | | USCS Symbol CL |
| Wt. of Water (gm) | 1.2 | 1.3 | | |
| Wt. of DS (gm) | 6.5 | 7.0 | | |
| Moisture Content (%) | 18.6 | 18.9 | -0.2 | |

Note: The acceptable range of the two Moisture contents is ± 2.6

Flow Curve

Plasticity Chart



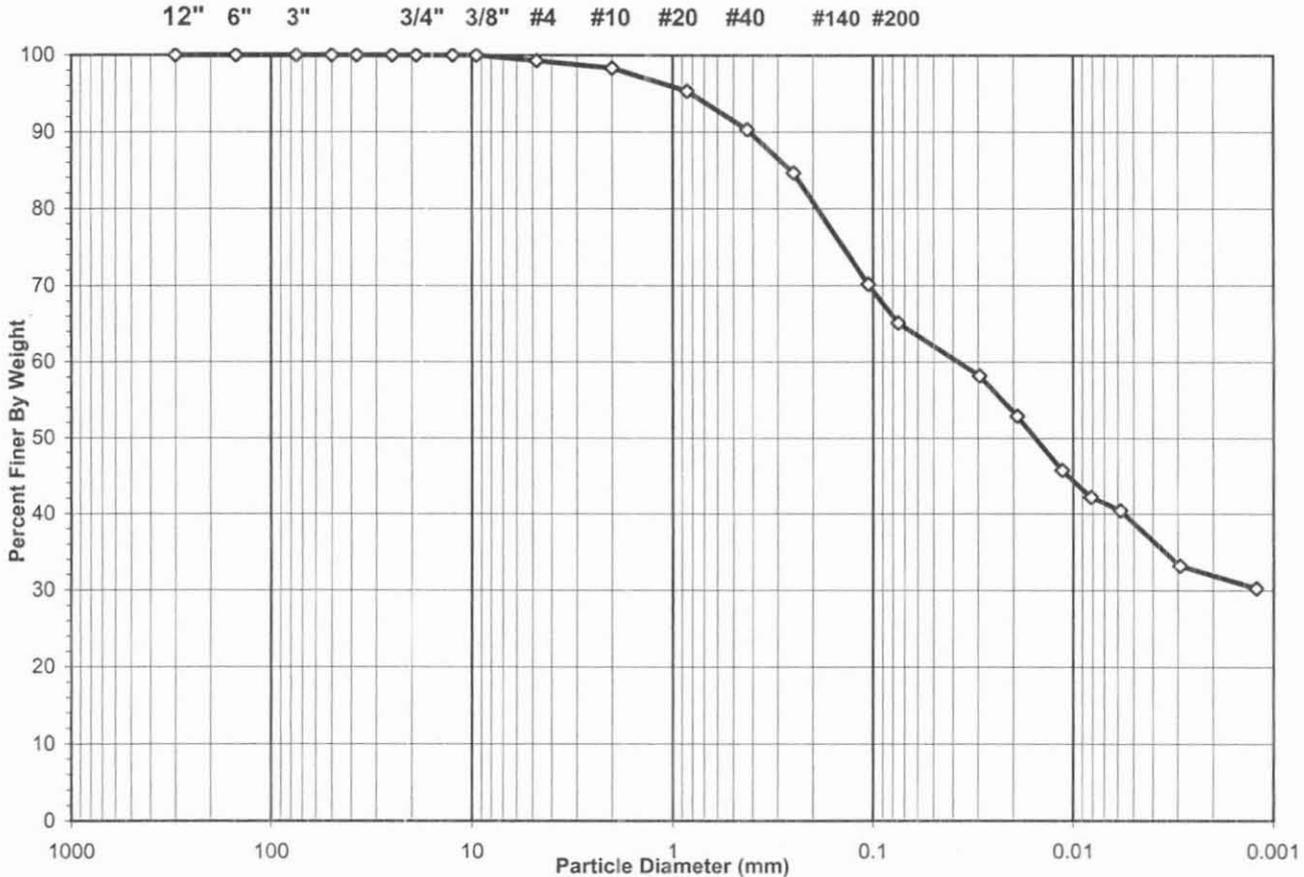
Tested By **MCW** Date **9/13/2005** Checked By **GEM** Date **9-15-05**

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)



| | | | |
|------------------|-------------------------|------------|--------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 2'-6" |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-01 | Soil Color | BROWN |

| USCS | SIEVE ANALYSIS | | | | | HYDROMETER | |
|---------|----------------|--------|--------|------|------------------------|------------|------|
| | boulder | gravel | sand | | silt and clay fraction | | |
| W-WORTH | boulder | cobble | pebble | gran | sand | silt | clay |

