de maximis, inc.

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December 17, 2010

Ms. Karen Lumino
United States Environmental Protection Agency
5 Post Office Square, Suite 100
Mail Code OSRR07-4
Boston, MA 02109

Mr. Michael Smith
Vermont Dept. of Env. Conservation
Waste Management Division
103 South Main St.
Waterbury, VT 05676

RE: Subsurface Investigation and Evaluation- Northwestern Well Area
Pine Street Canal Superfund Site, Burlington, Vermont

Dear Karen and Michael:

On behalf of the Performing Defendants, attached is the report of the subsurface investigation and evaluation performed in October, 2010. The report presents a detailed discussion of the geohydrologic setting, and recommends the installation of a vertical barrier. A preliminary, conceptual alignment for such a barrier is also provided. The Performing Defendants are prepared to move forward with a more detailed design, and subsequent installation of such a barrier following concurrence from EPA and VTDEC with the conclusions and recommendations presented in the report.

Please do not hesitate to call me at 781-642-8775 should you have any questions.

Sincerely,
de maximis, inc.

Thor Helgason
Project Coordinator

Cc: N. Terreri –GMP
J. Tedesco - GMP
P. Van Oot – Downs Rachlin Martin PLLC
B. Stearns – National Grid
Rob Kirsch – WilmerHale, LLP
J. Mullowney – Vermont Gas Systems, Inc.
C. Crandell – The Johnson Co.

SDMS DocID 478697

PAPER

THE JOHNSON COMPANY, INC.
100 State Street, Montpelier, Vermont 05602
Phone: (802) 229-4600
FAX: (802) 229-5876

MEMORANDUM

Date: **December 13, 2010**

From: **Donald M. Maynard, The Johnson Co., Inc.**

To: **Thor Helgason, de maximis and Norm Terreri, GMP**

Subject: **Pine Street Canal Superfund Site, Burlington, Vermont**
Report of October 2010 Soil Data
Subsurface Investigation and Evaluation- Northwestern Well Area

Job#: **1-0870-2 (247)**

Background

Recent (since 2008) increases in benzene concentrations in groundwater samples along with the intermittent presence of measurable thicknesses of dense non-aqueous phase liquid (manufactured gas plant (MGP) coal tar or DNAPL) in several wells between the Canal and the Lake, has created cause for concern at the Pine Street Canal Superfund Site in Burlington, Vermont (the Site). This document is a report of a soil investigation conducted in October, 2010 to collect site-specific information that can be used to evaluate the lateral extent of DNAPL in the subsurface and to assess the feasibility of a subsurface vertical barrier to prevent DNAPL migration to the Lake. Figure 1 shows the area of concern evaluated during this investigation.

A previously prepared memorandum dated July 1, 2010 describes the history of water quality and DNAPL thicknesses and the stratigraphy and hydrogeology in the vicinity of the impacted wells; and provides a conceptual site model and preliminary assessment of remedial options. The conceptual site model is that DNAPL is migrating through thin (less than 0.5 ft thick) gravel lenses from the Canal west towards the Lake. The gravel lenses are interbedded in fine-grained beach sands below fill and a peat layer. The western-most documented extent of DNAPL to-date is at the MW-23 well cluster (see Figure 1).

Due to its physical properties, including relatively high viscosity and its characteristic as a non-wetting fluid, the DNAPL generally cannot penetrate into saturated fine-grained sediments, including medium- and fine- grained sands. There is a thick (50 ft or more) marine and lacustrine silt/clay unit located approximately 30-35 ft below ground surface (fbgs) which acts as a barrier to the migration of the DNAPL down to the underlying bedrock.

The work was conducted in accordance with the October 21, 2010 Work Plan for Vertical Barrier Feasibility and Pilot Testing, Pine Street Canal Superfund Site, Burlington, VT. During the active field work, daily updates were provided to the performing defendants (PDs), U.S. EPA, and the State of Vermont Department of Environmental Conservation, Sites Management Section (VT SMS). The work included the collection of soil cores between the known western extent of DNAPL at the MW-23 well cluster and the Lake (see Figure 1). Additionally, field testing of the injection of cement-bentonite grout, along with confirmation core samples to determine the radial extent of grout permeation was performed to evaluate the feasibility of installing a grout "curtain" to contain the DNAPL.

A detailed description of the field work completed, the results of the investigation, and conclusions/recommendations, are presented in the sections that follow. Figures are provided at the end of this memorandum. Attachment 1 contains data tables and field notes; Attachment 2 contains photographs of the cores; and Attachment 3 contains the logs from this investigation, plus logs for soil borings cored between the 1990 and 2002.

Project Objectives and Summary Conclusions

The work was intended to answer the following questions:

1) Where is the western extent of DNAPL?
   Answer: East of the center railroad track.

2) Are there subsurface obstructions (e.g., boulders) that would prevent the installation of a vertical barrier?
   Answer: Not between the eastern and center railroad tracks.

3) What is the feasible lateral extent (radius) and volume of grout that can be reasonably injected into the target strata, particularly the gravel lenses?
   Answer: Grout injection into the target gravels was not reliably successful.

Test Locations

Five primary test locations were cored. These locations, labeled B101 through B105 are shown on Figure 2. Historical borings, monitoring wells and piezometers are also shown on Figure 2. Boring B101 is due west of the MW-23 well cluster which marks the previously known western – most extent of DNAPL. Borings B102 and B103 are located approximately 25 ft south and north of B101, respectively. Borings B104 and B105 are located 130 ft apart along the north-south transect. Boreholes B101 and B103 were used for grout injection tests.

In addition, B106 was cored to evaluate alternative mixes and methods of grout injection, and is located between B101 and B103 (see Figure 2). Confirmation corings were advanced the day following grout injection at offset distances ranging from 1.1 to 5 ft from the injection borings to determine the nature and extent of grout permeation. These cores were generally collected the next day after grouting, when the cement had had time to set up. The confirmation borings are designated with an A, B, C or D following the number of the associated injection boring (for instance, the first confirmation core next to grout injection boring B101 was designated B101A) and their locations are also shown in Figure 2.

DNAPL was not encountered in any of the borings, so, in accordance with the work plan, no additional borings were advanced.

Test Methods

Vermont Railway and Dig-Safe were contacted. Work hours and access considerations were negotiated with Vermont Railway. All intrusive work was conducted by OSHA 1910.120 trained personnel and in accordance with a Site Specific Health and Safety Plan. The field work was conducted during daylight hours from October 25 through November 4, 2010.

All test locations were surveyed using a sub-meter differentially-corrected Trimble global positioning system (GPS) to within 1 ft horizontal accuracy in reference to the Vermont State Plane coordinate system. The ground elevation at each boring was surveyed with a Topcon autolevel to within 0.1 ft vertical accuracy in reference to the 1988 North American Vertical Datum (NAVD).

A Geoprobe rubber track mounted drilling rig was used to core and grout all borings. Direct push drilling techniques were employed and all cores were saved so no investigation derived waste (IDW) soils were produced. Additional support equipment included a moyno pump, portable water tanks, and mixing tanks. City of Burlington potable water was used for decontamination and grouting. Hand tools that came in contact with soils were decontaminated with Alconox™ and water; and drill rods and casing were cleaned with high-pressure hot water between uses. No sheen or DNAPL was observed in the decontamination fluids, so they were dispersed gently onto the ground surface at the point of origin in such a manner as to prevent erosion and avoid their entry into surface waters. Solid IDW, including personal protective equipment, paper, plastic and similar debris, was double-bagged and sent to a licensed lined landfill for disposal.

The total depth of each of the five primary borings was at least 2 ft into the marine silt/clay unit (i.e. to a minimum of depth of 35 feet below ground surface (fbgs), or ~70 ft NAVD (North American Vertical Datum)). Continuous soil cores were collected from approximately 5 to 35 fbgs using direct push piston core and/or dual-tube core technology. All intrusive activities were supervised by Donald Maynard, P.E., P.G. of The Johnson Company (JCO) who has more than 15 years experience on the Pine Street Canal Superfund Site.

Photoionization detector (PID) field screening was performed on each core immediately upon its retrieval. The field screening was accomplished by slowly moving the PID over the exposed soil core, and noting the peak readings and depths of the elevated responses. The PID instrument was calibrated to 100 parts per million (ppm) isobutylene at the start of each day.

All cores were photographed and will be retained by The Johnson Company for a minimum of one year. Grain size of the soil and clasts, sedimentary structures, and visual or olfactory presence of MGP related contaminants (i.e., coal tar DNAPL or light NAPL) were noted; the results appear in Table 1 of Attachment 1.

For the grout injection tests, grout was pumped into the formation via hollow rod or casing under a minimum pressure of approximately 100 pounds per square inch (psi). The grout was mixed in 30 to 50 gallon batches, and injected in varying (8 to 200 gallon) volumes at predetermined

depths during removal of the drill string. Particular care was taken to inject larger volumes of grout at depths containing coarse sands and gravels. The depth and injection rates were monitored and recorded, and are summarized in Attachment 1. The grout mixture was made of neat Portland Type I cement with 2-10% bentonite clay added shortly before injection, and is generally referred to as cement grout herein. In general, the mix ratio was 5-6 gallons of water per 94 lb bag of cement.

Results

Following is a summary listing the results of the investigation. A more detailed description of the results is provided below.

1) No coal tar or oil NAPLs or sheens were observed in any of the 13 borings or in the equipment decontamination rinse fluids.
2) Naphthalene odors were detected in B101, B103 and B106, but not in B102, B104 or B105.
3) No large boulders or debris were encountered that would hinder the installation of a vertical barrier between the center and eastern railroad tracks.
4) Gravel and sandy gravel lenses were observed in most borings, primarily between 20 and 30 fbgs.
5) Confirmation cores indicate that low-pressure cement grout injection did not reliably fill and seal the gravel and sandy gravel layers at distances of 1.1 to five feet from the injection location (the distances to the confirmation borings).

Stratigraphy

The top of the thick silt-clay unit which underlies the Site, and protects the bedrock from DNAPL and dissolved contaminant migration, was further defined by the core data. Figure 3 shows a contour map of the top of silt-clay unit elevations which in the area of interest generally ranges between 65 and 80 ft NAVD. The data indicate that there is a low area in the silt-clay surface between the Canal and the Lake.

A 10-15 ft-thick unit of layered sand and silty sand with sandy gravel lenses lies above the silt-clay unit. The gravel lenses previously observed to contain DNAPL to the east (at BO70 and MW23B in 2001) are within this sand and silty-sand unit between elevations of 72 and 90 ft NAVD (approximately 15-33 fbgs). Odors of naphthalene were detected in these sands at discrete depths in several borings (see Figure 1 for locations). However no sheens or DNAPLs were observed. Up to four individual sand and gravel lenses were observed in the various cores, however none were present in the southern-most core, B105, and only one was present in the northernmost core, B104. Only one boring, B106A, contained pea-stone gravel layers with no sandy matrix (0.1 and 0.4 ft thick), similar to those observed in B70 and MW-23B. Several of the grout injection confirmation cores demonstrated that the gravel and sandy gravel lenses are not continuous in a north-south direction based upon cores collected within 3-5 ft of each other. Cross-sections showing the depths and possible correlations and connections between the gravel lenses (or stringers) are provided in Figures 4 and 5, respectively.

Peat, silt and clay, and various types of fill overlie the sand and gravel stringer unit. Previous and current data indicate that these units are not preferential migration pathways for DNAPL or dissolved contaminant migration towards Lake Champlain.

Normal groundwater levels in this area are between 95 and 100 ft NAVD, and are controlled by the stages of Lake Champlain and the Canal.

DNAPL, Odor and PID Results

The presence of MGP-related DNAPLs and dissolved contamination in soils was determined using a combination of visual and olfactory observations and PID readings. No free-phase DNAPLs or sheens were observed in any of the October 2010 cores.

Naphthalene odors, which appear to be the best evidence of dissolved contamination, were detected at depths between 20 and 28 fbgs (78-80 ft NAVD) in all borings except B102, B103A, B104 and B105. The locations where odors were detected are shown in Figure 1, and the specific depths are provided in the cross-sections (Figures 4 and 5).

Elevated PID readings of 0.3 to 2.65 parts per million by volume (ppmv) were detected in the sand unit containing gravel stringers. Three of the highest readings included:

- B102 had a PID reading of 1.75 ppmv at 28-31.7 fbgs,
- B103 had a PID reading of 2.65 ppmv at 27.2-27.9 fbgs,
- B103A had a PID reading of 0.8 ppmv at 24.6-26.9 fbgs.

The three elevated PID readings cited above are shown in the cross-section provided in Figure 4. Borings B101A, B103B, B104, B105, and B106A through B106D did not exhibit PID readings above 0.2 ppmv. Table 1 in Attachment 1 contains all of the PID data.

The thicknesses of DNAPL accumulated at the bottoms of wells MW-23A, MW-23B and MW-17 was measured and removed on October 14, 2010 in accordance with the Compliance Monitoring Work Plan. DNAPL was not present in MW_23A, which is consistent with historical data there, and MW-23B and MW-17 contained 4.15 feet and 0.9 feet DNAPL, respectively. At the request of EPA, the DNAPL thicknesses were re-measured on November 1, 2010. DNAPL was not present in MW-23A, and MW-23B and MW-17 contained 0.55 feet, and 0.2 feet, respectively.

Grout Injection Radius Test Results

Approximately 110 gallons of cement grout were injected into B101 below 28 fbgs into the medium and coarse sands which contained approximately 10% gravel. Confirmation boring B101A was cored from 16 to 28 fbgs at an offset distance of 3.4 ft from B101, and there was no evidence of the cement grout present.

Two hundred and forty-five gallons of cement grout were injected into B103 from 14 to 32 fbgs. Confirmation cores B103A and B103B were drilled at a distance of 3 ft and 1.1 ft from B103, respectively. Boring B103A was cored from 16.4 to 32.9 fbgs while B103B was cored from 16.4 to 32.9 fbgs. There was no evidence of the grout in either of these confirmation cores.

Approximately 945 gallons of cement grout (containing ninety-seven 94 lb bags of cement) were injected into B106 at depths between 21 and 32 fbgs. While grouting B106 at 21 fbgs, cement grout was observed surfacing at the previous boring B101A, located 8.2 ft away. Boring B101A had been previously sealed with pure bentonite grout (no cement). Four confirmation borings were cored in the vicinity of B106 (designated as B106A through B106D) at offset distances ranging between 1.1 and 5 ft to the north, south, and west. The grout was observed in three of the four confirmation cores at depths ranging between approximately 23 and 25 fbgs. However, the observed cement thickness in the cores was less than 0.5 feet in all cases. Furthermore, the cement was not observed in the targeted gravel and sandy-gravel lenses.

Conclusions and Recommendations

The physical data obtained from thirteen borings advanced along a north-south line in October, 2010, combined with results from borings completed during prior investigations, allow for the development of a refined and detailed conceptual stratigraphic and transport model in this area which is graphically represented by the cross-section presented in Figure 4. This conceptual model, combined with the analytical groundwater and DNAPL measurement results, provides the basis for the following conclusions regarding contaminant transport:

- When there is a gradient towards the Lake, dissolved benzene moves from the DNAPL source in the east through relatively permeable sand, sandy gravel and gravel layers located between the bottom of the peat and the top of the underlying clay/silt unit;
- Preferential dissolved transport occurs through a few thin (several inches) sand and gravel layers (stringers). A few of these stringers, one with observed DNAPL during prior borings towards the Canal (BO 70), are intercepted by the screened portions of MW-17 and MW-23B, both of which extend significantly below the stringers and therefore likely function as sumps accumulating DNAPL;
- The stringers appear to slope downwards to MW-23B (and B101 & B106) which enhances DNAPL movement to the west by gravity. The absence of DNAPL in the stringers encountered in B101 or B106 may be due to the interception of the DNAPL by MW-23B, which is located approximately 12 ft to the east, or to natural variation in the gravel stringers relative permeability to DNAPL;
- A few of these stringers continue to extend westward and are intercepted by MW-21A, which allows dissolved transport from the DNAPL source in the east to MW-21A when there is a hydraulic gradient towards the west. However, the stringers all appear to turn upwards somewhere under the railroad embankment (as does the underlying clay/silt), and continue with an upward slope towards MW-21A. That upward slope likely prevents or hinders DNAPL movement farther west beyond the low point under the tracks (since gravity would prevent it from moving upwards, and there is not driving head created by a continuous vertical pool of DNAPL);
- Generally, individual gravel stringers are not continuous in the north-south direction, based upon cores collected 3-5 ft apart. However, it is likely that many are interconnected in a web or network. The gravel stringers do not extend southwards as far as B105, where there was no evidence of contamination. Similarly, there was no evidence of any contamination in the northernmost boring, B104, which contained only one coarse sand and gravel stringer at a relatively high elevation near the base of the peat unit.

The lack of grout in most of the confirmation cores, and minimal grout in others, indicates a lack of ability of grout injection to permeate and seal the sand and gravel stringers associated with DNAPL migration. Therefore, grout injection is not recommended as a vertical barrier technology at this Site. However, boring data from this and prior investigation indicate a lack of subsurface obstructions that would hinder the installation of a vertical barrier. Accordingly, we recommend that a vertical barrier be installed.

The barrier should extend vertically from approximately 2 fbgs (to allow for future railroad track maintenance) to 35 fbgs (to insure a minimum of two feet of barrier penetration into the silt/clay unit). A preliminary conceptual alignment for a 250 ft-long vertical barrier is proposed between the eastern and central railroad tracks as shown in Figure 6. The rationale for this location includes:

- It is west of the western most known extent of DNAPL,
- It extends south to a point where no gravel-containing preferential pathway is known to exist,
- It extends north beyond the observed extent of soil contamination, and beyond PZ-2S, which contained 75 parts per billion (ppb) benzene in a groundwater sample collected in April, 2010,
- It extends between the area of observed DNAPL in the subsurface at PZ-3, MW-17 and MW-23B, and the well pair MW-24A/B, of which the shallow well (MW-24A), has historically contained benzene in groundwater samples collected since its installation, and recently at concentrations of approximately 10 ppb.

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Figures

NOTES

BATHYMETRIC SURVEY DATA BY THE JOHNSON COMPANY, INC. – 2005, 2007.

VERTICAL & HORIZONTAL CONTROL AND TOPOGRAPHIC SURVEY BY LITTLE RIVER SURVEY COMPANY OF STOWE, VERMONT – 1992, 1994, 2000, 2003, 2005, 2007.

ADDITIONAL SURVEY DATA BY THE JOHNSON COMPANY, INC. – MARCH, 2003 & SUMMER, 2004.

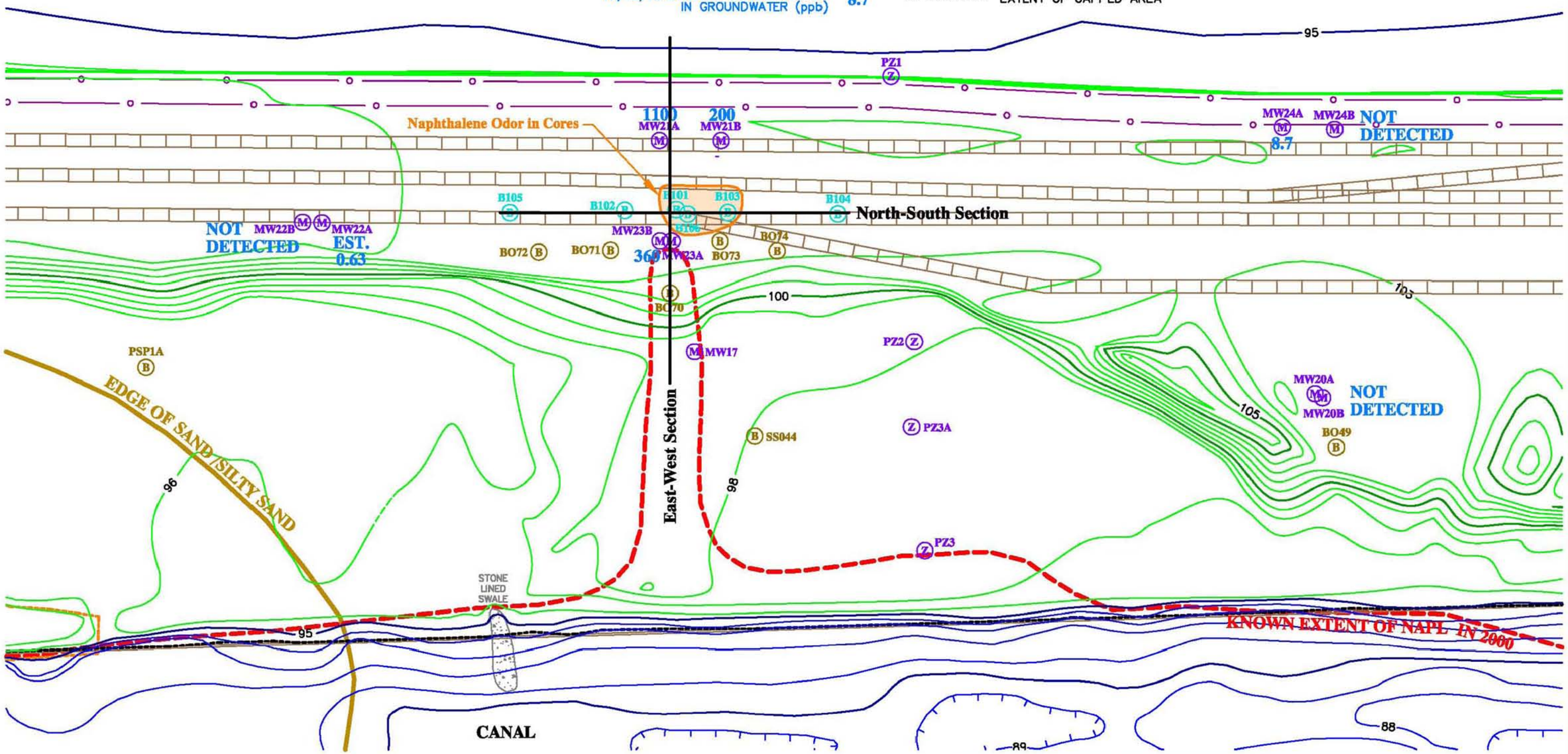
ADDITIONAL GPS SURVEY DATA BY THE JOHNSON COMPANY, INC. – SEPTEMBER, 2003 & NOVEMBER, 2010.

ADDITIONAL SOURCES: 3/92 S.R.I., 8/96 A.R.I., 5/98 A.F.S., A.R.I. Fieldbooks, 2002–2003 PSCS RA Fieldbooks 1 through 8. (Documents #337 & #408), JCO 1996 R.I. Figure 3.3–7 "Sand /Silty Sand Isopach" & Figure 4.2–1 "Map of Extent of Visual Evidence of NAPL in the Subsurface", JCO TAPED MEASUREMENTS OF RAILROAD TRACKS AND POWER LINES JULY 13, 2010.

LEGEND

HISTORICAL SOIL BORING LOCATION (B)
SOIL BORING LOCATION OCTOBER 2010 (B)
PIEZOMETER LOCATION (Z)
MONITORING WELL LOCATION (M)
10/12/10 BENZENE CONCENTRATION IN GROUNDWATER (ppb) 8.7

FENCELINE
RAILROAD TRACKS
WOODEN CRIBBING
1' SURFACE CONTOUR
5' SURFACE CONTOUR
1' BATHYMETRIC CONTOUR
5' BATHYMETRIC CONTOUR
EXTENT OF CAPPED AREA



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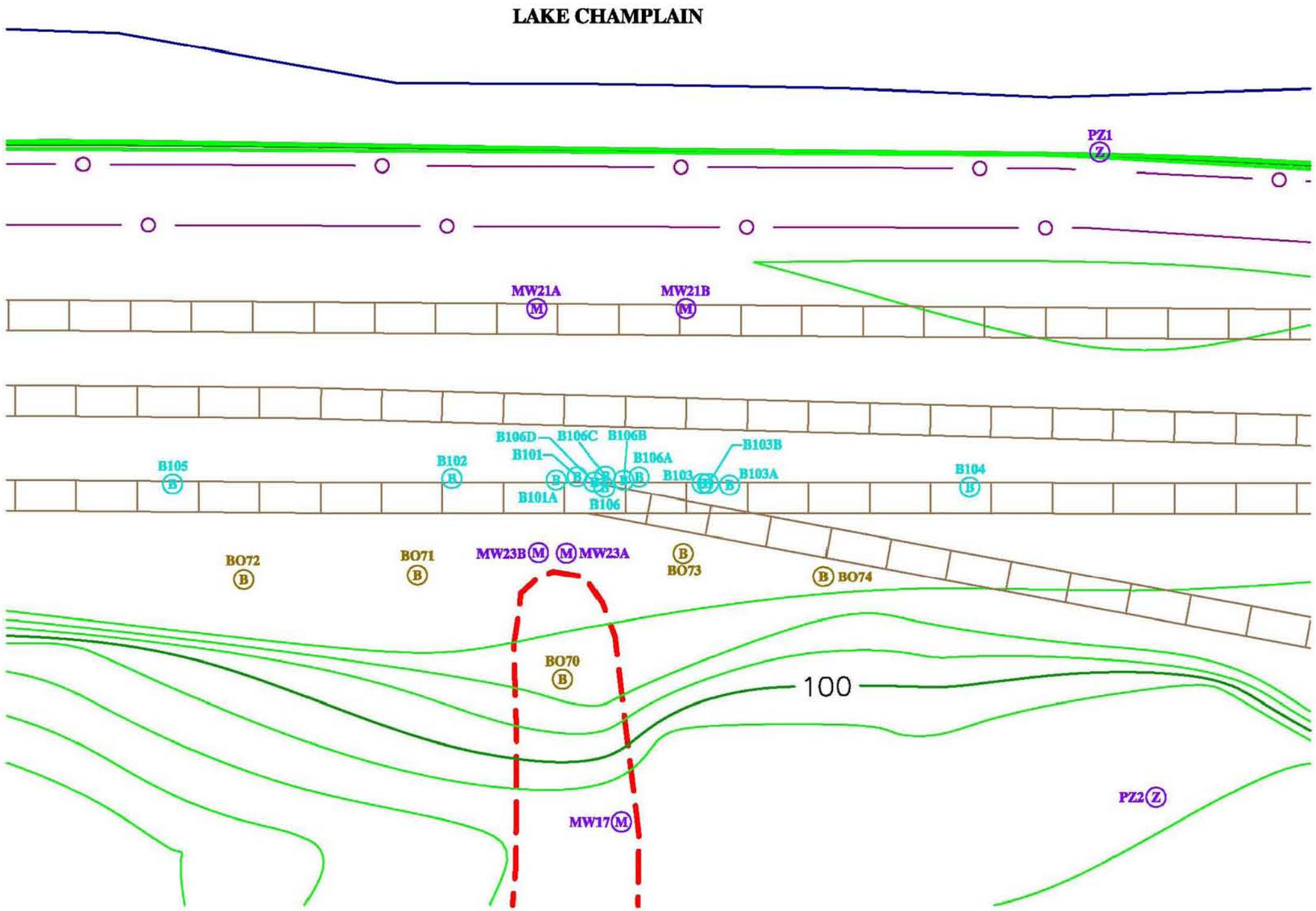
Drawn by: TJK Date: 12/13/10
Chk'd by: DMM Date: 12/13/10
Scale: As Shown Project: 1-0870-2

FIGURE 1
AREA OF CONCERN
PINE STREET CANAL SITE
BURLINGTON, VERMONT



LEGEND

- FENCELINE
- RAILROAD TRACKS
- WOODEN CRIBBING
- 1' SURFACE CONTOUR
- 5' SURFACE CONTOUR
- 1' BATHYMETRIC CONTOUR
- 5' BATHYMETRIC CONTOUR
- KNOWN EXTENT OF NAPL IN 2000
- (B) HISTORICAL SOIL BORING LOCATION
- (B) SOIL BORING LOCATION OCTOBER 2010
- (Z) PIEZOMETER LOCATION
- (M) MONITORING WELL LOCATION

N

0 5 10 20
SCALE IN FEET

NOTES

BATHYMETRIC SURVEY DATA BY THE JOHNSON COMPANY, INC. – 2005, 2007.

VERTICAL & HORIZONTAL CONTROL AND TOPOGRAPHIC SURVEY BY LITTLE RIVER SURVEY COMPANY OF STOWE, VERMONT – 1992, 1994, 2000, 2003, 2005, 2007.

ADDITIONAL SURVEY DATA BY THE JOHNSON COMPANY, INC. – MARCH, 2003 & SUMMER, 2004.

ADDITIONAL GPS SURVEY DATA BY THE JOHNSON COMPANY, INC. – SEPTEMBER 3, 2003.

ADDITIONAL SOURCES: 3/92 S.R.I., 8/96 A.R.I., 5/98 A.F.S., A.R.I. Fieldbooks, 2002–2003 PSCS RA Fieldbooks 1 through 8. (Documents #337 & #408), JCO 1996 R.I. Figure 3.3–7 "Sand /Silty Sand Isopach" & Figure 4.2–1 "Map of Extent of Visual Evidence of NAPL in the Subsurface", JCO TAPED MEASUREMENTS OF RAILROAD TRACKS AND POWER LINES JULY 13, 2010.

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FIGURE 2: CORING & GROUT LOCATIONS FOR VERTICAL BARRIER FEASABILITY TESTING PINE STREET CANAL SITE BURLINGTON, VERMONT

NOTES

BATHYMETRIC SURVEY DATA BY THE JOHNSON COMPANY, INC. – 2005, 2007.

VERTICAL & HORIZONTAL CONTROL AND TOPOGRAPHIC SURVEY BY LITTLE RIVER SURVEY COMPANY OF STOWE, VERMONT – 1992, 1994, 2000, 2003, 2005, 2007.

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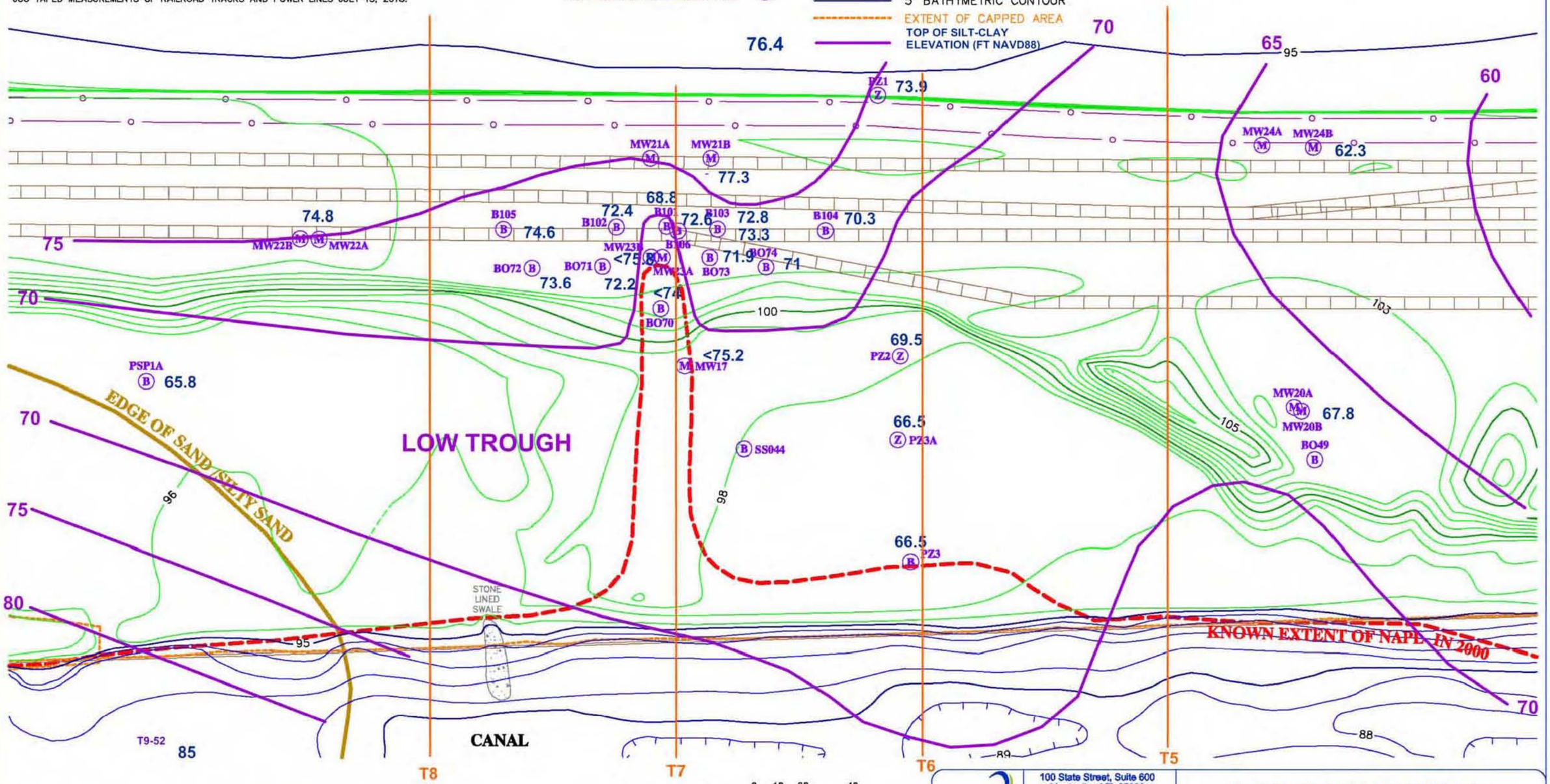
ADDITIONAL GPS SURVEY DATA BY THE JOHNSON COMPANY, INC. – SEPTEMBER, 2003 & NOVEMBER, 2010.

ADDITIONAL SOURCES: 3/92 S.R.I., 8/96 A.R.I., 5/98 A.F.S., A.R.I. Fieldbooks, 2002–2003 PSCS RA Fieldbooks 1 through 8. (Documents #337 & #408), JCO 1996 R.I. Figure 3.3–7 "Sand /Silty Sand Isopach" & Figure 4.2–1 "Map of Extent of Visual Evidence of NAPL in the Subsurface", JCO TAPED MEASUREMENTS OF RAILROAD TRACKS AND POWER LINES JULY 13, 2010.

LEGEND

SOIL BORING LOCATION (B)
PIEZOMETER LOCATION (Z)
MONITORING WELL LOCATION (M)

FENCELINE
RAILROAD TRACKS
WOODEN CRIBBING
1' SURFACE CONTOUR
5' SURFACE CONTOUR
1' BATHYMETRIC CONTOUR
5' BATHYMETRIC CONTOUR
EXTENT OF CAPPED AREA
TOP OF SILT-CLAY ELEVATION (FT NAVD88)



1-0-870-2_2010 NW GW report_TOP OF SILT-CLAY MAP 113010.
K:\1-0870-2\cad\FALL 2007 CMR\BATHGRID.DWG

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Scale: As Shown Project: 1-0870-2

FIGURE 3: TOP OF SILT-CLAY UNIT
PINE STREET CANAL SITE
BURLINGTON, VERMONT

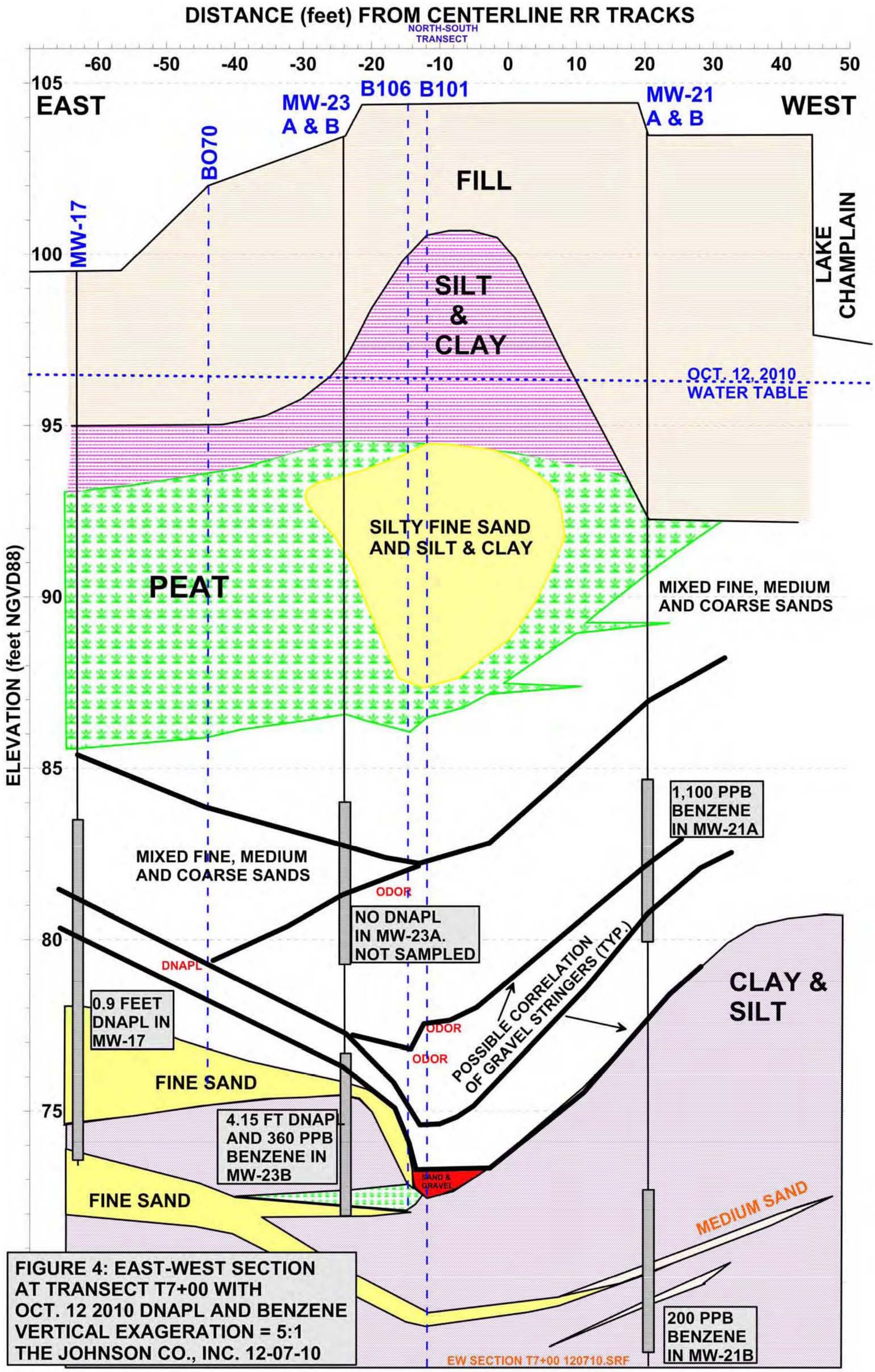

FIGURE 4: EAST-WEST SECTION AT TRANSECT T7+00 WITH OCT. 12 2010 DNAPL AND BENZENE
VERTICAL EXAGERATION = 5:1
THE JOHNSON CO., INC. 12-07-10

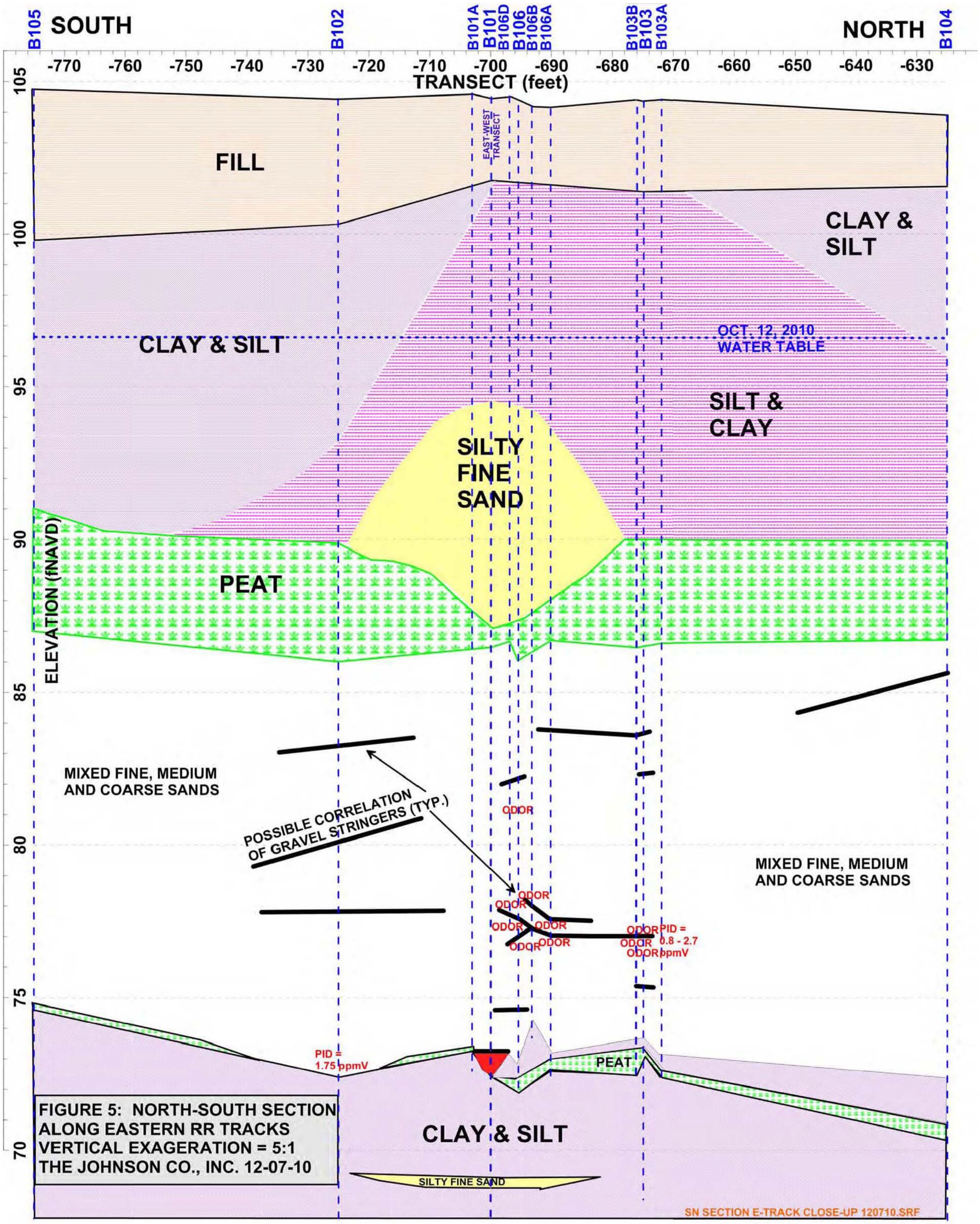

FIGURE 5: NORTH-SOUTH SECTION
ALONG EASTERN RR TRACKS
VERTICAL EXAGERATION = 5:1
THE JOHNSON CO., INC. 12-07-10

NOTES

BATHYMETRIC SURVEY DATA BY THE JOHNSON COMPANY, INC. – 2005, 2007.