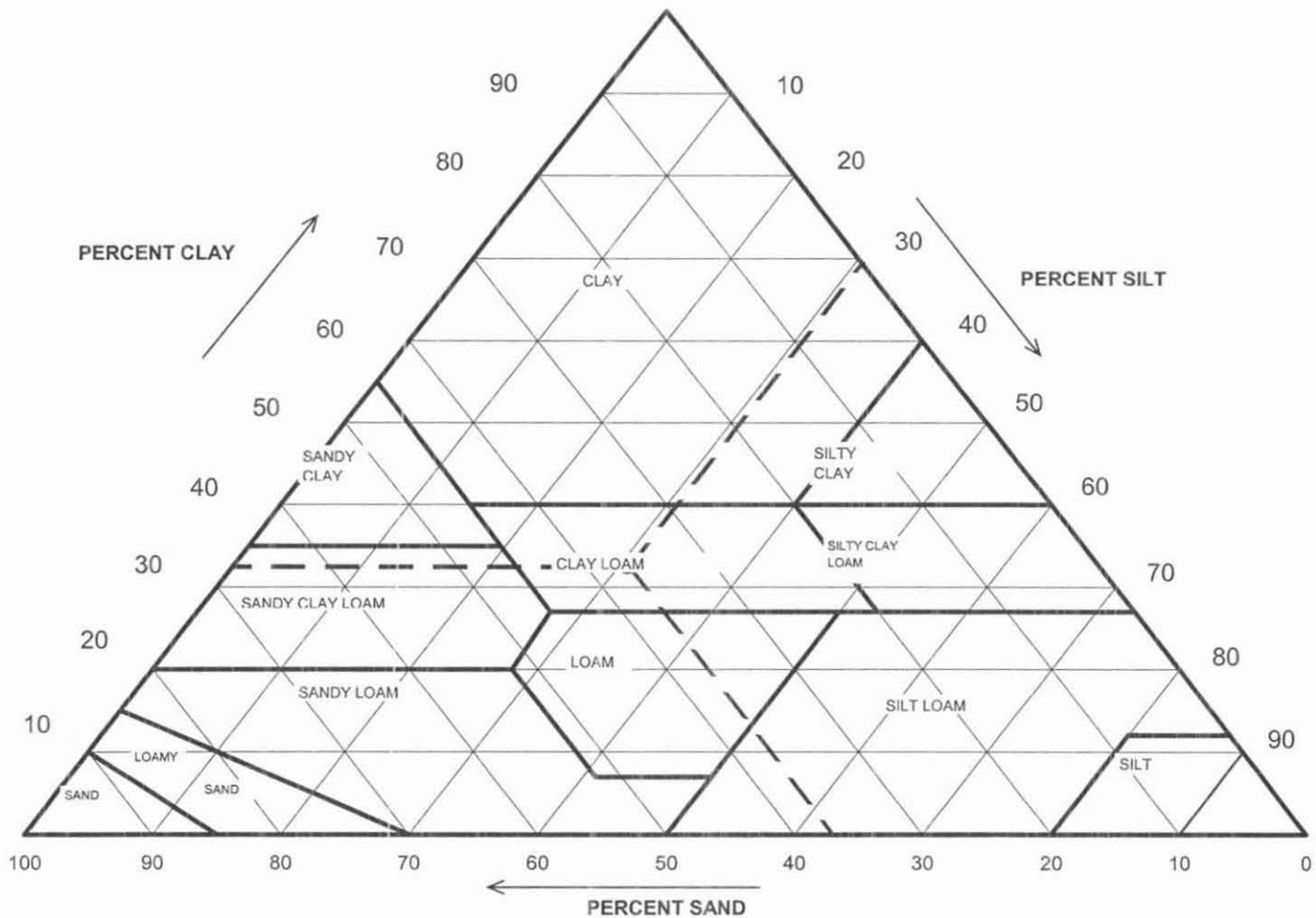


| Sieve Size (mm) | Percent Finer | USCS (%) | ASTM (%) | Wentworth (%) |
|-----------------|---------------|-------------------|-------------|---------------|
| 100 | 100.00 | Gravel 0.71 | Gravel 0.71 | BOULDERS 0.00 |
| 2 | 98.33 | Sand 34.15 | Sand 34.15 | COBBLES 0.00 |
| 0.075 | 65.14 | Silt & Clay 65.14 | Silt 26.27 | PEBBLES 0.90 |
| 0.05 | 62.12 | | Clay 38.87 | GRANULES 0.77 |
| 0.005 | 38.87 | | | VC SAND 2.45 |
| 0.002 | 31.92 | | | C SAND 4.41 |
| | | | | M SAND 6.81 |
| | | | | F SAND 11.73 |
| | | | | VF SAND 9.15 |
| | | | | SILT 27.55 |
| | | | | CLAY 36.24 |

USCS Symbol **CL, TESTED**
USCS Classification **SANDY LEAN CLAY**

USDA CLASSIFICATION CHART

| | | |
|------------------|-------------------------|------------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) 2'-6' |
| Project No. | 2005-584-01 | Sample No. MW-8 |
| Lab ID | 2005-584-01-01 | Soil Color BROWN |



| Particle Size (mm) | Percent Finer | USDA SUMMARY | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classificat. |
|--------------------|---------------|---------------------------------------|-------------------|--|
| | | <i>Gravel</i> | 1.67 | 0.00 |
| 2 | 98.33 | <i>Sand</i> | 36.21 | 36.82 |
| 0.05 | 62.12 | <i>Silt</i> | 30.21 | 30.72 |
| 0.002 | 31.92 | <i>Clay</i> | 31.92 | 32.46 |
| | | USDA Classification: CLAY LOAM | | |

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

| | | | |
|------------------|-------------------------|------------|--------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 2'-6' |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-01 | Soil Color | BROWN |

| - #10 for Hygroscopic | | Hydrometer Specimen Data | |
|-----------------------------|------------|--|---------------|
| Tare No. | C-2 | Air Dried - #10 Hydrometer Material (gm) | 56.08 |
| Wgt. Tare + Wet Soil (gm) | 41.30 | Corrected Dry Wt. of - #10 Material (gm) | 54.98 |
| Wgt. Tare + Dry Soil (gm) | 40.92 | | |
| Weight of Tare (gm) | 21.94 | Weight of - #200 Material (gm) | 36.42 |
| Weight of Water (gm) | 0.38 | Weight of - #10 ; + #200 Material (gm) | 18.56 |
| Weight of Dry Soil (gm) | 18.98 | | |
| Moisture Content (%) | 2.0 | J-FACTOR (%FINER THAN #10) | 0.9833 |

| Soil Specimen Data | | | |
|----------------------------------|--------|---|-------|
| Air Dried Wgt. Total Sample (gm) | 266.77 | Dry Weight of Material Retained on #10 (gm) | 4.36 |
| Total Dry Sample Weight (gm) | 261.6 | Corrected Dry Sample Wt - #10 (gm) | 257.3 |

| Sieve Size | Sieve Opening (mm) | Wgt. of Soil Retained (gm) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12" | 300 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 6" | 150 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3" | 75 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 2" | 50 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1 1/2" | 37.5 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1" | 25.0 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3/4" | 19.0 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1/2" | 12.5 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3/8" | 9.50 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| #4 | 4.75 | 1.86 | 0.71 | 0.71 | 99.29 | 99.29 |
| #10 | 2.00 | 2.50 | 0.96 | 1.67 | 98.33 | 98.33 |
| #20 | 0.85 | 1.69 | 3.07 | 3.07 | 96.93 | 95.31 |
| #40 | 0.425 | 2.80 | 5.09 | 8.17 | 91.83 | 90.30 |
| #60 | 0.250 | 3.15 | 5.73 | 13.90 | 86.10 | 84.67 |
| #140 | 0.106 | 8.12 | 14.77 | 28.67 | 71.33 | 70.15 |
| #200 | 0.075 | 2.80 | 5.09 | 33.76 | 66.24 | 65.14 |
| Pan | - | 36.42 | 66.24 | 100.00 | - | - |

Notes :

Tested By MCW Date 09/15/05 Checked By MDS Date 9-15-05

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

| | | | |
|------------------|-------------------------|------------|--------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 2'-6' |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-01 | Soil Color | BROWN |

Bulb Ser.#
435834

| Elapsed Time (min) | R Measured | Temp. (°C) | Composite Correction | R Corrected | N (%) | K Factor | Diameter (mm) | N' (%) |
|--------------------|------------|------------|----------------------|-------------|-------|----------|---------------|--------|
| 0 | NA | NA | NA | NA | NA | NA | NA | NA |
| 2 | 37.0 | 37.0 | 4.14 | 32.9 | 59.2 | 0.01300 | 0.0294 | 58.2 |
| 5 | 34.0 | 34.0 | 4.14 | 29.9 | 53.8 | 0.01300 | 0.0190 | 52.9 |
| 15 | 30.0 | 30.0 | 4.17 | 25.8 | 46.5 | 0.01302 | 0.0113 | 45.7 |
| 30 | 28.0 | 28.0 | 4.17 | 23.8 | 42.9 | 0.01302 | 0.0081 | 42.2 |
| 60 | 27.0 | 27.0 | 4.17 | 22.8 | 41.1 | 0.01302 | 0.0058 | 40.4 |
| 250 | 23.0 | 23.0 | 4.26 | 18.7 | 33.7 | 0.01307 | 0.0029 | 33.2 |
| 1440 | 21.0 | 21.0 | 3.91 | 17.1 | 30.8 | 0.01288 | 0.0012 | 30.3 |

| Soil Specimen Data | | Other Corrections | |
|-----------------------------|-------|-----------------------------|-------------|
| Dry Sample Wt - #10 (gm) | 54.98 | Hygroscopic Moisture Factor | 0.980 |
| Weight of Deflocculant (gm) | 5.0 | a - Factor | 0.99 |
| | | Percent Finer than # 10 | 98.33 |
| | | Specific Gravity | 2.7 Assumed |

Notes:

Tested By MCW Date 09/13/05 Checked By MPS Date 9-15-05

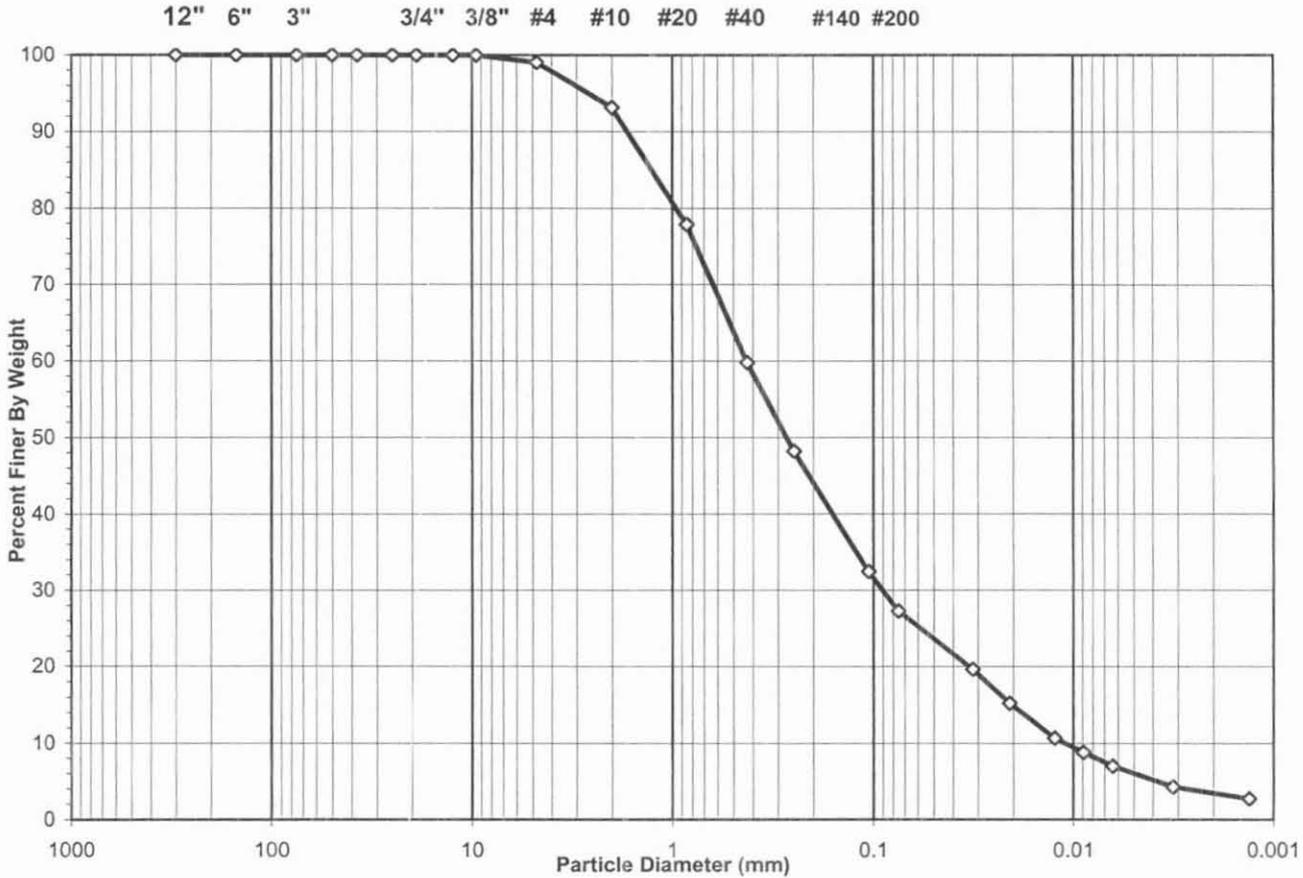
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)



Client: JOYCE ENGINEERING, INC.
 Client Reference: COBLE'S SANDROCK C&D LF
 Project No.: 2005-584-01
 Lab ID: 2005-584-01-02

Boring No.: NA
 Depth (ft): 15'-22'
 Sample No.: MW-8
 Soil Color: **LIGHT BROWN**

| | | | | | | | |
|----------------|-----------------------|--------|--------|------|------|------------------------|------|
| | SIEVE ANALYSIS | | | | | HYDROMETER | |
| USCS | boulder | | gravel | sand | | silt and clay fraction | |
| W-WORTH | boulder | cobble | pebble | gran | sand | silt | clay |



| Sieve Size (mm) | Percent Finer | USCS (%) | ASTM (%) | Wentworth (%) |
|-----------------|---------------|-------------------|-------------|---------------|
| 100 | 100.00 | Gravel 0.95 | Gravel 0.95 | BOULDERS 0.00 |
| 2 | 93.14 | Sand 71.79 | Sand 71.79 | COBBLES 0.00 |
| 0.075 | 27.26 | Silt & Clay 27.26 | Silt 21.19 | PEBBLES 2.12 |
| 0.05 | 23.64 | | Clay 6.07 | GRANULES 4.73 |
| 0.005 | 6.07 | | | VC SAND 12.37 |
| 0.002 | 3.47 | | | C SAND 16.75 |
| | | | | M SAND 15.84 |
| | | | | F SAND 12.72 |
| | | | | VF SAND 9.82 |
| | | | | SILT 20.54 |
| | | | | CLAY 5.09 |