VERTICAL & HORIZONTAL CONTROL AND TOPOGRAPHIC SURVEY BY LITTLE RIVER SURVEY COMPANY OF STOWE, VERMONT – 1992, 1994, 2000, 2003, 2005, 2007.

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LEGEND

8.7 10/12/10 BENZENE CONCENTRATIONS IN GROUNDWATER (PPB)

SOIL BORING LOCATION (B)

PIEZOMETER LOCATION (Z)

MONITORING WELL LOCATION (M)

FENCELINE

RAILROAD TRACKS

WOODEN CRIBBING

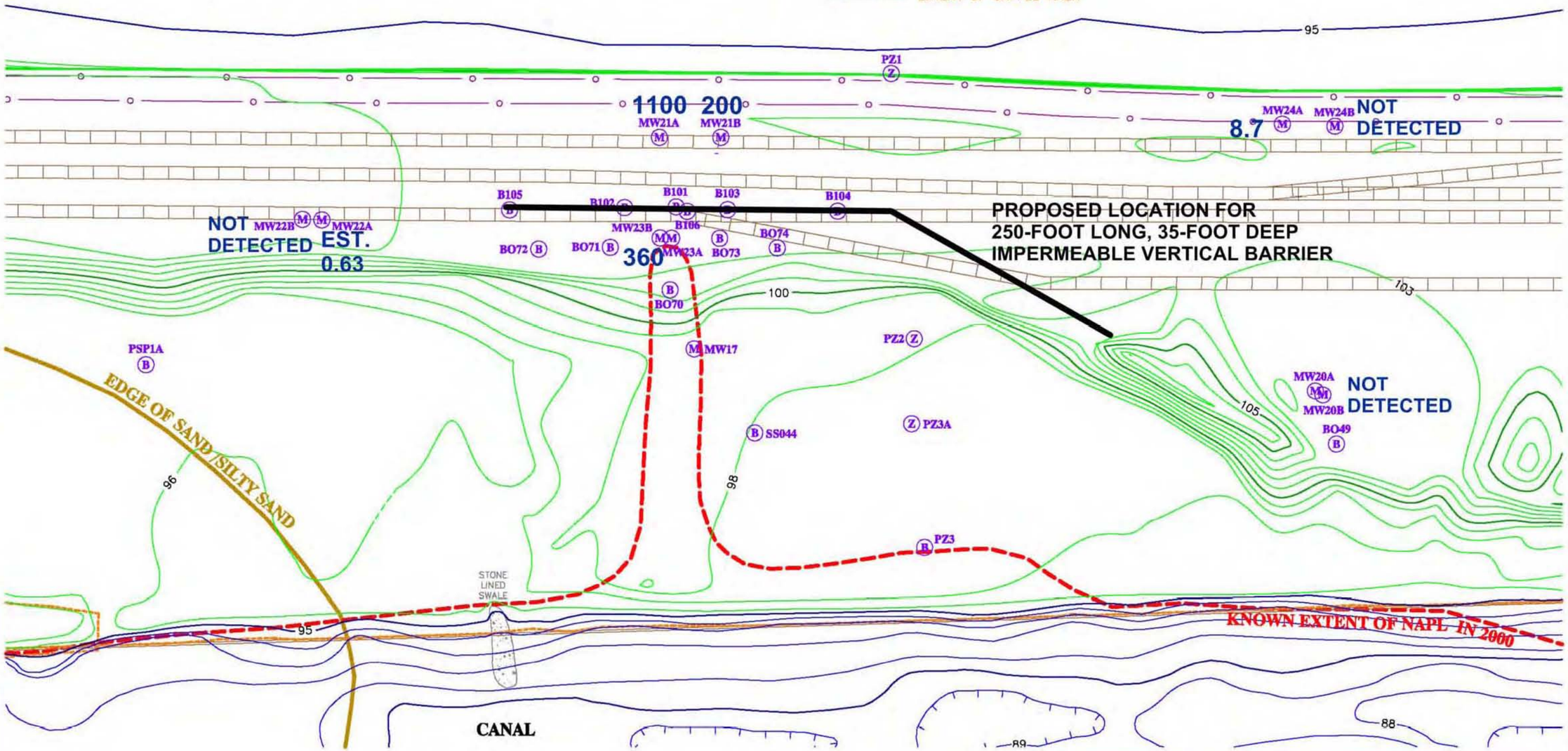
1' SURFACE CONTOUR

5' SURFACE CONTOUR

1' BATHYMETRIC CONTOUR

5' BATHYMETRIC CONTOUR

EXTENT OF CAPPED AREA



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SCALE IN FEET

1-0-870-2_2010 NW GW report_FIGURE 6 PROPOSED BARRIER LOCATION 120710.

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Scale: As Shown Project: 1-0870-2

FIGURE 6:
PROPOSED LOCATION FOR VERTICAL BARRIER
PINE STREET CANAL SITE
BURLINGTON, VERMONT

Attachment 1
Summary Tables and Field Notes

TABLE 1: PINE STREET CANAL OCTOBER 2010 SOIL CORE DESCRIPTIONS AND RESULTS

SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B101	104.5	717864.9	1452785.8	0		104.475			B101		0.0	0.6	Ballast stone.
B101	104.5	717864.9	1452785.8					0.2			0.6	1.2	Black, dry, angular gravel, and fine-medium sand (ballast stone). Sharp horizontal contact.
B101	104.5	717864.9	1452785.8					0.2			1.2	1.7	Grey, dry, loose, massive fine-medium sand. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8					0.15			1.7	2.2	Black, dry, fine sand, trace gravel. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8	-2.7	FILL	101.775		0.15			2.2	2.7	Tan, dry, massive fine sand. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8	-3.1	CLAY AND SILT	101.375		0.15			2.7	3.1	Red-brown, moist, dense, plastic clay.
B101	104.5	717864.9	1452785.8								3.1	3.9	No recovery.
B101	104.5	717864.9	1452785.8					0.05			3.9	7.0	Brown-tan, moist, massive, silt and clay, trace fine sand, angular gravel.
B101	104.5	717864.9	1452785.8					0			7.0	8.0	No recovery.
B101	104.5	717864.9	1452785.8	-10	SILT AND CLAY	94.475		0			8.0	10.0	Brown-tan to grey, moist to wet, silt and clay, trace angular gravel. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8					0			10.0	10.4	Grey, wet fine sand and silt, trace angular gravel.
B101	104.5	717864.9	1452785.8					0			10.4	11.6	Grey, saturated, massive, loose silt and fine sand, trace angular gravel.
B101	104.5	717864.9	1452785.8								11.6	16.2	No recovery.
B101	104.5	717864.9	1452785.8	-17.4	SILTY FINE SAND	87.075		0			16.2	17.4	Grey, saturated, massive, loose silt and fine sand, trace angular gravel. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8	-18	PEAT	86.475		0			17.4	18.0	Red-brown, damp, dense, fibrous peat.
B101	104.5	717864.9	1452785.8	-18.4	MEDIUM-COARSE SAND			0			18.0	18.4	Grey, moist, medium-coarse sand.
B101	104.5	717864.9	1452785.8								18.4	20.0	No recovery.
B101	104.5	717864.9	1452785.8					0			20.0	22.6	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8					0			22.6	23.9	Grey, saturated, massive, fine-medium sand, some fine sand, little 1/4" to 1" wood chunks, trace gravel.
B101	104.5	717864.9	1452785.8	-24.5	MEDIUM-FINE SAND	79.975		0.3			24.0	24.5	Grey, saturated, fine-medium sand, trace red sub-rounded gravel.
B101	104.5	717864.9	1452785.8	-26	VERY FINE SAND	78.475		0.3			24.5	26.0	Grey, saturated, massive, micaceous fine sand.
B101	104.5	717864.9	1452785.8	-26.5	MEDIUM-FINE SAND		ODOR				26.0	26.5	Grey, saturated, fine-medium sand, one chunk wood. Faint napthalene odor.
B101	104.5	717864.9	1452785.8								26.5	28.0	No recovery.
B101	104.5	717864.9	1452785.8	-31.2	MEDIUM-COARSE SAND	73.275		0.05			28.0	31.2	Grey, saturated, massive, medium-coarse sand. Gradual contact.
B101	104.5	717864.9	1452785.8	-32	MEDIUM-COARSE SAND WITH GRAVEL	72.475		0.15			31.2	32.0	Grey, saturated, medium-coarse sand, little sub-angular gravel (red Dunham dolomite). Gradual contact. One 0.1ft chunk clay and wood chunk in tip.
B101	104.5	717864.9	1452785.8	-35.4	CLAY AND SILT	69.075		0			32.0	35.4	Grey, saturated, massive, plastic, clay. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8	-35.7	SILTY FINE SAND	68.775		0			35.4	35.7	Grey, saturated, loose, very fine sand and silt. Sharp horizontal contact.
B101	104.5	717864.9	1452785.8	-36.3	CLAY AND SILT	68.175		0			35.7	36.3	Grey, saturated, massive, plastic, clay.
B101	104.5	717864.9	1452785.8	-40	TOTAL DEPTH	64.475					36.3	40.0	No recovery.
B101A	104.6	717861.4	1452786.4	0		104.6			B101a	3.4	0.0	16.0	Drive with center rod and plug to 16 fbgs. Not sampled.
B101A	104.6	717861.4	1452786.4	-17.2	PEAT	87.4		0.15			16.0	17.2	Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.
B101A	104.6	717861.4	1452786.4	-19.5	MEDIUM-COARSE SAND			0.05			17.2	19.5	Grey, wet, massive, medium-coarse sand. No evidence of cement grout. No odor.
B101A	104.6	717861.4	1452786.4								19.5	20.1	No recovery.
B101A	104.6	717861.4	1452786.4	-22.4	MEDIUM-FINE SAND	82.2		0			20.1	22.4	horizontal contact.
B101A	104.6	717861.4	1452786.4	-22.9	MEDIUM-COARSE SAND	81.7		0			22.4	22.9	Grey, saturated, massive, medium-coarse sand. Sharp horizontal contact.
B101A	104.6	717861.4	1452786.4	-23.7	FINE SAND	80.9		0			22.9	23.7	Grey, saturated, massive, fine sand, trace wood.
B101A	104.6	717861.4	1452786.4	-24.3	MEDIUM-COARSE SAND	80.3		0.05			24.0	24.3	Grey, saturated, medium-coarse sand.
B101A	104.6	717861.4	1452786.4	-25.2	MEDIUM-FINE SAND	79.4		0.05			24.3	25.2	Grey, saturated, fine-medium sand, trace red sub-rounded gravel.
B101A	104.6	717861.4	1452786.4	-25.6	MEDIUM-COARSE SAND	79		0.05			25.2	25.6	Grey, saturated, medium-coarse sand.
B101A	104.6	717861.4	1452786.4	-26.5	VERY FINE SAND	78.1		0.05			25.6	26.5	Grey, saturated, micaceous fine sand.
B101A	104.6	717861.4	1452786.4	-27	MEDIUM-FINE SAND	77.6					26.5	27.0	Grey, saturated, fine-medium sand. No odor, no stains, no evidence of grout.
B101A	104.6	717861.4	1452786.4								27.0	28.0	No recovery.
B101A	104.6	717861.4	1452786.4	-31	MEDIUM-COARSE SAND	73.6		0			28.0	31.0	Grey, saturated, massive, medium-coarse sand.
B101A	104.6	717861.4	1452786.4	-31.2	SILTY FINE SAND	73.4		0			31.0	31.2	Grey, moist, fine sand and silt. Horizontal partings.
B101A	104.6	717861.4	1452786.4	-31.3	PEAT	73.3		0			31.2	31.3	Cement grout. Brown, organic, wet, fibrous, degraded wood chunks.
B101A	104.6	717861.4	1452786.4	-32	TOTAL DEPTH	72.6					31.0	32.1	No recovery

TABLE 1: PINE STREET CANAL OCTOBER 2010 SOIL CORE DESCRIPTIONS AND RESULTS

SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B102	104.4	717844.3	1452786.1	0		104.425		0	B102		0.0	0.5	Ballast stone.
B102	104.4	717844.3	1452786.1					0			0.5	1.1	Black, damp, fine-medium sand and angular gravel. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1					0			1.1	1.3	Tan, dry, fine-medium sand. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1					0			1.3	1.9	Black, dry, fine-medium sand and gravel. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1	-4.1	FILL	100.325		0			1.9	2.5	Brown, humid, massive fine sand.
B102	104.4	717844.3	1452786.1								2.5	4.1	No recovery.
B102	104.4	717844.3	1452786.1					0			4.1	7.5	Red-brown, moist, dense, massive, plastic clay and silt, trace sub-angular gravel.
B102	104.4	717844.3	1452786.1								7.5	8.2	No recovery.
B102	104.4	717844.3	1452786.1	-11.2	CLAY AND SILT	93.225		0			8.2	11.2	Brown, wet, massive, plastic, clay and silt, trace gravel.
B102	104.4	717844.3	1452786.1								11.2	12.3	No recovery.
B102	104.4	717844.3	1452786.1	-14.6	SILT AND CLAY	89.825		0			12.3	14.6	Grey, damp to moist, massive, dense silt and clay. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1					0			14.6	15.2	Red-brown, damp, dense, fibrous peat.
B102	104.4	717844.3	1452786.1								15.2	16.4	No recovery.
B102	104.4	717844.3	1452786.1	-18.4	PEAT	86.0		0			16.4	18.4	Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1					0			18.4	19.9	Grey, wet, massive, fine-medium sand.
B102	104.4	717844.3	1452786.1	-21	MEDIUM-FINE SAND	83.425		0			20.0	21.0	Grey, wet, massive, fine-medium sand.
B102	104.4	717844.3	1452786.1	-21.3	MEDIUM-COARSE SAND WITH GRAVEL	83.125		0			21.0	21.3	Medium-coarse sand, little sub-rounded gravel, wood chunks. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1	-22.7	MEDIUM-FINE SAND	81.725		0			21.3	22.7	Grey, wet, massive, fine-medium sand.
B102	104.4	717844.3	1452786.1	-23	FINE SAND	81.425		0			22.7	23.0	Grey, saturated, massive, fine sand.
B102	104.4	717844.3	1452786.1								23.0	24.0	No recovery.
B102	104.4	717844.3	1452786.1	-24.5	MEDIUM-FINE SAND WITH GRAVEL	79.925		0			24.0	24.5	Grey, saturated, fine-medium sand, some sub-rounded gravel. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1	-26.2	MEDIUM-FINE SAND	78.225		0			24.5	26.2	Grey, saturated, fine-medium sand. Fine sand layers (0.1' thick) at 25.0, 25.4 and 25.7 fbgs.
B102	104.4	717844.3	1452786.1					0.05			26.2	26.8	Grey, wet, fine-medium sand.
B102	104.4	717844.3	1452786.1								26.8	28.0	No recovery.
B102	104.4	717844.3	1452786.1	-31.7	MEDIUM-FINE SAND	72.725		1.75			28.0	31.7	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.
B102	104.4	717844.3	1452786.1	-32	VERY FINE SAND	72.425		0.65			31.7	32.0	Grey, saturated, massive, very fine sand, little silt.
B102	104.4	717844.3	1452786.1					0.05			32.0	33.3	Grey, wet, dense, clay and silt.
B102	104.4	717844.3	1452786.1					0.1			33.3	36.0	No recovery.
B102	104.4	717844.3	1452786.1	-40	TOTAL DEPTH, CLAY AND SILT	64.425		0.05			36.0	40.1	Grey, saturated, massive, plastic, clay and silt.

TABLE 1: PINE STREET CANAL OCTOBER 2010 SOIL CORE DESCRIPTIONS AND RESULTS

SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B103	104.4	717885.4	1452786.9	0		104.37		0	B103		0.0	1.0	Estimated ballast stone.
B103	104.4	717885.4	1452786.9					0			1.0	1.3	Black, dry, angular gravel and medium sand. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9					0			1.3	1.9	Tan, dry, fine-medium sand. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9					0			1.9	2.3	Black, dry, fine-medium sand and sub-rounded gravel. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9					0			2.3	2.7	Tan, dry, fine-medium sand.
B103	104.4	717885.4	1452786.9	-3	FILL	101.37		0			2.7	3.0	Brown, damp, silt and fine sand, little sub-rounded gravel fill.
B103	104.4	717885.4	1452786.9								3.0	4.1	No recovery.
B103	104.4	717885.4	1452786.9					0			4.1	7.8	Brown-orange, damp, dense, massive silt and clay.
B103	104.4	717885.4	1452786.9								7.8	8.2	No recovery.
B103	104.4	717885.4	1452786.9					0.05			8.2	10.2	Brown-orange, moist, dense, massive silt and clay, trace sub-angular gravel.
B103	104.4	717885.4	1452786.9					0			10.2	11.7	Grey, moist, dense, massive silt and clay, trace sub-angular gravel.
B103	104.4	717885.4	1452786.9								11.7	12.3	No recovery.
B103	104.4	717885.4	1452786.9	-14.3	SILT AND CLAY	90.07		0			12.3	14.3	Grey, wet, massive sand and clay, trace gravel. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9					0			14.3	15.2	Red-brown, damp, dense, fibrous peat.
B103	104.4	717885.4	1452786.9								15.2	16.4	No recovery.
B103	104.4	717885.4	1452786.9	-17.8	PEAT	86.57		0			16.4	17.8	Red-brown, damp, dense, fibrous peat.
B103	104.4	717885.4	1452786.9	-19.4	MEDIUM-COARSE SAND	84.97		0			17.8	19.4	Grey, saturated, massive, medium-coarse sand.
B103	104.4	717885.4	1452786.9								19.4	20.5	No recovery.
B103	104.4	717885.4	1452786.9	-20.7	COARSE SAND AND GRAVEL	83.67		0			20.5	20.7	Grey, saturated, coarse sand and angular gravel. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-20.9	WOOD	83.47		0			20.7	20.9	Wood chunks. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-21.9	MEDIUM-FINE SAND	82.47		0			20.9	21.9	Grey, saturated, fine-medium sand. Gradual contact.
B103	104.4	717885.4	1452786.9	-22.1	MEDIUM-COARSE SAND WITH GRAVEL	82.27		0			21.9	22.1	Grey, saturated, medium-coarse sand and gravel. Gradual contact.
B103	104.4	717885.4	1452786.9					0			22.1	23.9	Grey, saturated fine sand and very fine sand. Horizontal lamination.
B103	104.4	717885.4	1452786.9								23.9	24.6	No recovery.
B103	104.4	717885.4	1452786.9	-27.2	VERY FINE SAND	77.17	ODOR	0.85			24.6	27.2	Grey, saturated fine sand. Grading down through very fine sand to very fine sand, some silt. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-27.9		76.47	ODOR	2.7			27.2	27.9	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact. Slight napthalene odor.
B103	104.4	717885.4	1452786.9								27.9	28.7	No recovery.
B103	104.4	717885.4	1452786.9	-28.9	MEDIUM-FINE SAND	75.47		0.15			28.7	28.9	Grey, saturated, fine-medium sand. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-29.1	MEDIUM-COARSE SAND WITH GRAVEL	75.27		0.15			28.9	29.1	Grey, saturated, coarse sand and medium sand and sub-rounded gravel (some red). No odor. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-29.8	MEDIUM-FINE SAND	74.57		0.15			29.1	29.8	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-30.7	SILTY FINE SAND	73.67		0.15			29.8	30.7	Grey, saturated, very fine sand, some silt. Horizontal lamination. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-31	CLAY AND SILT	73.37		0			30.7	31.0	Grey, saturated, dense, clay and silt. Sharp horizontal contact.
B103	104.4	717885.4	1452786.9	-31.2	PEAT	73.17		0			31.0	31.2	Brown, damp, dense, organic, fibrous peat.
B103	104.4	717885.4	1452786.9								31.2	32.8	No recovery.
B103	104.4	717885.4	1452786.9	-36.2	TOTAL DEPTH, CLAY AND SILT	68.17		0			32.8	36.2	Grey, saturated, dense, massive clay and silt.
B103A	104.4	717889.7	1452787.2	0		104.42			B103a	3.0	0.0	16.4	Not sampled.
B103A	104.4	717889.7	1452787.2	-17.9	PEAT	86.52		0			16.4	17.9	Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.
B103A	104.4	717889.7	1452787.2					0			17.9	19.4	Grey, wet, massive, medium-coarse sand. No evidence of cement grout.
B103A	104.4	717889.7	1452787.2								19.4	20.5	No recovery.
B103A	104.4	717889.7	1452787.2	-20.8	MEDIUM-COARSE SAND	83.62		0			20.5	20.8	Grey, saturated, massive, coarse-medium sand. Sharp horizontal contact.
B103A	104.4	717889.7	1452787.2	-22.1	MEDIUM-FINE SAND	82.32		0			20.8	22.1	Grey, saturated, massive, fine-medium sand, little coarse sand, wood chunks. Sharp horizontal contact.
B103A	104.4	717889.7	1452787.2					0			22.1	23.2	Grey, saturated, very fine sand (with horizontal lamination), trace wood chunks.
B103A	104.4	717889.7	1452787.2								23.2	24.6	No recovery.
B103A	104.4	717889.7	1452787.2	-26.9	VERY FINE SAND	77.52		0.8			24.6	26.9	Grey, saturated, very fine sand (with horizontal lamination). Sharp horizontal contact.
B103A	104.4	717889.7	1452787.2	-27.9	MEDIUM-COARSE SAND	76.52		0.1			26.9	27.9	Grey, saturated, massive, medium-coarse sand.
B103A	104.4	717889.7	1452787.2								27.9	28.7	No recovery.
B103A	104.4	717889.7	1452787.2	-29.7	MEDIUM-FINE SAND	74.72		0			28.7	29.7	Grey, saturated, massive, fine-medium sand, trace wood chunks. Sharp horizontal contact.
B103A	104.4	717889.7	1452787.2	-31.3	SILTY FINE SAND	73.12		0			29.7	31.3	Grey, saturated, very fine sand, little silt. Sharp horizontal contact.
B103A	104.4	717889.7	1452787.2	-31.9	CLAY AND SILT	72.52		0			31.3	31.9	Grey, saturated, massive, plastic, clay and silt. Gradual contact.
B103A	104.4	717889.7	1452787.2	-32	PEAT	72.42		0			31.9	32.0	Red-brown, moist, dense, fibrous peat.
B103A	104.4	717889.7	1452787.2		TOTAL DEPTH						32.0	32.8	No recovery.

TABLE 1: PINE STREET CANAL OCTOBER 2010 SOIL CORE DESCRIPTIONS AND RESULTS

SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B103B	104.4	717886.2	1452786.9	0		104.4			B103b	1.1	0.0	16.4	Not sampled.
B103B	104.4	717886.2	1452786.9	-17.9	PEAT	86.5		0.05			16.4	17.9	Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9					0.05			17.9	19.0	Grey, saturated, massive, medium-coarse sand, trace gravel. No evidence of grout.
B103B	104.4	717886.2	1452786.9								19.0	20.5	No recovery.
B103B	104.4	717886.2	1452786.9	-20.7	MEDIUM-COARSE SAND	83.7		0			20.5	20.7	Grey, saturated, medium-coarse sand. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9	-20.9	MEDIUM-COARSE SAND WITH GRAVEL	83.5		0			20.7	20.9	Grey, wet, medium-coarse sand and sub-rounded gravel. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9					0			20.9	21.4	Grey, saturated, fine-medium sand, little coarse sand, little wood chunks, trace silt. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9	-22.4	MEDIUM-FINE SAND	82		0			21.4	22.4	Grey, saturated, massive, fine-medium sand, trace gravel, trace organics. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9					0			22.4	23.4	Grey, very fine sand (with 15 degree lamination), trace organics.
B103B	104.4	717886.2	1452786.9								23.4	24.6	No recovery.
B103B	104.4	717886.2	1452786.9	-26.7	VERY FINE SAND	77.7		0.15			24.6	26.7	Grey, saturated, massive, very fine sand.
B103B	104.4	717886.2	1452786.9	-27.6	MEDIUM-COARSE SAND WITH GRAVEL	76.8	ODOR	0.15			26.7	27.6	Grey, saturated, massive, medium-coarse sand, little gravel. No NAPL. No sheen. No evidence of cement grout. Slight napthalene odor.
B103B	104.4	717886.2	1452786.9								27.6	28.7	No recovery.
B103B	104.4	717886.2	1452786.9	-29.7	MEDIUM-FINE SAND	74.7		0			28.7	29.7	Grey, wet, massive, fine-medium sand. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9	-31.1	VERY FINE SAND	73.3		0			29.7	31.1	Grey, wet, very fine sand, trace silt, trace organics, one pebble.
B103B	104.4	717886.2	1452786.9	-31.8	CLAY AND SILT	72.6		0			31.1	31.8	Grey, wet, massive, dense, plastic, clay and silt. Sharp horizontal contact.
B103B	104.4	717886.2	1452786.9	-31.9	TOTAL DEPTH, PEAT	72.5		0			31.8	31.9	Red-grey, moist, fibrous peat and clay.
B104	103.9	717929.2	1452787.5	0		103.88			B104		0.0	0.5	Ballast stone.
B104	103.9	717929.2	1452787.5					0			0.5	0.7	Black, dry, medium-coarse sand and gravel. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			0.7	1.1	Brown, damp, fine-medium sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			1.1	1.6	Black, dry, coarse sand and gravel, some medium sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			1.6	2.0	Tan, damp, dense fine sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-2.3	FILL	101.58		0			2.0	2.3	Brown, dry, medium-coarse sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			2.3	3.0	Red-brown, dry, dense, silt and clay, trace sub-angular gravel (red Dolomite).
B104	103.9	717929.2	1452787.5								3.0	4.1	No recovery.
B104	103.9	717929.2	1452787.5	-7.9	CLAY AND SILT	95.98		0			4.1	7.9	Red-brown and grey mottled, damp to moist, dense, clay and silt, trace gravel, trace wood chunks.
B104	103.9	717929.2	1452787.5					0			8.2	10.4	Brown and grey mottled silt and clay, trace fine sand, trace gravel. Gradual contact.
B104	103.9	717929.2	1452787.5					0			10.4	11.6	Same as above but grey.
B104	103.9	717929.2	1452787.5								11.6	12.3	No recovery.
B104	103.9	717929.2	1452787.5	-13.9	SILT AND CLAY	89.98		0			12.3	13.9	Grey, wet, moderately dense silt and clay, trace fine sand, trace gravel. Sharp
B104	103.9	717929.2	1452787.5					0			13.9	15.3	Red-brown, damp, dense, fibrous peat.
B104	103.9	717929.2	1452787.5								15.3	16.4	No recovery.
B104	103.9	717929.2	1452787.5	-17.2	PEAT	86.68		0			16.4	17.2	Red-brown, damp, dense, fibrous peat, trace wood chunks. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-17.7	MEDIUM-COARSE SAND	86.18		0			17.2	17.7	Grey, saturated, massive, medium-coarse sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-18.1	MEDIUM-FINE SAND	85.78		0			17.7	18.1	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-18.4	COARSE SAND AND GRAVEL	85.48		0			18.1	18.4	Grey, saturated, coarse sand and gravel (Dunham red dolomite). Sharp horizontal contact. No odor. No stains.
B104	103.9	717929.2	1452787.5	-18.9	MEDIUM-FINE SAND	84.98		0			18.4	18.9	Grey, saturated, fine-medium sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			18.9	19.8	Grey, saturated, massive, medium-coarse sand.
B104	103.9	717929.2	1452787.5								19.8	20.5	No recovery.
B104	103.9	717929.2	1452787.5	-21.4	MEDIUM-COARSE SAND	82.48		0			20.5	21.4	Grey, wet, massive, medium-coarse sand fining down to medium sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			21.4	22.3	Grey, damp, dense, very fine sand and silt. Horizontal lamination.
B104	103.9	717929.2	1452787.5								22.3	24.6	No recovery.
B104	103.9	717929.2	1452787.5	-27.2	VERY FINE SAND	76.68		0			24.6	27.2	Grey, saturated very fine sand, laminated with fine sand and fine sand, little silt layers (approximately 1/4" to 2" layers). Sharp horizontal contact.
B104	103.9	717929.2	1452787.5								27.2	28.6	No recovery.
B104	103.9	717929.2	1452787.5	-28.8	MEDIUM-FINE SAND	75.08		0			28.6	28.8	Grey, wet, fine-medium sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-28	VERY FINE SAND	75.88		0			28.8	29.2	Grey, wet, very fine sand and silt.
B104	103.9	717929.2	1452787.5	-29.9	MEDIUM-FINE SAND	73.98		0			29.2	29.9	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact. No odor, stains or NAPL.
B104	103.9	717929.2	1452787.5	-31.5	VERY FINE SAND	72.38		0			29.9	31.5	Grey, saturated, laminated, very fine sand. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5					0			31.5	32.1	Grey, saturated, massive, clay and silt.
B104	103.9	717929.2	1452787.5								32.1	32.8	No recovery.
B104	103.9	717929.2	1452787.5	-33	CLAY AND SILT	70.88		0			32.8	33.0	Grey, saturated, dense, massive, clay and silt. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-33.6	PEAT	70.28		0			33.0	33.6	Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.
B104	103.9	717929.2	1452787.5	-36.2	CLAY AND SILT	67.68		0			33.6	36.2	Grey, saturated, dense, massive, clay and silt.
B104	103.9	717929.2	1452787.5								36.2	36.9	No recovery.

TABLE 1: PINE STREET CANAL OCTOBER 2010 SOIL CORE DESCRIPTIONS AND RESULTS

SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B105	104.7	717798.6	1452787.0	0		104.74			B105		0.0	2.1	Ballast stone.
B105	104.7	717798.6	1452787.0					0			2.1	3.2	Brown-red, damp, dense, clay. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0					0			3.2	3.6	Black, medium sand, trace angular gravel. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0					0			3.6	4.1	Light brown fine sand.
B105	104.7	717798.6	1452787.0	-5	FILL	99.74		0			4.1	5.0	Tan, fine-medium sand. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0					0			5.0	6.8	Brown, damp, dense, clay and silt.
B105	104.7	717798.6	1452787.0								6.8	8.2	No recovery.
B105	104.7	717798.6	1452787.0					0			8.2	9.5	Tan and grey mottled, wet, dense, clay and silt. Gradual contact.
B105	104.7	717798.6	1452787.0					0			9.5	10.6	Grey, wet, moderately dense, clay and silt.
B105	104.7	717798.6	1452787.0								10.6	12.3	No recovery.
B105	104.7	717798.6	1452787.0	-13.7	CLAY AND SILT	91.04		0.05			12.3	13.7	Grey, wet, moderately dense, clay and silt. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0					0.05			13.7	14.8	Red-brown, moist, dense, fibrous peat.
B105	104.7	717798.6	1452787.0								14.8	16.4	No recovery.
B105	104.7	717798.6	1452787.0	-17.7	PEAT	87.04		0			16.4	17.7	Red-brown, moist, dense, fibrous peat. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0	-19.7	MEDIUM-COARSE SAND	85.04		0			17.7	19.7	Grey, saturated, medium-coarse sand grading down to medium sand, some coarse sand.
B105	104.7	717798.6	1452787.0								19.7	20.5	No recovery.
B105	104.7	717798.6	1452787.0	-22.2	MEDIUM SAND	82.54		0.15			20.5	22.2	Grey, saturated, massive, medium sand, little fine sand, little coarse sand, trace gravel, trace wood chunks. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0	-22.8	FINE SAND	81.94		0.15			22.2	22.8	Grey, wet, fine sand with 10-15 degree lamination, trace organics. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0					0.15			22.8	23.0	Grey, saturated, fine-medium sand.
B105	104.7	717798.6	1452787.0								23.0	24.6	No recovery.
B105	104.7	717798.6	1452787.0	-24.7	MEDIUM SAND	80.04		0.05			24.6	24.7	Grey, saturated, medium sand. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0	-24.9	SILTY FINE SAND	79.84		0.05			24.7	24.9	Grey, saturated fine sand, some silt. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0	-27.3	MEDIUM SAND	77.44		0.05			24.9	27.3	Grey, saturated, medium sand (with 0.05' fine sand and silt layers at 25.6 and 26.1 fbgs). Sharp horizontal contacts.
B105	104.7	717798.6	1452787.0								27.3	28.7	No recovery.
B105	104.7	717798.6	1452787.0	-29	MEDIUM-FINE SAND	75.74		0			28.7	29.0	Grey, saturated, fine-medium sand. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0	-29.9	SILTY FINE SAND	74.84		0			29.0	29.9	Grey, saturated, massive, fine sand and silt. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0	-30.1	PEAT	74.64		0			29.9	30.1	Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.
B105	104.7	717798.6	1452787.0					0			30.1	32.0	Grey, saturated, massive, plastic, clay and silt.
B105	104.7	717798.6	1452787.0								32.0	32.8	No recovery.
B105	104.7	717798.6	1452787.0	-36.4	CLAY AND SILT	68.34		0			32.8	36.4	Grey, wet, dense, plastic, clay and silt.
B105	104.7	717798.6	1452787.0		TOTAL DEPTH						36.4	36.9	No recovery.
B106	104.4	717869.3	1452787.6	0		104.36			B106		0.0	16.4	Not sampled.
B106	104.4	717869.3	1452787.6	-18	PEAT	86.36		0			16.4	18.0	Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6	-18.1	MEDIUM SAND	86.26		0			18.0	18.1	Grey, saturated, medium sand. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6	-18.3	PEAT	86.06		0			18.1	18.3	Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6					0			18.3	19.4	Grey, saturated, massive, medium-coarse sand.
B106	104.4	717869.3	1452787.6								19.4	20.5	No recovery.
B106	104.4	717869.3	1452787.6	-23.2	MEDIUM-COARSE SAND	81.16	ODOR	0.35			20.5	23.2	Grey, saturated, massive, medium-coarse sand grading down to coarse sand, trace gravel. Napthalene odor. No sheen or NAPL observed. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6					0.35			23.2	23.5	Grey, wet, laminated fine sand, trace organics.
B106	104.4	717869.3	1452787.6								23.5	24.6	No recovery.
B106	104.4	717869.3	1452787.6	-26.6	SILTY FINE SAND	77.76		0.25			24.6	26.6	Grey, saturated, massive, fine sand (few 1/4" layers), little silt. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6	-27.6	MEDIUM-COARSE SAND WITH GRAVEL	76.76	ODOR	0.25			26.6	27.6	Grey, saturated, massive, medium sand, some coarse sand, some sub-rounded (white quartz and Dunham dolomite) gravel. Napthalene odor. No sheen or NAPL observed.
B106	104.4	717869.3	1452787.6								27.6	28.7	No recovery.
B106	104.4	717869.3	1452787.6	-29.5	MEDIUM-COARSE SAND	74.86		0			28.7	29.5	Grey, saturated, massive, medium sand, some coarse sand. No odor. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6	-31.5	VERY FINE SAND	72.86		0			29.5	31.5	Grey, saturated, very fine sand, little silt. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6	-32	CLAY AND SILT	72.36		0			31.5	32.0	Grey, wet, massive, dense, clay and silt. Sharp horizontal contact.
B106	104.4	717869.3	1452787.6	-32.3	TD PEAT	72.06		0			32.0	32.3	Red-brown, moist, dense, fibrous peat.