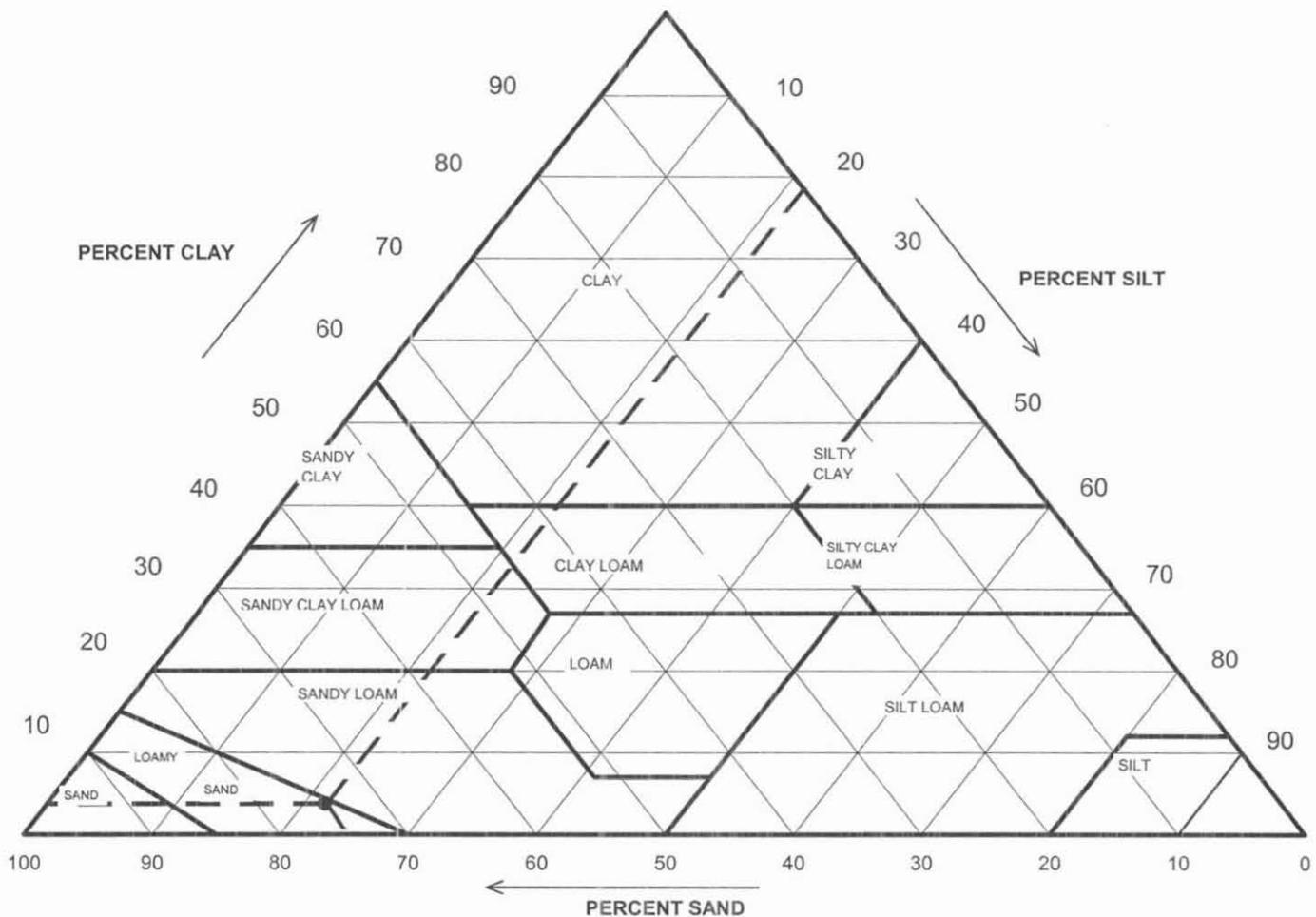
USCS Symbol: **SC, TESTED**
 USCS Classification: **CLAYEY SAND**

USDA CLASSIFICATION CHART

Client
Client Reference
Project No.
Lab ID

JOYCE ENGINEERING, INC.
COBLE'S SANDROCK C&D LF
2005-584-01
2005-584-01-02

Boring No. NA
Depth (ft) 15'-22'
Sample No. MW-8
Soil Color LIGHT BROWN



| Particle Size (mm) | Percent Finer | USDA SUMMARY | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classificat. |
|-----------------------------|---------------|-------------------|-------------------|--|
| | | <i>Gravel</i> | 6.86 | 0.00 |
| 2 | 93.14 | <i>Sand</i> | 69.51 | 74.62 |
| 0.05 | 23.64 | <i>Silt</i> | 20.17 | 21.65 |
| 0.002 | 3.47 | <i>Clay</i> | 3.47 | 3.73 |
| USDA Classification: | | LOAMY SAND | | |

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

| | | | |
|------------------|-------------------------|------------|--------------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 15'-22' |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-02 | Soil Color | LIGHT BROWN |

| - #10 for Hygroscopic | | Hydrometer Specimen Data | |
|-----------------------------|------------|--|---------------|
| Tare No. | J-2 | Air Dried - #10 Hydrometer Material (gm) | 103.32 |
| Wgt. Tare + Wet Soil (gm) | 32.71 | Corrected Dry Wt. of - #10 Material (gm) | 102.74 |
| Wgt. Tare + Dry Soil (gm) | 32.65 | | |
| Weight of Tare (gm) | 21.98 | Weight of - #200 Material (gm) | 30.07 |
| Weight of Water (gm) | 0.06 | Weight of - #10 ; + #200 Material (gm) | 72.67 |
| Weight of Dry Soil (gm) | 10.67 | | |
| Moisture Content (%) | 0.6 | J-FACTOR (%FINER THAN #10) | 0.9314 |

| Soil Specimen Data | | | |
|----------------------------------|-------|---|-------|
| Air Dried Wgt. Total Sample (gm) | 279.9 | Dry Weight of Material Retained on #10 (gm) | 19.09 |
| Total Dry Sample Weight (gm) | 278.4 | Corrected Dry Sample Wt - #10 (gm) | 259.4 |

| Sieve Size | Sieve Opening (mm) | Wgt. of Soil Retained (gm) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12" | 300 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 6" | 150 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3" | 75 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 2" | 50 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1 1/2" | 37.5 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1" | 25.0 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3/4" | 19.0 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1/2" | 12.5 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3/8" | 9.50 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| #4 | 4.75 | 2.65 | 0.95 | 0.95 | 99.05 | 99.05 |
| #10 | 2.00 | 16.44 | 5.90 | 6.86 | 93.14 | 93.14 |
| #20 | 0.85 | 16.85 | 16.40 | 16.40 | 83.60 | 77.87 |
| #40 | 0.425 | 19.95 | 19.42 | 35.82 | 64.18 | 59.78 |
| #60 | 0.250 | 12.80 | 12.46 | 48.28 | 51.72 | 48.18 |
| #140 | 0.106 | 17.37 | 16.91 | 65.18 | 34.82 | 32.43 |
| #200 | 0.075 | 5.70 | 5.55 | 70.73 | 29.27 | 27.26 |
| Pan | - | 30.07 | 29.27 | 100.00 | - | - |

Notes :

Tested By MCW Date 09/15/05 Checked By MMJ Date 9-15-05

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

| | | | |
|------------------|-------------------------|------------|--------------------|
| Client | JOYCE ENGINEERING, INC. | Boring No. | NA |
| Client Reference | COBLE'S SANDROCK C&D LF | Depth (ft) | 15'-22' |
| Project No. | 2005-584-01 | Sample No. | MW-8 |
| Lab ID | 2005-584-01-02 | Soil Color | LIGHT BROWN |

Bulb Ser.#
435834

| Elapsed Time (min) | R Measured | Temp. (°C) | Composite Correction | R Corrected | N (%) | K Factor | Diameter (mm) | N' (%) |
|--------------------|------------|------------|----------------------|-------------|-------|----------|---------------|-------------|
| 0 | NA | NA | NA | NA | NA | NA | NA | NA |
| 2 | 26.0 | 22.8 | 4.14 | 21.9 | 21.1 | 0.01300 | 0.0319 | 19.6 |
| 5 | 21.0 | 22.8 | 4.14 | 16.9 | 16.2 | 0.01300 | 0.0208 | 15.1 |
| 15 | 16.0 | 22.8 | 4.14 | 11.9 | 11.4 | 0.01300 | 0.0124 | 10.6 |
| 30 | 14.0 | 22.7 | 4.17 | 9.8 | 9.5 | 0.01302 | 0.0089 | 8.8 |
| 60 | 12.0 | 22.7 | 4.17 | 7.8 | 7.5 | 0.01302 | 0.0064 | 7.0 |
| 250 | 9.0 | 22.5 | 4.23 | 4.8 | 4.6 | 0.01305 | 0.0032 | 4.3 |
| 1440 | 7.0 | 23.5 | 3.94 | 3.1 | 3.0 | 0.01290 | 0.0013 | 2.7 |

| Soil Specimen Data | Other Corrections | |
|-----------------------------|-----------------------------|-------------|
| Dry Sample Wt - #10 (gm) | 102.74 | |
| Weight of Deflocculant (gm) | 5.0 | |
| | Hygroscopic Moisture Factor | 0.994 |
| | a - Factor | 0.99 |
| | Percent Finer than # 10 | 93.14 |
| | Specific Gravity | 2.7 Assumed |

Notes:

Tested By MCW Date 09/13/05 Checked By MPS Date 9-15-05

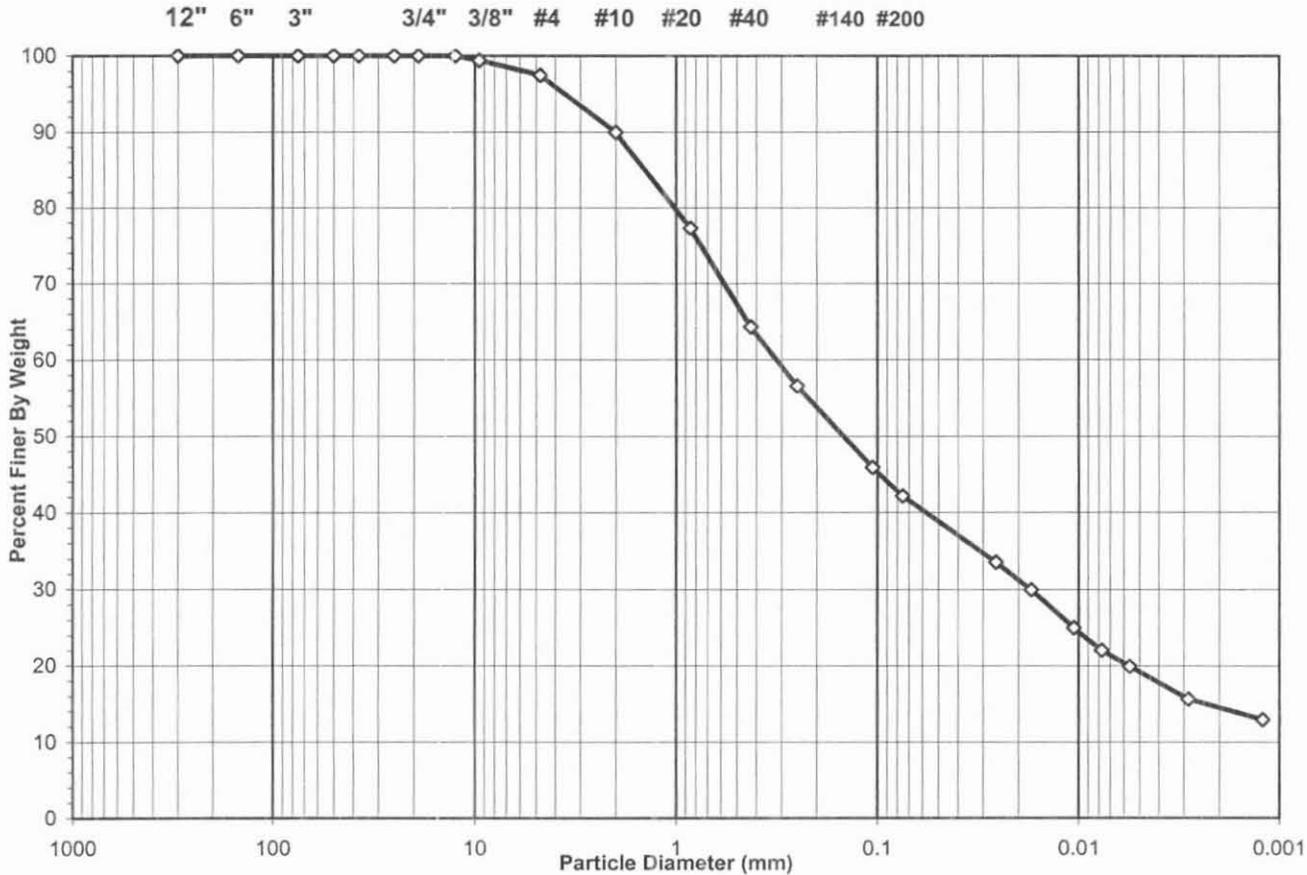
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)