TABLE 1: PINE STREET CANAL OCTOBER 2010 SOIL CORE DESCRIPTIONS AND RESULTS

SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B106A	104.1	717874.9	1452785.8	0		104.11			B106a	5.9	0.0	16.4	Not sampled.
B106A	104.1	717874.9	1452785.8	-17.4	PEAT	86.71		0			16.4	17.4	Red-brown, moist, dense, fibrous peat. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-17.55	MEDIUM-COARSE SAND	86.56		0			17.4	17.6	Brown, wet, massive, medium-coarse sand. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-17.7	PEAT	86.41		0			17.6	17.7	Red-brown, moist, dense, fibrous peat.
B106A	104.1	717874.9	1452785.8	-20.4	MEDIUM-COARSE SAND	83.71		0			17.7	20.0	Grey, saturated, massive, medium sand (coarsening downwards), some coarse sand, some fine sand.
B106A	104.1	717874.9	1452785.8	-20.4	MEDIUM-COARSE SAND WITH GRAVEL	83.71		0			20.0	20.4	Grey, saturated, medium-coarse sand, some sub-rounded gravel.
B106A	104.1	717874.9	1452785.8					0			20.5	21.1	Grey, wet, massive, medium sand. Gradual contact.
B106A	104.1	717874.9	1452785.8	-21.3	MEDIUM-COARSE SAND	82.81		0			21.1	21.3	Grey-brown, medium-coarse sand, little gravel. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-22.7	MEDIUM-FINE SAND	81.41		0			21.3	22.7	Brown, saturated, massive, fine-medium sand, trace gravel, organic wood chunks. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8					0			22.7	24.1	Grey, saturated, very fine sand, little silt, trace organics.
B106A	104.1	717874.9	1452785.8								24.1	24.6	No recovery.
B106A	104.1	717874.9	1452785.8	-26.2	VERY FINE SAND	77.91		0			24.6	26.2	Grey, saturated, very fine sand, trace organics. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-26.6	GRAVEL	77.51		0			26.2	26.6	Grey, wet, sub-rounded to sub-angular gravel, little medium and coarse sand. No odor. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-27	MEDIUM-FINE SAND	77.11		0			26.6	27.0	Grey, wet, fine-medium sand. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-27.1	GRAVEL	77.01	ODOR	0			27.0	27.1	Grey, wet, sub-angular gravel. Trace napthalene odor. No cement grout. No NAPL.
B106A	104.1	717874.9	1452785.8	-27.6	MEDIUM-FINE SAND	76.51		0			27.1	27.6	Grey, wet, fine-medium sand, trace gravel, trace organics.
B106A	104.1	717874.9	1452785.8								27.6	28.7	No recovery.
B106A	104.1	717874.9	1452785.8	-29.7	MEDIUM-COARSE SAND	74.41		0			28.7	29.7	Grey, wet, medium sand, some coarse sand. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-30.9	VERY FINE SAND	73.21		0			29.7	30.9	Grey, saturated, very fine sand (with horizontal lamination), trace silt, trace organics.
B106A	104.1	717874.9	1452785.8	-31.1	CLAY AND SILT	73.01		0			30.9	31.1	Grey, saturated, clay and silt. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-31.5	PEAT	72.61		0			31.1	31.5	Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.
B106A	104.1	717874.9	1452785.8	-31.7	CLAY AND SILT	72.41		0			31.5	31.7	Grey, wet, dense, clay and silt.
B106A	104.1	717874.9	1452785.8		TOTAL DEPTH						31.7	32.8	No recovery.
B106B	104.2	717872.4	1452786.4	0		104.19			B106b	2.5	0.0	16.4	Not sampled.
B106B	104.2	717872.4	1452786.4	-17.9	PEAT	86.29		0			16.4	17.9	Red-brown, wet, fibrous peat. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-19.8	MEDIUM-COARSE SAND	84.39		0			17.9	18.4	Grey, wet, massive, medium sand coarsens downwards. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4					0			18.4	19.8	Grey, wet, massive, medium-coarse sand.
B106B	104.2	717872.4	1452786.4					0			19.8	20.1	Grey, saturated, fine-medium sand.
B106B	104.2	717872.4	1452786.4								20.1	20.5	No recovery.
B106B	104.2	717872.4	1452786.4	-21.9	MEDIUM-FINE SAND	82.29		0			20.5	21.9	Grey, wet, massive, fine-medium sand, trace wood. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-23	VERY FINE SAND	81.19		0			21.9	23.0	Grey, saturated, very fine sand (with horizontal lamination), trace wood, trace silt. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	26.1	CEMENT	130.29					23.0	23.2	Cement grout.
B106B	104.2	717872.4	1452786.4								23.2	24.6	No recovery.
B106B	104.2	717872.4	1452786.4	-26.1	VERY FINE SAND	78.09		0			24.6	26.1	One lump of cement at top of core. Grey, saturated, very fine sand (with horizontal lamination), trace wood. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-26.2	MEDIUM-COARSE SAND WITH GRAVEL	77.99	ODOR	0			26.1	26.2	Grey, wet, medium-coarse sand and gravel. Napthalene odor. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-26.6	MEDIUM-FINE SAND	77.59		0			26.2	26.6	Grey, saturated, fine-medium sand. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-27	MEDIUM SAND WITH GRAVEL	77.19	ODOR	0			26.6	27.0	Grey, saturated, medium sand and gravel, little fine sand, little coarse sand. Napthalene odor. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-27.3	MEDIUM-FINE SAND	76.89		0			27.0	27.3	Grey, wet, fine-medium sand.
B106B	104.2	717872.4	1452786.4								27.3	28.7	No recovery.
B106B	104.2	717872.4	1452786.4	-29	MEDIUM SAND	75.19		0			28.7	29.0	Grey, saturated, massive, medium sand. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-29.9	VERY FINE SAND	74.29		0			29.0	29.9	Grey, saturated, very fine sand grading down to fine sand and silt. Sharp horizontal contact.
B106B	104.2	717872.4	1452786.4	-30.2	CLAY AND SILT	73.99		0			29.9	30.2	Grey, saturated, dense, plastic, clay and silt.
B106B	104.2	717872.4	1452786.4	-30.5	TD P-CEMENT	73.69		0			30.2	30.5	Red-brown, wet, fibrous peat. At 30.5 fbgs, 1/2 inch of cement grout.

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SLID	Ground Elev. (fNGVD)	Northing (ft)	Easting (ft)	Depth (fbgs)	Stratigraphic Unit	Strat. Base Elev (ft NAVD)	ODOR	PID (ppmV)	Boring	Distance to Primary	Top Depth (fbgs)	Bottom Depth (fbgs)	Soil Description
B106C	104.4	717869.4	1452785.7	0		104.42			B106c	1.8	0.0	16.4	Not sampled.
B106C	104.4	717869.4	1452785.7	-17.8	PEAT	86.62		0			16.4	17.8	Red-brown, moist, dense, fibrous peat. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-19.2	MEDIUM-COARSE SAND	85.22		0			17.8	19.2	Grey, saturated, massive, medium sand, some coarse sand.
B106C	104.4	717869.4	1452785.7								19.2	20.5	No recovery.
B106C	104.4	717869.4	1452785.7	-21.7	MEDIUM-FINE SAND	82.72		0			20.5	21.7	Grey, wet, massive, fine-medium sand. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-22.3	MEDIUM-FINE SAND WITH GRAVEL	82.12		0			21.7	22.3	Grey, wet, massive, fine-medium sand, little gravel.
B106C	104.4	717869.4	1452785.7	-23.1	VERY FINE SAND	81.32		0			22.3	23.1	Grey, wet, fine sand and very fine sand (with horizontal lamination), trace organics. No evidence of cement grout.
B106C	104.4	717869.4	1452785.7								23.1	24.6	No recovery.
B106C	104.4	717869.4	1452785.7	-25	CEMENT	79.42					24.6	25.0	Cement grout. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-25.8	VERY FINE SAND	78.62		0.05			25.0	25.8	Grey, wet, massive, very fine sand. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-26.1	MEDIUM SAND	78.32		0.05			25.8	26.1	Grey, wet, medium sand. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-26.9	MEDIUM SAND WITH GRAVEL	77.52	ODOR	0.05			26.1	26.9	Grey, wet, medium sand, little gravel. Faint napthalene odor.
B106C	104.4	717869.4	1452785.7								26.9	28.7	No recovery.
B106C	104.4	717869.4	1452785.7	-29.6	MEDIUM SAND	74.82		0			28.7	29.6	Grey, saturated, massive, medium sand. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-29.9	MEDIUM SAND WITH GRAVEL	74.52		0			29.6	29.9	Grey, wet, massive, medium sand and gravel. No odor. Sharp horizontal contact.
B106C	104.4	717869.4	1452785.7	-30.5	TOTAL DEPTH, SILTY FINE SAND	73.92					29.9	30.5	Grey, wet, massive, very fine sand, little silt.
B106D	104.5	717867.7	1452786.7	0		104.53			B106d	1.6	0.0	16.4	Not sampled.
B106D	104.5	717867.7	1452786.7	-17.9	PEAT	86.63		0			16.4	17.9	Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.
B106D	104.5	717867.7	1452786.7					0			17.9	19.4	Grey, wet, medium sand grading down to medium sand, some coarse sand. One pink pebble. Sharp horizontal contact.
B106D	104.5	717867.7	1452786.7								19.4	20.5	No recovery.
B106D	104.5	717867.7	1452786.7	-22.8	MEDIUM-COARSE SAND	81.73		0			20.5	22.8	Grey, wet, medium-coarse sand. Sharp horizontal contact.
B106D	104.5	717867.7	1452786.7	-23.7	VERY FINE SAND	80.83		0			22.8	23.7	Grey, wet, very fine sand (with horizontal lamination), little organics.
B106D	104.5	717867.7	1452786.7								23.7	24.6	No recovery.
B106D	104.5	717867.7	1452786.7	-24.8	CEMENT	79.73					24.6	24.8	Cement grout.
B106D	104.5	717867.7	1452786.7	-25.9	FINE SAND	78.63		0.2			24.8	25.9	Grey, saturated, massive, fine sand, trace organics. Sharp horizontal contact.
B106D	104.5	717867.7	1452786.7	-27.1	TOTAL DEPTH, FINE TO MEDIUM SAND WITH GRAVEL	77.43	ODOR	0.2			25.9	27.1	Grey, wet, massive, fine-medium sand, little gravel. Napthalene odor.

TABLE 2: GROUT INJECTION DATA

Core Date	Core Location	Core Top (fbgs)	Core TD (fbgs)	Grout Date	Total Grout Volume (gal.)	Grout Injection Depth (fbgs)	Grout volume at depth (gal.)	Grout water (gal.)	Grout Cement (94# bags)	Grout Bentonite (lbs)
10/26/2010	J_B101	0	40	10/26/2010	115	32	40	30	4.5	4
	J_B101			10/26/2010		32	35	30	4	4
	J_B101			10/26/2010		28	30	25	4	2
	J_B101			10/26/2010		26	10	10	3	2
10/27/2010	J_B101A	16	32	10/27/2010	38	32	38	35	1	35
10/27/2010	J_B102	0	40.1	10/27/2010	185	32	40	30	4.5	3
	J_B102			10/27/2010		27	40	30	4.5	3
	J_B102			10/27/2010		27	40	30	4.5	3
	J_B102			10/27/2010		23	40	30	4.5	3
	J_B102			10/27/2010		23	25	18	2.5	1
10/28/2010	J_B103	0	36.9	10/28/2010	205	32	8	7.5	1	0.25
	J_B103			10/28/2010		31	8	7.5	1	0.25
	J_B103			10/28/2010		30	8	7.5	1	0.25
	J_B103			10/28/2010		29	8	7.5	1	0.25
	J_B103			10/28/2010		28	8	7.5	1	0.25
	J_B103			10/28/2010		27	8	7.5	1	0.25
	J_B103			10/28/2010		26	8	7.5	1	0.25
	J_B103			10/28/2010		25	8	7.5	1	0.25
	J_B103			10/28/2010		24	8	7.5	1	0.25
	J_B103			10/28/2010		23	8	7.5	1	0.25
	J_B103			10/28/2010		22	8	7.5	1	0.25
	J_B103			10/28/2010		21	8	7.5	1	0.25
	J_B103			10/28/2010		20	8	7.5	1	0.25
	J_B103			10/28/2010		19	8	7.5	1	0.25
	J_B103			10/28/2010		18	8	7.5	1	0.25
	J_B103			10/28/2010		17	8	7.5	1	0.25
	J_B103			10/28/2010		16	42	37.5	5	1.75
	J_B103			10/28/2010		14	35	30	4	1.5
10/29/2010	J_B103A	16.4	32.8	10/29/2010	35	32	35	30	0.5	30
10/30/2010	J_B103B	16.4	32.8	10/30/2010	32	32	32	28	0.25	20
10/29/2010	J_B104	0	36.9	10/29/2010	195	32	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		31	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		30	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		29	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		28	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		27	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		26	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		25	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		24	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		23	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		22	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		21	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		20	8	7	1	0.25
10/29/2010	J_B104			10/29/2010		19	15	15	1.5	0.5
10/29/2010	J_B104			10/29/2010		18.5	15	15	1.5	0.5
10/29/2010	J_B104			10/29/2010		17.5	61	49	6	3
10/30/2010	J_B105	0	36.9	10/30/2010	40	32	40	35	1.5	25
10/30/2010	J_B106	16.4	32.8	10/31/2010	1065	31	115	100	11	16
10/30/2010	J_B106			10/31/2010		29	100	90	9	13
10/30/2010	J_B106			10/31/2010		28	100	90	9	13
10/30/2010	J_B106			10/31/2010		27	100	90	9	13
10/30/2010	J_B106			10/31/2010		26	100	90	9	13
10/30/2010	J_B106			10/31/2010		25	200	180	18	13
10/30/2010	J_B106			10/31/2010		24	100	90	9	13
10/30/2010	J_B106			10/31/2010		23	100	90	9	13
10/30/2010	J_B106			10/31/2010		22	100	90	9	13
10/30/2010	J_B106			10/31/2010		21	50	35	5	8
11/1/2010	J_B106A	16.4	32.8	11/1/2010	25	32	25	20	2	1
11/1/2010	J_B106B	16.4	32.8	11/1/2010	50	32	50	30	4	2
11/1/2010	J_B106C	16.4	32.8	11/1/2010	15	32	17	15	1.5	1.5
11/1/2010	J_B106D	16.4	28.7	11/1/2010	15	28	17	15	1.5	1.5

DIFFERENTIALLY CORRECTED GPS DATA

1	Note	Trimble GeoExplorer Series	Note	PSCS-110310_SPLIT.co	0			718418.432	1452789.6	1
4	Point_generic	rv24	Point_generic	PSCS-110310_SPLIT.co	107	2.5	1.5	718418.602	1452789.361	4
718418.602	1452789.361	rv24	Point_generic	PSCS-110310_SPLIT.co	107	2.5	1.5	718418.602	1452789.361	4
15	Point_generic	b104	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717929.224	1452787.526	15
717929.224	1452787.526	b104	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717929.224	1452787.526	15
16	Point_generic	b103a	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717889.735	1452787.182	16
717889.735	1452787.182	b103a	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717889.735	1452787.182	16
17	Point_generic	b103b	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717886.248	1452786.917	17
717886.248	1452786.917	b103b	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717886.248	1452786.917	17
18	Point_generic	b103	Point_generic	PSCS-110310_SPLIT.co	121	1	0.9	717885.356	1452786.933	18
717885.356	1452786.933	b103	Point_generic	PSCS-110310_SPLIT.co	121	1	0.9	717885.356	1452786.933	18
19	Point_generic	b106a	Point_generic	PSCS-110310_SPLIT.co	121	1	0.9	717874.938	1452785.848	19
717874.938	1452785.848	b106a	Point_generic	PSCS-110310_SPLIT.co	121	1	0.9	717874.938	1452785.848	19
20	Point_generic	b106b	Point_generic	PSCS-110310_SPLIT.co	14	1	0.9	717872.3	1452786.294	20
717872.3	1452786.294	b106b	Point_generic	PSCS-110310_SPLIT.co	14	1	0.9	717872.3	1452786.294	20
21	Point_generic	b106b	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717872.414	1452786.391	21
717872.414	1452786.391	b106b	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717872.414	1452786.391	21
22	Point_generic	b106c	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717869.415	1452785.708	22
717869.415	1452785.708	b106c	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717869.415	1452785.708	22
23	Point_generic	b106	Point_generic	PSCS-110310_SPLIT.co	122	1	0.9	717869.303	1452787.595	23
717869.303	1452787.595	b106	Point_generic	PSCS-110310_SPLIT.co	122	1	0.9	717869.303	1452787.595	23
24	Point_generic	b106b	Point_generic	PSCS-110310_SPLIT.co	122	1	0.9	717867.651	1452786.692	24
717867.651	1452786.692	b106b	Point_generic	PSCS-110310_SPLIT.co	122	1	0.9	717867.651	1452786.692	24
25	Point_generic	b101	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717864.882	1452785.808	25
717864.882	1452785.808	b101	Point_generic	PSCS-110310_SPLIT.co	120	1	0.9	717864.882	1452785.808	25
26	Point_generic	b101a	Point_generic	PSCS-110310_SPLIT.co	125	1	0.9	717861.411	1452786.351	26
717861.411	1452786.351	b101a	Point_generic	PSCS-110310_SPLIT.co	125	1	0.9	717861.411	1452786.351	26
27	Point_generic	b102	Point_generic	PSCS-110310_SPLIT.co	124	1	0.9	717844.346	1452786.097	27
717844.346	1452786.097	b102	Point_generic	PSCS-110310_SPLIT.co	124	1	0.9	717844.346	1452786.097	27
28	Point_generic	b105	Point_generic	PSCS-110310_SPLIT.co	143	1	0.9	717798.555	1452787.011	28
717798.555	1452787.011	b105	Point_generic	PSCS-110310_SPLIT.co	143	1	0.9	717798.555	1452787.011	28

ELEVATION SURVEY DATA AND CALCULATIONS

Back sight (ft)	Station	Fore Sight (ft)	Elevation (ft NGVD)	Notes	Instrument Elevation (ft NGVD)	
5.240	1		103.640	USGS RV24	108.880	
	1	5.335	103.545	MW24A TOG	108.880	
	1	5.030	103.850	MW23A TOG	108.880	
5.390	2		103.850	MW23A TOG	109.240	
	2	4.765	104.475	B101	109.240	
	2	4.640	104.600	B101a	109.240	
	2	4.870	104.370	B103	109.240	
	2	4.820	104.420	B103a	109.240	
	2	4.840	104.400	B103b	109.240	
	2	5.360	103.880	B104	109.240	
	2	4.500	104.740	B105	109.240	
	2	4.880	104.360	B106	109.240	
	2	5.130	104.110	B106a	109.240	
	2	5.050	104.190	B106b	109.240	
	2	4.820	104.420	B106c	109.240	
	2	4.710	104.530	B106d	109.240	
	2	5.755	103.485	Station # GS	109.240	
5.190	3		103.485	Station # GS	108.675	
	3	4.250	104.425	B102	108.675	
	3	5.140	103.535	MW24A TOG	108.675	OK within 0.01 ft
5.650	4		103.545	MW24A TOG	109.195	
	4	5.550	103.645	USGS RV24	109.195	OK within 0.005 ft

THE JOHNSON CO., INC.
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(802) 229-4600

JOB PSLS 1-0870-2
SHEET NO. 1 OF
CALCULATED BY RJ, DMN DATE
CHECKED BY DATE
SCALE

Well/Boring	Depth (BGS)	PID (PMV)	Time	
J_B101		0.0	9:25	Background
10/26/10	0.6 - 1.5	0.20	0939	
	1.5 - 3.9	0.15	0940	
	3.9 - 6.0	0.05	0947	NR = No Recovery
	6.0 - 8.0	0.00	0947	
	8.0 - 10.4	0.00	0954	
	10.4 - 12.1	no recovery		
	12.1 - 13.3	0.00	0957	
	13.3 - 16.2	no recovery		
	16.2 - 18.4	0.00		
RVJ 10/26/10	18.4 - 20.3	NR		
RVJ 10/26/10	20 - 22 ~~20.3~~ -	0.00	1120	
	22 - ~~24.1~~ 23.9	0.00	1120	
	24 - 26	0.30	1204	
	26 - 28	NR		
	28 - 30	0.05	1251	
	30 - 31.6	0.15	1251	
	32 - 34	0.0	13:25	
	34 - 36	0.0	13:25	BG. 0.05 - 0.0
	36 - 36.3	0.00	1410	
J_B102	0 - 2.0	0.00	0815	0.00 Background
10/27/10	2.0 - 4.1	NR		
	4.1 - 6.1	0.00	0820	
	6.1 - 7.5	0.00	0820	
	7.5 - 8.2	NR		
	8.2 - 10.2	0.00	0830	
	10.2 - 11.2	0.00	0830	
	11.2 - 12.3	NR		
	12.3 - 13.3	0.00	0835	
	13.3 - 15.1	0.00	0835	
	15.1 - 16.4	NR		
	16.4 - 18.4	0.00	0842	
	18.4 - 19.9	0.00	0842	
	19.9 - 20.5	NR		

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JOB Pine St. Canal 1-0870-2
SHEET NO. 2 OF
CALCULATED BY RVJ, DMM DATE 10/27/10 - 28/10
CHECKED BY DATE
SCALE

WELL	DEPTH (fbgs)	PID (ppm)	Time	
J_B102	20.0 - 22.0	0.00	0930	
10/27/10	22.0 - 23.0	0.00	0930	
	23.0 - 24.1	NR		
	24.0 - 26.0	0.00	1005	
	26.0 - 27.2	0.05	1005	
	27.2 - 28.1	NR		
	28.0 - 30.0	1.75	1042	(approx 29.0' bgs)
	30.0 - 32.1	0.65	1042	
	32.0 - 31.3	0.05	1107	bkgrnd 0.05
	31.3 - 34.1	NR		
	34.0 - 36.0	0.10	1145	
	36.0 - 38.1	0.05	1145	
B_101A	16.0 - 18.0	0.15	1547	
10/27/10	18.0 - 19.5	0.05	1547	
	19.5 - 20.1	NR		
	20.1 - 22.1	0.00	1552	
	22.1 - 23.7	0.00	1552	
	23.7 - 24.2	NR		
	24 - 26.5	0.05	1625	
	26.5 - 28.0	NR		
10/28/10	28.0 - 30.0	0.00	0807	Background 0.00
↓	30.0 - 31.5	0.06	0807	
	31.5 - 32.1	NR		

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JOB Pine St. Canal 1-0870-2
SHEET NO. 3 OF
CALCULATED BY RVJ, DMM DATE 10/28/10
CHECKED BY DATE
SCALE

WELL	DEPTH (fbgs)	PID (ppm)	Time	Background
J-B103	0.0 - 3.0	0.00	1016	0.00
10/28/10	4.1 - 6.1	0.00	1023	
	6.1 - 7.8	0.00	1023	
	7.8 - 8.2	NR		
	8.2 - 10.2	0.05	1027	
	10.2 - 11.7	0.00	1027	
	11.7 - 12.3	NR		
	12.3 - 13.8	0.00	1032	
	13.8 - 15.2	0.00	1032	
	15.2 - 16.4	NR		
	16.4 - 17.9	0.00	1038	
	17.9 - 19.4	0.00	1038	
	19.4 - 20.5	NR		
	20.5 - 22.5	0.00	1042	
	22.5 - 23.9	0.05	1042	
	23.9 - 24.6	NR		
	24.6 - 26.6	0.85	1050	
	26.6 - 27.9	2.70	1050	slight naphthalene odor
	27.9 - 28.7	NR		
	28.7 - 30.7	0.15	1057	
	30.7 - 31.2	0.00	1057	
	31.2 - 32.8	NR		
	32.8 - 34.8	0.00	1112	
	34.8 - 36.2	0.00	1112	
	36.2 - 36.9	NR		

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JOB Pine St. Canal 1-0870-2
SHEET NO. 4 OF
CALCULATED BY RVJ, DMM DATE 10/29/10
CHECKED BY DATE
SCALE

WELL	DEPTH (fbgs	PID (ppm)	Time	Background
J-B104	0.00 - 2.0	0.00	0803	0.00
10/29/10	2.0 - 2.5	0.00	0803	
	2.5 - 4.1	NR		
	4.1 - 6.1	0.00	0812	
	6.1 - 7.9	0.00	0812	
	7.9 - 8.2	NR		
	8.2 - 10.2	0.00	0815	
	10.2 - 11.6	0.00	0815	
	11.6 - 12.3	NR		
	12.3 - 14.3	0.00	0820	
	14.3 - 15.3	0.00	0820	
	15.3 - 16.4	NR		
	16.4 - 18.4	0.00	0828	
	18.4 - 19.8	0.00	0828	
	19.8 - 20.5	NR		
	20.5 - 21.5	0.00	0844	
	21.5 - 22.3	0.00	0844	
	22.3 - 24.6	NR		
	24.6 - 26.1	0.00	0850	
	26.1 - 27.2	0.00	0850	
	27.2 - 28.7	NR		
	28.7 - 29.3	0.00	0911	
	29.3 - 32.8	NR		
	28.7 - 30.7	0.00	0953	Redrilled due to poor
	30.7 - 32.1	0.00	0953	recovery
	32.1 - 32.8	NR		↓
	32.8 - 34.8	0.00	1004	
	34.8 - 36.2	0.00	1004	
	36.2 - 36.9	NR		

PRODUCT 204-1 (Single Sheets) 205-1 (Padded)

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JOB Pine St. Canal
SHEET NO. 5 OF
CALCULATED BY RVJ, DMM, JCK DATE 10/29/10
CHECKED BY DATE
SCALE

WELL	DEPTH (fbgs)	PID (ppm)	Time	Background
J-B103A	16.5 - 18.0	0.00	1437	0.00
10/29/10	18.0 - 19.5	0.00	1437	
RVJ 10/29/10	19.5 ~~20.0~~ - 20.6	NR		
	20.6 - 22.6	0.00	1447	
	22.6 - 23.3	0.00	1447	
	23.3 - 24.7	NR		
	24.7 - 26.7	0.80		
	26.7 - 28.0	0.10		
	28.0 - 28.8	NR		
	28.8 - 30.8	0.00	1502	
	30.8 - 32.1	0.00	1502	
	32.1 - 32.9	NR		

J-B103B		PID (ppm)	Time	Background
10/~~29~~ 30/10	16.4 - ~~21.9~~ 19 JCK	0.05	0930	0.00
JCK	20.5 - 23.4	JCK ~~23.4~~ 0.00	0947	
	~~23.4 - 26.4~~ JCK			
	24.6 - 27.6	0.15 bottom ft	1000	
	28.7 - 31.9	0.00	1007	

J-B105.				Background
10/30/10	2.1 - 4.1	0.00	1220	0.00
	4.1 - 6.8	0.00	1225	
	8.2 - 10.6	0.00	1230	
	12.3 - 14.8	0.05	1236	
	16.4 - 19.7	0.00	1242	
	20.5 - 23.0	0.15	1255	
	24.6 - 27.3	0.05	1310	
	28.7 - 32.0	0.00	1330	
	32.8 - 36.4	0.00	1336	

J-B106				Background
10/30/10	16.4 - 19.4	0.00	1530	0.00
	20.5 - 23.5	0.35	1535	
	24.6 - 27.6	0.25	1543	
	28.7 - 32.3	0.00	1600	

THE JOHNSON CO., INC.
100 State Street, Suite 600
MONTPELIER, VERMONT 05602
(802) 229-4600

JOB Pine St. Canal
SHEET NO. 6 OF
CALCULATED BY DMH, JCK DATE 11/01/10
CHECKED BY DATE
SCALE

Well	Depth (flags)	PID (ppm)	Time	Background
J_B106A	16.4 - 20.1	0.00	820	0.00
	20.5 - ~~28.6~~ 24.1 JCK	0.00	830	
	24.6 - 27.6	0.00	838	
	28.7 - 31.7	0.00	850	
J-B106B	16.4 - 20.1	0.00	1005	Background 0.00
	20.5 - 23.2	0.00	1035	
	24.6 - 27.3	0.00	1045	
	28.7 - 30.5	0.00	1120	
J-B106C	16.4 - ~~20.5~~ 19.2 JCK	0.00	1258	Background 0.00
	20.5 - ~~23.2~~ JCK 23.1	0.00	1304	
	24.6 - 26.7	0.05	1314	
	28.7 - 30.5	0.00	1325	
J-B106D	16.4 - 19.4	0.00	1442	
	20.5 - 23.7	0.00	1450	
	24.6 - 27.1	0.20	1457	

The Johnson Company, Inc.
100 State Street, Suite 600
Montpelier, VT 05602

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

PID CALIBRATION SHEET

Job Name: PINE ST		Job #: 1-087-02	
Equipment ID: MINI-RAE	Serial #		Lamp: 10.2eV
Brand of Standard	PINE ENV.		
Lot #			
Expiration Date			

Date	Time	Initials	100 ppm Isobutylene Value (ppm)	Site Background Value (ppm)
10-26-10	6:55	DM	99.95	0.5-0.7
10-27-10	6:45	DM	99.90	0.3
10-27-10	18:45	DM	100.15	0.15 Cal. check
10-28-10	6:45	DM	100.1	0.0
10-28-10	21:45	DM	107.1	0.05 cal check
10-29-10	7:10	DM	99.7	0.0
10-29-10	15:40	DM	106.0	0.0 cal check
10-30-10	7:00	DM	99.7	0.05
10-30-10	17:15	DM	109.0	0.15 cal check
10-31-10	6:50	DM	99.65	0.05
10/31/10	17:56	DM	104.0	Cal check 0.3
11-1-10	7:00	DM	99.95	0.0
11-2-10	9:10	DM	97.5	0.05 check

CONTENTS

PAGE	REFERENCE	DATE

VT RR charlie LeMeaux
cell 343-9207
Brion Muzey
~~26~~ cell 363-9645
Dispatch 862-2503
Ask for ALT. Perry Martell
demaximus cell 617-515-6696
THor Helgason 781-642-8775
Dave Boram 717 476-1777
GMP. John Tedesco
GMP Norm Terran
239-970-0343
Bed - Roger Donegan
658-0300
VT SMS Mike Smith
241-3879 cell 233-1513
EPA
Karen Lumino 617 918 1348
steve Mangione 617 918 1452

PW - Mike ELLINGWORTH
800-782-7260
Cell: 315-439-3936

Location PSCSPCM 6 Date

Project / Client

Dig site 9/30/10 Between RAILS,
450-650 FT so. of Drury Bridge
VT RAILWAY ROW
1 RAILWAY Lane, Burlington
(Dead end)
x street LaValley Lane
southend so. Champlain
Delivery @ End of ~~Bottom st.~~
South off Maple st.

Att, Comcast, GMP,
COMCAST.
NOT Verizon.

Dig site: 200 400 8439
expires.. 10/30 12:30

Driller + Ian
315 256 6208

Geoprobe 6620 T

Location PSCS PCM FB6 Date 10-25-10

Project / Client D Maynard
Ryan PHUZEV

Meet Brion 7AM.

T140 Delivery 9 AM.

Steve Manglone on-site Tues+Weds.
Bruce PIVETZ on site Tues-THURS.
Shaw Environmental 580-399-4361

PW on-site ~2 pm...

onsite 7AM.
50-60° F overcast.
Variable wind

Mob EQUP + supplies

DM

Location Date

Project / Client

~7-1 pm most active trains

Rutland Freight 11-1
and build train there

5-7 pm. Train returns
From Local

IAN Grassie... Driller...
Jim Robertsons
PW - onsite 16:00

Ryan off 17:00
PW, DM offsite 6:00

DM

Location PSCS PCM FB6 Date 10-25-10

Project / Client D Maynard

60' min. Beaver pipe.

DM onsite 6:45

60-70°F overcast, ~~showers~~ Calm

DM TO Supp

?N - Ryan on-site 7:00Am Sat.

Cal P.I.D - H+S meeting

MACRO-CORE BBL Length 4.2FT.

Liners 0.1' Clear x 4.1 FT

17 casings + BBL 4.1' Long

17 RODS.

Steam clean Downhole Equip before each hole

EPA + Shaw Env. onsite 12:30-1pm

T.Hdg. demaximus onsite 1600-16:35

DM N. off site 17:10

PW Offsite 17:10

Location Date

Project / Client

Boring JB101 - Directly Between MW-23 + MW-24

~20 FT W. of MW-23

21" E, 6" S. of Rebar Temp. BM.

0-0.6' Ballast Stone

0.6-3.9' 2.5' rec

0-0.6' Black Dry org GVL + M+FS, SHC.

0.6-1.1 Brn Dry Loose Mass. F+MS, SHC

1.1-1.6 Black Dry FS, Trc GVL SHC

1.6-2.1 Tan Dry mass FS SHC

2.1-2.5 Red BRN MOIST ~~Pere~~ PLASTIC Clay

core 3.9-8.0 3.1' Rec.

Brn-Tan MOIST SILT + clay trc FS, ANG GVL MASS

core 8-12.1 2.4' rec.

0-2' Brn tan to 2.0' (10") then grey MOIST - wet SILT + Clay, trc ANG GVL. SHC

(10.)

20:2-4' Grey wet FS+SLT, Trc GVL

Location PSCS PCM FB6 Date 10-26-10

Project / Client D. Maynard

J_B 101 cont.

core 12.1-16.2' 1.2' rec.
Grey Sat. Loose SLT + FS
massive. TRC Amb GVL

core ~~Driller says, (1.8' SU ROD)~~ pulled back
16.2 - ~~20.3~~ 17 2.2 rec. DM
0-0.9 Grey Sat Loose SLT+FS
TRC SA GVL, mass. SHC.
(17.1') 0.9-1.8 Red'dish Dump Dense
FIBROUS peat
(18.0) 1.8-2.2 Grey moist M+CS.

~~20.3 - 24.4~~ (1.8' SU of ROD)
1.2' Heave in Bbl. 1ft
pull rods. off-set + piston core.

P. core
20 - 24.1 3.9' rec.
0-2.6' Grey sat. mass F+M Sand
SHC
2.6-3.9' Grey sat. mass.
M+CS, some FS, TRC Gvl.
Little 1/4-1" wood chunks

DM

Location Date

Project / Client

P. core
24.0 - 28.1
core + Liner stuck in Barrel
Knocked out Sample
~2.5' rec.
~0-0.5' Grey sat. M+FS
TRC SR Red gvl
0.5-2.0' Grey Sat mass
micaceous FINE Sand
2.0-2.5' Grey sat, M+FS
one chunk wood
Faint naphthalene odor..

P. core
28 - 32.3 4.0' Rec.
NO ODOR
0-3.2 FT Grey Sat mass M+CS
Grad contact
3.2-4.0' Grey Sat. M+CS,
Lit S.A gvl, (Red Dudson Dolomite)
one 0.4' chuck clay +
wood chunk in tip..

DM

Location PSCS PCM FB6 Date 10-26-10

Project / Client

J_B101 cont. D. Maymard

P. core 32-36' 4.3' rec.

9-3.4' Grey Sat. Mass plastic Clay SHC

3.4-3.7' Grey Sat. Loose VFS+ SHC SLT

3.7-4.3' Grey sat. Mass plastic clay

P. core 36-40' TD 0.3' rec. in shoe.

Grey Sat mass plastic clay

water tote ~ 50 Gal = 0.55 FT

14:45

USE initial spec for Concrete 3 gal/50# Bag 47#

Start w/30 Gals H2O

9 Bags. Type I/II Quickrete Portland cement

30 oz. Enviro plug No. 16 Bentonite 50# Bag Liquid.

DM

Location Date

Project / Client

Took entire Batch ~ 40 Gal @ 32'

2nd Batch. 15:15

H2O Buckets ~30 Gal LHT, 8 Bags cmt.

~ 30 oz. Enviroplug.

Chase w/ 3 Gals H2O

Took entire Batch, ~35 Gal @ 32'

3rd Batch 25 Gal H2O, 8 Bags cmt

15:30 ~ 30 oz. Enviro plug

@ 28' took entire 30 Gal Batch.

Chase w/ 4 Gals H2O.

4th Batch @ 26 FT @ 16:00

30 Gals H2O, 9 Bags cmt

~ 30 oz. Bent.

~ 10 Gals pumped in until surface grout

Total ~ 10# Bent

34 Bags x 47# cement

95 Gals H2O

Ryan off site 17:00.

Steam clean Rods + pipe

DM.

Location PSCS PCM FB6 Date 10-27-10

Project / Client

D Maynard

DM onsite 6:30
PW onsite 6:45
RJ onsite 7:10

60°F overcast 5-10 mph SE w/ light showers. clearing, 70° in PM
B101 Full of cement to 0.2 FBGS

Set up on J-B102
~26' due SO. of JB101

~~45'~~ 40' casing @ well head.
DM 11-27 ~~50'~~
EPA + Shaw Env. onsite
10:15 - 12:05

Geotechnics on-site. 11:35-12:00

PW off-site 1800
JCO offsite 1800

Location Date

Project / Client

J-B102

~0.5' Ballast Stone
core 0-4.1 F

0-0.6' Black Damp M+FS + org GVL SHC

0.6-0.8' Tan Dry F+MS SHC

0.8-1.4' Black Dry M+FS+GVL SHC

1.4-2' Brn Humid mass FS

core 4.1-8.2 3.4' rec.
Red-Brn - moist Dense mass. plastic Clay + SILT, Trc SA GVL

core 8.2-12.3' 3.0' Rec
Brn wet clay + SILT, Trc GVL mass, plastic

DM

Location PSCS PCM PB6 Date 10-27-10

Project / Client D. Maynard

B102 cont.

Core 12.3-16.4 2.9' rec

0-2.3' Grey Damp-Moist mass. Dense Silt + clay SHC

(14.6) 2.3-2.9' Red-Brn Damp Dense Fibrous peat.

~ 13" Heave in Casing @ ~~14.4'~~ 20.5' DM 10/27

~~Add water + core~~

16.4-20.5 3.5' rec.

0-2' Red-Brn Damp Dense Fibrous peat SHC

(18.4 FBGS) 2-3.5' Grey wet mass. M+FS.

pull casing - re-enter Hole w/ piston core.

Hole Caved ~~to~~ ~ 12 FBGS

DM.

Location Date

Project / Client

P. core 20-24.1

core stuck in Barrel - Hammer core out of sleeve

~ 3' recovery

0-2.7' Grey wet mass. M+FS. SHC

one 0.3' layer M+CS, ~~SM~~ DM

NO ODOR. Little SRGVL, wood chunks

(~21-21.3 FBGS) ~ 1-1.3' SHC. (Bagged)

~ 2.7-3' Grey Sat mass. FS

~~P core~~ Bag headspace 21-21.3 = 0.7 ppmV after 20 min.

B6 in Baggie (empty = 0.55 ppmV)

P core 24-28.1 3.2' rec.

0-0.5' Grey Sat M+FS, some SRGVL SHC.

(~26.2-26.9) 0.5-2.2 Grey Sat M+FS 0.1' FS layers @ 1.0, 1.4, 1.7 SHC

PID #5 in Bag = 0.5 after 10 min. 2.2-2.8' Grey wet CS+GRVL, some WOOD. SHC

2.8-3.2' Grey wet F+MS.

DM

Location PSCS PCM FB6 Date 10-27-10

Project / Client D. Maynard

B102 cont.

P core 28-32.1 4.0' Rec.

0 - 3.7' Grey Sat mass
M+FS. SNC

(Bag HS on 29-30 Fbgs = 1.55)

3.7-4.0 Grey Sat mass
Very Fine sand, Little SILT

P core 32-36.1 1.3' rec.
Grey wet Dense
Clay + SILT

---

reg. core. (Drive to 36 w/ piston plug
pull plug + core..
core 36-40.1 4.0' rec.
Grey, Sat. plastic
massive Clay + SILT
TD 40.1 ft.

DM

Location Date

Project / Client

Grout Mix	5 Gal Buckets H_2O	47# cement Bags	Bent	Time. Depth
#1	6=30G.	9	~½ Gal	12:50
—	— Follow w/ 6 gal H_2O			@32 Fbgs
#2 ~40G. Grout	30 G.	9 (423#)	~1½ G.	13:25
	Follow w/ 4 Gal H_2O			@27'
#3	30 Gal	9	~1 QT	13:45
	Follow w/ 4 Gal H_2O			@27'
#4	30 Gal	9 Bags	~½ Gal	14:15
~40 Gal Grout.				-14:30
	Chase w/ 4 Gal H_2O.			@23'
#5	18 Gal.	5 Bags	w/ BT	14:50
~25 Gal. Grout.				@23'
	Chase w/ 4 Gal H_2O			

TOTAL 185 Gal Grout
138 Gal H_2O, 41 Bags, 2 Gal Bent.
End Grout 15:10
Grout in Hole to. unknown
Depth Due to Caved
Ballast Rock

DM

Location PSCS PCM FB6 Date 10-27-10

Project / Client D. Maynard

15:45

Grout extent test core

J-B101A

Located 3.4 FT SSE From B101

Drive w/ center Rod + Plug to 16.0 FBGS (Below top of RR Ties) remove plug + core.

Core 16-20.1, 3.5' recovery

0-1.2' Red Brn Pump Dense Fibrous peat SHC.

1.2-3.5'

Grey Wet mass

M+CS - No sign of Cont Grout

No odor

Core 20.1-24.1 3.6 FT Rec

0-2.3' Grey Sat. mass M+FS, Trc SA Gvl. SHC

No Grout No odor

2.3-3.8' Grey sat mass M+CS SHC

3.8-3.6 Grey Sat. FS trc wood

Location Date

Project / Client

B101A cont.

Piston Core 24-28.1

core B61 stuck in casing

Hammer out core

~2.5-3 FT recovery

0-0.3 Grey Sat- M+CS

0.3-1.2 Grey Sat. F+MS Trc SR Red gvl.

1.2-1.6 Grey Sat M+CS

1.6-2.5 Grey Sat Micaceous Fine Sand

2.5-3.0 Grey Sat. M+FS

No odor

No stains

No evidence of Grout

DM

Location PSCS PCM FB6 Date 10-28-10

Project / Client D. Maynard

B101 cont. - Piston core

28.0-32.1 TD

Core Barrel stuck in Liner

Hammer Core Out

~3.5' recovery

0-3' Grey Sat mass

MTCS SHC

3-3.2 Grey moist SFS

Horiz. Partings

3.2-3.3 Cement Grout

BM organic - Not Fibrous

DM ~~Pulver~~ Decayed

10/29. wood chunk

mix Grout

~ 80 Gals H_2O

~ 40 #s Bent.

Trade From 32 FT to 35

took almost all ≈ 38 Gals.

Location

Date 10/28/10

Project / Client

JZD onsite 645 R. Dunzen 7:00

PW onsite 7:00

60°F overcast - clearing

Light winds

increasing 10-20 mph winds (east)

+ cloudy afternoon..

core B101A 28-32'

core + Grout B103..

Total Grout IN B103

245 Gals

56 Bags.

Offsite 17:15

Location PSCS PCM FB6 Date 10-28-10

Project / Client D. Maynard

CORE J_B103 25' N. of B101
12' E of ℄ center track

core 1.0-4.1 2' rec.
~~0-.5~~ Est. Ballast stone To 1'

0-0.3 Black Dry
ang gvl + m S. SHC
0.3-0.9 Tan dry F+MS SHC
0.9-1.3 Black Dry
m+FS + SR GVL SHC
1.3-1.7 Tan dry F+MS
1.7-2.0 Brn Damp SILT+FS
Little SR GVL FILL

core 4.1-8.2 3.7' rec.
Brn. Orange Damp Dense
Massive SILT + Clay

Core 8.2-12.3 3.5' rec.
0-2' Brn-orange
2-3.5 Grey
moist dense massive
SILT + clay, TRC. SA
GVL.

Location Date

Project / Client

Core 12.3-16.4' 2.9' rec.
0-2' Grey wet mass
S+C, TRC GVL SHC

(14.3) 2-2.9' Red-Brn Damp
Dense Fibrous
peat

core 16.4-20.5 3.0' rec.
0-1.4' Red-brown Damp
Dense Fibrous peat
SHC

(17.8) 1.4-3.0'
Grey, Sat. mass M+CS

Core 20.5-24.6 3.4' rec.
(use H_2O in pipe to prevent Heave)

(10.5) 0-0.2 Grey Sat CS + ang gvl
SHC
0.2-0.4 wood Chunks SHC
0.4-1.4 Grey Sat M+FS GC.
(21.9) 1.4-1.6 Grey sat. MCSG SHC
1.6-3.4 Grey sat. Horz Lam
FS and VFS

DM

Location PSCG PCM FB6 Date 10-28-19

Project / Client P Maynard

B103 cont.

core 24.6-28.7 3.3' rec

0-2.6 Grey Sat FS
Grading down
through VFS to
VFS, some SILT (SFS)
SHC

2.5 ppm V

(27.1) 2.6-3.3'
slight naphthalene odor
Grey Sat mass
M+FS

core 28.7-32.8, 2.5' rec.

0-0.2' Grey Sat. F+MS
SHC

(28.9) 0.2-0.4 Grey Sat.
CS + MS + SR bul
no ODOR (some Red)
SHC

29.1 0.4-1.1 Grey sat mass
MM + FS SHC

29.8 1.1-2.0 Grey Sat Loam (H)
S FS (VFS, some SILT)
SHC

(30.7) 2.0-2.3' Grey Sat Dense clay + SILT
MM SHC

Location Date

Project / Client

(31) 2.3-2.5' ~~Red~~ BM Dump
Dense organic
Fibrous Peat (or decomposed wood)

core 32.8-36.9' 3.4' rec
TD
Grey Sat. Dense
massive Clay + SILT

Grout from 32 up. 11:45-415
pump in ~10 gals
pull up 1 FT. Then repeat

Lighter Mix 30 Gal H_2O + 8 47# Bags Cement

Mix #	H_2O	Cmt Bags	Bent	Grout Depth Vol
1	30 G.	8	~1-2 cups at 0 w 10/20	35 G. 32-28
2	30 G	8	~2 cups	35 28-24
3	30	8	~2 cups	35 24-20
4	30	8	~2 cups	35 20-16
5	15	4	~1 cup	18 16'
6	15	all chased w/ 4-5 Gal H_2O to clear pump..	~1 cup	18 16

Dm

Location PSCS PCM FB6 Date 10-28-10

Project / Client D Maynard

15:30

continue Grouting B103

current total 175 Gal Grout.

150 Gal H_2O 40 bags cem

(~40# Bent. Total)

Mix #7 30 Gal H_2O 8 Bags cem @ 14 FT

35 Gal Grout + 1/2 G. Bent

Mix #8 30 G H_2O 8 Bags 1 QT Bent

Final 35 Gal Grout @ 14 FT

DMM

Location

Date 10-29-10

Project / Client D. Maynard

45-55°F showers, mostly cloudy 10-20 mph WSW wind

DM onsite 7:00 off 16:15

RJ onsite 7:00 off 16:04

PW onsite 6:30 off 16:15

core + Grout J-B104 Located between CTR + E. tracks 75' North of B101

TO ~36 FBGS

Chris Shoner is RR Flagman

core JB104A - 3' from J_B103 TO 32 FT

DM

Location PSCS PCU FB6 Date 10-29-19

Project / Client D. Maynard

J-B104

Core 0-4.1' 2.5' rec

0-0.5 Ballast no

0.5-

0-0.2' Black Dry M+CS + GVL SAC

0.2-0.6' Brn Damp M+FS SAC

0.6-1.1 Black Dry CS + GVL, SAC

1.1-1.5' Tan Damp Dense FS SAC

1.5-1.8 Brn Dry M+CS, SAC

(2.3) 1.8-2.5 Red-brn Dry Dense SILT + Clay TRC SA GVL (red Dolomite)

DM

Location Date

Project / Client

Core 4.1-8.2 3.8' rec.

Red brn + Grey mottled Damp to moist Dense Clay + SILT TRC wood GVL, chucks

Core 8.2-12.3 3.4' rec

0-2.2' Brn + Grey mottled SILT + Clay ~~+ SILT~~, TRC FS, GVL Brn GC

2.2-3.4 Grey SAA.

Core 12.3-16.4' 3.0' rec

0-1.6 Grey wet Dense mod. SILT + Clay TRC FS, GVL SAC

(12.9) 1.6-3.0 Red brn Damp Dense Fibrous peat

DM

Location PSCS PCM FB6 Date 10-29-10

Project / Client R. Maynard

B104 cont

core 16.4-20.5' 3.4' rec

0-0.8' Red brn Damp Dense Fibrous peat trc wood chunks SHC

(17.2) 0.8-1.3 Grey Sat mass M+CS SHC

(17.7) 1.3-1.7 Grey Sat mass M+FS, SHC

(18.1) 1.7-2.0 Grey Sat CSG NO ODOR (red pole) NO STAINS SHC.

(19.4) 2.0-2.5 Grey Sat M+FS, SHC.

(19.9) 2.5-3.4 Grey Sat mass M+CS

DM

Location Date

Project / Client

core 20.5-24.5 1.8' rec

(20.5) 0.-0.9' Grey wet mass M+CS Fining Down TO MS. SHC

(21.4) 0.9-1.8' Grey Damp Dense Horz. Lam. VFS, some SILT (SFS)

core 24.5-28.7 2.6' rec.

0-2.6' Grey Sat. VFS Laminated w/ FS and FS, LT SILT 1/4" TO 2" Layers SHC.

core 28.7-32.7' 0.6' rec.

0-0.2' Grey wet F+MS SHC

0.2-0.6 Grey wet VFS + SILT

DM

Location PSCS PCM FB6 Date 10-29-10

Project / Client

B104 cont. P Maynard

offset w/ 1ft recore.

28.7 - 32.8 3.4' rec.

0 - 1.2 Grey Sat. mass
No odor M + FS SHC
STRMS, NAPL

(29.9) 1.2 - 2.8 Grey Sat. Laminated
VFS SHC

(31.5) 2.8 - 3.4 Grey sat. Mass
Clay + SILT.

core 32.8 - 36.9' 3.4' rec.

0 - 0.2' Grey Sat Dense mass
Cly + SLT FS. SHC.

(33) 0.2 - 0.6 Red brn Damp Dense
Fibrous Peat, SHC.

(33.4) 0.6 - 3.4' Grey sat Dense
mass Cly + SLT

TD 36.9.

DM

Location Date

Project / Client

Grout B104 10:45 - 14:00

MIX #	H2O Gal.	Bags Cmt	Bent ~	Grout Vol.	Depth 32.28
1	30	8	1QT	35	32-28'
2	30	8	1QT	35	28-24
3	30	8	1QT	35	24-20
4	30	8	1QT	35	20-18½'
5	30	8	1QT	35	18½-17½
6	30	8	1QT	~~35~~	17.5'

Injected ~20 gals from Batch 6 until grout Surfaced

total injected
~195 Gals Grout
~170 Gals H2O
~45 Bags Cmt.

Total 48 Bags used

DM

Location PSCS PCH FB6 Date 10-29-10
Project / Client O Maynard

14:15
Core test boring B103A
TO test Grout radius-
Located 3 FT NE of B103

core 16.4-20.5' 3.0' rec

Base (17.9) 0-1.5' Red-brown wet
Dense Fibrous
Peat, SHC
1.5-3.0 Grey wet mass.
No cement. CS + MS

core 20.5-24.6 2.7' rec

(20.8) 0-0.3 Grey Sat. mass CMS SHC
(22.1) 0.3-1.6 Grey sat mass
M+FS, Lit CS, wood chunks
SHC
1.6-2.7 Grey Sat. M. Lom.
VFS, trc wood chunks

Dm

Location Date
Project / Client
B103A

core 24.6-28.7 3.3 rec.
0-2.3 Grey sat Lom VFS
SHC
(26.9) 2.3-3.3 Grey sat. Mass.
M+CS

core 28.7-32.8 3.3' rec
(29.7) Base 0-1.0 Grey sat mass
M+FS, trc wood
SHC
(31.3) Base 1.0-2.6 Grey sat VFS, Lit silt
SHC
(31.9) Base 2.6-3.2 Grey sat. mass
Plastic clay + silt
LC
3.2-3.3 Red brown
moist Dense
Fibrous peat.

30 Gal H2O
30# Bent Cut
1 Bag
TD 32.8
Grout w/ Gals. TO
No cement seen at All.
Dm

Location PSCS PCM FB6 Date 10-30-10

Project / Client D Maynard

PW, DM onsite 6:30
John Kozuskanich JCO onsite 7AM
40-50°F cloudy Light w sw breeze
showers

Core B103B ~16-32'
+ Bent Grout.

John offsite 16:30

DM-PW offsite
16:45

DM

Location Date

Project / Client

B103B 19 ft / FT so. of B103
core 16.4-20.5. 3.6 rec

0-1.5' Red brown Damp
(17.9) Dense Fibrous
peat SHC

1.5-2.6 Grey Sat. mass
no grout M+CS trc GVL

Core 20.5-23.6 2.9' rec
(20.7) 0-0.2 Grey Sat M+CS, SHC
(20.9) 0.2-0.4 Grey wet M CS + GVL
SHC (SR)
0.4-0.9 Grey Sat
M+FS, little CS, trc SLT
Little wood. SHC
0.9-1.9 Grey Sat mass.
F+MS, trc GVL,
trc organics SHC.
TOP (22.4) 1.9-2.9 Grey 15° Loam.
VFS v trc org.

DM

Location PSCS PCM FBG Date 10-30-10

Project / Client P.M. Lynard

B103B cont.

core 24.6-28.7 3' rec.

0-2.1 Grey sat. mass VFS.

(26.7)

2.1-3.0 Grey sat. mass
↗ M+CS, Little Gr
27.6 NO NAPL, NO Sheens
NO cement grout
(#1) slight Naphtalene odor.

core 28.7-32.8 - 3.2' rec

0-1.0 Grey wet mass MS+FS
(28.7)↗ SHC..

1.0-2.4 Grey wet VFS, TR silt
(31.1)↗ one pebble organics
SHC.

2.4-3.2 Grey wet mass Dense
(35.9)↗ plastic clay+SILT
SHC

3.1-32. Red-Grey moist
N. Fibrous peat + clay.

GM

Location Date

Project / Client

B103B. cont.

NO evidence of
cement grout
Throughout...

Grout from 32.8' TD
TO G-S wl

N28 Gal. H_2O
20 # Bent
30 gal. Grout.

core J-B105
Between CTR + E Docks
75' SO of B101

Core 0-4.1 2.0' rec
Ballast TO 2.1'
2' FBGS-3.2 Brinfed Damp
Dense Clay SHC

3.2-3.6 FBGS. Black MS
TRCAny gas SHC
3.6-4.1 Light Brn Damp
FS.

PM

Location PSCS PCM FB6 Date 10-29-10
Project / Client D Maynard

JB10.5 cont.

core 4.1-8.2 2.7' rec

(5.0') 0-0.9 Tan ~~10% Lam~~ 2cm FtMS ~~Lamin~~ SHC.

0.9-2.7 Brn Damp dense Clay + SILT

core 8.2-12.3 2.4' rec

0-1.3 Tan + Grey mottled wet Dense Clay + SILT g.c.

1.3-2.4 Grey wet mod dense Clay+SLT

core 12.3-16.4' 2.5' rec.

(13.7) 0-1.4 Grey wet mod dense Clay + SILT SHC

1.4-2.5' Red Brn moist dense Fibrous peat

Bm

Location Date
Project / Client

core 16.4-20.5 3.3' rec

(17.7 Bu) 0-1.3 Red Brn Damp dense Fibrous peat SHC

1.3-3.3 Gray sat MtCS

(19.7) Grading Down MS, some CS.

Core 20.5-24.6 2.5' rec.

(22.2) 0-1.7 Grey sat. mass MS, little FS, CS, SHC

Tree Bu: Tree woodchunk

1.7-2.3. Tan wet 10+5% Lam Grey FS SHC trc organics

(22.8) 2.3-2.5 Grey sat MtFS

core 24.6-28.7 2.7' rec

0-0.1 Gry sat MS SHC

(24.7) → 0.1-0.3 Gry sat FS, some SILT SHC

(24.9) → 0.3-2.7 Grey sat MS SHCS

(27.3) 0.05' FS, Cut SLT Layers @ 1+1.5'

Bm

Location PSCS PCM FBG Date 10-30-10
Project / Client R. Maynard

B105 continued.

core. 28.7-32.8' 3.3' rec

0-0.3 Grey sat F+MS SHC
(29.0)
0.3-1.2 Grey Sat mass. FS/+SILT SHC.
(29.9)
1.2-1.4 Red brown Dead Dense Fibrous peat SHC
(30.1)
1.4-3.3 Grey Sat. mass plastic clay+SILT

core 32.8-36.9 3.6' rec
TD
Grey wet plastic Dense Clay+SILT.

Tremie Grout with
35 Gal H2O
25# Bent
1 Qt Cement
From TD to GS.
DM!

Location Date
Project / Client

CORE J-B106
Located 4.5 Ft N
and 2.5 Ft E from B101

core 16.4-20.5 3.0 rec

0-1.6 Red-brn wet Dense FIBROUS peat SHC
1.6-1.7 Grey sat MS SHC
1.7-1.9 Peat as above SHC
(18.3) 1.9-3.0 Grey Sat mass MKS

core 20.5-24.6 3.0' rec
0-2.7 Grey Sat mass C+MS grading down TO M+CS TRACE
27.7
23.2
* naphthalene ODOR No sheen, NO NAPL SHC
2.7-3.0 Grey wet Loam. FS, TRC Organics

DM
10 ea

Location PSCS PCH FB6 Date

Project / Client D. Maynard

J_ B106 - Continued

Core 24.6-28.7 3.0' rec

(26.6) 0-2.0' Grey Sat mass (Few 1/4" HSC Layers) SILTY FINE Sand, Little SILT. Dm SHC

2-3 Grey Sat mass MS, sm CS, gvl CSR, white qtz + Quartzite Gravel

No Sheen NO NAPL.

★ Naphthalene ODOR

Core 28.7-32.8 TD 3.6' Rec.

(29.5) 0- 0.8 - Grey Sat MS, sm CS NO ODOR. SHC

0.8-2.8 Grey Sat Very Fine Sand, LIT SILT SHC

(31.5)

2.8-3.3' Grey Wet mass Dense clay + SLT SHC

(32') 3.3-3.6' Red Brn moist Dense Fibrous Peat. Dm

Location Date 10-31-10

Project / Client Omnogreen

PW onsite 6:35 off 16:30

DM onsite 6:45

John onsite 7:00 -

35-45°F rain 10-20mph NW wind

GROUT B106 20 94# Bags/ 3KID

Round tank 325 Gal

square tank 325 Gal

MIX# Gal H2O 94# Bags cmt Weight Bent VOL Time Depth

1 1/2 50# Bags Bent

Start 600 Gal 4 1/2 Bags (94#)

8:00 ~6 gal/Bag MIX. Nominal

① 115 gal @ 31 FT @ 9:30

② 100 gal @ 29 FT @ 10:00

③ 100 gal @ 28 FT @ 10:30

④ 100 gal @ 27 FT @ 11:00

⑤ 100 gal @ 26. FT @ 11:25

To Date ~~600~~ 615 Gals ~~420~~ 420 + 1 Bag Bent + 43 Bags 515 G. Grout. 390 Gal H2O (94#) Cmt.

+ 1 Bag Bent Start next set

60.5 total 285 Gal + 170 Gal H2O + 230 Gal. H2O + 23 Bags CMT

Location PSCS PCM FB6 Date 10-31-10

Project / Client D. Maynard

SWER Summary

WELL	Depth of Napth. odor
B106D	FBGS 25.9-27.1
B101	25.9-26.5
B101A	NONE
B102	NONE
B103	27.1-27.9
B103A	NONE
B103B	26.7-27.6
B104	NONE
B105	NONE
B106	26.6-~~27.0~~ on 27.6
B106A	27.0-27.1
B106B	26.1-27.0
B106C	26.1-26.9

7554 B106 Grout calcs.

2806 = 255 remaining H20

18 Bags cmt left →

1/2 Bag Bent

used 1 ~~1~~ Bag cmt →

175 Gals H20 1/2 Bent

Dumped 30 Gals Grout

Location Date

Project / Client

B106 Grout Continued

	Vol. injected	time	Depth
1	100 gal	@ 1216	@ 25 FT
7	100 gal	@ 12:50	@ 25 FT
	+ Another 230 Gal.		
8	100	@ 13:25	@ 24 FT
9	100	@ 13:55	@ 23 FT

End H20 ~~345~~ Gals

2nd qrt. ~~595~~ Gal + 1 Bag Bent on 10/31

Lm. ~~360~~ used for ~~43~~ 37 Bags.

Start w/ ~~354~~ Bags cmt

1 Bag Bent.

530 Gal H20

10	100G	@ 14:55	@ 22 FT
11	50G	@ 13:10	@ 21 FT.

13:13 cmt surface

@ B101A @ 8.2' SSW From B106

Location PSCS PCM FB6 Date

Project / Client D. Maynard

B106 95 gals
21-32 FBGS
water used 945 Gal. (94 #)
Cement used 97 Bags ant.
Bent used 242 Bags (50#)

Grout pumped in 1065 gals

DMN

Location PSCSPCM FB6 Date 11-1-10

Project / Client DMaynard

Check NAPL thickness
in MW23 & MW17

PM onsite 6:45 off 17:45
PW onsite 7:15 off 17:45
John K onsite 7:05 off 17:30

35-45°F overcast
10-15 mph NW wind.
Rain + sleet mid-Day

core test grout near
B106

MW23A NO DNAPL @ 7:15
MW23B 0:55' DNAPL
by bailer @ 7:20
MW17 0.20' by bailer @ 7:25

Location PSCS POW FB6 Date 11-1-10

Project / Client D Maynard

core B106A

Located 5.4' N of B106
1.5' W of B106

core 16.4-20.5 4.0' rec

(17.4) 0-1.0 Red Brn moist Dense Fibrous Peat SHC

1-1.15 Brn wet M+CS SHC

(17.7) 1.15-1.3 R-B Peat as above

1.3-3.6' Grey Sat mass MS, SmCS, FS coarsening ~~outward~~ Down wards.

3.6-4.0 Grey Sat M+CS, some SRGVL

20A

core 20.5-24.6 3.6' rec

0-0.6 Grey wet mass. MS S GC

0.6-0.8' Grey Brn M+CS, Little GVL, SHC

21.3

0.8-2.2 Brn Sat mass F+MS, TRC GVL, organics SHC WOOD

22.7

2.2-3.6 Grey Sat VFS Little SILT TRC org.

Location Date

Project / Client

B106A

core 24.6-28.7 3.0' rec

(26.2) 0-1.6' Grey Sat VFS, TRC SHC. org.

1.6-2.0 Grey wet SA-SR Gravel, Little MS, CS

(26.6) NO ODOR SHC.

2.0-2.4 Grey wet F+MS SHC

(27.0)

2.4-2.5 Grey wet SA Gravel SHC

(27.0) NO CONT, NO NAPL, SHC

* Trace Nap Naphthalene odor

(27.6) 2.5-3.0 Grey wet M+FS TRC GVL, TRC organics

core 28.7-32.8' TD 3.0' rec.

0-1.0 Grey wet MS, some CS SHC

(29.7) 1.0-2.2 Grey Sat Lam. (Horz) SHC VFS. TRC SILT, org.

2.2-2.4 Grey Sat. Clay+SILT SHC

2.4-2.9 Red brown wet Dense Fib. peat

2.9-3.0 SHC Grey wet Dense Clay +SILT

Location PSCS PCM FB6 Date 11-1-10

Project / Client D. Maynard.

Grout B106 A - 32 TOGS.
30 Gal H_2O
4 100# Bags cmt
16t Bent. 25 Gal Grout Injected

B106 B 2.5 From B106.
Located 2.3 FT N of B106
1.2 FT W of B106

core 16.4-20.5' 3.7' rec
0-0.5' Red brn wet Fib. peat SH
(17.9) - 1.5-2.0 Grey wet MS coarsen down
2.0-3.4 ~~2.0~~ - TO m + CS SHC
(18.4) 3.4-3.7 Grey sat FtMS

core 20.5-24.6 2.7' rec.
0-1.4 Grey wet mass.
M&FS, tre wood, SHC
21.9 1.4-2.5 Grey sat Horz Lam.
VFS, tre wood, slt SHC
23.0 2.5-2.7 Cement Grout
25.2

Location Date

Project / Client 0.08' Dia Orifice in TP

B106A Falling Head test in casing

Depth	ψ DROP	#Secs.
~~16.4~~ 20.5	0.2	35
~~20.5~~ 24.6	0.2	95
~~24.6~~ 28.7	0.2	124
32.8	0.2	95

B106 B

Depth	ψ DROP	#Secs.
20.5	0.2	110
24.6	NONE	120
28.7	0.2	67
32.8	0.2	37

B106 D
20.5
24.6
28.7
32.8

Location PSCS PCM FB6 Date 11-1-10
Project / Client D Maynard

B-106 B Cont.

core 24.6 - 28.7' 3.7' rec
one lump cement at top of core

0-1.5 Grey Sat Horz Lam VFS
T/C wood SHC
(26.1) 1.5-1.6 Grey wet M+CS+GVL SHC
* Naphth odor
(26.2) 1.6-2.0 Grey Sat F+MS SHC
2.0-2.4 Grey Sat medium
Sand + GAVL, Lit FS, CS
(27.0) * Naphth odor SHC
2.4-2.7 Grey wet F+MS

core 28.7 - 32.8 1.8' rec

0-0.3 Grey Sat Moss MS, SHC
(29.0) 0.3-1.2 Grey sat. VFS Grading down to FS+SLT SHC
(29.9) 1.2-1.5 Grey Sat. Dense Plastic Clay+SLT
(30.2) 1.5-1.8 Red brown wet Fibrous Peat
(30.5)

1.8' = 1/2" cement Grout

Location Date
Project / Client

B106B.

Grout w/ remainder of B106A cmt Grout ~ 25 Gal.

B106B mix 2nd Batch Grout 30 G H2O + 4 94# Bags cmt + 1 QT Bent
pump in 25 Gals to GS

B106C
Located 1.8' FT west of B106
core 16.4 - 20.5' 2.8' rec
0-1.4' Red brn Fibrous Peat moist Peat SHC
(17.8) 1.4-2.8' Grey Sat Moss MS, Some Coarse Sand
(19.2)

core 20.5 - 24.6 2.6' rec.
(21.7) 0-1.2' Grey wet moss M+FS SHC
(22.3) 1.2-1.8 Grey wet Moss M+FS, Little GVL
1.8-2.6' Grey wet Horz Lam FS and VFS, T/C Organics
DM NO cement Grout.

Location PSCS PCM FB6 Date 11-1-10

Project / Client D. Maynard.

B106C continued.

core 24.6-28.7 2.3' rec.

(24.6-25.0) 0-0.4' Cement Grout ! SHC

24.8-25-25.8 0.4-1.2' Grey wet mass VFS SHC

1.2-1.5 Grey wet MS SHC

1.5-2.3 Grey wet mass

(26.1) MS, little Gvl

26.9 * Faint naptha odor

core 28.7-32.8 TD 1.8' rec.

0-0.9' Grey sat mass MS SHC

(29.6) 0.9-1.2' Grey wet MS+GVL

(29.9) NO ODOR SHC

1.2-1.8 Grey wet mass

(30.5) VFS, Little SILT

MIX ~30 gal H20

three + ~~two~~ DM 11-1 94 # Bags cmt

+ 1/2 BT Bent

Grout

+ tremie from 32' TO GS

~ 15 Gals

DM

Location Date

Project / Client

B106D 1.6' From B106

Located 1.4 Ft South and

0.6 Ft west From B106.

core 18.4-20.5, 3.0' rec

0-1.5 Red brn wet Dense

Fibrous Peat SHC

(18.1)

1.5-~~2.9~~ Grey wet MS

3.0 grading Down to MS,

(~~19.3~~) SHC some CS.

DM 11/1 one Pink Pebble

~~DM 2.9-3.0 pink cement Grout~~

core 20.5-24.6 3.2' rec

0-2.3' Grey wet M+CS SHC

(22.8)

2.3-3.2 - Grey wet pale brn.

VFS Little organics

core 24.6-28.7 TD

2.5' rec

0-0.2' cement Grout SHC

0.2-1.3 Grey sat mass FS, trc org. SHC

1.3-2.5 Grey wet mass

Ft MS, Little GVL

(25.9-27.1) naptha like odor

DM

Location PSCS PCM FBG Date 11-1-10

Project / Client D Maynard

SR/GA = subround - subangular

Trowie Grout B10GD
w/ 15 gals cement
Grout mixed
for B10BC

Demobilize

MCSGr = MS and CS and GVL
+ = and
VFS = Very Fine Sand
FS = Fine Sand
MS = medium Sand
CS = COARSE Sand
MCS = MS and CS
CMS = CS and MS
G or GVL = Gravel
SLT = SILT
Cly = Clay
SHC = sharp horizontal contact
Sat = Saturated
Mass = Massive
Lam = Laminated
Brn = Brown
SLC = SILT and clay

Location [illegible] Date 11-3-10

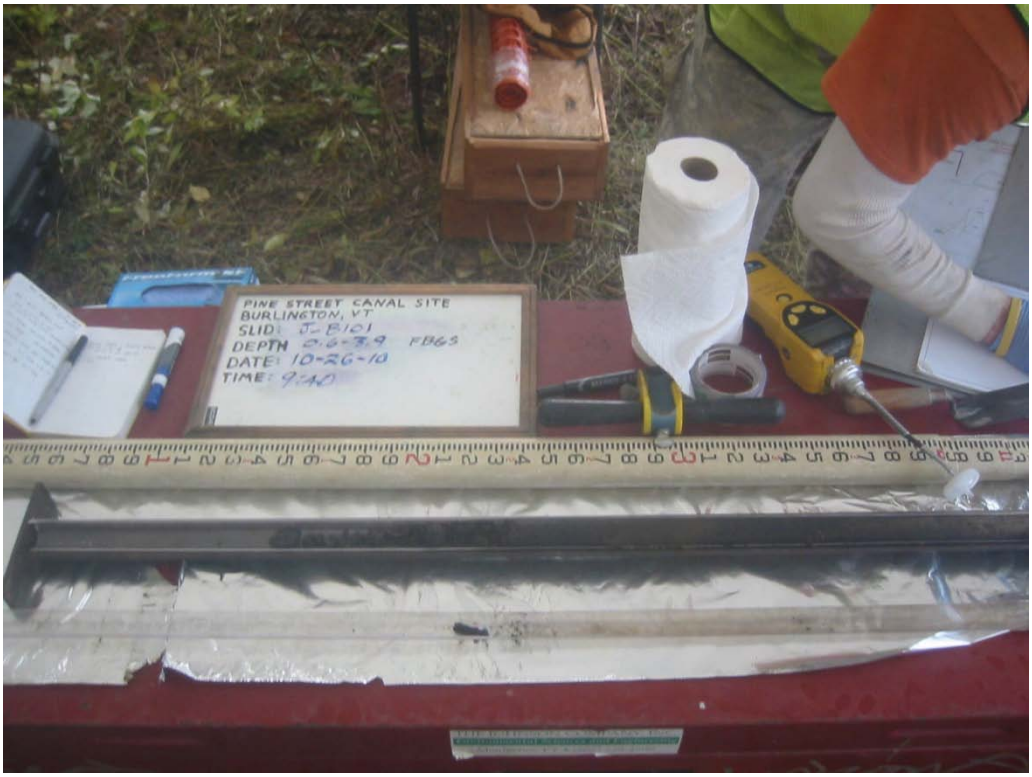
Project / Client D Maynard
T Osborne

on-site 12:15
clear - 40-50°F 10-15 mph wind
offsite 16:30
Demob. SW sampler DM

11-4-10
D Maynard, T Osborne
S. Donavan, J. Matt.
on site 9:00
off site 15:30
50°F showers
Light west wind
install pipe + cage
For Beaver Bypass

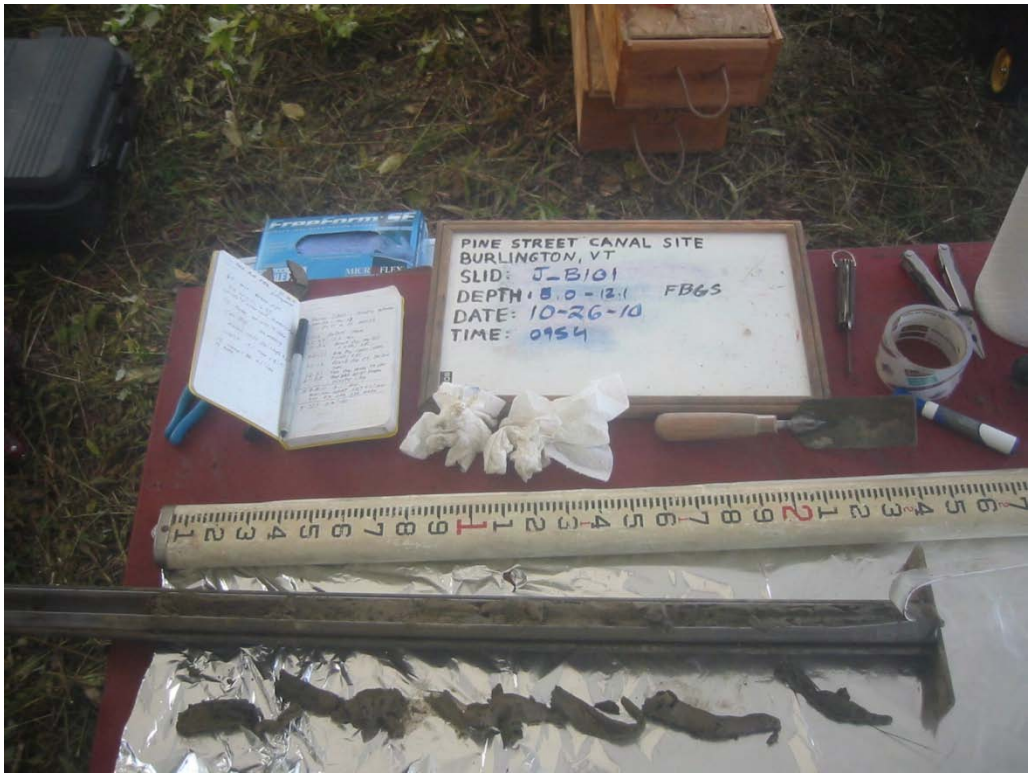
DM

Attachment 2
Photographs

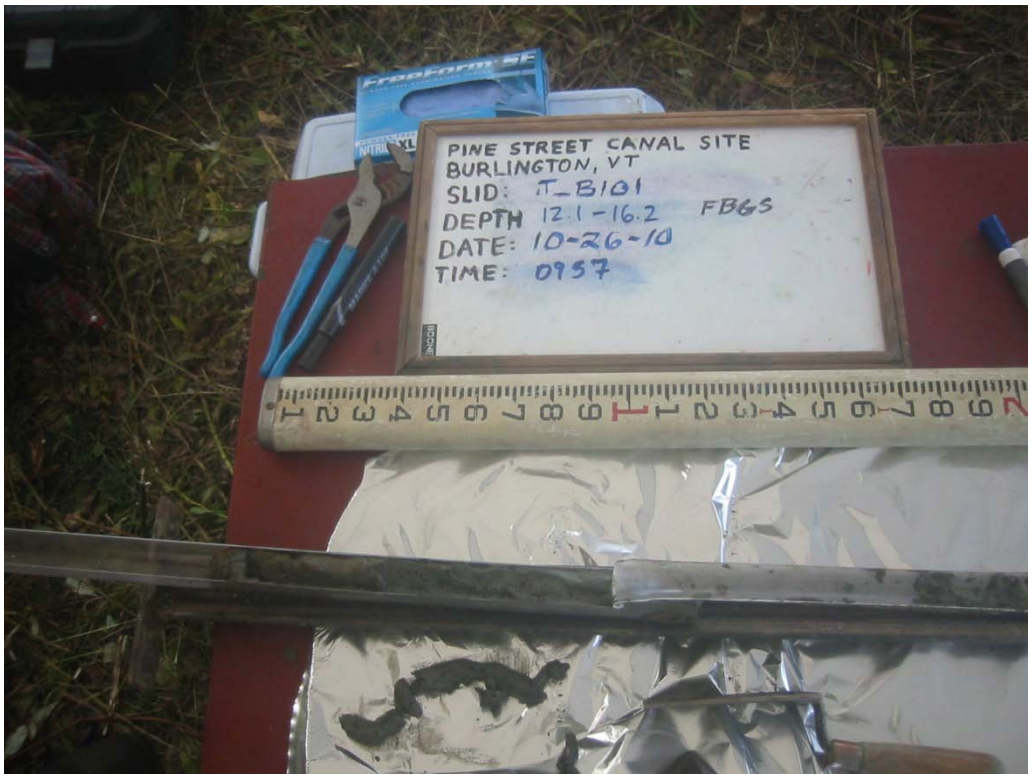


J_B101, 0.6-3.9 fbgs.

J_B101, 3.9-8 fbgs.



J_B101, 8-12.1 fbgs.



J_B101. 12.1-16.2 fbgs.

J_B101, 16.2-20.3 fbgs.

J_B101, 20-24.1 fbgs.

J_B101, 24-28.1 fbgs.

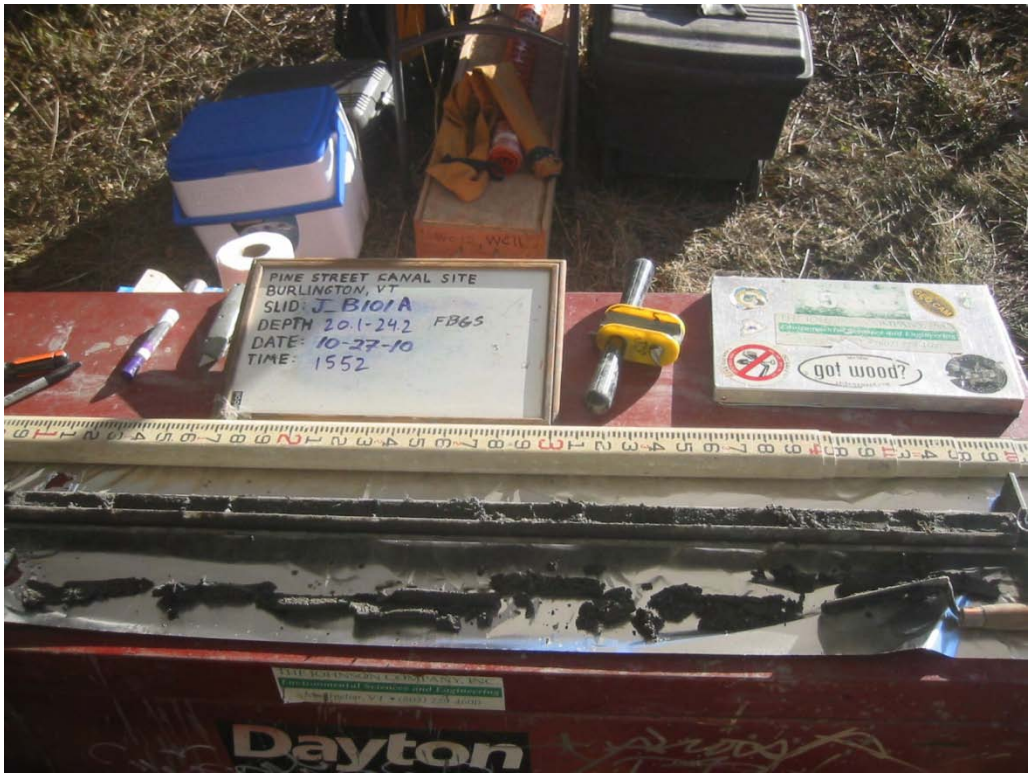
J_B101, 28-32.3 fbgs.

J_B101, 28-32.3 fbgs.

J_B101, 32-36 fbgs.

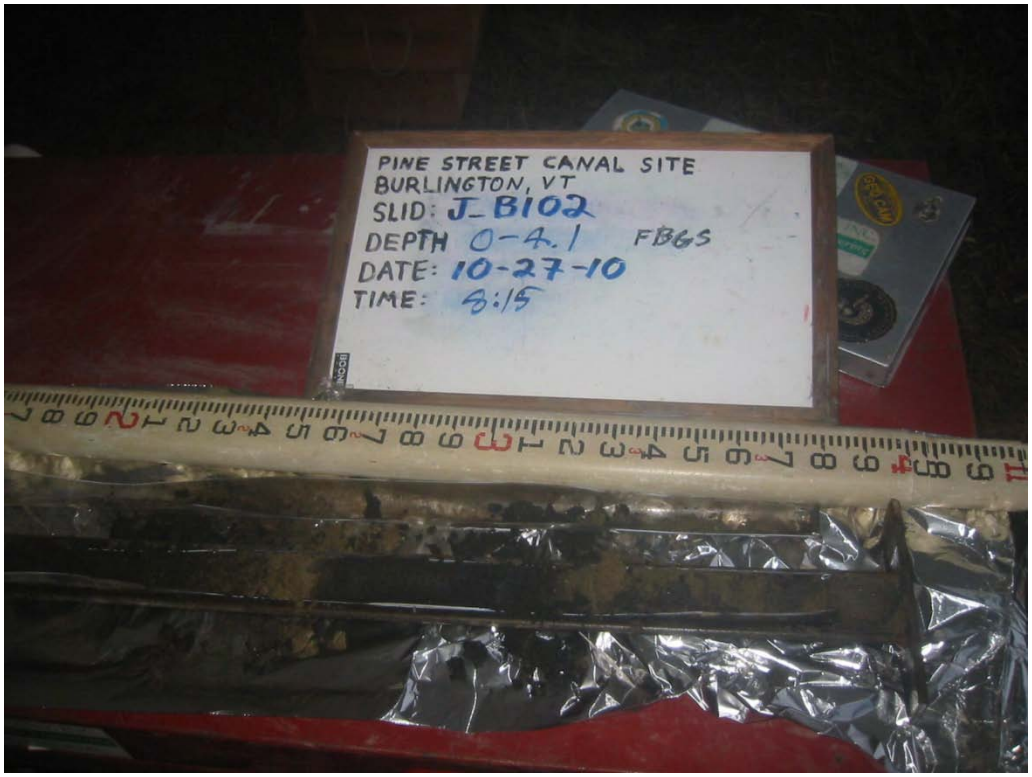
J_B101, 36-40 fbgs.

J_B101A, 16-20.1 fbgs.