Client: JOYCE ENGINEERING, INC.
 Client Reference: COBLE'S SANDROCK C&D LF
 Project No.: 2005-584-01
 Lab ID: 2005-584-01-03

Boring No.: NA
 Depth (ft): 5'-12'
 Sample No.: P-24
 Soil Color: **LIGHT BROWN**

| USCS | SIEVE ANALYSIS | | | | | HYDROMETER | |
|---------|----------------|--------|--------|------|------------------------|------------|------|
| | boulder | gravel | sand | | silt and clay fraction | | |
| W-WORTH | boulder | cobble | pebble | gran | sand | silt | clay |



| Sieve Size (mm) | Percent Finer | USCS (%) | ASTM (%) | Wentworth (%) |
|-----------------|---------------|-------------------|-------------|---------------|
| 100 | 100.00 | Gravel 2.51 | Gravel 2.51 | BOULDERS 0.00 |
| 2 | 89.96 | Sand 55.35 | Sand 55.35 | COBBLES 0.00 |
| 0.075 | 42.13 | Silt & Clay 42.13 | Silt 22.90 | PEBBLES 4.01 |
| 0.05 | 38.86 | | Clay 19.24 | GRANULES 6.03 |
| 0.005 | 19.24 | | | VC SAND 10.24 |
| 0.002 | 14.50 | | | C SAND 12.37 |
| | | | | M SAND 10.77 |
| | | | | F SAND 8.65 |
| | | | | VF SAND 7.27 |
| | | | | SILT 23.02 |
| | | | | CLAY 17.64 |

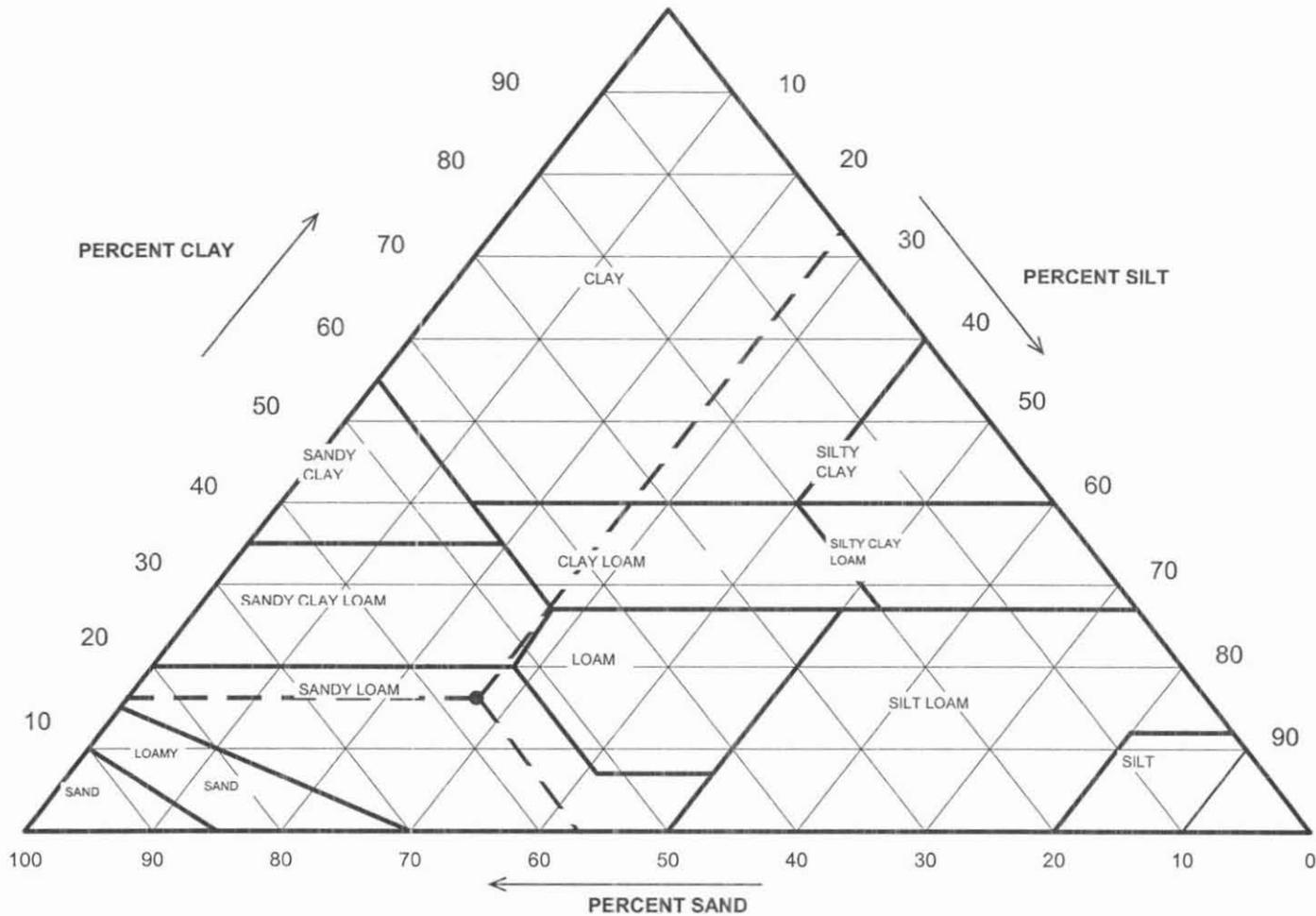
USCS Symbol: **SC, TESTED**
 USCS Classification: **CLAYEY SAND**

USDA CLASSIFICATION CHART

Client
Client Reference
Project No.
Lab ID

JOYCE ENGINEERING, INC.
COBLE'S SANDROCK C&D LF
2005-584-01
2005-584-01-03

Boring No. NA
Depth (ft) 5'-12'
Sample No. P-24
Soil Color LIGHT BROWN



| Particle Size (mm) | Percent Finer | USDA SUMMARY | Actual Percentage | Corrected % of Minus 2.0 mm material for USDA Classificat. |
|--------------------|---------------|--|-------------------|--|
| | | <i>Gravel</i> | 10.04 | 0.00 |
| 2 | 89.96 | <i>Sand</i> | 51.10 | 56.80 |
| 0.05 | 38.86 | <i>Silt</i> | 24.36 | 27.08 |
| 0.002 | 14.50 | <i>Clay</i> | 14.50 | 16.12 |
| | | USDA Classification: SANDY LOAM | | |

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

 Client JOYCE ENGINEERING, INC.
 Client Reference COBLE'S SANDROCK C&D LF
 Project No. 2005-584-01
 Lab ID 2005-584-01-03