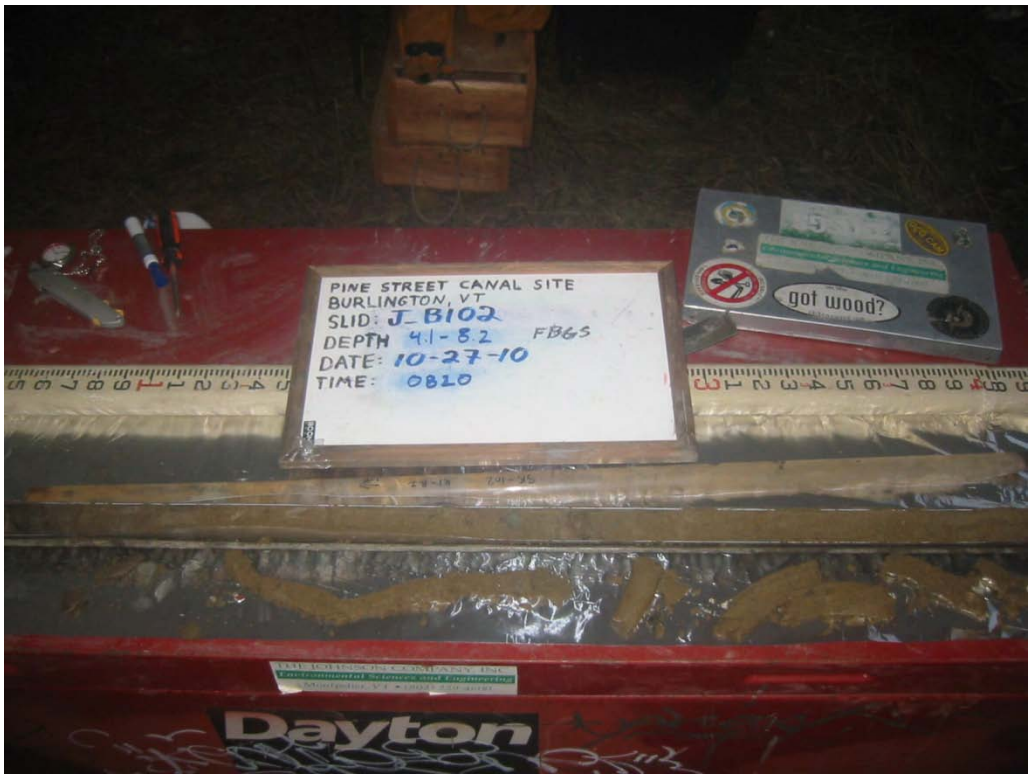


J_B101A, 20.1-24.2 fbgs.

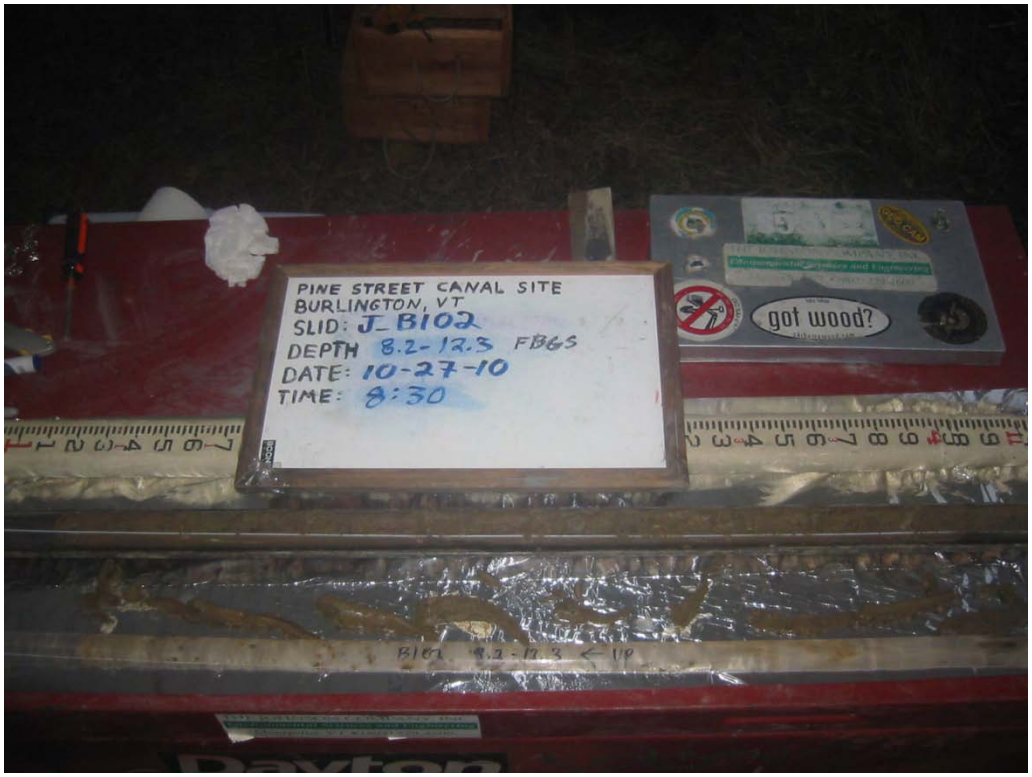
J_B101A, 24-28.1 fbgs.



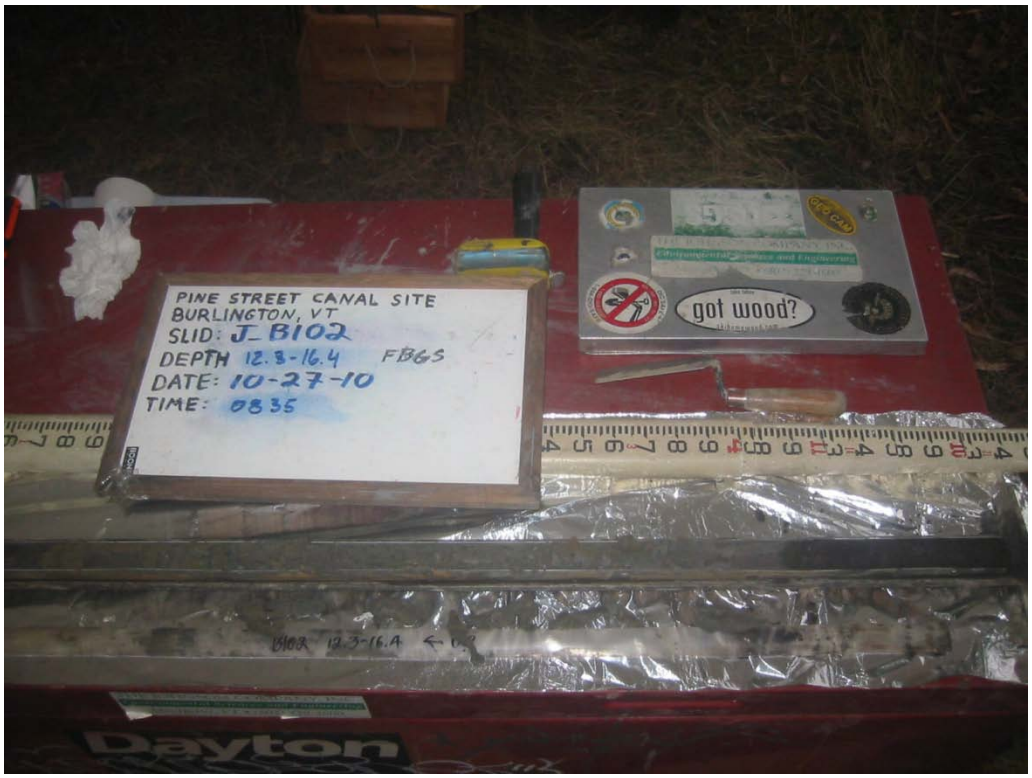
J_B102, 0-4.1 fbgs.



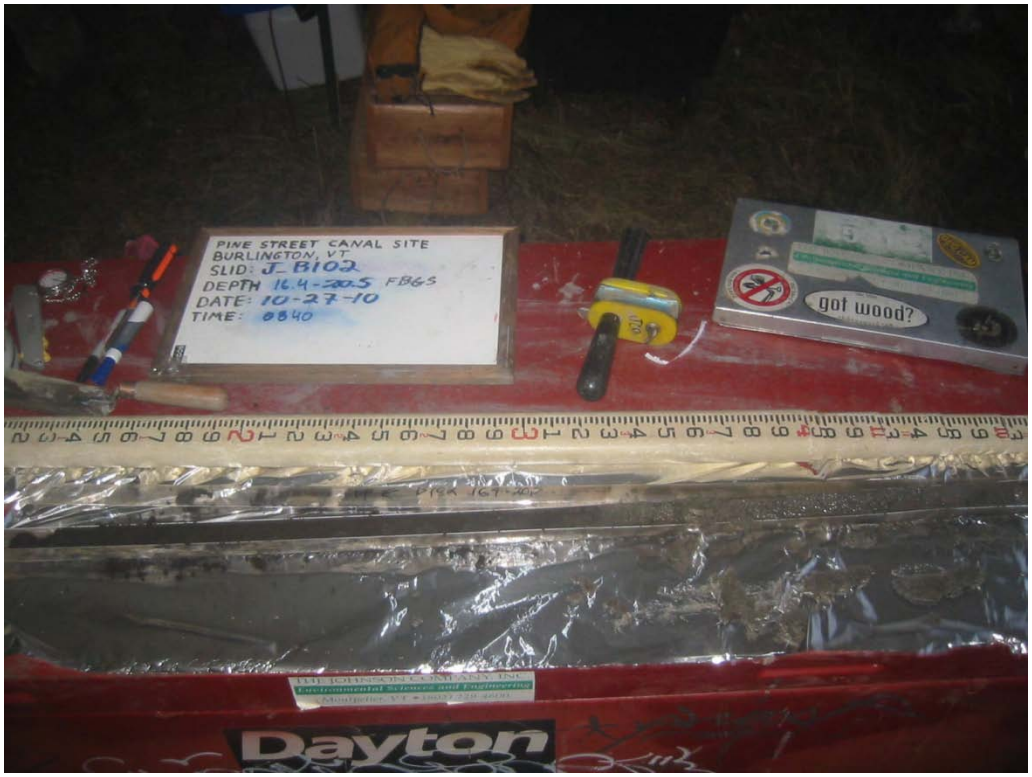
J_B102, 4.1-8.2 fbgs.



J_B102, 8.2-12.3 fbgs.



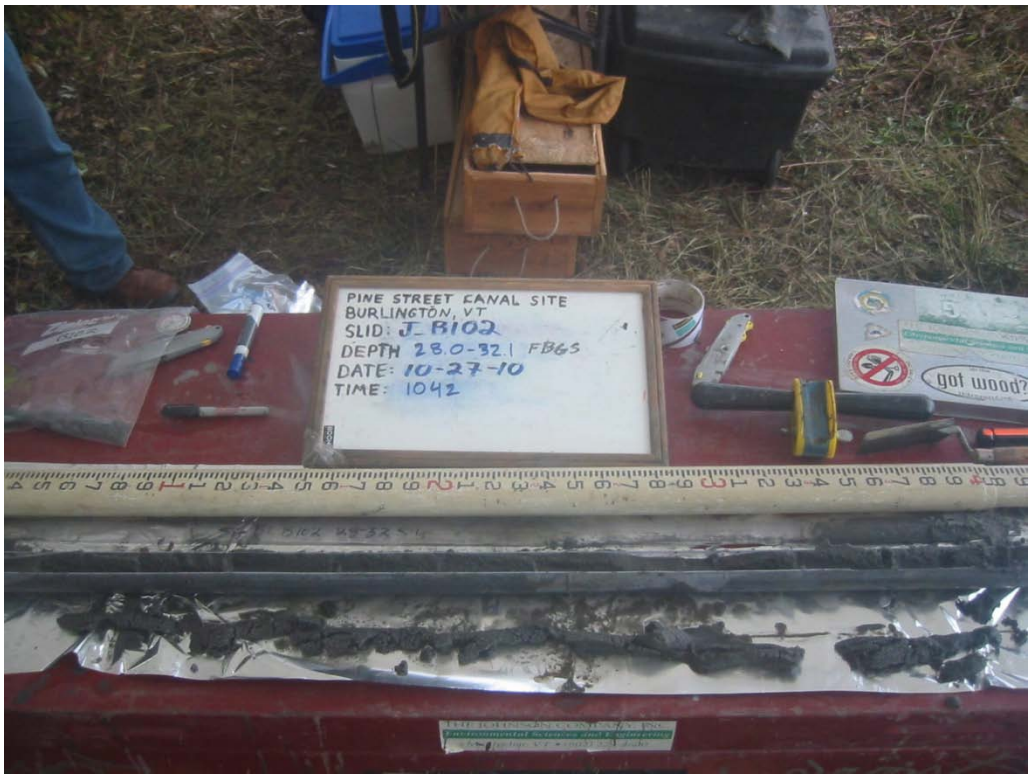
J_B102, 12.3-16.4 fbgs.



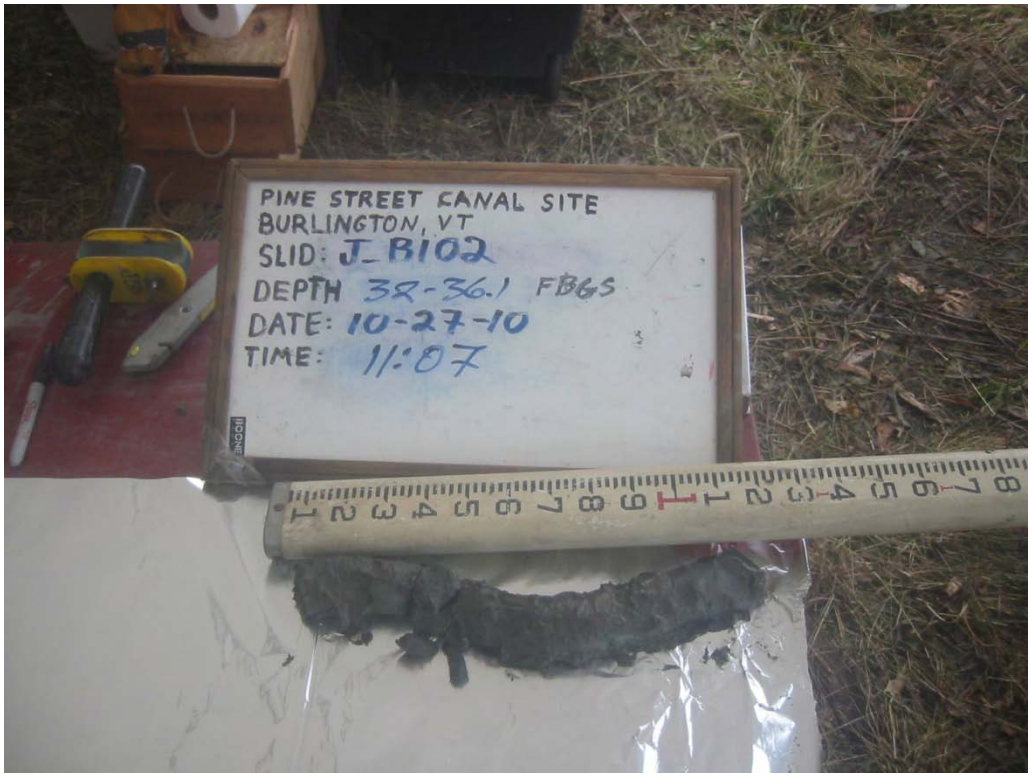
J_B102, 16.4-20.5 fbgs.

J_B102, 20-24.1 fbgs.

J_B102, 24-28.1 fbgs.

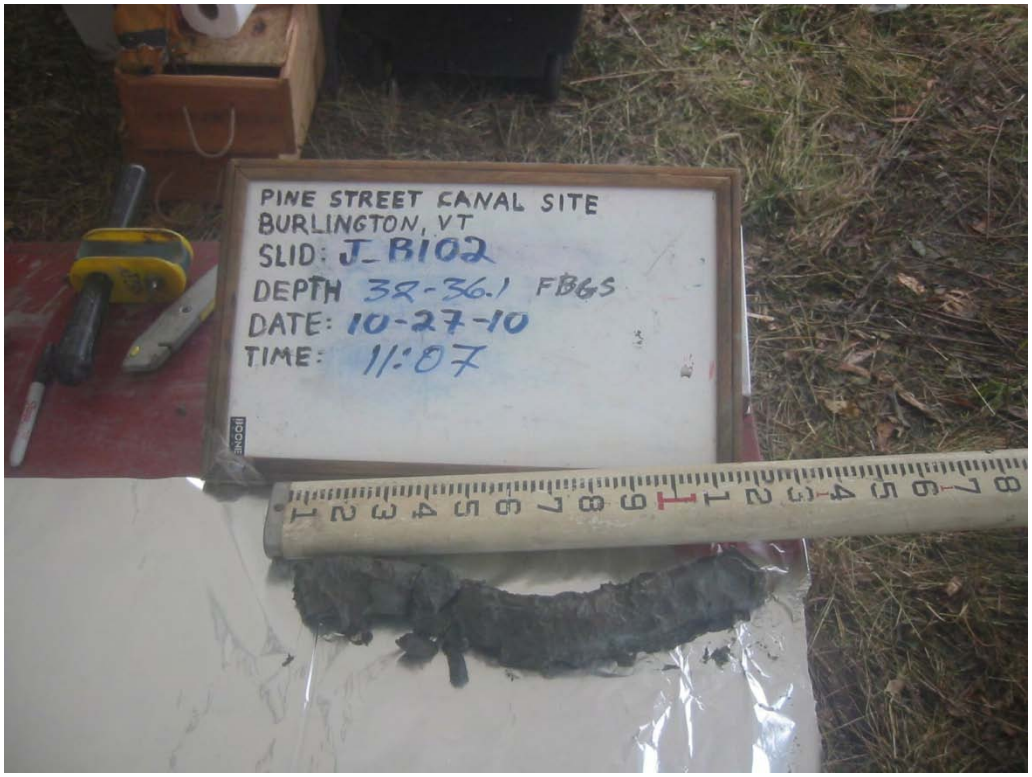


J_B102, 28-32.1 fbgs.



J_B102, 32-36.1 fbgs.

J_B102, 36-40.1 fbgs.



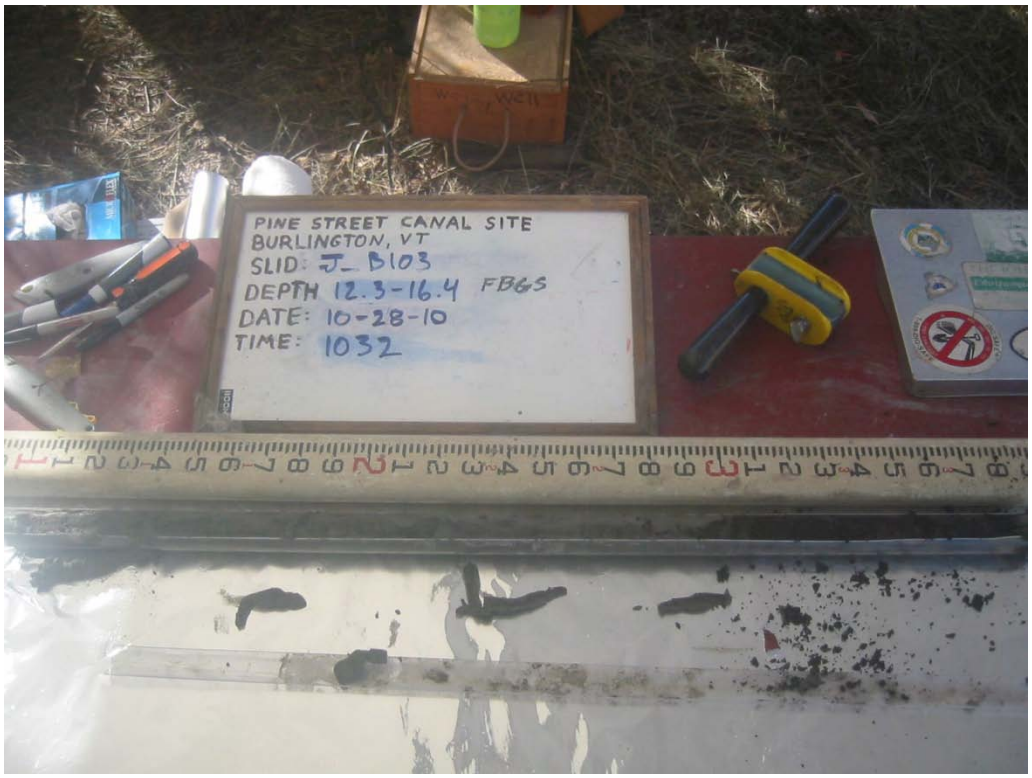
J_B102, 32-36.1 fbgs.

J_B102, 36-40.1 fbgs.

J_B103, 1-4.1 fbgs.

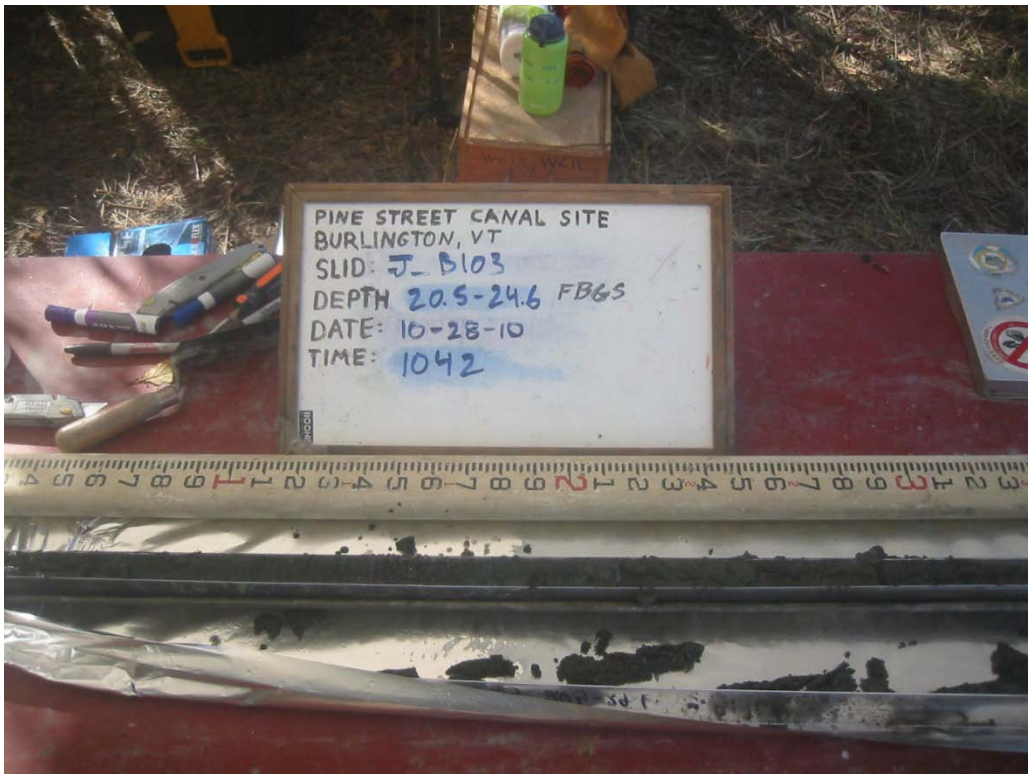
J_B103, 4.1-8.2 fbgs.

J_B103, 8.2-12.3 fbgs.



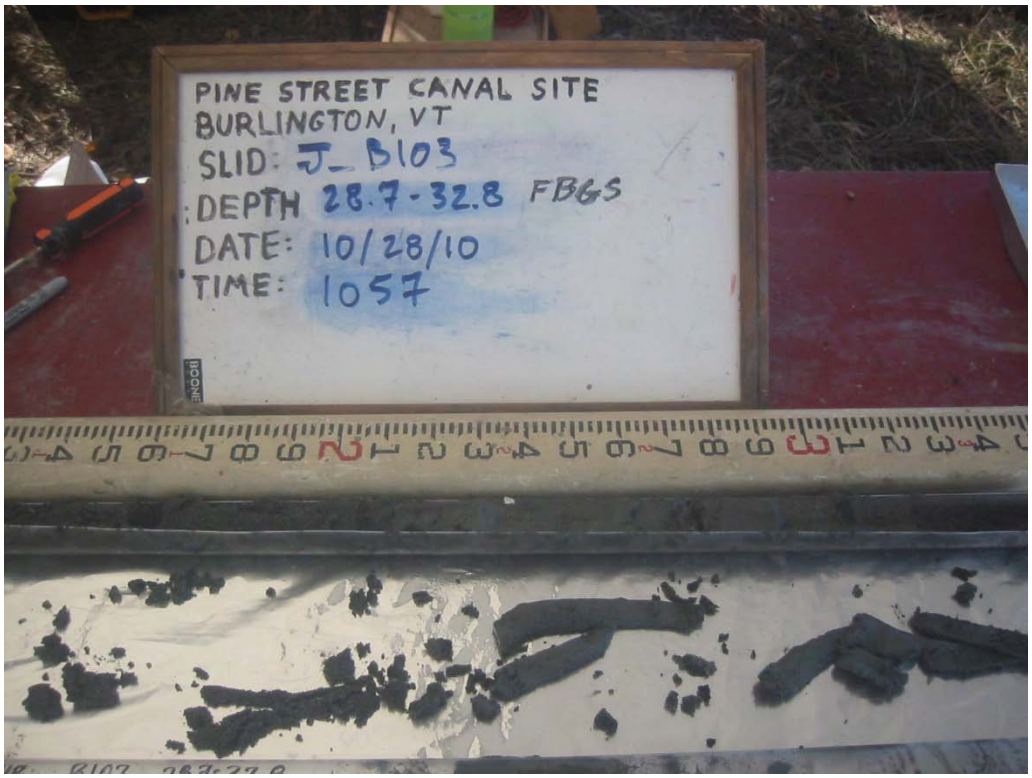
J_B103, 12.3-16.4 fbgs.

J_B103, 16.4-20.5 fbgs.



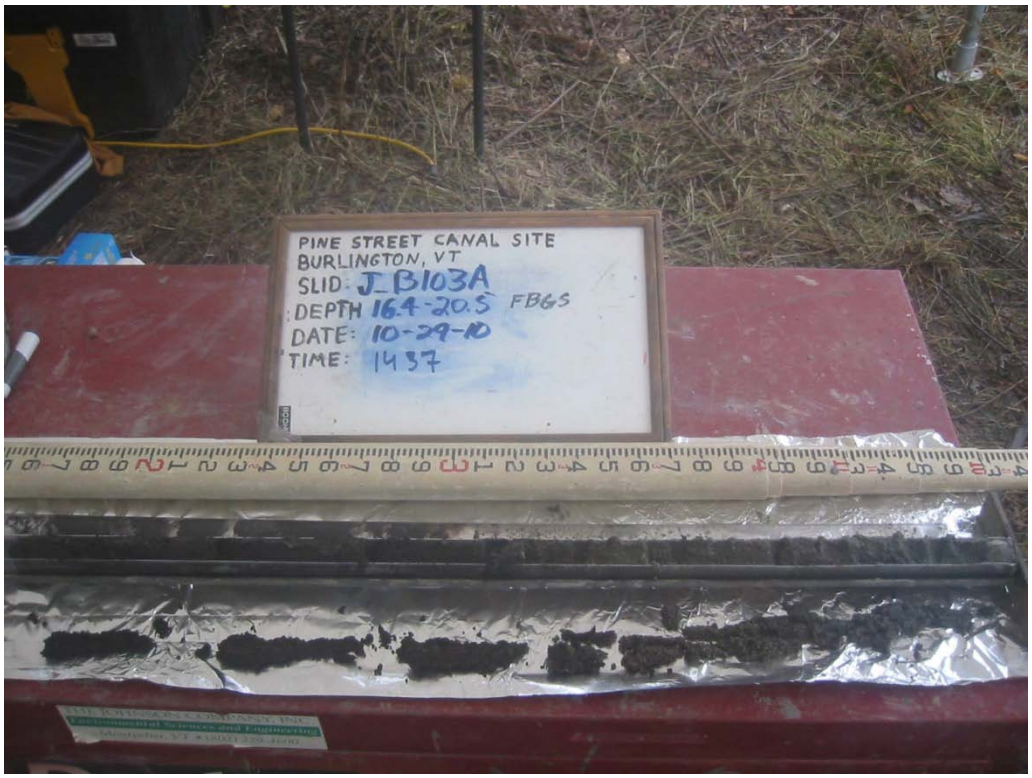
J_B103, 20.5-24.6 fbgs.

J_B103, 24.6-28.7 fbgs.

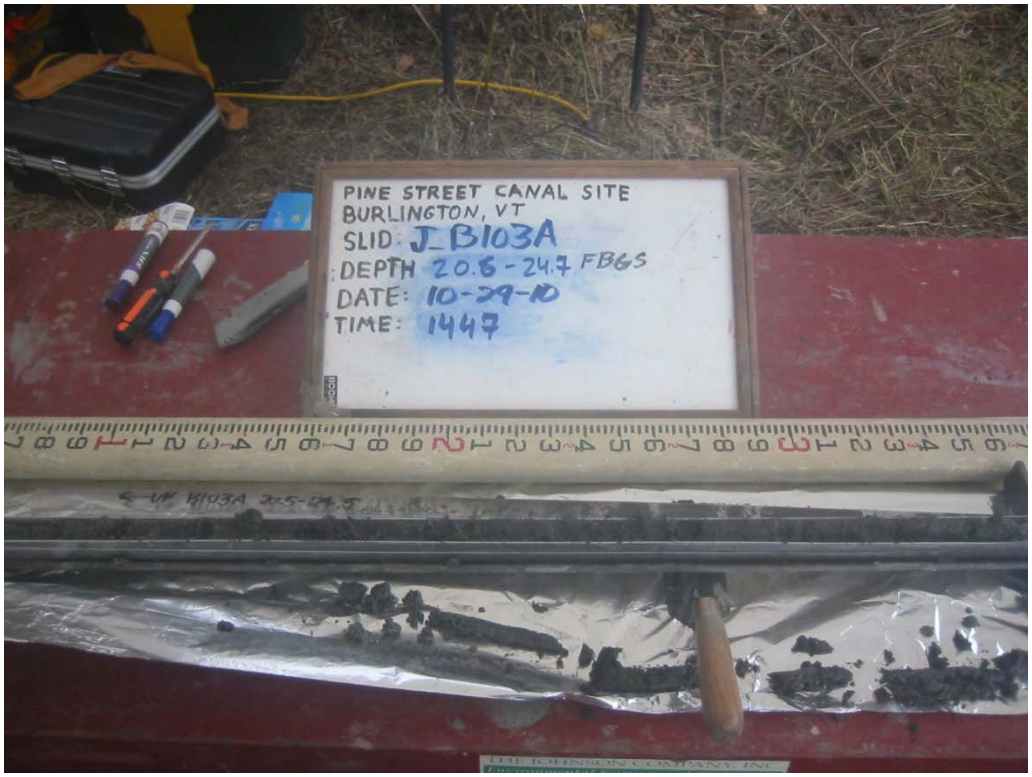


J_B103, 28.7-32.8 fbgs.

J_B103, 32.8-36.9 fbgs.



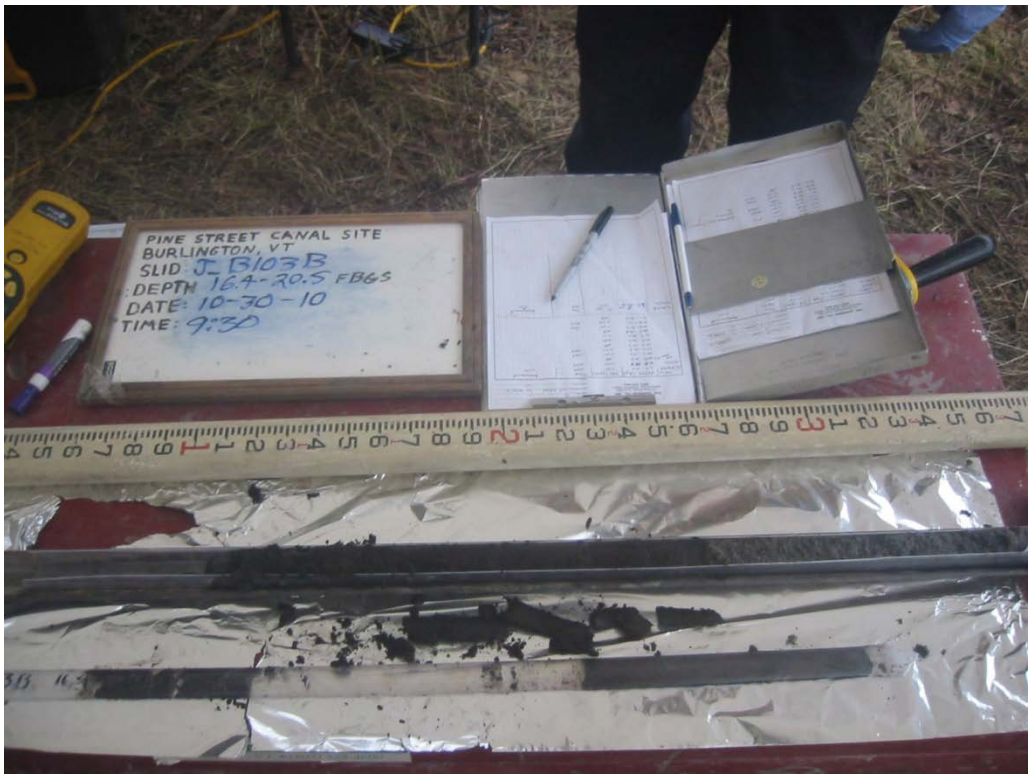
J_B103A, 16.4-20.5 fbgs.



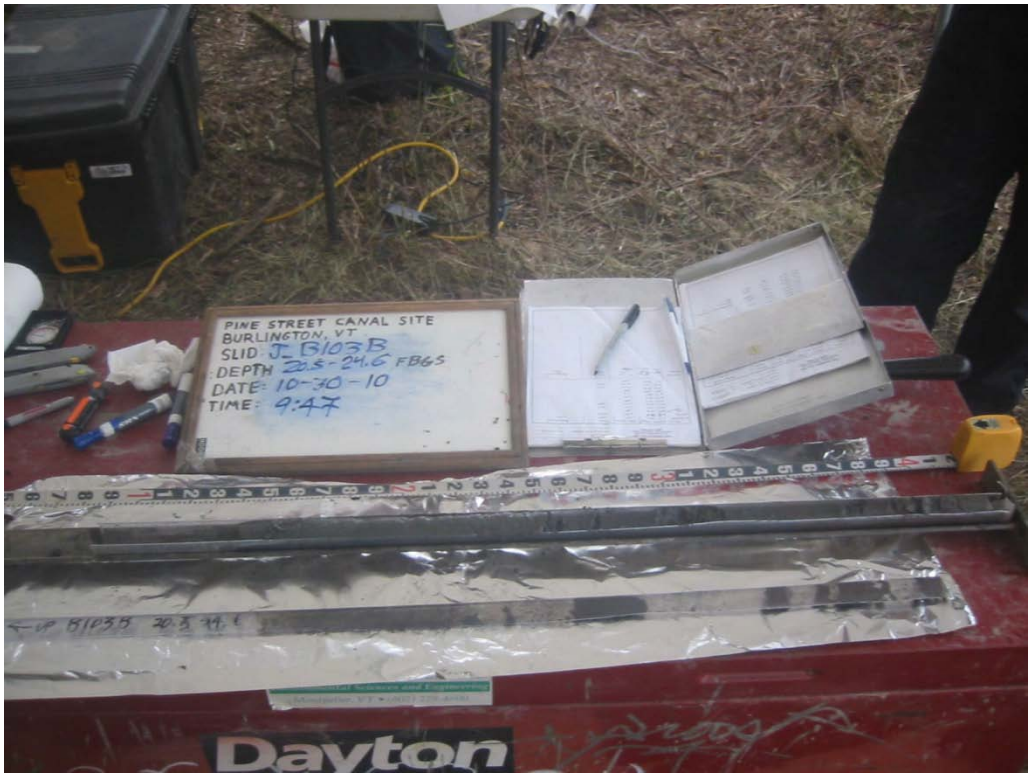
J_B103A, 20.6-24.7 fbgs.

J_B103A, 24.6-28.7 fbgs.

J_B103A, 28.8-32.9 fbgs.



J_B103B, 16.4-20.5 fbgs.



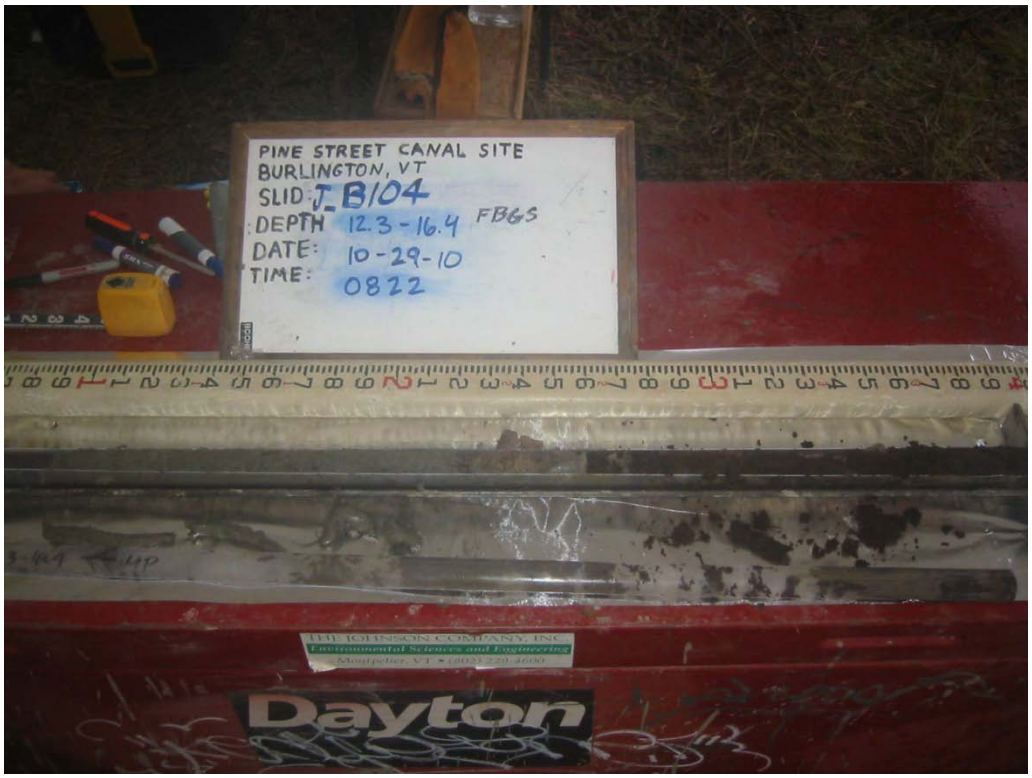
J_B103B, 20.3-24.6 fbgs.

J_B103B, 28.7-32.8 fbgs.

J_B104, 0.5-4.1 fbgs.

J_B104, 4.1-8.2 fbgs.

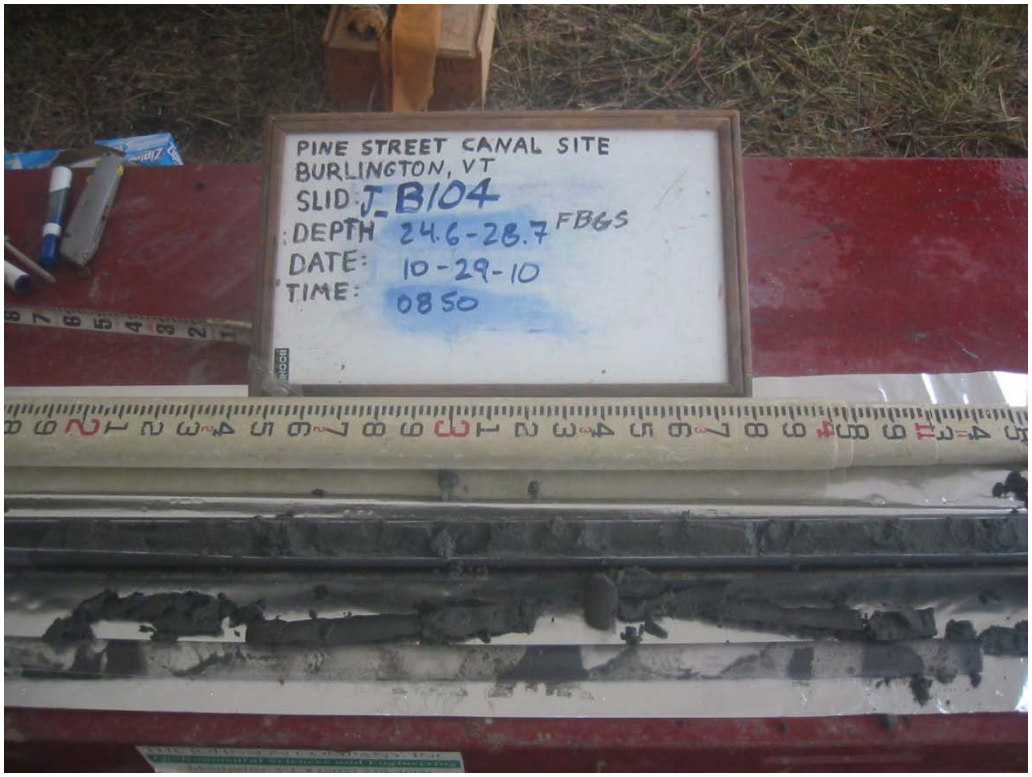
J_B104, 8.2-12.3 fbgs.