 Boring No. NA
 Depth (ft) 5'-12'
 Sample No. P-24
 Soil Color **LIGHT BROWN**

| - #10 for Hygroscopic | | Hydrometer Specimen Data | |
|-----------------------------|------------|--|---------------|
| Tare No. | H-2 | Air Dried - #10 Hydrometer Material (gm) | 126.34 |
| Wgt. Tare + Wet Soil (gm) | 36.96 | Corrected Dry Wt. of - #10 Material (gm) | 124.39 |
| Wgt. Tare + Dry Soil (gm) | 36.73 | | |
| Weight of Tare (gm) | 22.07 | Weight of - #200 Material (gm) | 58.26 |
| Weight of Water (gm) | 0.23 | Weight of - #10 ; + #200 Material (gm) | 66.13 |
| Weight of Dry Soil (gm) | 14.66 | | |
| Moisture Content (%) | 1.6 | J-FACTOR (%FINER THAN #10) | 0.8996 |

| Soil Specimen Data | | | |
|----------------------------------|--------|---|-------|
| Air Dried Wgt. Total Sample (gm) | 366.61 | Dry Weight of Material Retained on #10 (gm) | 36.30 |
| Total Dry Sample Weight (gm) | 361.5 | Corrected Dry Sample Wt - #10 (gm) | 325.2 |

| Sieve Size | Sieve Opening (mm) | Wgt. of Soil Retained (gm) | Percent Retained (%) | Accumulated Percent Retained (%) | Percent Finer (%) | Accumulated Percent Finer (%) |
|------------|--------------------|----------------------------|----------------------|----------------------------------|-------------------|-------------------------------|
| 12" | 300 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 6" | 150 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3" | 75 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 2" | 50 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1 1/2" | 37.5 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1" | 25.0 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3/4" | 19.0 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 1/2" | 12.5 | 0.00 | 0.00 | 0.00 | 100.00 | 100.00 |
| 3/8" | 9.50 | 2.10 | 0.58 | 0.58 | 99.42 | 99.42 |
| #4 | 4.75 | 6.99 | 1.93 | 2.51 | 97.49 | 97.49 |
| #10 | 2.00 | 27.21 | 7.53 | 10.04 | 89.96 | 89.96 |
| #20 | 0.85 | 17.48 | 14.05 | 14.05 | 85.95 | 77.32 |
| #40 | 0.425 | 18.01 | 14.48 | 28.53 | 71.47 | 64.29 |
| #60 | 0.250 | 10.67 | 8.58 | 37.11 | 62.89 | 56.58 |
| #140 | 0.106 | 14.80 | 11.90 | 49.01 | 50.99 | 45.87 |
| #200 | 0.075 | 5.17 | 4.16 | 53.16 | 46.84 | 42.13 |
| Pan | - | 58.26 | 46.84 | 100.00 | - | - |

Notes :

 Tested By MCW Date 09/15/05 Checked By MMS Date 9-15-05

HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client JOYCE ENGINEERING, INC.
Client Reference COBLE'S SANDROCK C&D LF
Project No. 2005-584-01
Lab ID 2005-584-01-03

Boring No. NA
Depth (ft) 5'-12'
Sample No. P-24
Soil Color **LIGHT BROWN**

Bulb Ser.#
435834

| Elapsed Time (min) | R Measured | Temp. (°C) | Composite Correction | R Corrected | N (%) | K Factor | Diameter (mm) | N' (%) |
|--------------------|------------|------------|----------------------|-------------|-------|----------|---------------|--------|
| 0 | NA | NA | NA | NA | NA | NA | NA | NA |
| 2 | 51.0 | 22.8 | 4.14 | 46.9 | 37.3 | 0.01300 | 0.0259 | 33.5 |
| 5 | 46.0 | 22.8 | 4.14 | 41.9 | 33.3 | 0.01300 | 0.0172 | 30.0 |
| 15 | 39.0 | 22.8 | 4.14 | 34.9 | 27.7 | 0.01300 | 0.0106 | 25.0 |
| 30 | 35.0 | 22.8 | 4.14 | 30.9 | 24.6 | 0.01300 | 0.0077 | 22.1 |
| 60 | 32.0 | 22.8 | 4.14 | 27.9 | 22.2 | 0.01300 | 0.0056 | 19.9 |
| 250 | 26.0 | 22.7 | 4.17 | 21.8 | 17.4 | 0.01302 | 0.0029 | 15.6 |
| 1440 | 22.0 | 23.4 | 3.97 | 18.0 | 14.4 | 0.01291 | 0.0012 | 12.9 |

| Soil Specimen Data | Other Corrections | |
|-----------------------------|-----------------------------|-------------|
| Dry Sample Wt - #10 (gm) | 124.39 | |
| Weight of Deflocculant (gm) | 5.0 | |
| | Hygroscopic Moisture Factor | 0.985 |
| | a - Factor | 0.99 |
| | Percent Finer than # 10 | 89.96 |
| | Specific Gravity | 2.7 Assumed |

Notes:

Tested By MCW Date 09/13/05 Checked By AMS Date 9-15-05

SOIL MOISTURE AND GROUND WATER

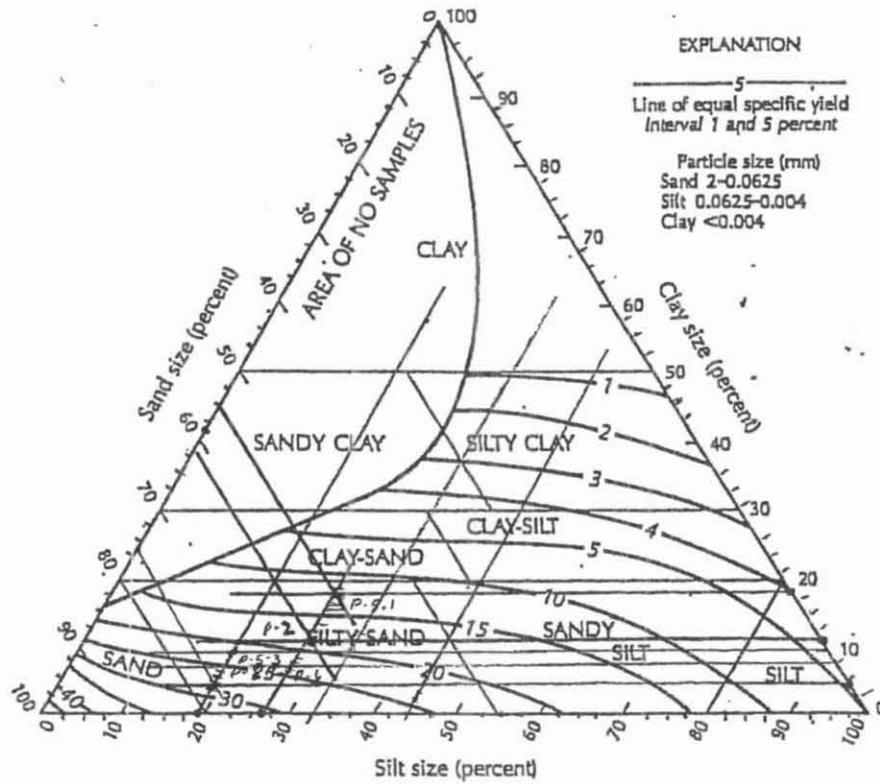


FIGURE 4.11 Textural classification triangle for unconsolidated materials showing the relation between particle size and specific yield. Source: A.I. Johnson, U.S. Geological Survey Water-Supply Paper 1662-D, 1967.

APPENDIX DH-10
Analytical Requirements

SAMPLING AND ANALYSIS REQUIREMENTS
CONSTRUCTION AND DEMOLITION LANDFILLS
and CLOSED SANITARY LANDFILLS
N.C. SOLID WASTE SECTION

LAB CERTIFICATION REQUIREMENTS:

The Solid Waste Section now requires water quality sample analysis by a laboratory certified by the Division of Environmental Management for groundwater analysis (15A NCAC 2H .0800). The laboratories used for water quality analysis for Solid Waste Section facilities shall be certified under the Division of Environmental Management (DEM) Certification program for the approved methods and at the approved levels of certification.

SAMPLING ANALYTICAL METHODS AND REPORTING LIMITS:

Each parameter on the following constituent list shall be certified at the designated level and an appropriately certified method used for the sample analysis. The data shall be reported at the specified Practical Quantitation Limit (PQL).

| Parameter | Certification by DEM | PQL in ppb |
|-----------|------------------------------|------------|
| Arsenic | Metals, Group I - low level | 10 |
| Barium | Barium (20) | 500 |
| Cadmium | Metals, Group I - low level | 1 |
| Chromium | Metals, Group I - low level | 10 |
| Lead | Metals, Group I - low level | 10 |
| Mercury | Mercury (21) | 1 |
| Selenium | Metals, Group I - low level | 20 |
| Silver | Metals, Group II - low level | 10 |

Volatile Organic Compounds

For the parameters and PQLs required for volatile organic compound analysis, refer to the next page of this attachment. For volatile organic analysis the laboratory shall be certified for an SW-846 GC/MS Method (8240 or 8260). The recommended method of analysis is EPA Method 8260.

SAMPLING AND ANALYSIS:

In addition to sampling for the constituents referenced above, all sampling should also include field testing of pH, temperature, and specific conductivity. EPA requires analysis for total metals. No filtering of samples is allowed. The 3030C preparation method for metals analysis is not allowed.

January 1995

VOLATILE ORGANIC COMPOUNDS

| ORGANIC CONSTITUENT | PQL (UG/L) | ORGANIC CONSTITUENT | PQL (UG/L) |
|------------------------------|---------------|--------------------------------|---------------|
| (16) ACETONE | 100 | (40) T-1,3-DICHLOROPROPENE | 10 |
| (17) ACRYLONITRILE | 200 | (41) ETHYLBENZENE | 5 |
| (18) BENZENE | 5 | (42) METHYL BUTYL KETONE | 50 |
| (19) BROMOCHLOROMETHANE | 5 | (43) METHYL BROMIDE | 10 |
| (20) BROMODICHLOROMETHANE | 5 | (44) METHYL CHLORIDE | 10 |
| (21) BROMOFORM | 5 | (45) METHYLENE BROMIDE | 10 |
| (22) CARBON DISULFIDE | 100 | (46) METHYLENE CHLORIDE | 10 |
| (23) CARBON TETRACHLORIDE | 10 | (47) MEK; 2-BUTANONE | 100 |
| (24) CHLOROBENZENE | 5 | (48) METHYL IODIDE | 10 |
| (25) CHLOROETHANE | 10 | (49) METHYL ISOBUTYL KETONE | 100 |
| (26) CHLOROFORM | 5 | (50) STYRENE | 10 |
| (27) CHLORODIBROMOMETHANE | 5 | (51) 1,1,1,2-TETRACHLOROETHANE | 5 |
| (28) DBCP | 25 | (52) 1,1,2,2-TETRACHLOROETHANE | 5 |
| (29) ETHYLENE DIBROMIDE | 5 | (53) TETRACHLOROETHYLENE | 5 |
| (30) O-DICHLOROBENZENE | 5 | (54) TOLUENE | 5 |
| (31) P-DICHLOROBENZENE | 5 | (55) 1,1,1,-TRICHLOROETHANE | 5 |
| (32) T-1,4-DICHLORO-2-BUTENE | 100 | (56) 1,1,2-TRICHLOROETHANE | 5 |
| (33) 1,1-DICHLOROETHANE | 5 | (57) TRICHLOROETHYLENE | 5 |
| (34) ETHYLENE DICHLORIDE | 5 | (58) CFC-11 | 5 |
| (35) VINYLIDENE CHLORIDE | 5 | (59) 1,2,3-TRICHLOROPROPANE | 15 |
| (36) CIS-1,2-DICHLOROETHENE | 5 | (60) VINYL ACETATE | 50 |
| (37) T-1,2-DICHLOROETHENE | 5 | (61) VINYL CHLORIDE | 10 |
| (38) PROPYLENE DICHLORIDE | 5 | (62) XYLENES | 5 |
| (39) CIS-1,3-DICHLOROPROPENE | 10 | | |

ALSO KNOWN AS: (21)-TRIBROMOMETHANE, (25)-ETHYL CHLORIDE, (26)-TRICHLOROMETHANE, (27)-DIBROMOCHLOROMETHANE, (28)-1,2-DIBROMO-3-CHLOROPROPANE, (29)-1,2-DIBROMOETHANE, (30)-1,2-DICHLOROBENZENE, (31)-1,4-DICHLOROBENZENE, (33)-ETHYLIDENE CHLORIDE, (34)-1,2-DICHLOROETHANE, (35)-1,1-DICHLOROETHENE (ETHYLENE), (36)-CIS-1,2-DICHLOROETHYLENE, (37)-TRANS-1,2-DICHLOROETHYLENE, (38)-1,2-DICHLOROPROPANE, (42)-2-HEXANONE, (43)-BROMOMETHANE, (44)-CHLOROMETHANE, (45)-DIBROMOMETHANE, (46)-DICHLOROMETHANE, (47)-METHYL ETHYL KETONE, (48)-METHYL IODIDE, (49)-4-METHYL-2-PENTANONE, (53)-TETRACHLOROETHENE, PERCHLOROETHYLENE, (54)-METHYLCHLOROFORM, (57)-TRICHLOROETHENE, (58)-TRICHLOROFLUOROMETHANE