J_B104, 12.3-16.4 fbgs.

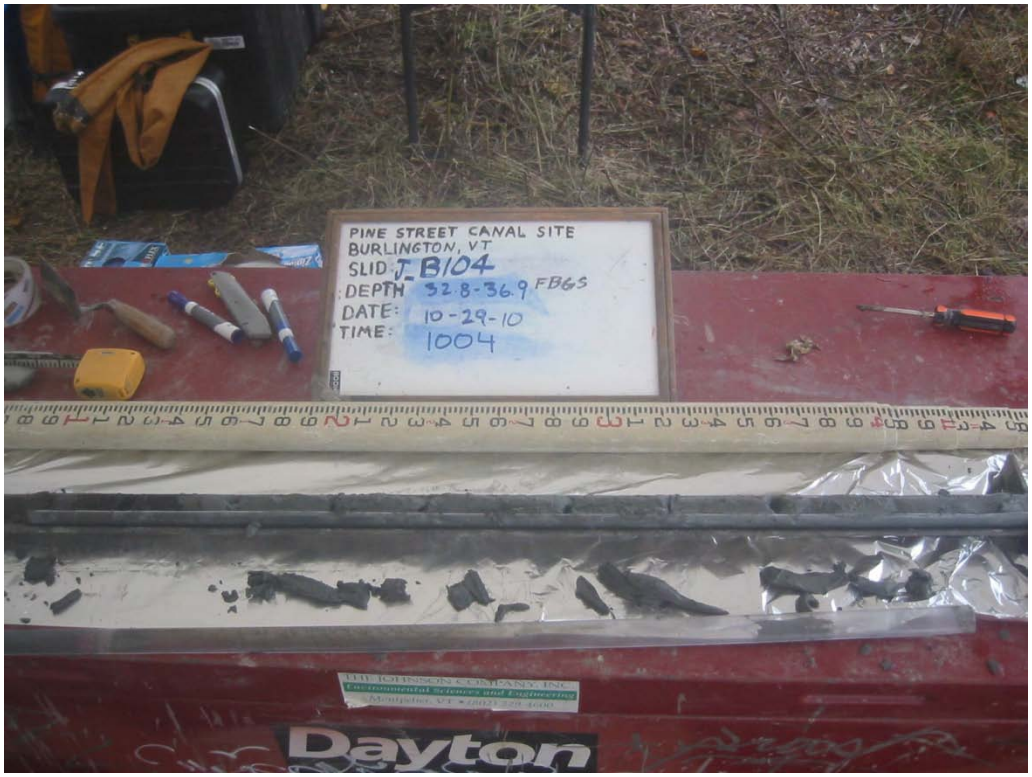
J_B104, 16.4-20.5 fbgs.

J_B104, 20.5-24.6 fbgs.



J_B104, 24.6-28.7 fbgs.

J_B104, 28.7-32.8 fbgs.



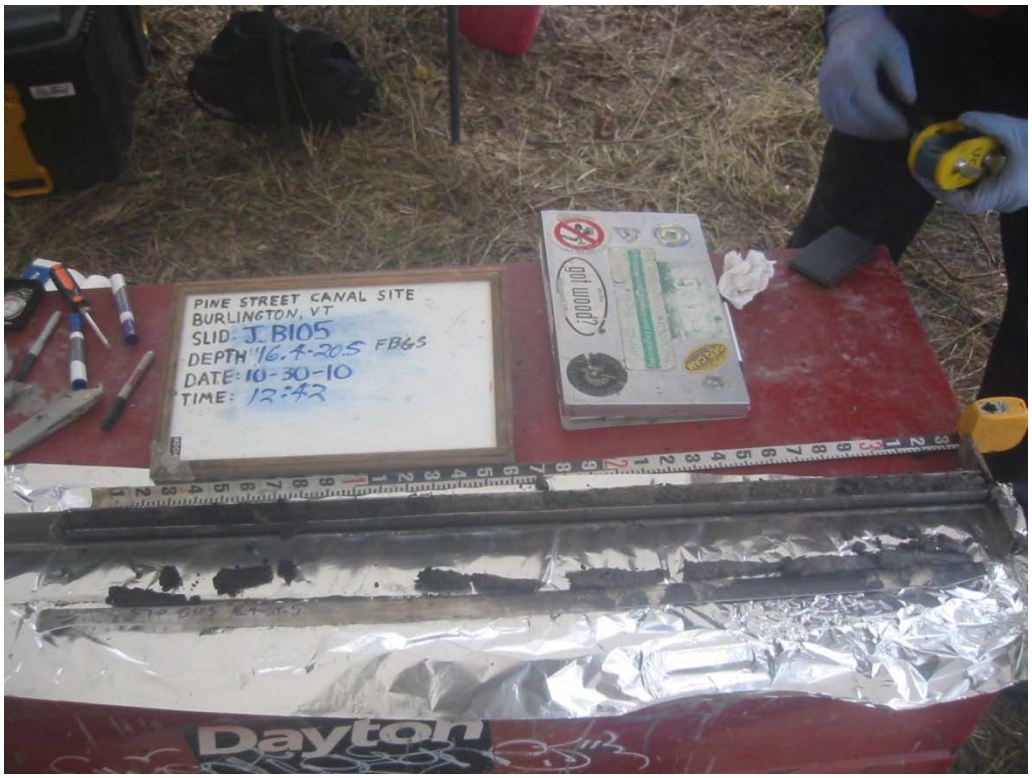
J_B104, 32.8-36.9 fbgs.

J_B105, 0-4.1 fbgs.

J_B105, 4.1-8.2 fbgs.

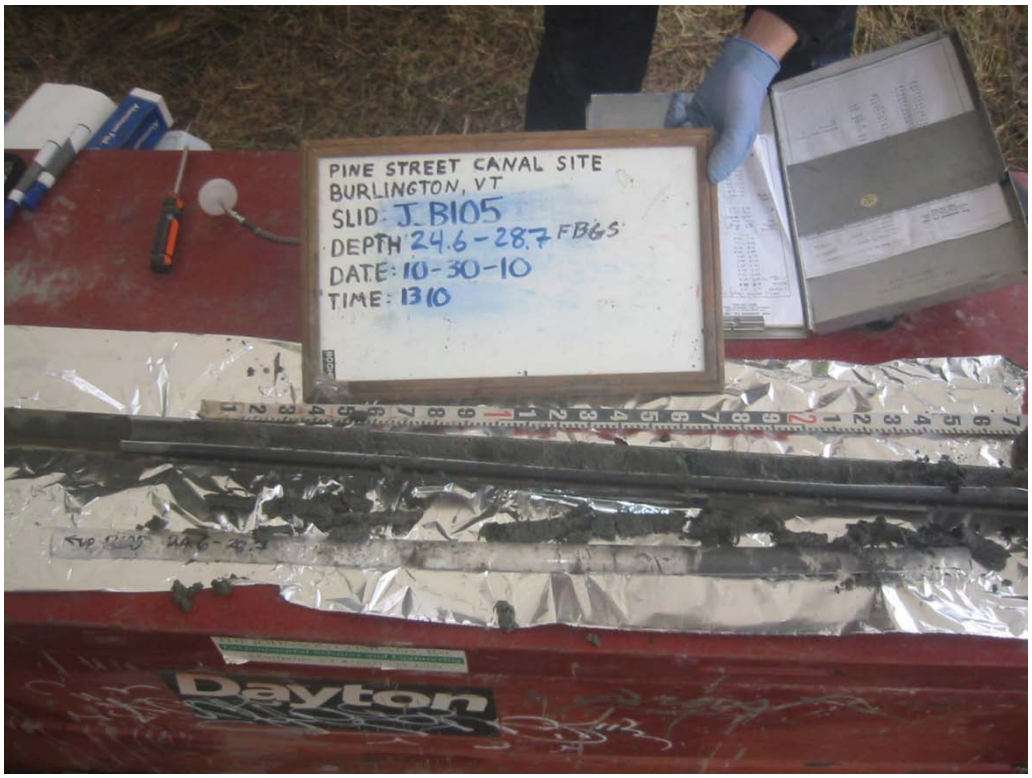
J_B105, 8.2-12.3 fbgs.

J_B105, 12.3-16.4 fbgs.



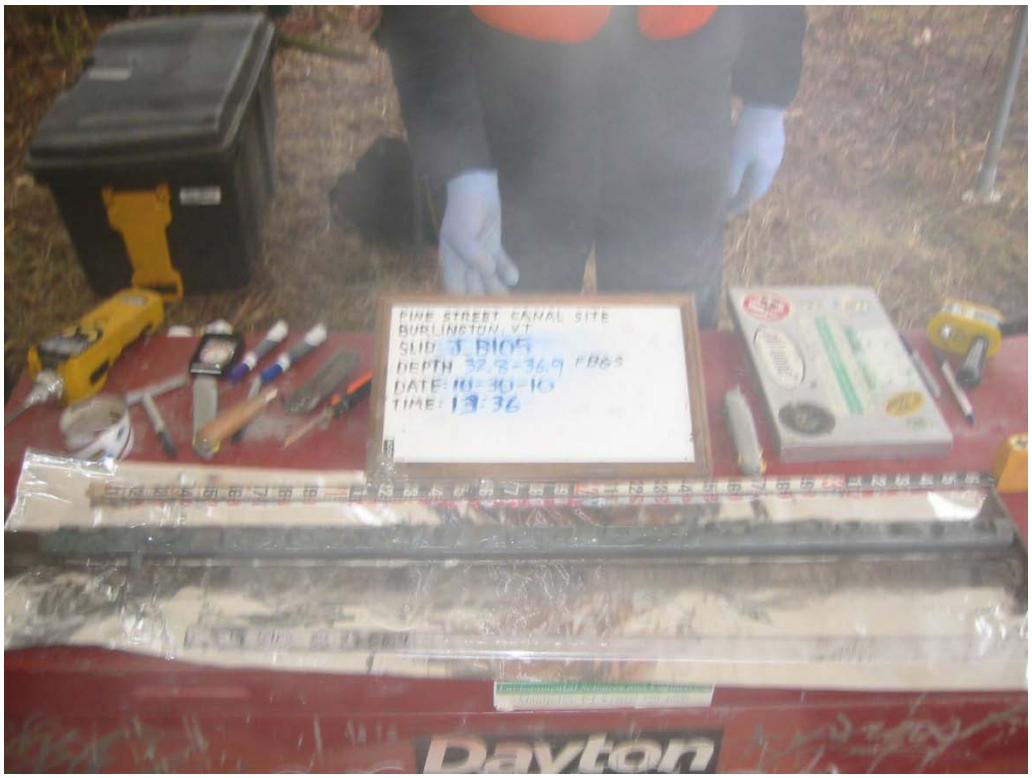
J_B105, 16.4-20.5 fbgs.

J_B105, 20.5-24.6 fbgs.



J_B105, 24.6-28.7 fbgs.

J_B105, 28.7-32.8 fbgs.

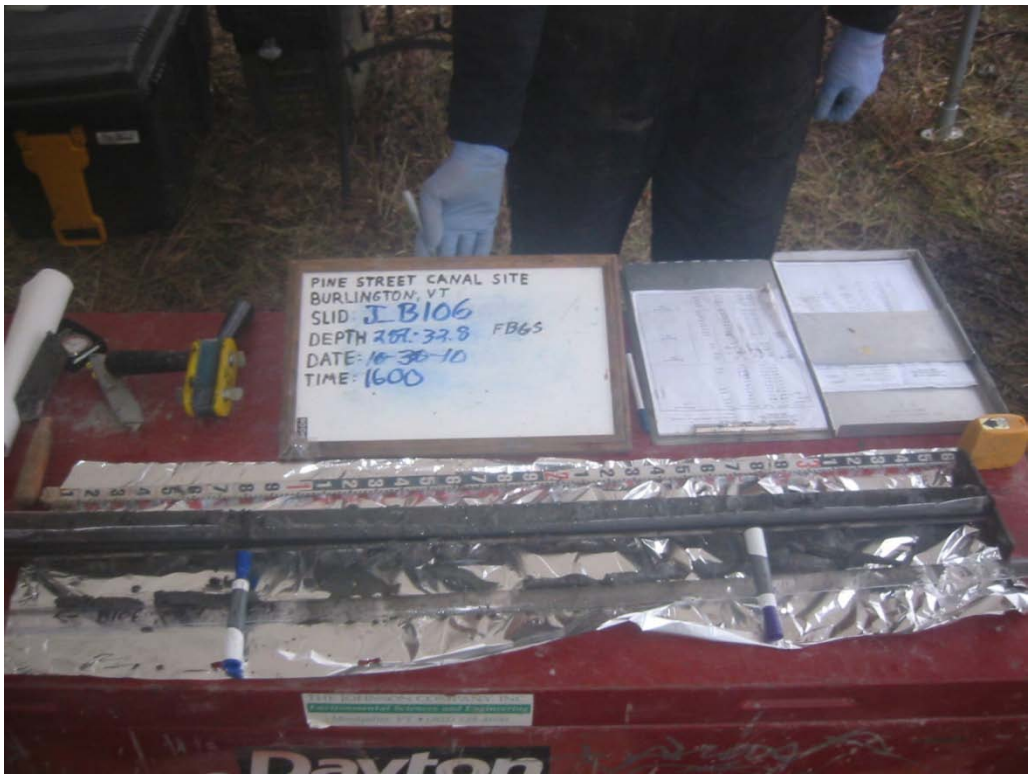


J_B105, 32.8-36.9 fbgs.

J_B106, 16.4-20.5 fbgs.

J_B106, 20.5-24.6 fbgs.

J_B106, 24.6-28.7 fbgs.



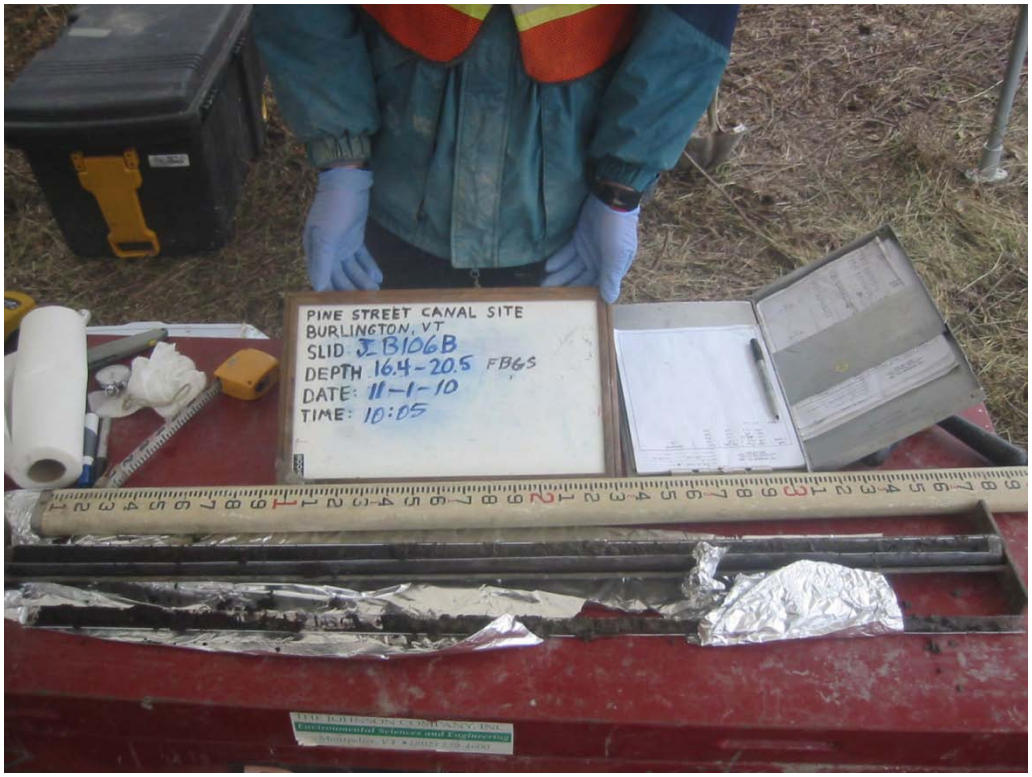
J_B106, 28.7-32.8 fbgs.

J_B106A, 16.4-20.5 fbgs.

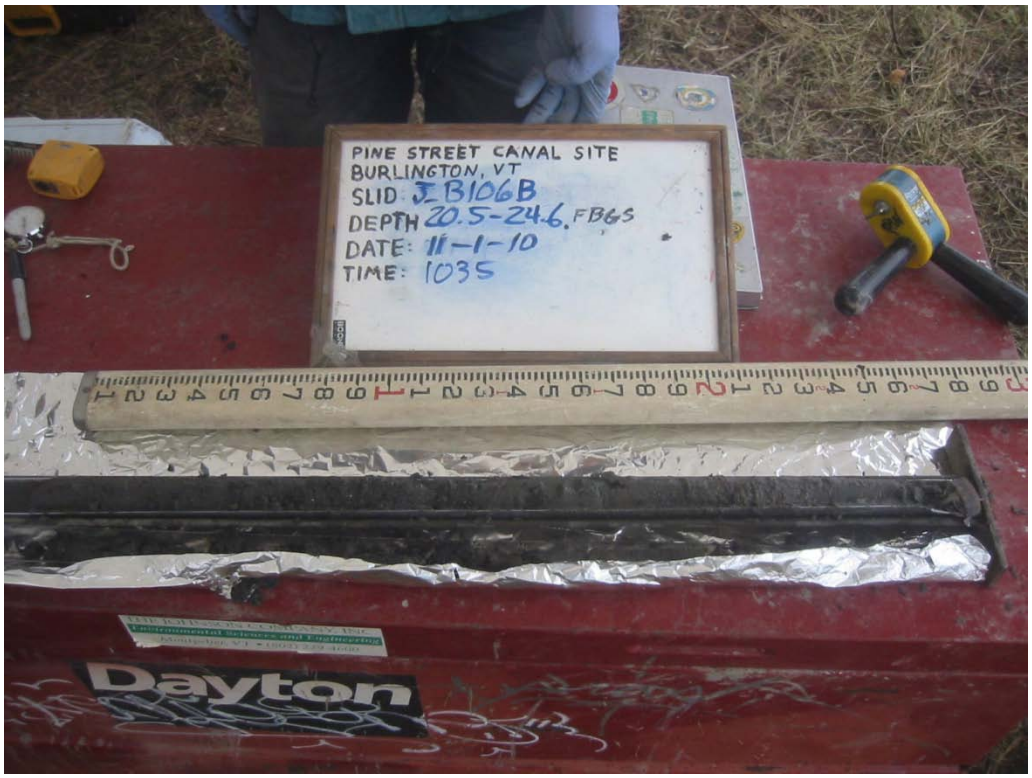
J_B106A, 20.5-24.6 fbgs.

J_B106A, 24.6-28.7 fbgs.

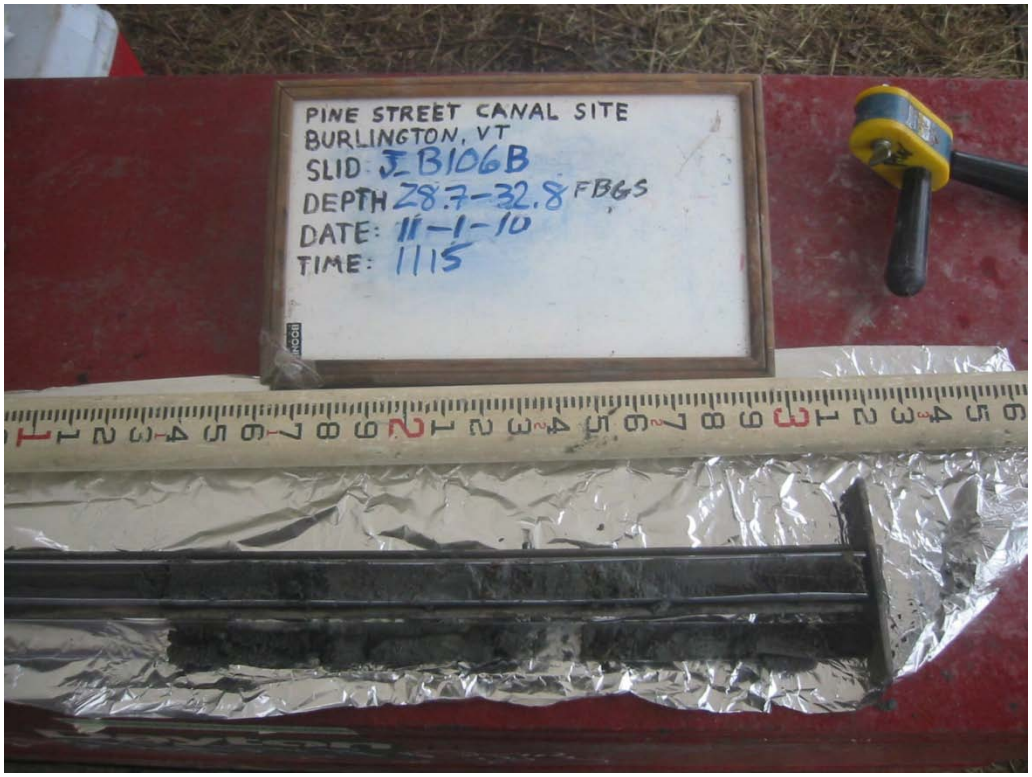
J_B106A, 28.7-32.8 fbgs.



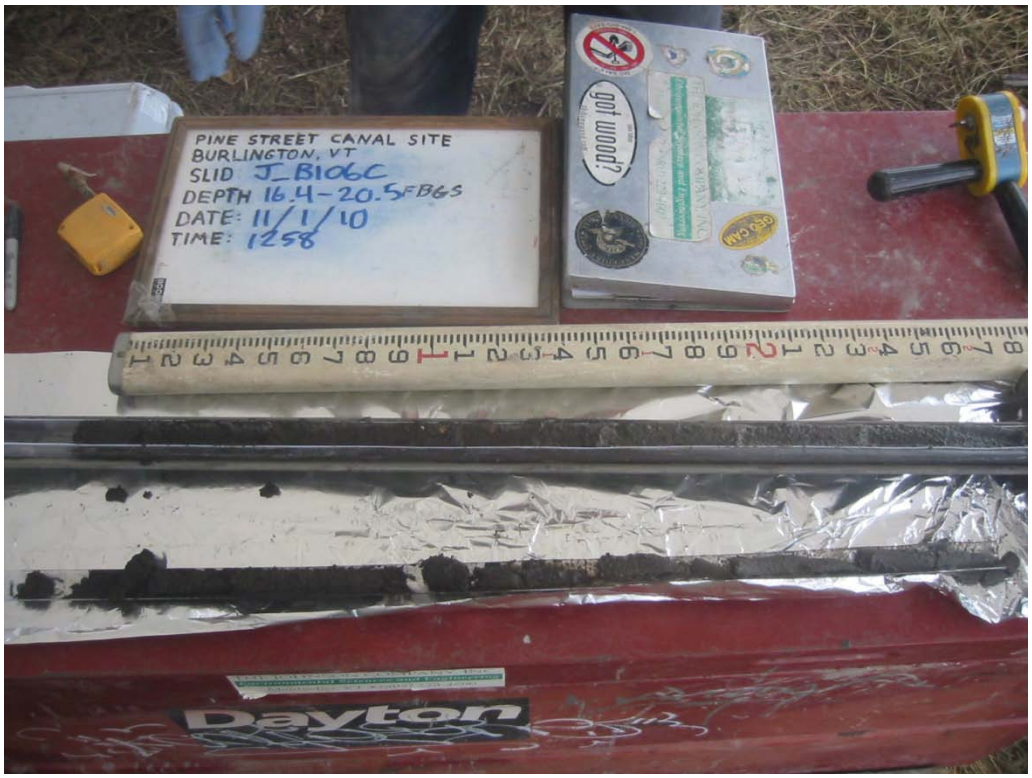
J_B106B, 16.4-20.5 fbgs.



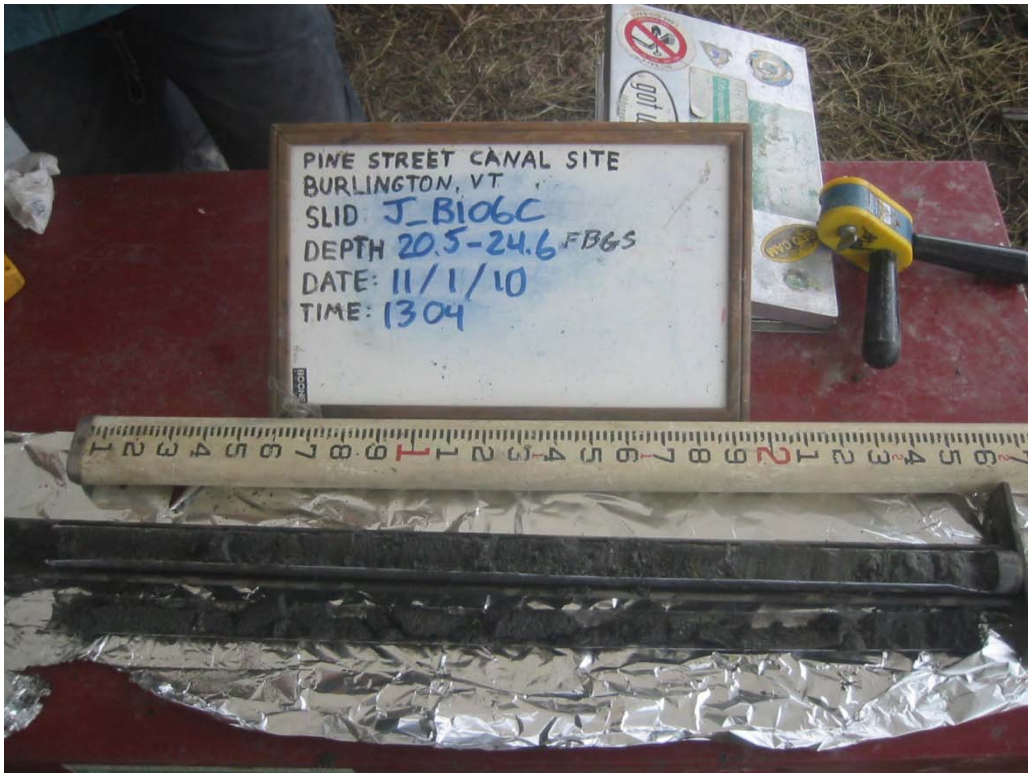
J_B106B, 20.5-24.6 fbgs.



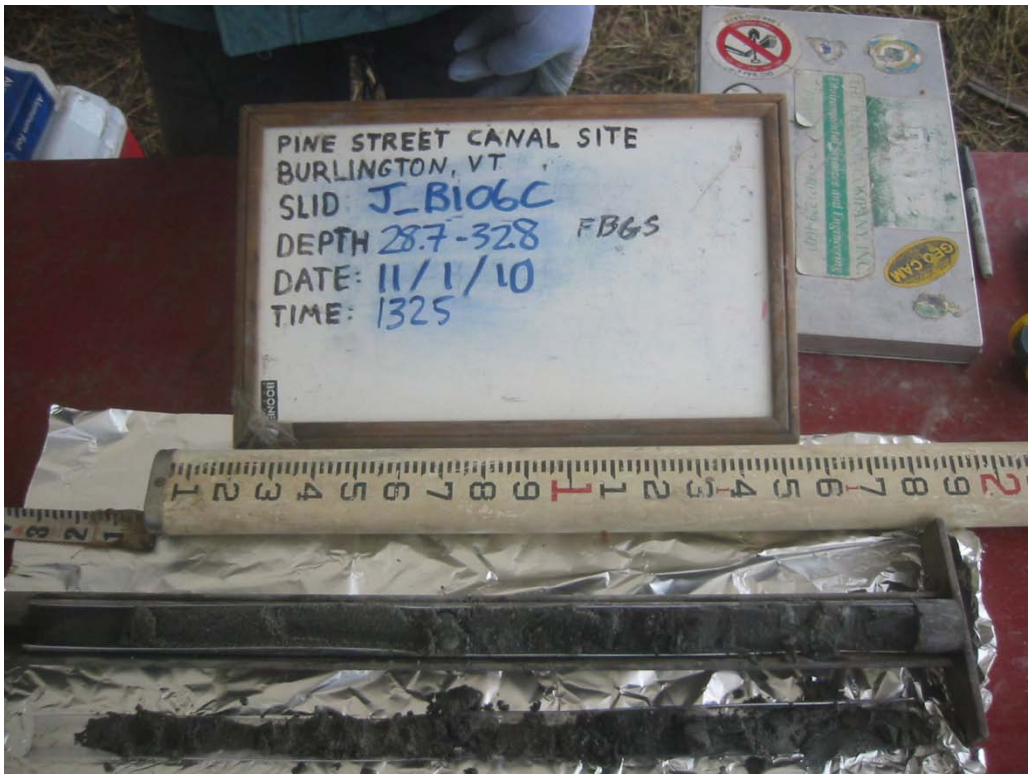
J_B106B, 28.7-32.8 fbgs.



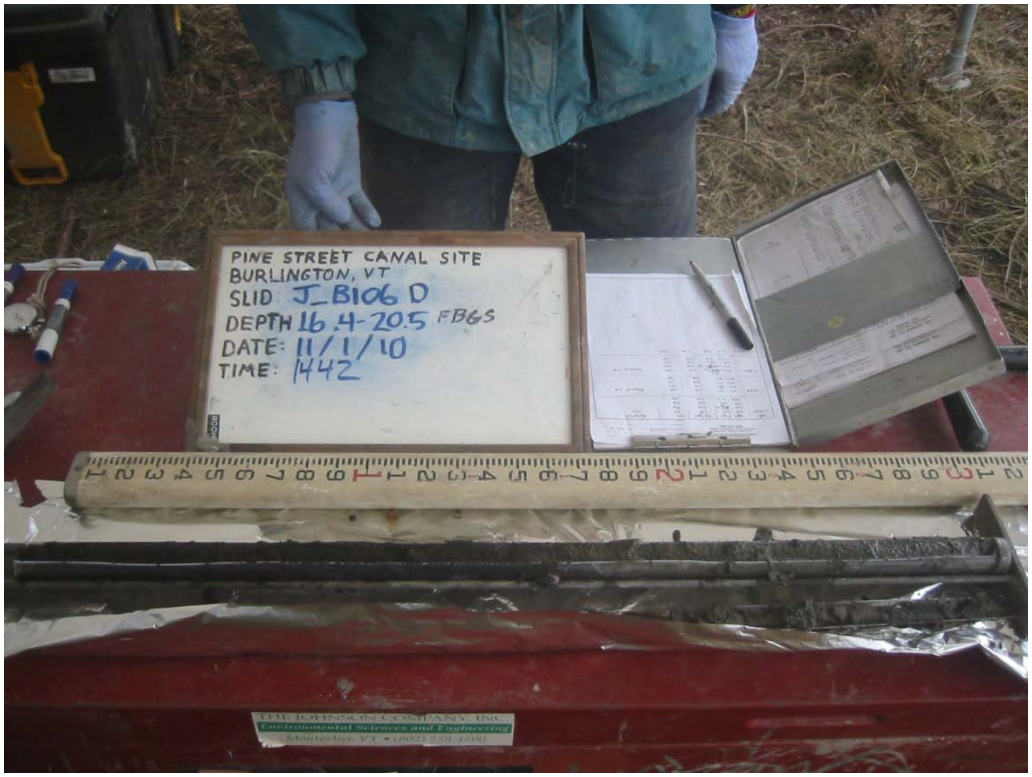
J_B106C, 16.4-20.5 fbgs.



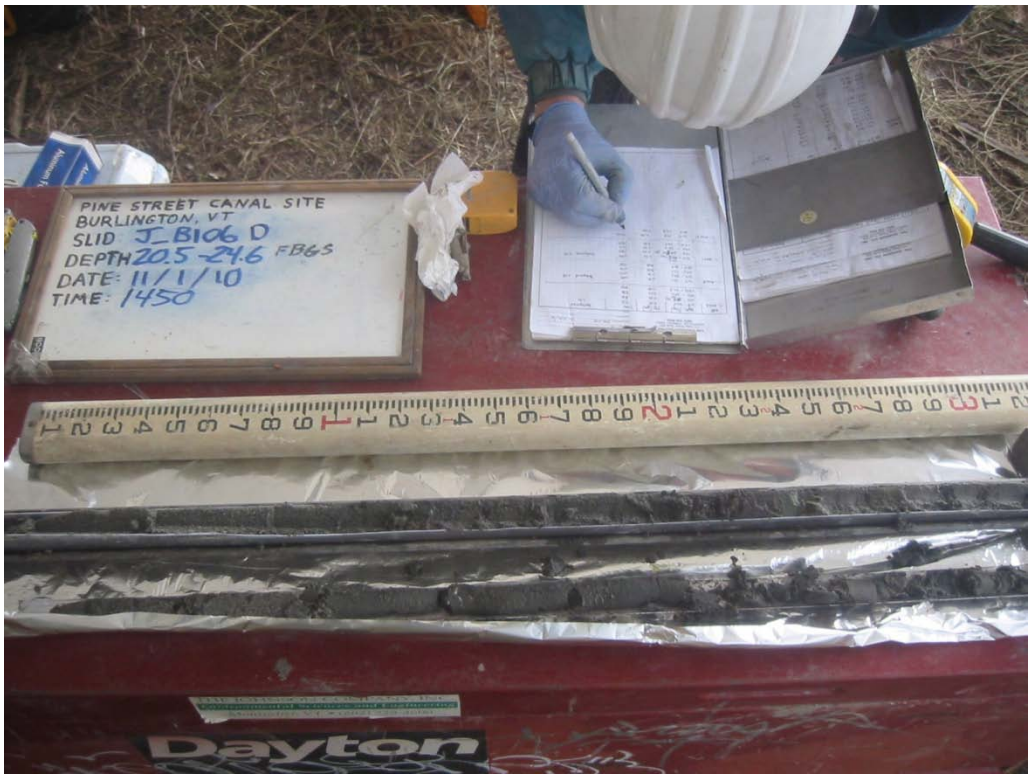
J_B106C, 20.5-24.6 fbgs.



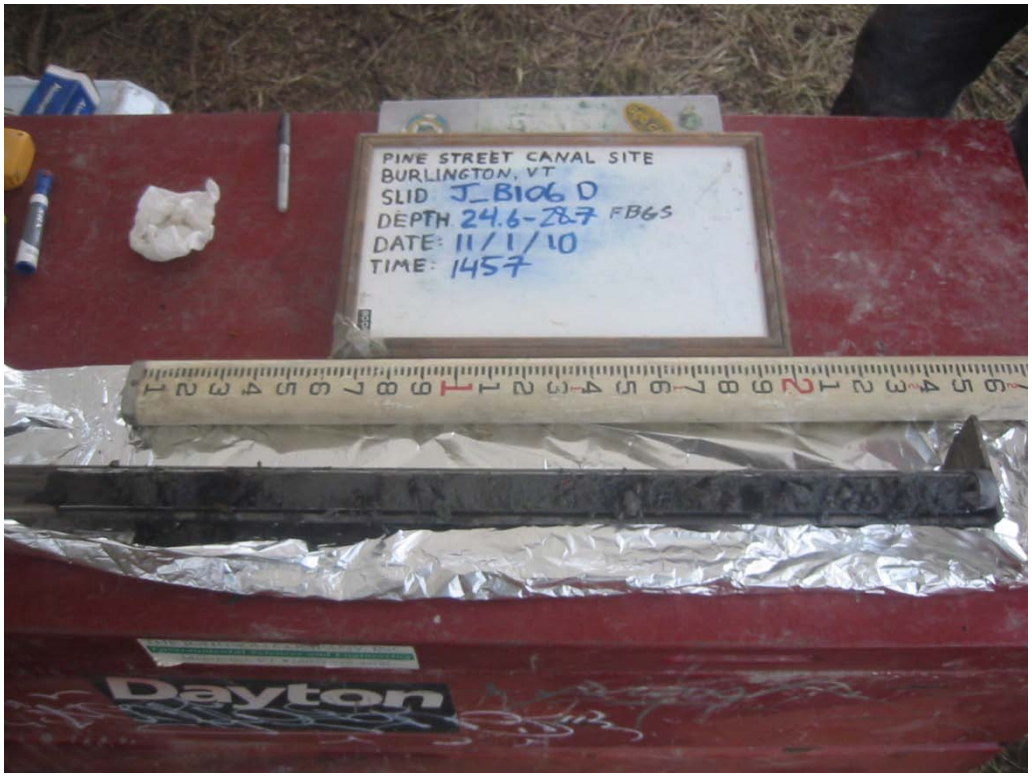
J_B106C, 28.7-32.8 fbgs.



J_B106D, 16.4-20.5 fbgs.



J_B106D, 20.5-24.6 fbgs.



J_B106D, 24.6-28.7 fbgs.

J_B106D, ~24.6-25.2 fbgs (close-up of previous photo).

Attachment 3
Boring Logs

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: KEY

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104			
2	102		Fill	
4	100		Sand	
6	98		Clay and Silt	
8	96		Silt and Clay	
10	94		Silty Sand	
12	92		Very Fine Sand	
14	90		Fine Sand	
16	88		Medium Sand	
18	86		Coarse Sand	
20	84		Sand with >10% Gravel	
22	82		Gravel	
24	80		Peat	
26	78		Cement Grout	
28	76		Blank indicates no recovery	
30	74			
32	72			
34	70			
36	68			
38	66			
40				

Drilling Date: NA

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 30

Ground Elevation (ft NAVD): 105
VT State Plane Northing (ft): NA Easting (ft): NA

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B101

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology Description	PID (ppmV)
0	104	Ballast stone.	
		Black, dry, angular gravel, and fine-medium sand (ballast stone). Sharp horizontal contact.	0.2
2	102	Grey, dry, loose, massive fine-medium sand. Sharp horizontal contact.	0.2
		Black, dry, fine sand, trace gravel. Sharp horizontal contact.	0.15
		Tan, dry, massive fine sand. Sharp horizontal contact.	0.15
4	100	Red-brown, moist, dense, plastic clay.	0.15
		No recovery.	
		Brown-tan, moist, massive, silt and clay, trace fine sand, angular gravel.	0.05
6	98	No recovery.	0
8	96	Brown-tan to grey, moist to wet, silt and clay, trace angular gravel. Sharp horizontal contact.	0
10	94	Grey, wet fine sand and silt, trace angular gravel.	0
		Grey, saturated, massive, loose silt and fine sand, trace angular gravel.	0
12	92	No recovery.	
14	90		
16	88	Grey, saturated, massive, loose silt and fine sand, trace angular gravel. Sharp horizontal contact	0
18	86	Red-brown, damp, dense, fibrous peat.	0
		Grey, moist, medium-coarse sand.	0
		No recovery.	
20	84	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.	0
22	82	Grey, saturated, massive, fine-medium sand, some fine sand, little 1/4" to 1" wood chunks, trace gravel.	0
24	80	Grey, saturated, fine-medium sand, trace red sub-rounded gravel.	0.3
		Grey, saturated, massive, micaceous fine sand.	0.3
26	78	Grey, saturated, fine-medium sand, one chunk wood. Faint napthalene odor.	
		No recovery.	
28	76	Grey, saturated, massive, medium-coarse sand. Gradual contact.	0.05
30	74		
32	72	Grey, saturated, medium-coarse sand, little sub-angular gravel (red Dunham dolomite). Gradual contact. One 0.1ft chunk clay and wood chunk in tip.	0.15
		Grey, saturated, massive, plastic, clay. Sharp horizontal contact.	0
34	70		
36	68	Grey, saturated, loose, very fine sand and silt. Sharp horizontal contact.	0
		Grey, saturated, massive, plastic, clay.	0
		No recovery.	
38	66		
40			

Drilling Date: 10/26/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 40

Ground Elevation (ft NAVD): 104.5
VT State Plane Northing (ft): 717864.9 Easting (ft): 1452785.8

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B101A

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Drive with center rod and plug to 16 fbgs. Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.	0.15
18	86		Grey, wet, massive, medium-coarse sand. No evidence of cement grout. No odor.	0.05
20	84		No recovery.	
			Grey, saturated, massive, fine-medium sand, trace sub-angular gravel. Sharp horizontal contact.	0
22	82		Grey, saturated, massive, medium-coarse sand. Sharp horizontal contact.	0
			Grey, saturated, massive, fine sand, trace wood.	0
24	80		Grey, saturated, medium-coarse sand.	0.05
			Grey, saturated, fine-medium sand, trace red sub-rounded gravel.	0.05
26	78		Grey, saturated, medium-coarse sand.	0.05
			Grey, saturated, micaceous fine sand.	0.05
28	76		Grey, saturated, fine-medium sand. No odor, no stains, no evidence of grout.	0.05
			No recovery.	
30	74		Grey, saturated, massive, medium-coarse sand.	0
32	72		Grey, moist, fine sand and silt. Horizontal partings.	0
			Cement grout. Brown, organic, wet, fibrous, degraded wood chunks.	0
			No recovery	
34	70			
36	68			
38	66			
40				

Drilling Date: 10/27/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 32

Ground Elevation (ft NAVD): 104.6
VT State Plane Northing (ft): 717861.4 Easting (ft): 1452786.3

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B102

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology Description	PID (ppmV)
0	104	Ballast stone.	0
		Black, damp, fine-medium sand and angular gravel. Sharp horizontal contact.	0
2	102	Tan, dry, fine-medium sand. Sharp horizontal contact.	0
		Black, dry, fine-medium sand and gravel. Sharp horizontal contact.	0
		Brown, humid, massive fine sand.	
4	100	No recovery.	0
		Red-brown, moist, dense, massive, plastic clay and silt, trace sub-angular gravel.	
6	98		0
8	96	No recovery.	
		Brown, wet, massive, plastic, clay and silt, trace gravel.	
10	94		0
12	92	No recovery.	
		Grey, damp to moist, massive, dense silt and clay. Sharp horizontal contact.	
14	90		0
		Red-brown, damp, dense, fibrous peat.	0
16	88	No recovery.	
		Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.	
18	86		0
		Grey, wet, massive, fine-medium sand.	0
20	84	Grey, wet, massive, fine-medium sand.	0
		Medium-coarse sand, little sub-rounded gravel, wood chunks. Sharp horizontal contact.	0
22	82	Grey, wet, massive, fine-medium sand.	0
		Grey, saturated, massive, fine sand.	0
24	80	No recovery.	
		Grey, saturated, fine-medium sand, some sub-rounded gravel. Sharp horizontal contact.	
		Grey, saturated, fine-medium sand. Fine sand layers (0.1' thick) at 25.0, 25.4 and 25.7 fbgs.	0
26	78	Grey, wet, fine-medium sand.	0
		No recovery.	0.05
28	76	Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.	
30	74		1.75
32	72	Grey, saturated, massive, very fine sand, little silt.	0.65
		Grey, wet, dense, clay and silt.	0.05
34	70	No recovery.	0.1
36	68	Grey, saturated, massive, plastic, clay and silt.	
38	66		0.05
40	64		

Drilling Date: 10/27/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 40

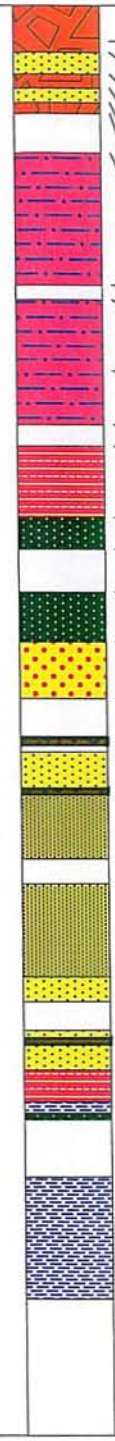
Ground Elevation (ft NAVD): 104.4
VT State Plane Northing (ft): 717844.3 Easting (ft): 1452786.1

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B103



Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology Description	PID (ppmV)
0	104	Estimated ballast stone.	0
		Black, dry, angular gravel and medium sand. Sharp horizontal contact.	0
2	102	Tan, dry, fine-medium sand. Sharp horizontal contact.	0
		Black, dry, fine-medium sand and sub-rounded gravel. Sharp horizontal contact.	0
		Tan, dry, fine-medium sand.	0
4	100	Brown, damp, silt and fine sand, little sub-rounded gravel fill.	0
		No recovery.	0
6	98	Brown-orange, damp, dense, massive silt and clay.	0
8	96	No recovery.	
		Brown-orange, moist, dense, massive silt and clay, trace sub-angular gravel.	0.05
10	94	Grey, moist, dense, massive silt and clay, trace sub-angular gravel.	0
12	92	No recovery.	
		Grey, wet, massive sand and clay, trace gravel. Sharp horizontal contact.	0
14	90	Red-brown, damp, dense, fibrous peat.	0
16	88	No recovery.	
		Red-brown, damp, dense, fibrous peat.	0
18	86	Grey, saturated, massive, medium-coarse sand.	0
20	84	No recovery.	
		Grey, saturated, coarse sand and angular gravel. Sharp horizontal contact.	0
		Wood chunks. Sharp horizontal contact.	0
22	82	Grey, saturated, fine-medium sand. Gradual contact.	0
		Grey, saturated, medium-coarse sand and gravel. Gradual contact.	0
24	80	Grey, saturated fine sand and very fine sand. Horizontal lamination.	0
		No recovery.	0
26	78	Grey, saturated fine sand. Grading down through very fine sand to very fine sand, some silt. Sharp horizontal contact.	0.85
		Grey, saturated, massive, fine-medium sand. Sharp horizontal contact. Slight napthalene odor.	2.7
28	76	No recovery.	
		Grey, saturated, fine-medium sand. Sharp horizontal contact.	0.15
30	74	Grey, saturated, coarse sand and medium sand and sub-rounded gravel (some red). No odor. Sharp horizontal contact.	0.15
		Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.	0.15
32	72	Grey, saturated, very fine sand, some silt. Horizontal lamination. Sharp horizontal contact.	0.15
		Grey, saturated, dense, clay and silt. Sharp horizontal contact.	0
		Brown, damp, dense, organic, fibrous peat.	0
34	70	No recovery.	
		Grey, saturated, dense, massive clay and silt.	0
36	68		
38	66		
40	64		

Drilling Date: 10/28/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 36.2

Ground Elevation (ft NAVD): 104.4
VT State Plane Northing (ft): 717885.4 Easting (ft): 1452786.9

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B103A

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.	0
18	86		Grey, wet, massive, medium-coarse sand. No evidence of cement grout.	0
20	84		No recovery.	
			Grey, saturated, massive, coarse-medium sand. Sharp horizontal contact.	0
22	82		Grey, saturated, massive, fine-medium sand, little coarse sand, wood chunks. Sharp horizontal contact.	0
			Grey, saturated, very fine sand (with horizontal lamination), trace wood chunks.	0
24	80		No recovery.	
26	78		Grey, saturated, very fine sand (with horizontal lamination). Sharp horizontal contact.	0.8
			Grey, saturated, massive, medium-coarse sand.	0.1
28	76		No recovery.	
			Grey, saturated, massive, fine-medium sand, trace wood chunks. Sharp horizontal contact.	0
30	74		Grey, saturated, very fine sand, little silt. Sharp horizontal contact.	0
			Grey, saturated, massive, plastic, clay and silt. Gradual contact.	0
32	72		Red-brown, moist, dense, fibrous peat.	0
			No recovery.	
34	70			
36	68			
38	66			
40	64			

Drilling Date: 10/29/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 32

Ground Elevation (ft NAVD): 104.4
VT State Plane Northing (ft): 717889.7 Easting (ft): 1452787.2

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B103B

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.	0.05
18	86		Grey, saturated, massive, medium-coarse sand, trace gravel. No evidence of grout.	0.05
			No recovery.	
20	84		Grey, saturated, medium-coarse sand. Sharp horizontal contact.	0
			Grey, wet, medium-coarse sand and sub-rounded gravel. Sharp horizontal contact.	0
22	82		Grey, saturated, fine-medium sand, little coarse sand, little wood chunks, trace silt. Sharp horizontal contact.	0
24	80		Grey, saturated, massive, fine-medium sand, trace gravel, trace organics. Sharp horizontal contact.	0
			Grey, very fine sand (with 15 degree lamination), trace organics.	0
			No recovery.	
26	78		Grey, saturated, massive, very fine sand.	0.15
			Grey, saturated, massive, medium-coarse sand, little gravel. No NAPL. No sheen. No evidence of cement grout. Slight napthalene odor.	0.15
28	76		No recovery.	
			Grey, wet, massive, fine-medium sand. Sharp horizontal contact.	0
30	74		Grey, wet, very fine sand, trace silt, trace organics, one pebble.	0
			Grey, wet, massive, dense, plastic, clay and silt. Sharp horizontal contact.	0
32	72		Red-grey, moist, fibrous peat and clay.	0
34	70			
36	68			
38	66			
40	64			

Drilling Date: 10/30/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 31.9

Ground Elevation (ft NAVD): 104.4
VT State Plane Northing (ft): 717886.2 Easting (ft): 1452786.9

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B104

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology Description	PID (ppmV)
0		Ballast stone.	
		Black, dry, medium-coarse sand and gravel. Sharp horizontal contact.	0
2	102	Brown, damp, fine-medium sand. Sharp horizontal contact.	0
		Black, dry, coarse sand and gravel, some medium sand. Sharp horizontal contact.	0
		Tan, damp, dense fine sand. Sharp horizontal contact.	0
4	100	Brown, dry, medium-coarse sand. Sharp horizontal contact.	0
		Red-brown, dry, dense, silt and clay, trace sub-angular gravel (red Dolomite).	0
		No recovery.	0
6	98	Red-brown and grey mottled, damp to moist, dense, clay and silt, trace gravel, trace wood chunks.	0
8	96		0
		Brown and grey mottled silt and clay, trace fine sand, trace gravel. Gradual contact.	0
10	94		
		Same as above but grey.	0
12	92	No recovery.	
		Grey, wet, moderately dense silt and clay, trace fine sand, trace gravel. Sharp horizontal contact	0
14	90	Red-brown, damp, dense, fibrous peat.	0
16	88	No recovery.	
		Red-brown, damp, dense, fibrous peat, trace wood chunks. Sharp horizontal contact.	0
18	86	Grey, saturated, massive, medium-coarse sand. Sharp horizontal contact.	0
		Grey, saturated, massive, fine-medium sand. Sharp horizontal contact.	0
		Grey, saturated, coarse sand and gravel (Dunham red dolomite). Sharp horizontal contact. No odor. No stains.	0
20	84	Grey, saturated, fine-medium sand. Sharp horizontal contact.	0
		Grey, saturated, massive, medium-coarse sand.	0
22	82	No recovery.	0
		Grey, wet, massive, medium-coarse sand fining down to medium sand. Sharp horizontal contact.	
		Grey, damp, dense, very fine sand and silt. Horizontal lamination.	0
24	80	No recovery.	0
26	78	Grey, saturated very fine sand, laminated with fine sand and fine sand, little silt layers (approximately 1/4" to 2" layers). Sharp horizontal contact.	0
28	76	No recovery.	
		Grey, wet, fine-medium sand. Sharp horizontal contact.	0
30	74	Grey, wet, very fine sand and silt.	0
		Grey, saturated, massive, fine-medium sand. Sharp horizontal contact. No odor, stains or NAPL.	0
		Grey, saturated, laminated, very fine sand. Sharp horizontal contact.	0
32	72	Grey, saturated, massive, clay and silt.	0
		No recovery.	0
		Grey, saturated, dense, massive, clay and silt. Sharp horizontal contact.	
34	70	Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.	
		Grey, saturated, dense, massive, clay and silt.	0
36	68		0
		No recovery.	0
38	66		
40	64		

Drilling Date: 10/29/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 36.2

Ground Elevation (ft NAVD): 103.9
VT State Plane Northing (ft): 717929.2 Easting (ft): 1452787.5

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B105

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology Description	PID (ppmV)
0	104	Ballast stone.	
2	102	Brown-red, damp, dense, clay. Sharp horizontal contact.	0
		Black, medium sand, trace angular gravel. Sharp horizontal contact.	0
4	100	Light brown fine sand.	0
		Tan, fine-medium sand. Sharp horizontal contact.	0
6	98	Brown, damp, dense, clay and silt.	0
		No recovery.	
8	96	Tan and grey mottled, wet, dense, clay and silt. Gradual contact.	0
10	94	Grey, wet, moderately dense, clay and silt.	0
		No recovery.	
12	92	Grey, wet, moderately dense, clay and silt. Sharp horizontal contact.	0.05
14	90	Red-brown, moist, dense, fibrous peat.	0.05
		No recovery.	
16	88	Red-brown, moist, dense, fibrous peat. Sharp horizontal contact.	0
18	86	Grey, saturated, medium-coarse sand grading down to medium sand, some coarse sand.	0
20	84	No recovery.	
		Grey, saturated, massive, medium sand, little fine sand, little coarse sand, trace gravel, trace wood chunks. Sharp horizontal contact.	0.15
22	82	Grey, wet, fine sand with 10-15 degree lamination, trace organics. Sharp horizontal contact.	0.15
		Grey, saturated, fine-medium sand.	0.15
24	80	No recovery.	
		Grey, saturated, medium sand. Sharp horizontal contact.	
26	78	Grey, saturated fine sand, some silt. Sharp horizontal contact.	0.05
		Grey, saturated, medium sand (with 0.05' fine sand and silt layers at 25.6 and 26.1 fbgs). Sharp horizontal contacts.	0.05
28	76	No recovery.	0.05
		Grey, saturated, fine-medium sand. Sharp horizontal contact.	0
30	74	Grey, saturated, massive, fine sand and silt. Sharp horizontal contact.	0
		Red-brown, damp, dense, fibrous peat. Sharp horizontal contact.	0
32	72	Grey, saturated, massive, plastic, clay and silt.	0
		No recovery.	0
34	70	Grey, wet, dense, plastic, clay and silt.	0
36	68	No recovery.	
38	66		
40			

Drilling Date: 10/30/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 36.4

Ground Elevation (ft NAVD): 104.7
VT State Plane Northing (ft): 717798.6 Easting (ft): 1452787

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B106

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.	0
18	86		Grey, saturated, medium sand. Sharp horizontal contact.	0
			Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.	0
20	84		Grey, saturated, massive, medium-coarse sand.	0
			No recovery.	
22	82		Grey, saturated, massive, medium-coarse sand grading down to coarse sand, trace gravel. Napthalene odor. No sheen or NAPL observed. Sharp horizontal contact.	0.35
24	80		Grey, wet, laminated fine sand, trace organics.	0.35
			No recovery.	
26	78		Grey, saturated, massive, fine sand (few 1/4" layers), little silt. Sharp horizontal contact.	0.25
28	76		Grey, saturated, massive, medium sand, some coarse sand, some sub-rounded (white quartz anc Dunham dolomite) gravel. Napthalene odor. No sheen or NAPL observed.	0.25
			No recovery.	
30	74		Grey, saturated, massive, medium sand, some coarse sand. No odor. Sharp horizontal contact.	0
			Grey, saturated, very fine sand, little silt. Sharp horizontal contact.	0
32	72		Grey, wet, massive, dense, clay and silt. Sharp horizontal contact.	0
			Red-brown, moist, dense, fibrous peat.	0
34	70			
36	68			
38	66			
40	64			

Drilling Date: 10/31/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 32.3

Ground Elevation (ft NAVD): 104.4
VT State Plane Northing (ft): 717869.3 Easting (ft): 1452787.6

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B106A

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, moist, dense, fibrous peat. Sharp horizontal contact.	0
18	86		Brown, wet, massive, medium-coarse sand. Sharp horizontal contact.	0
			Red-brown, moist, dense, fibrous peat.	0
20	84		Grey, saturated, massive, medium sand (coarsening downwards), some coarse sand, some fine sand.	0
			Grey, saturated, medium-coarse sand, some sub-rounded gravel.	0
			Grey, wet, massive, medium sand. Gradual contact.	0
22	82		Grey-brown, medium-coarse sand, little gravel. Sharp horizontal contact.	0
			Brown, saturated, massive, fine-medium sand, trace gravel, organic wood chunks. Sharp horizontal contact.	0
24	80		Grey, saturated, very fine sand, little silt, trace organics.	0
			No recovery.	0
			Grey, saturated, very fine sand, trace organics. Sharp horizontal contact.	
26	78		Grey, wet, sub-rounded to sub-angular gravel, little medium and coarse sand. No odor. Sharp horizontal contact.	0
28	76		Grey, wet, fine-medium sand. Sharp horizontal contact.	0
			Grey, wet, sub-angular gravel. Trace napthalene odor. No cement grout. No NAPL.	0
			Grey, wet, fine-medium sand, trace gravel, trace organics.	0
30	74		No recovery.	0
			Grey, wet, medium sand, some coarse sand. Sharp horizontal contact.	
			Grey, saturated, very fine sand (with horizontal lamination), trace silt, trace organics.	
32	72		Grey, saturated, clay and silt. Sharp horizontal contact.	0
			Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.	0
34	70		Grey, wet, dense, clay and silt.	0
			No recovery.	0
36	68			0
38	66			
40	64			

Drilling Date: 11/1/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 31.5

Ground Elevation (ft NAVD): 104.1
VT State Plane Northing (ft): 717874.9 Easting (ft): 1452785.8

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
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Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B106B

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology Description	PID (ppmV)
0	104	Not sampled.	
2	102		
4	100		
6	98		
8	96		
10	94		
12	92		
14	90		
16	88	Red-brown, wet, fibrous peat. Sharp horizontal contact.	0
18	86	Grey, wet, massive, medium sand coarsens downwards. Sharp horizontal contact.	0
		Grey, wet, massive, medium-coarse sand.	0
20	84	Grey, saturated, fine-medium sand.	0
		No recovery.	
		Grey, wet, massive, fine-medium sand, trace wood. Sharp horizontal contact.	
22	82	Grey, saturated, very fine sand (with horizontal lamination), trace wood, trace silt. Sharp horizontal contact.	0
		Cement grout.	0
24	80	No recovery.	
		One lump of cement at top of core. Grey, saturated, very fine sand (with horizontal lamination), trace wood. Sharp horizontal contact.	0
26	78	Grey, wet, medium-coarse sand and gravel. Napthalene odor. Sharp horizontal contact.	0
		Grey, saturated, fine-medium sand. Sharp horizontal contact.	0
28	76	Grey, saturated, medium sand and gravel, little fine sand, little coarse sand. Napthalene odor. Sharp horizontal contact.	0
		Grey, wet, fine-medium sand.	0
30	74	No recovery.	0
		Grey, saturated, massive, medium sand. Sharp horizontal contact.	
		Grey, saturated, very fine sand grading down to fine sand and silt. Sharp horizontal contact.	0
32	72	Grey, saturated, dense, plastic, clay and silt.	0
		Red-brown, wet, fibrous peat. At 30.5 fbgs, 1/2 inch of cement grout.	0
34	70		0
36	68		
38	66		
40	64		

Drilling Date: 11/1/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 30.5

Ground Elevation (ft NAVD): 104.2
VT State Plane Northing (ft): 717872.4 Easting (ft): 1452786.4

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
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Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B106C

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, moist, dense, fibrous peat. Sharp horizontal contact.	0
18	86		Grey, saturated, massive, medium sand, some coarse sand.	0
20	84		No recovery.	
			Grey, wet, massive, fine-medium sand. Sharp horizontal contact.	0
22	82		Grey, wet, massive, fine-medium sand, little gravel.	0
			Grey, wet, fine sand and very fine sand (with horizontal lamination), trace organics. No evidence of cement grout.	0
24	80		No recovery.	
			Cement grout. Sharp horizontal contact.	
			Grey, wet, massive, very fine sand. Sharp horizontal contact.	0.05
26	78		Grey, wet, medium sand. Sharp horizontal contact.	0.05
			Grey, wet, medium sand, little gravel. Faint napthalene odor.	0.05
28	76		No recovery.	
			Grey, saturated, massive, medium sand. Sharp horizontal contact.	
30	74		Grey, wet, massive, medium sand and gravel. No odor. Sharp horizontal contact.	0
			Grey, wet, massive, very fine sand, little silt.	0
32	72			
34	70			
36	68			
38	66			
40	64			

Drilling Date: 11/1/10

Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 30.5

Ground Elevation (ft NAVD): 104.4
VT State Plane Northing (ft): 717869.4 Easting (ft): 1452785.7

Borehole sealed with Cement Grout and Bentonite

The Johnson Company, Inc.
100 State St. Suite 600
Montpelier, VT 05602
(802) 229-4600

Project Name: Pine Street Canal Superfund Site
Location: Burlington, Vermont
Project Number: 1-0870-2

Boring ID: B106D

Depth (fbgs)	Elevation (ft NAVD 1988)	Lithology	Lithology Description	PID (ppmV)
0	104		Not sampled.	
2	102			
4	100			
6	98			
8	96			
10	94			
12	92			
14	90			
16	88		Red-brown, wet, dense, fibrous peat. Sharp horizontal contact.	0
18	86		Grey, wet, medium sand grading down to medium sand, some coarse sand. One pink pebble. Sharp horizontal contact.	0
20	84		No recovery.	
22	82		Grey, wet, medium-coarse sand. Sharp horizontal contact.	0
24	80		Grey, wet, very fine sand (with horizontal lamination), little organics.	0
			No recovery.	
			Cement grout.	
26	78		Grey, saturated, massive, fine sand, trace organics. Sharp horizontal contact.	0.2
			Grey, wet, massive, fine-medium sand, little gravel. Napthalene odor.	0.2
28	76			
30	74			
32	72			
34	70			
36	68			
38	66			
40				

Drilling Date: 11/1/10

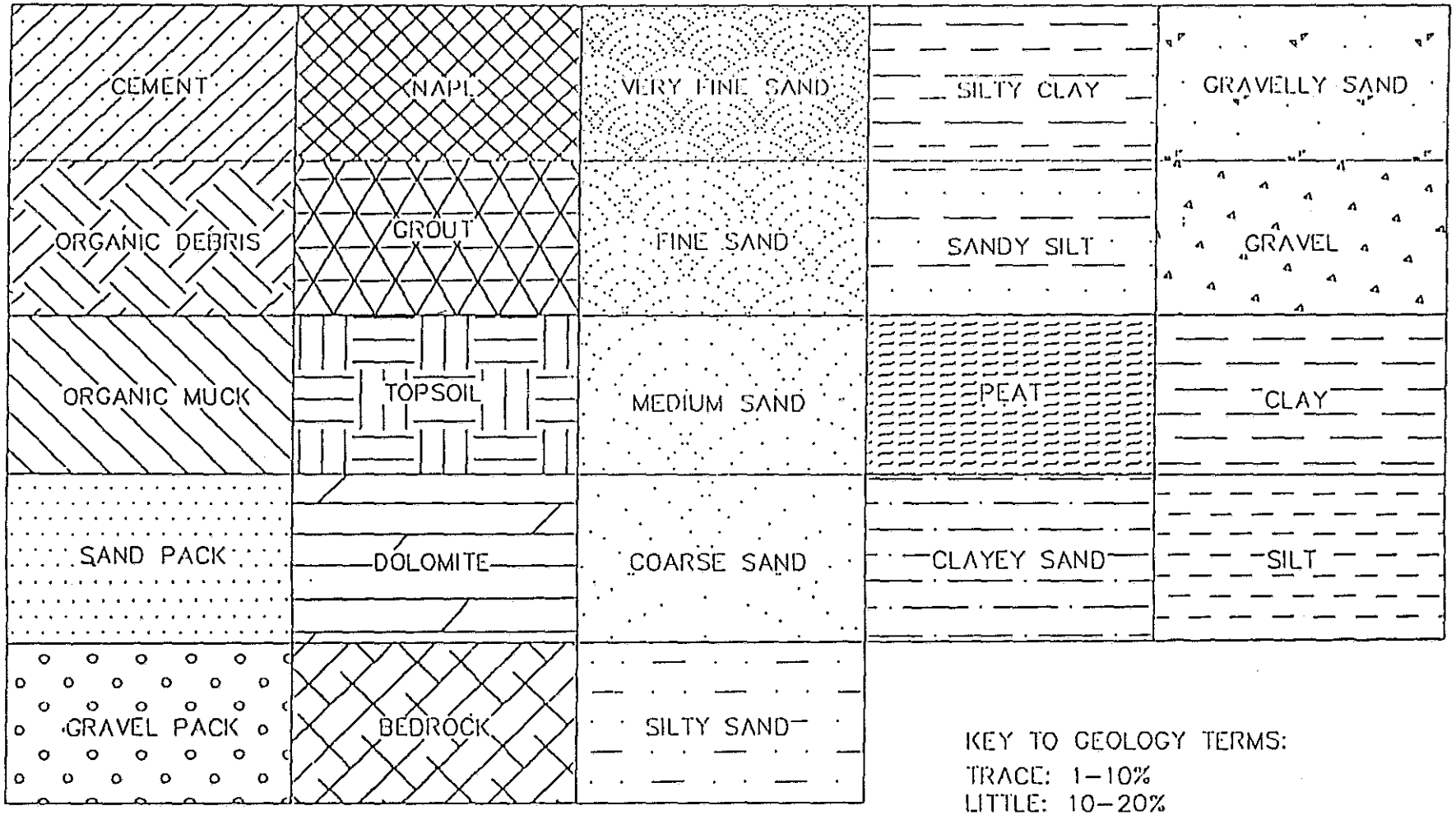
Geologist: D.Maynard

Drilling Company: Parrott Wolff
Method: Geoprobe-Macrocore

Total Depth Drilled (fbgs): 27.1

Ground Elevation (ft NAVD): 104.5
VT State Plane Northing (ft): 717867.7 Easting (ft): 1452786.7

Borehole sealed with Cement Grout and Bentonite



KEY TO GEOLOGY TERMS:

TRACE: 1–10%
LITTLE: 10–20%
SOME: 20–35%
AND: 35–50%

KEY TO GEOLOGY PATTERNS
PINE STREET CANAL SITE
BURLINGTON, VERMONT

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602

1-0730-5\GEOKEY.dwg

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-1

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/20/94
Driller: J_B/DMM
Drill Method: Drive Point Piston

Casing Type: N/A
Casing Diameter:
Casing Length:
Screen Type: N/A
Screen Diameter:
Screen Length:
Slot Size: N/A

Total Pipe: 0.0 ft.
Stick Up: N/A
Total Hole Depth: 22.2 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: N/A
Surface Elevation: 95.0 Est.
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0		Core Dia.=2" See Drilling Log PZ-1A for piezometer installation details			Logged by shovel: Tan coarse sand and subangular pebbles, cobbles. (Fill and beach sand matrix).
1, 2, 3, 4, 5, 6, 7, 8, 9				0	Core 3–8', 4.5' recovery. 3–4' Grey wet coarse sand, some gravel, one subangular pebble. Gradational lower contact. 4.0–4.3' Grey saturated (sat.) fine sand, some silt. roots at base. Sharp horizontal contact (SHC).
10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20				0	4.3–4.7' Grey sat. medium and coarse sand grading down to fine sand, some silt. Fibrous roots at base. SHC. 4.7–5.1' Grey sat. silt and fine sand. SHC. 5.1–6.9' Brown/red moist to wet, dense fibrous peat. (gap from 5.1–6.1').
21, 22, 23, 24, 25					6.9–7.0' Brown wet clay. SHC. 7.0–7.4' Brown/red sat. fibrous peat with wood. SHC. 7.4–8.0' Dark grey sat. mixed peat and clay. Two 1/8" thick fine sand laminae. SHC.
26, 27, 28, 29, 30, 31, 32, 33					Cored 8–9' and 10–14' 5.2' recovery 8–9' Grey wet massive coarse sand. Very well sorted. Faint 1/2" thick brown bands thoughout. 10–12' Grey wet very coarse sand and fine angular to subangular gravel. Gradational contact.
34, 35, 36, 37, 38, 39, 40					12–13.5' Grey wet coarse sand and subangular gravel and medium sand. SHC. 13.5–14.0' Brown wet medium and coarse sand, some subangular gravel.

(continued on Page 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-1

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/20/94
Driller: J_B/DMM
Drill Method: Drive Point Piston

Casing Type: N/A
Casing Diameter:
Casing Length:
Screen Type: N/A
Screen Diameter:
Screen Length:
Slot Size: N/A

Total Pipe: 0.0 ft.
Stick Up: N/A
Total Hole Depth: 22.2 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: N/A
Surface Elevation: 96.0 Est.
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1					
2					
3					(continued from Page 1)
4					
5					Core 15–20' 5' recovery. 15–16.4' Grey sat. massive well-sorted fine sand, little 1/4–1/2" roots and stems. Gradational contact. 16.5–18.8' Grey sat. massive fine sand, trace medium sand, organics. SHC. 18.8–19.0' Grey sat. medium sand.
6					
7					
8					
9					
10					
11					
12					
13					19–19.3' Grey sat. massive fine sand. SHC. 19.3–19.6' Subrounded pebbles, 1/2–3/4" diameter, trace medium and coarse sand. SHC. 19.6–20' Grey wet massive medium sand, little coarse sand, fine sand, gravel.
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-1A

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/29/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length: See Notes
Screen Type: Stainless
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: See Notes
Stick Up: See Notes
Total Hole Depth: 36.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: See Notes
Surface Elevation: 95.5 Est.
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0		Core Dia.=2"			
		TOC Elev.: S – 98.92 D – 98.91			
1, 2, 3, 4, 5		Stick Up: S – 3.0' D – 3.0'			
6, 7, 8, 9, 10		Casing Length: S – 15.2' D – 24.2'		0	Core 5.3–10.5'. 4.5' recovery. 5.3–8.0' Dark brown moist dense fibrous peat and wood chunks. 1" pockets of grey silt. (Compacted, 2' actually recovered). Sharp horizontal contact (SHC). 8–10.5' Grey saturated (sat.) massive
11, 12, 13, 14		Water Level: S – 1.5' D – 1.9'		0	Core 11–15'. 4' recovery. 11–14' Grey sat. massive coarse sand and gravel. SHC. 14–16' Grey sat. massive fine sand, few 1" wood chunks. (1' recovered).
15, 16, 17, 18, 19, 20	S	Piezo Screen: S 15.0'–15.5' D 21.2'–22.0'		0	
21, 22, 23, 24, 25, 26, 27	D			0	Core 16–21'. 5' recovery. 16–18.8' Grey sat. fine sand, with common 1/4–1/2" sharp horizontal medium sand layers. Few orange and brown fine distinct 1/2" by 1/16" mottles. 1/4" thick sharp horizontal driftwood/bark layer at
28, 29, 30, 31, 32, 33, 34, 35, 36					18.8–19.0'. Subrounded pebbles in a matrix of wet grey fine sand. SHC 19–19.5' Grey sat. laminated coarse sand. SHC. 19.5–19.7' Grey sat. massive fine sand. SHC. 19.7–20' Wood, bark, and twigs in fine sand matrix (storm wash). SHC.
37, 38, 39, 40					20–21' Grey sat. massive fine and silty sand.

(continued on Page 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-1A

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/29/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length: See Notes
Screen Type: Stainless
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: See Notes
Stick Up: See Notes
Total Hole Depth: 36.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: See Notes
Surface Elevation: 95.5 Est.
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1					
2					
3					
4					(continued from Page 1)
5					
6					Core 21–26'. 3.1' recovery. 21–22' Grey sat. massive fine sand, trace organic particles <1/8". Gradational contact. 22–23.3' Grey sat. massive fine sand, silty sand, some organic wood chunks <1" diameter. Fining downwards.
7					
8					
9					
10					
11					
12					
13					
14					23.3–23.5 Grey sat. alternating 1/8" layers of silt and clay, with clay and silt. SHC. 23.5–25' Dark brown very dense moist fibrous laminated peat. (Compacted, actual 0.6' recovery). SHC.
15					
16					
17					
18					
19					
20					
21					25–26' Blue-grey sat. horizontally laminated 1/8" layers of silt and clay with silt and clay.
22					
23					
24					
25					Two attempt to core 26–31'. Less than 0.5' clay and silt recovered.
26					
27					
28					Core 31–36'. 3.75' recovery. Grey saturated alternating 3–6" thick layers of clay, with clay and silt.
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-2

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/28/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length: See Notes
Screen Type: Stainless
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: See Notes
Stick Up: See Notes
Total Hole Depth: 31.0 ft.
Well Guard Length: 5.0 ft.
Initial Water Level: See Notes
Surface Elevation: 98.5
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 1 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0		Core Dia.=2" TOC Elev.: S – 101.32 D – 101.31			Background PID up to 9.8 ppm due to trains. Core 0–5.5' 4' recovery. 0–0.2' Black damp organic loam. 0.2–1.0' Black damp massive fine and medium sand grading down to medium and fine sand. Sharp horizontal contact (SHC)
1, 2, 3, 4, 5, 6		Stick Up: S – 2.5' D – 2.8'		5.3/bg 5.3	
7, 8, 9, 10		Casing Length: S – 20.1' D – 25.3'		5.3/bg 5.3	1.0–3.5' Grey moist laminated silt and clay. Common large orange mottles. SHC. 3.5–4.5' Dark brown damp dense massive particulate peat. (compacted, actual 0.5' recovery.)
11, 12, 13, 14		Water Level: S – 3.5' D – 3.6'		5.2/bg 7.3	
15, 16, 17, 18, 19, 20	S	Piezo Screen: S 17.5'–18.1' D 23.5'–24.3'		3.4/bg 3.9	Core 4.5–10'. 3' recovery. 4.5–9' Dark brown saturated (sat.) very loose, massive particulate peat. SHC. 9–10' Dark brown dense damp massive fibrous peat. (Compacted, actual 0.5' recovery).
21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	D			0 0	Core 11–16'. 3.5' recovery. 11–13.5' Dark brown wet dense fibrous peat. SHC. 13.5–15.4' Grey sat. massive medium sand, few angular phyllite pebbles, coarse sand, gravel. SHC. 15.4–15.7' Dark brown moist leaves, twigs, and wood.
32, 33					15.7–16' Grey wet massive fine micaceous sand, few angular phyllite pebbles.
34, 35, 36, 37, 38, 39, 40					Core 16–21'. 3.4' recovery. 16–15.4' Black wet twigs, wood, bark. Few isolated subangular pebbles. One rounded 2" driftwood chunk. (Storm wash). SHC.

(continued on Page 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05502

DRILLING LOG
WELL # PZ-2

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/23/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length: See Notes
Screen Type: Stainless
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: See Notes
Stick Up: See Notes
Total Hole Depth: 31.0 ft.
Well Guard Length: 5.0 ft.
Initial Water Level: See Notes
Surface Elevation: 98.5
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 2 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					(continued from Page 1)
1					
2					15.4–21' Grey sat. massive fine sand, few black horizontal 1/8" thick bands. SHC. (Actual recovery 3').
3					
4					
5					
6					
7					Core 21–26'. 4.7' recovery. 21–25.6' Grey sat. massive fine sand, few bark and wood chunks to 2". (Actual 4.3 recovery). SHC. 25.6–26' Grey sat. massive silt, some fine sand, clay.
8					
9					
10					
11					
12					
13					
14					
15					Core 26–31'. 4.2' recovery. 26–28' Grey sat. fine sand grading down to fine sand and silt. Massive. SHC. 28–28.3' Grey wet laminated clay. Gradational contact. 28.3–29' Dark brown moist particulate peat. SHC. 29–31' Grey sat. laminated clay.
16					
17					
18					
19					
20					
21					
22					
23					Roots at 29–29.2'. 1/2" thick fine sand layer at 30.5'. SHC.
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-3

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/23/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: None
Casing Diameter:
Casing Length:
Screen Type: None
Screen Diameter:
Screen Length:
Slot Size: N/A

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 20.7 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 98.2
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 1 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0		Core Dia.=2"			
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14				2.7 8.6 7.6	Core 0–5.4' 2.5' recovery. 0–1' Grey humid silt, little fine sand and roots. Sharp horizontal contact (SHC). 1–2.4' Grey and orange dry silt, some clay, trace roots and sticks. Common fine distinct orange mottles from 1–2'. Wet to sat. at 2.3–2.4' Damp red/black fibrous peat. All soils compacted, hole open to 4.7'.
15, 16, 17, 18, 19, 20				21	Core 4.7–10' 1.3' recovery. Poor recovery mostly due to compaction as demonstrated by measurements of core during drilling. 4.7–5.1' Grey sat. clay and silt. SHC. 5.1–10' Red/black very dense dry fibrous peat. (Actual 0.9'
21, 22, 23, 24, 25, 26, 27, 28, 29					Core 10–15'. 2.75' recovery. 10–14.25' Brown/red dense fibrous moist peat with seeds and wood. (Compacted, 2' actual recovery). SHC. 14.3–15' Grey sat. medium and coarse sand, little subangular gravel, trace silt, pebbles.
30, 31, 32, 33, 34, 35, 36, 37					Core 15.7–20.7'. 4.4' recovery. 15.7–17.5' Grey sat. massive coarse sand and subangular gravel. 17.5–17.6' Wood. 17.6–17.9' Grey massive wet fine sand, little silt. SHC. 17.9–18.3' Grey wet medium sand and wood, some subangular pebbles.
38, 39, 40					(continued on Page 2)

The Johnson Company, Inc.
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100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-3

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 9/23/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: None
Casing Diameter:
Casing Length:
Screen Type: None
Screen Diameter:
Screen Length:
Slot Size: N/A

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 20.7 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 98.2
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 2 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2		Core Dia.=2"			
1					
0					
1					(continued from Page 1)
2					
3					18.3–18.5' Grey sat. fine sand. Petroleum sheen. SHC. 18.5–19.2' Grey sat. massive medium sand and gravel grading down to fine sand. Petroleum sheen. SHC. 19.2–19.4' Brown/grey wet coarse sand and angular gravel and wood. Dark brown
4					
5					
6					
7					
8					
9					
10					
11					19.4–20.7' Grey massive sat. fine sand. Floating petroleum sheen and 1/4" diameter dark brown NAPL droplets.
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-3A

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 10/03/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length: See Notes
Screen Type: Stainless
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: See Notes
Stick Up: See Notes
Total Hole Depth: 35.0 ft.
Well Guard Length: 5.0 ft.
Initial Water Level: See Notes
Surface Elevation: 97.45
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0		Core Dia.=2"			Core 0–5.5'. 3.2' recovery due to compaction, hole open to 5.3'. 0–0.2' Black moist organic loam. Sharp horizontal contact (SHC). 0.2–2.0' Grey wet clay and silt. Common fine distinct brown mottles. Horizontal laminae. SHC.
1, 2, 3, 4, 5, 6		TOC Elev.: S – 100.40 D – 100.39 Stick Up: S – 3.0' D – 3.0' Casing Length: S – 19.7' D – 25.9'		0	2–5.3' Brown fibrous dense damp peat. (Compacted, actual 1.2' recovery).
7, 8, 9, 10, 11, 12, 13, 14		Water Level: S – 2.9' D – 2.5'		30.7 0	Core 5.3–11'. 3.3' recovery. Floating petroleum sheen on water in core barrel. 5.3–5.0' Grey saturated (sat.) clay and silt, little sand. (Spoil?). SHC. 5–11' Brown sat. fibrous peat. (Compacted, actual 3' recovery).
15, 16, 17, 18, 19, 20, 21, 22	S	Piezo Screen: S 16.7'–17.5' D 22.9'–23.7'		1	Core 11–16'. 2' recovery. 11–11.2' Fine sand and silt and peat (spoil) 11.2–14.5' Brown damp dense massive fibrous and granular peat with seeds and wood chunk at base. (Compacted, actual 1.4' recovery). SHC.
23, 24, 25, 26, 27, 28	D			1.2	14.5–15' Grey sat. laminated medium and fine micaceous sand. Brown 1/4" organic layers and sand layers increasing to 1" downwards. SHC.
29, 30, 31				0.4	15–16' Grey wet fine sand, some silt, interbedded with medium sand. Partial recovery, disturbed.
32, 33, 34, 35, 36				0.4	Core 16–21'. 4.6' recovery. 16–16.6' Grey moist massive fine sand. SHC. 16.6–17 Grey wet massive fine and medium sand, some angular fine gravel, organic fibers. SHC. 17–17.3' Grey and red subround coarse gravel in matrix of some fine sand,
37, 38, 39, 40					(continued on Page 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PZ-3A

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 10/03/94
Driller: PTD/DMM
Drill Method: Drive Point Piston-

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length: See Notes
Screen Type: Stainless
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: See Notes
Stick Up: See Notes
Total Hole Depth: 36.0 ft.
Well Guard Length: 5.0 ft.
Initial Water Level: See Notes
Surface Elevation: 97.45
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1					(continued from Page 1)
2					
3					17.3–17.7' Grey sat. horizontally laminated fine sand. SHC. 17.7–18.1' Grey sat. massive medium sand, some fine sand. SHC. 18.1–18.4' Grey sat. laminated fine sand. Two sharp horizontal black organic layers. SHC.
4					
5					
6					
7					
8					
9					
10					
11					18.4–18.5' Grey and red sat. subround coarse gravel, some fine sand. SHC. 18.5–21' Grey sat. horizontally laminated fine sand with fine sand, little silt layers 1–3" thick. Few wood chunks.
12					
13					
14					
15					
16					
17					
18					Core 21–26'. 4.6' recovery. 21–25' Grey sat. massive fine sand, little silt. Trace 1" wood chunks. SHC. 25–25.5' Grey moist laminated clay and silt. SHC. 25.6–26' Brown moist laminated clay and silt and organic fibers (compacted).
19					
20					
21					
22					
23					
24					
25					
26					Core 26–31'. 4.3' recovery. 26–27.8' Grey sat. laminated clay and silt. SHC. 27.8–30.7' Grey sat. massive medium and fine sand.
27					
28					
29					
30					
31					
32					Core 31–36'. 4.2' recovery. Grey saturated clay and silt alternating with clay, some silt in 2–3" layers. SHC.
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PSP-1

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 11/14/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: N/A
Casing Diameter:
Casing Length:
Screen Type: N/A
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 20.3 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 96.0 Est.
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2		Core Dia.=2"			
1					
0					
1					Hole remained open to 3.3'. 14" recovery. 8" of brown humid dense fibrous peat over 6" of wood.
2					
3				3.6	
4					
5					
6					Core 5.3–10.3'. 23" recovery. 0–16" red brown saturated (sat.) fibrous peat, some silt. Sharp horizontal contact (SHC). 16–23" Grey wet massive fine sand and silt.
7					
8				3.6	
9					
10					
11					
12					Core 6.7–11.7'. 45" recovery. 0–22" Red brown sat. fibrous peat with 1" wood chunks. SHC. 22–39" Grey sat. 1/4" horizontally laminated fine sand alternating with silt layers. SHC. 39–45" Red brown loose sat. fibrous peat.
13					
14					
15					
16					
17					
18				2.6	
19					
20					
21					No recovery after four attempts to core 12–15' interval. Core 15.3–20.3. 55" recovery. Tan/grey sat. plastice clay grading down to grey sat. silt and fine sand. Contact of clay and silt at 18.7'.
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # PSP-1A

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 11/16/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: None
Casing Diameter:
Casing Length:
Screen Type: None
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 25.5 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 95.8
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0		Core Dia.=2"			
1, 2, 3, 4, 5, 6					Core 0–5.4'. 9" recovery. Wet dense black organic muck and red brown fibrous peat.
7, 8, 9, 10				8.9	Core 5–10'. 25" recovery. Red brown wet dense to loose fibrous peat.
11, 12, 13, 14				12.9	Core 9.6–14.7'. 47" recovery. Red brown wet dense fibrous (fib.) peat, some wood chunks.
15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25				20.1	Core 14.7–19.7'. 36" recovery. 0–6" Red brown wet loose to medium dense fib. peat. SHC. 6–8" Grey wet laminated silt. 8–15" Wood. 15–23" Grey laminated wet silt, some roots. SHC. 23–26" Grey sat. massive fine sand.
25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40					26"–30" Grey sat. laminated silt and fine sand. 30–36" Grey wet laminated plastic clay and silt.
					No recovery after three attempts. Clay and silt on tip. Split spoon 19.2–21.5'. 19" recovery. 0–3" Grey wet very fine sand. SHC. 3–19" Grey wet laminated silt and clay grading down to clay and silt.

The Johnson Company, Inc.
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Montpelier, Vermont 05602

DRILLING LOG
WELL # PSP-4

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 11/17/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length:
Screen Type: Stainless Steel
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 46.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 102.5
T.O.C. Elevation: –

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
6 4 2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 72 74 76 78 80 82 84 86		Core Dia.=2" Stickup: 1 – 2.9' 2 – 4.5' 3 – 4.5' Casing Length: 1 – 18.4' 2 – 25.0' 3 – 30.0' Water Level: bgs 11/29/94 1 – 10.55' 2 – 20.15' 3 – 24.05' Piezo Screen: 1 15.5'–16.3' 2 20.5'–21.3' 3 25.5'–26.3' Piezometers removed 12/94		8.6 11 1.3 10 0 0 0	Core 0–5.1'. 38" recovery. 0–1.9' Grey dense dry fine sand and silt, some subangular gravel. 1.9–3.2' Brown dry fine sand, little silt, some gravel, pebbles. (Fill). ---------- Core 5.5–10.5'. 37" recovery. 0–6" brown damp fine sand, some bricks, angular gravel. (Fill). Sharp horizontal contact (SHC). 6–14" Black moist fine sand, some silt, little medium sand, gravel. Poorly-sorted. SHC. ---------- 14–20" Brown mottled wet massive fine sand. 20–37" Alternating 2–3" thick layers of wet sand and peat. ---------- Core 10.5–15.3'. 15" recovery in bottom of tube. 0–17" Red and black very dense damp granular peat, few wood chunks, roots. 2" grey silt layer with sharp 10 degree contact at 3–5". 17–15" Grey wet coarse and medium sand. ---------- Core 15.5–20.5'. 5' recovery. 1'thick grey wet massive medium sand grading down to 2.5' thick coarse sand and then to a 1.5' thick coarse sand and angular gravel. All clean and well-sorted. ---------- Core 20.5–25.5'. 9" recovery. Grey wet fine and medium sand, some wood chunks. SHCs in 1/4" thick layers. ---------- Core 24.5–30.5'. 5.2' recovery. 0–32" Grey saturated (sat.) massive fine sand, little silt. SHC. 32–38" Grey sat. massive fine sand and silt. SHC. 38–46" Grey sat. massive fine sand, some silt. 46–62" Grey sat. silt and fine sand. ---------- (continued on Page 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05502

DRILLING LOG
WELL # PSP-4

Project: Pine Street Barge Canal
Location: Burlington, Vermont
Job # 1-0730-5
Logged By: DMM
Date Drilled: 11/17/94
Driller: PTD/DMM
Drill Method: Drive Point Piston

Casing Type: IP/Nalgene
Casing Diameter: 0.5 in.
Casing Length:
Screen Type: Stainless Steel
Screen Diameter: 1.5 in.
Screen Length: 0.8 ft.
Slot Size: N/A

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 46.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 102.5
T.O.C. Elevation: --

▌ = Sampled Interval

Sheet 2 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
6					
4					
2					
0					
2					
4					
6					
8					(continued from Page 1)
10					
12					Core 30-35.5. 59" recovery. 0-14" Grey wet horizontally laminated (HL) silt and fine sand. 14-16" Grey wet silt and clay. SHC. 16-20" Grey wet HL silt and fine sand. SHC. 20-42" Grey wet plastic HL clay and silt grading down to blue
14					
16					
18					
20					
22					
24					
26					
28					42-46" Clay gradually changes to peat in laminations. 46-57" Red brown very dense fibrous peat, some wood chunks. 57-59" Grey very dense laminated silt, trace clay.
30					
32					
34					
36					
38					
40					Core 35-40.5'. 25" recovery; lost 30" of sample from bottom of core. Grey saturated laminated clay with clay and silt. Few wood chunks in lower 4".
42					
44					
46					
48					
50					
52					Core 40-46'. 48" recovery. Lost 8" of sample from bottom of core. Grey moist to wet laminated plastic clay, little silt. Pressure grout hole to surface.
54					
56					
58					
60					
62					
64					
66					
68					
72					
74					
76					
78					
80					
82					
84					
86					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-70

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard, J. Bowes
Date Drilled: 5/09/00
Driller: The Johnson Company, Inc.
Drill Method: Piston Envirocore

Casing Type: None
Casing Diameter:
Casing Length:
Screen Type: None
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 27.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 4.0 ft.
Surface Elevation: –
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					Drive probe to 8' to bypass railroad ties and other debris in fill.
0					Envirocore 7–9'. No recovery.
1, 2, 3					Core 9–11' 0.3' recovery. Dark brown fine grained peat humus.
4		▽			
5, 6					Core 11–13' 1.3' rec. Dark brown peat humus.
7, 8					Core 13–15'. 0.8' rec. Brown peat humus.
9				1.0 ppmv	
10, 11					Core 15–17'. 1.2' rec. 0–1.1' Brown peat humus. Sharp horizontal contact (SHC). 1.1–1.2' Grey wet medium sand (ms).
12				0.3	
13, 14		Grout		1.3	
15, 16				1.0	Piston core 17–22'. 2.7' rec. 0–0.8' Grey wet fine sand (fs). SHC. 0.8–1.1' Wet very coarse sand & gravel. SHC. 1.1–1.8' Grey wet coarse sand. SHC. 1.8–2.4' Grey–brown wet banded very fine sand (vfs) & silt. SHC. 2.4–2.7' Pebble & VFS.
17, 18, 19				0.3/0.5	
20, 21, 22, 23, 24, 25, 26					Piston core 22–27'. 4.3' rec. No PID measurement per Steve Mangion, EPA. Core tube sealed. VISUAL DESCRIPTION: 0–0.8'Black, wet gravel and coarse sand. Odor reminiscent of coal tar. 1/16" LNAPL on water in core. Black and brown NAPL staining.
27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40					Core 22–27' cont. 22.8–24.7' Brown–grey wet medium & coarse sand. 24.7–25.2' Grey wet medium sand. Gradational contacts. 25.2–26.3' fine sand grading down to very fine sand. No NAPL. Total depth 27'. Hole bentonite grouted from up, bottom up.

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-71

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: JRB/DMM
Date Drilled: 5/30/00
Driller: DMM/AWR
Drill Method: Envirocore/Pist.core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 103.33
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 1 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					0–2' 0.15' recovery (rec.). Dark brown moist medium sand (fill).
0					0–4' No rec.
1				1.0 ppm	
2, 3, 4, 5					4–6' 0.45' rec. Dark brown medium to coarse sand, rock fragment @ 0.3'.
6				4.0 ppm	
7				3.8 ppm	6–8' 1.45' rec. 0–.2' Brown coarse sand (mottled). 0.2–1.45' Dark brown to gray silty clay banded organics, mottles 0.75–1.2'.
8, 9				4.0 ppm	
10, 11				3.5 ppm	8–10' 0.85' rec. Gray to brown silty clay to 0.8'. Brown fine peat @ 0.8–0.85'.
12, 13, 14				3.5 ppm	
15, 16, 17					10–12' 1.1' rec. 0–.5' Dark brown moist peat. 0.5–1.1' Gray medium to fine sand. NOTE: Switch to piston corer.
18, 19				3.0 ppm	
20		Grout			
21, 22				2.5 ppm	12–15.5' 1.0' rec. 0–.1' Gray saturated (sat) coarse sand (cs). .1–1.0' Dark brown peat (compacted) wood chip in tip of sampler. NOTE: Heaving sands @ 7' bgs.
23, 24, 25				2.3 ppm	
26, 27, 28				2.0/1.5ppm	15.5–20' 1.7' rec. 0–.6' Gray wet medium (ms) to fine sand (fs). 0.6–1.2' Brown peat compacted with silty matrix. 1.2–1.7' Gray wet coarse sand.
29, 30, 31					
32, 33				2.3/2.0ppm	20–25' 2.3'rec. 0–.3' Gray sat massive (mass) firm poorly sorted fs,some cs–ms, trace gravel (gvl). Sharp Horizontal Contact (SHC). 0.3–.4'Red sat fine grained peat humus, SHC.
34, 35, 36, 37					
38				1.8/1.5ppm	
39, 40					

(continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-71

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: JRB/DMM
Date Drilled: 5/30/00
Driller: DMM/AWR
Drill Method: Envirocore/Pist.core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 103.33
T.O.C. Elevation: –

▌ = Sampled Interval

Sheet 2 of 2

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					(continued from Sheet 1)
2					
1					20–25' (cont.) 0.4–.8' Gray sat horiztally laminated micaceous ultra fine sand (ufs). Two 1/4" red peat layers @ 0.75' and 0.8', SHC. 0.8–1.4' Gray sat mass firm poorly sorted ms, little cs, fs. Gradational contact.
0					
1					
2					
3					
4					
5					
6					
7					20–25' (cont.) 1.4–1.6' Gray wet mass sub–round gvl and ms, SHC. 1.6–1.9' Brown (Br) wet ufs and wood chunks. 1.9–2.3' Gray wet horizontally laminated micaceous ufs.
8					
9					
10					
11					
12					
13					
14					25–30' 3.8' rec 0–2.5'Gray sat mass firm m & cs some fs, tr gvl. 0.05' ufs layers w/some cs @ 1.2' & 1.7'. 2.5–3.2' Gray sat soft mass silt, SHC. 3.2–3.8' Grey sat soft clay & silt (1/16"thread) w/.05–.1'chunks of br fibrous organic matter (peat?).
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					30–35' 3.8' rec. 0–.3' Br/gray sat. mass poorly sorted gvl and fs, ms, cs, SHC. 0.3–1.1' Gray sat mass loose ufs & silt, some clay 1/8" thread. SHC. 1.1–3.8' Gray sat mass firm plastic clay and silt 1/16–1/32" thread.
25					
26					
27					
28				31.1	
29					
30					
31					
32					35–40' 4.3' rec. Gray mass sat firm plastic clay and silt. 1/4" Br ufs layer @ 2.6'. 1/4" Diameter Br organic blobs at 3.0 and 3.5'
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
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100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-72

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: DMM
Date Drilled: 6/01/00
Driller: WPD
Drill Method: Piston Core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 35.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 103.79
T.O.C. Elevation:

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0					
1, 2, 3					0-3' No information on 0-1'. 1-3' no recovery (rec.)
4, 5, 6				1.2 ppm 4.3 ppm	3-4.5' 0.2' rec. Wood chunks and tan damp fine sand (fs), little gravel (gvl).
7, 8, 9				3.0 ppm	4.5-6.5' 0.4' rec. Soil core same as above.
10, 11, 12, 13, 14, 15, 16				3.0 ppm 2.5 ppm 2.5 ppm 2.3 ppm	6.5-8.5' 1.5' rec. 0-0.3' Brown (Br) wet massive (mass) coarse sand (cs) and medium sand (ms), Sharp Horizontal Contact (SHC). 0.3-1.5' Gray moist mass dense clay and silt. Few mottles.
17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35		Grout		1.5 ppm 1.2/1.5ppm 1.2 ppm 1.2/1.0ppm 1.0 ppm 1.0 ppm	8.5-10.5' 1.0' rec. 0-.7' Grey moist mass dense clay and silt common pronounced br fine mottles. SHC. 0.7-1.0' Red/br damp fine grained peat humus.
					10.5-12.5' 0.8' rec. Red/brown moist peat humus.
					12.5-14.5' 0.7' rec. Red/brown moist peat humus.
					14.5-15.2' 0.5' rec. Br wet fibrous sphagnum peat. Note: Piston core remaing hole. Heaved to 7.0' bgs.
					15-20' 1.3' rec. 0-.2' Gray saturated (sat) fs, SHC. 0.2-0.8' Red/br wet fine grained peat humus, SHC. 0.8-1.3' Gray sat. ms and fs massive.
36, 37, 38, 39, 40					(continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-72

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: DMM
Date Drilled: 6/01/00
Driller: WPD
Drill Method: Piston Core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 35.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 103.79
T.O.C. Elevation:

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					(continued from Sheet 1)
2					
1					20-25' 3.5' rec. 0-.3' Gray sat. ms & fs, trace (tr) cs, SHC. 0.3-.6' Gray sat. laminated micaceous very fs w/ br organic ...?, SHC. 0.6-2.2' Gray sat mass fs & ms tr red quartz pebble, pockets of fiborous organic chips (waved washed), SHC.
0					
1					
2					
3					
4					
5					
6					
7					20-25' (cont.) 2.2-3.3' Gray sat mass mica very fs, trace wood chunks, pebbles. 3.3-3.5' Gray sat fs & ms, some gravel. No odor, staining, NAPL.
8					
9					
10					
11					
12					
13					25-30' 4.4' rec. 0-1.0' gray wet mass ms, lit. fs, cs, SHC. 1.0-1.1' Grey sub-round gravel and ms, cs (red quartz) SHC. 1.1-1.7' Gray wet mass ms & fs, one pebble, wood chunk at base SHC. 1.7-2.2'Gray sat silt, some fs, clay lamin. sharp 45 contact.
14					
15					
16					
17					
18					
19					
20					
21					
22					25-30' (cont.) 2.2-2.3' Gray sat fs & ms sharp 45 contact.2.3-3.2' Gray sat silt, some clay 45 lamin. SHC. 3.2-3.5' Gray wet firm silt & clay horizontal lamin. org. fiber layers 1/8", gradational contact. 3.5-4.4' Br damp dense fine grained peat humus.
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					30-35' 4.0' rec. 0-0.2' Gray sat. mass ms (spoil?) SHC. 0.2-4.0' Gray wet firm mass clay (1/16" thread). 1/8-1/4" thick very fs & silt layers w/SHC @ 0.7', 0.9', 1.5', 2.0'. Notes: Grout to surface.
33					
34				30.2	
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-73

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: DMM
Date Drilled: 6/01/00
Driller: WPD
Drill Method: Env core Piston core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 103.09
T.O.C. Elevation:

▮ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0					
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40		Grout		1.8 ppm 1.0 ppm 1.2 ppm 1.2 ppm 1.2 ppm 2.7 ppm 2.4 ppm 2.2/1.7ppm 2.2/3.0ppm 2.4/1.7ppm 1.1/.9 ppm 2.4/1.9ppm 2.2/1.4ppm	0.5-2.0' 0.6' recovery (rec.). Black (Bl) friable fine sand (fs), some silt, little (lit) gravel (gvl). 2-4' 1.3' rec. 0-.4' Black damp mass silt & fs, some gvl, sharp 45 degree contact (S45C). 0.4-.5' Brown (br) damp mass fs, ..., Sharp Horizontal Contact (SHC). 0.5-.7' Gray moist firm clay & silt S45C. 2-4' (cont.) .7-1.1' Bl dry coarse sand (cs) and gvl, with anthracite coal, SHC. 1.1-1.3' Tan damp massive (mass) fs. 4-6' 0.8' rec. Tan moist mass fs. 6-8' 1.4' rec. 0-0.1' Tan moist fs, SHC. 0.1-1.3' Gray damp dense clay & silt, many prominent fine organic mottles, SHC. 1.3-1.4' Red-br damp fine grained peat humus. 8-10' 0.8' rec. 0-.7' Red-br damp fine grained peat humus, SHC. 0.7-0.8' Gray wet fs. Note: 10-12' (split spoon) 1.5' rec. 0-.4' Gray wet clay & silt some angular gvl, little pebbles. .4-1.5' Red-br fiberous peat in tip. No recovery 12-16'. 10-15' Switched to Piston Coring. 2.3' rec. 0-1.4' Gray wet mass dense clay & silt, trace of sub-round gvl S45C. 1.4-2.3' Red-br damp fiberous sphagnum peat. (continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-73

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: DMM
Date Drilled: 6/01/00
Driller: WPD
Drill Method: Env core Piston core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 103.09
T.O.C. Elevation:

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					(continued from Sheet 1)
4					15-20' 2.6' rec. 0-.9' Gray wet mass dense clay & silt, trace sub-round pebbles, gvl, SHC. 0.9-1.1' Red/br moist fine grained humus, SHC. 1.1-1.5' Br/gray sat mass ms & cs, some fs, SHC. 1.5-2.6' Gray sat mass fs & ms, little cs.
3					
2					
1					
0					
1					
2					
3					
4					
5					20-25' 4.0' rec. 0-.3' Red/br sat fiberous sphagnum peat, SHC. .3-.9' Gray sat mass very fs (micaceous), SHC. 0.9-1.0' Red/br fine grained sat organic detritus (fibers, bark etc), SHC. 1.0-2.1' Gray sat very fs, SHC.
6					
7					
8					
9					
10					
11					
12					
13					20-25' (cont.) 2.1-2.3' Gray sat gravel and coarse sand. 2.3-3.9' Gray sat very fs, and ms. 3.9-4.1" Gray sat cs and ms, some gravel.
14					
15					
16					
17					
18					25-30' 4.8' rec. 0-.3' Gray sat very fs, SHC. 0.3-.5' Gray sat fs & ms, SHC. 0.5-.7' Gray sub-round gvl little cs, SHC. 0.7- 1.6' Gray sat mass ms & fs, little gvl, cs, SHC. 1.6-2.0' Gray sat cs, little gvl, SHC.
19					
20					
21					
22					
23					
24					
25					
26					25-30' (cont.) 2.0-4.8' Gray saturated mass very fs, some silt, little chunks of wood.
27					
28					
29					
30					
31					30-35' 2.2' rec. 0-.5' Gray moist plastic clay & silt, 1/16" thread, SHC. 0.5-1.0' Br damp fine grained peat humus, SHC. 1.0-1.2' Gray moist very fs, SHC. 1.2-2.2' Gray moist plastic clay & silt.
32					
33					
34					
35				31.2	
36					
37					
38					35-40' 4.5' rec. Gray sat. plastic massive clay & silt. Pressure grout to the surface.
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-74

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: DMM
Date Drilled: 6/05/00
Driller: WPD
Drill Method: Spltspoon, Pist.core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 35.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 102.84
T.O.C. Elevation:

▮ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					0-2' 0.6' recovery (rec) Black dry fine sand (fs) some silt, little gravel (gvl).
0					
1				1.4 ppm	2-4' 0.4' rec. Black humid fs & silt & sub-angular gvl.
2, 3				1.7 ppm	
4					No recovery
5				1.9 ppm	
6, 7				1.9 ppm	6-8' 0.9' rec. Grey & black moist firm massive (mass) clay & silt. Common fine distinct organic mottles.
8, 9				1.9/2.2ppm	
10, 11				2.2 ppm	8-10' 0.8' rec. 0-.6' Gray moist firm mottled clay & silt, Sharp Horizontal Contact (SHC). 0.6-0.8' Red/brown (br) damp fine grained peat humus.
12, 13				1.9 ppm	
14, 15				1.7 ppm	
16				2.2 ppm	
17, 18		Grout			10-12' 1.2' rec. Red/br damp fine grained peat humus, grading down to fiberous sphagnum peat.
19				2.2 ppm	
20, 21, 22, 23				1.9/3.7ppm	12-14' 1.1' rec. Red/br damp peat humus and sphagnum peat.
24, 25, 26, 27, 28				1.9/1.7ppm	14-16' 0.7' rec. 0-.65' Red/br damp peat humus, SHC. 0.65-.7' Gray wet coarse sand (cs), wood chunks. Note: Piston core 16-20' with no recovery, hole caved to 4' bgs off set ~ 1'north.
29, 30, 31, 32, 33				1.9/1.7ppm	15-20' 2.3' rec. 0-.5' Red/br peat humus some wood chunks sharp 45 contact. 0.5-1.7' Gray saturated (sat) loose mass medium sand (ms) & fs, trace cs, gvl, SHC. 1.7-1.8' Gray sat cs & silt, some ms, fs, SHC.
34, 35, 36, 37, 38, 39, 40					(continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_BO-74

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: DMM
Date Drilled: 6/05/00
Driller: WPD
Drill Method: Spltspoon, Pist.core

Casing Type: PVC
Casing Diameter:
Casing Length:
Screen Type: Factory
Screen Diameter:
Screen Length:
Slot Size: 010

Total Pipe: 0.0 ft.
Stick Up: 0.0 ft.
Total Hole Depth: 35.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: None
Surface Elevation: 102.84
T.O.C. Elevation:

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					(continued from Sheet 1)
1					
0					15-20' (cont.) 1.8-2.2' Gray sat. mass ms & fs. 2.2-2.3' Red/br wet peat humus & wood.
1					
2					
3					
4					20-25' 3.7' rec. 0-1.0' Alternating 1/4-1/2" layers of gray sat fs with 0.05-0.15'layers br organic fibers, bark, straw, detritus and fs, SHC. 1.0-3.7' Gray sat mass micaceous very fs.
5					
6					
7					
8					
9					
10					
11					25-30' 2.7' rec. 0-1.3' Gray sat very fs (mica), mass trace wood chunks, SHC. 1.3-1.5' Gray sat sub-round gvl in very fs matric, some cs, trace silt & organic fibers. 1.5-2.7' Gray sat mass ms & fs.
12					
13					
14					
15					
16					
17					
18					30-35' 2.7' rec. 0-.8' Gray to br moist dense clay & silt (1/16" thread) gradational contact (0.6-0.8'). 0.8-1.3' Br damp dense peat humus, SHC. 1.3-1.8' Gray sat firm mass very fs, SHC. 1.8-2.7' Gray wet dense clay and silt. Grout to surface.
19					
20					
21					
22					
23					
24				31.9	
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-20A

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/02/00
Driller: Green Mountain Boring
Drill Method: Hollow Stem Augers

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 9.9 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.3 ft.
Slot Size: 0.010"

Total Pipe: 14.4 ft.
Stick Up: -0.6 ft.
Total Hole Depth: 15.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 2.8 ft.
Surface Elevation: 102.4
T.O.C. Elevation: 101.82

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					
1		Cement			See MW-20B core log.
2					
3					
4		Grout			
5					
6					
7		Bentonite			
8					
9					
10					
11		Sand Pack			
12					
13		Screen			
14					
15					
16					
17					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

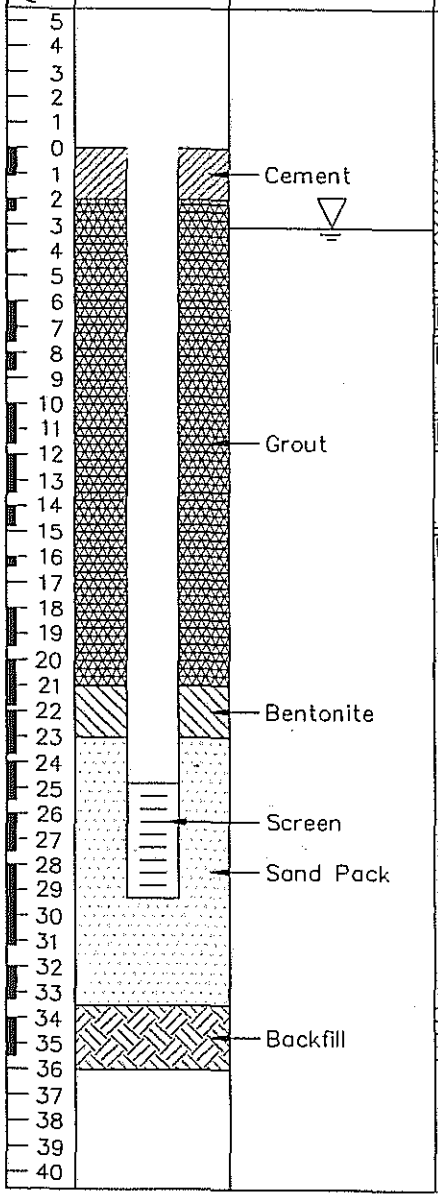
DRILLING LOG
WELL # J_MW-20B

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/01/00
Driller: Green Mountain Boring
Drill Method: Split Spoon & Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 23.9 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 28.9 ft.
Stick Up: -0.4 ft.
Total Hole Depth: 36.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 3.1 ft.
Surface Elevation: 102.46
T.O.C. Elevation: 102.06

▌ = Sampled Interval



Notes	PID Reading	Description
	0.0 ppmv	Split Spoon 0-2'. Blows 3,3,2,1. 1.1' recovery. 0-0.3' Brown damp angular (ang) gravel (gvl) and fine sand (fs). Sharp horizzontal contact (SHC). 0.3-1.1' Black shiny anthracite coal and silt, some fs, ang gvl.
	0.8	
	1.6/1.3	
	1.3	SS 2-4'. 2,1,1,12. 0.5' rec. Brown damp fs, some silt, black shiny coal fragments, wood.
	1.1/1.3	
	1.3	SS 4-6'. 2,1,1,1. No recovery. Spoon wet.
	1.3	
	0.8	SS 6-8' 1,2,2,2. 1.6' rec. 0-1.3' Grey massive saturated (sat) fs & silt, some clay. Few fine prominant mottles. SHC. 1.2-1.35' Grey sat. medium and coarse sand (m&cs). SHC 1.35-1.6' Black sat. fine grained peat humus with roots.
	0.9	
	1.1/1.1	
	0.9/0.9	
	0.6/0.8	SS 8-10' 2,2,2,2. 0.7' rec. 0-0.3' Brown sat. fibrous sphagnum peat, some silt, SHC. 0.3-0.7'
	0.8/0.8	
	0.4/0.6	SS 10-12' 2,1,2,19. 1.6' rec. 0-1.1' Grey massive (mass.) sat. m&cs. SHC. 1.1-1.6' Brown damp fine grained peat humus. Wood in tip. Flowing sands into auger upon spoon retrieval.
	1.9	
	2.3/2.3	
	1.9/1.9	SS 12-14' 7,6,6,5. 1.5' rec. Grey mass. sat. m&cs. Add potable water to augers to prevent flowing sands.

(continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-20B

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/01/00
Driller: Green Mountain Boring
Drill Method: Split Spoon & Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 23.9 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 28.9 ft.
Stick Up: -0.4 ft.
Total Hole Depth: 36.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 3.1 ft.
Surface Elevation: 102.46
T.O.C. Elevation: 102.06

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					
1					
0					(continued from Sheet 1)
1					
2					SS 14-16' 3,1,2,3. 0.8' rec. 0-0.6' Grey sat. mass. coarse and medium sand (c&ms). SHC. 0.6-0.8' Brown fine grained peat humus with wood chunks. Wood and 1/4" thick m&cs lens in tip. SHC.
3					
4					
5					
6					
7					
8					
9					SS 16-18' 4,4,6,6. 0.4' rec. Grey sat. m&cs. One wood chunk.
10					
11					
12					SS 18-20' 3,3,1,2. 1.5' rec. 0-1.0' Grey sat. c&ms. 1-1.5' Wood chunk.
13					
14					
15					SS 20-22' 3,1,2,3. 1.8' rec. 0-1.4' Grey sat. c&ms. 1.4-1.8' Wood chunk.
16					
17					
18					SS 22-24' 5,5,7,9. 1.7' rec. 0-1.2' Grey wet m&cs grading down to coarse sand, some medium sand, few wood chunks, subangular pebbles. SHC. 1.2-1.7' Grey sat. micaceous (mica) very fine sand (vfs) trace silt.
19					
20					
21					
22					
23					
24					
25					
26					SS 24-26' 5,7,10,9. 1.5' rec. 0-0.7' Brown mass. sat. medium sand (ms). SHC. 0.7-1.5' Grey sat. mass. mica vfs.
27					
28					
29					
30					
31					SS 26-28' 7,7,9,11. 1.5' rec. 0-0.8' Brown sat. mass very loose medium sand (augers measured for flowing sand prior to sampling and none detected). SHC. 0.8-1.5' Grey mass. sat. mica vfs.
32					
33					
34					
35					
36					
37					
38					
39					(continued on Sheet 3)
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-20B

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/01/00
Driller: Green Mountain Boring
Drill Method: Split Spoon & Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 23.9 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 28.9 ft.
Stick Up: -0.4 ft.
Total Hole Depth: 36.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 3.1 ft.
Surface Elevation: 102.46
T.O.C. Elevation: 102.06

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					
2					(continued from Sheet 2)
1					
0					SS 28-30'. 5,5,5,7. 2.0' rec. Partial overcore. 0-1.4' Brown-grey mass. sat. vfs, little gvl, few organic (org.) fibers. Coarsens downwards slightly to fine sand. SHC. 1.4-2.0' Dark grey sat. vfs, trace silt, org. fibers. 3' flowing sands @30'.
1					
2					
3					
4					
5					
6					
7					
8					
9					May 2. Wash sands from auger with roller bit. SS 30-32' 3,3,4,3. 1.2' rec. 0-0.4' Grey sat. mass. ms grading down to coarse sand, some org. fibers. One subangular pebble at SHC. 0.4-1.2' Grey sat. mass. mica vfs, little silt, org. fibers.
10					
11					
12					
13					
14					
15					
16					
17					SS 32-34' 5,4,3,4. 1.3' rec. Grey wet mass. fs grading down to silt. Some fine org. rootlets. 0.05' thick coarse sand layer at 0.1-0.15'. SHC.
18					
19					
20					
21					
22					
23					
24					SS34-36' 4,3,4,6. 1.5' rec. 0-0.3' Grey sat. mass. very loose m&fs spoil. Sharp 60 degree contact. 0.32-1.5' Grey sat. horizonatly laminated silt, little clay. 1/4" thread. One vfs laminae 0.9' above bottom of core. Total depth 36'.
25					
26					
27				34.3	
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
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100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-21A

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/05/00
Driller: Green Mountain Boring
Drill Method: Hollow stem auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 18.7 ft.
Screen Type: PVC U-pack
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 23.7 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 25.5 ft.
Well Guard Length: 0.1 ft.
Initial Water Level: 4.0 ft.
Surface Elevation: 103.42
T.O.C. Elevation: 103.12

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					
0		Well Guard			
1		Cement			See core log MW-21B for detailed description of cores.
2, 3, 4, 5, 6, 7, 8					
9		Grout			
10, 11, 12, 13, 14, 15, 16					
17		Bentonite			
18		Backfill			
19, 20					
21		Sand Pack			
22, 23		Screen			
24					
25		Backfill			
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40					

The Johnson Company, Inc.
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100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-21B

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/04/00
Driller: Green Mountain Boring
Drill Method: Split Spoon & Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 30.3 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 35.3 ft.
Stick Up: -0.6 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 4.0 ft.
Surface Elevation: 103.45
T.O.C. Elevation: 102.85

▮ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0					Auger to 10 feet. 0-4' Cobbles in a black fine sand and silt matrix. At one location augered over a 4" post from 4-8.5 feet. Post was vertical and embedded in auger. Wooden post had strong creosote odor and PID headspace of 50 ppmv.
1		Cement			
2, 3, 4		▽			
5, 6, 7, 8, 9, 10				2.3 ppmv	Split spoon 10-12'. Blows 14,4,2,2. 1.5' recovery. 0-0.5' Grey saturated (sat.) loose medium and coarse sand (m&cs) and angular (ang.) limestone (LS) gravel. Sharp horizontal contact (SHC).
11				2.1	
12, 13				2.3/2.7	SS 10-12' continued. 0.5-1.2' Grey sat. ang. LS pebble and fine sand, medium sand FILL. SHC. 1.2-1.5' Brown wet fine grained peat humus with rootlets.
14		Grout			
15				2.3	
16, 17				2.3/2.1	
18, 19				2.1	SS 12-14'. 6,4,2,2. 1.5' rec. 0-0.7' Grey sat. massive (mass.) loose, medium and fine sand (m&fs) SPOIL. Sharp conical contact. 0.7-1.5' Red-brown damp fine grained peat humus, few rootlets. Potable water added to annulus to prevent flowing sands.
20, 21				2.1	
22, 23				1.9	
24, 25				1.9	
26					
27		Bentonite		1.5	
28, 29				1.7	SS 14-16'. 4,2,2,4. 1.2' rec. Grey sat. f&ms grading down to coarse sand (cs) and ang. LS gravel (gvl). Peat in tip of spoon.
30, 31				1.5/1.2	
32		Sand Pack			
33				1.2/1.2	SS 16-18'. 4,2,2,3. 0.8' rec. 0-0.2' Fine and medium sand grading down to gvl & cs. SHC. 0.2-0.8' Grey sat. m&cs, some ang. white LS gvl. 1/4" thick dark band with SHC at 0.4'.
34		Screen			
35				1.0/1.0	
36				0.8	
37					
38		Backfill			
39, 40				0.6/0.8	

(continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-21B

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/04/00
Driller: Green Mountain Boring
Drill Method: Split Spoon & Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 30.3 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 35.3 ft.
Stick Up: -0.6 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 4.0 ft.
Surface Elevation: 103.45
T.O.C. Elevation: 102.85

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					(continued from Sheet 1)
2					
1					SS 18-20'. 12,5,7,5. 1.0' rec. Grey sat. firm mass. medium sand (ms), some fine sand (fs), little cs, one pebble.
0					
1					
2					
3					
4					SS 20-22'. 7,9,3,7. 1.3' rec. 0-0.8' Grey sat. firm, mass. ms, some fs, cs. SHC. 0.8-1.3' Dark grey and black 0.1' thick layers of sub-round red and green gravel, some cs; alternating with layers of grey fs & ms, trace wood chunks. SHCs.
5					
6					
7					
8					
9					
10					
11					
12					SS 22-24' 13,9,9,10. 1.2' rec. 0-0.6' Grey sat. mass. firm ms, some fs, cs. SHC. 0.6-0.7' Ang. pebbles. 0.7-1.2' Grey sat. firm fs, trace wood chunks. 1/4" thick black band at 1.15'. SHCs.
13					
14					
15					
16					
17					
18					
19					SS 24-26'. 13,10,4,5. 1.7' rec. 0-0.9' Grey sat. mass. firm, ms, some cs, one organic fiber. 0.9-1.0' One ang. white LS pebble. 1.0-1.1' Dark grey sat. mass. f&ms. SHC. 1.1-1.5' Grey sat. mass. cs & sub-round (SR) gravel, twig. SHC.
20					
21					
22					
23					
24					
25					
26					
27					SS 24-26' continued. 1.5-1.55' Grey sat. very fine sand (vfs). SHC. 1.55-1.6' Grey sat. cs. SHC. 1.6-1.7' Grey sat. mass. silt and clay (1/8" thread).
28					
29					
30					
31				29.6	
32					
33					SS 26-28'. 11,10,6,5. 1.2' rec. 0-0.6' Grey sat. mass. firm, ms. 0.6-0.8' Two white LS pebbles. 0.8-1.2' grey sat. firm silt and clay, few organic fibers.
34					
35					
36					
37					
38					
39					
40					(continued on Sheet 3)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-21B

Project: Pine Street Canal Site
Location: Burlington, Vermont
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 5/04/00
Driller: Green Mountain Boring
Drill Method: Split Spoon & Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 30.3 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.5 ft.
Slot Size: 0.010"

Total Pipe: 35.3 ft.
Stick Up: -0.6 ft.
Total Hole Depth: 40.0 ft.
Well Guard Length: 0.0 ft.
Initial Water Level: 4.0 ft.
Surface Elevation: 103.45
T.O.C. Elevation: 102.85

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					
4					
3					(continued from Sheet 2)
2					
1					SS 28-30'. 5,4,3,2. 1.2' rec. 0-0.7' Grey sat. mass. firm, ms grading down to ms&cs, trace fine gravel. SHC. 0.7-1.2' Grey wet mass. silt and clay. 0.01' thick fs layer at 0.9' SHCs.
0					
1				SPOIL	
2					
3					
4					
5					
6					SS 30-32' 4,3,3,3. 1.7' rec. 0-0.7' Grey sat. mass. ms, little fs, cs. SHC. 0.7-1.7' grey wet firm lcay and silt, few sticks (1/16" thread).
7					
8				SPOIL	
9					
10					
11					SS 32-34'. 3,1,1,2. 2.1' rec. 0-0.2' Grey sat. mass. fs SPOIL. SHC. 0.2-1.0' Brown-grey sat. mass. ms, some fs, cs. SHC. 1.0-1.9' Grey wet mass. clay and silt. SHC. 1.9-2.0' Brown-grey sat. mass. ms, some fs. SHC. 2.0-2.1' Grey wet mass. clay and silt.
12					
13					
14					
15				SPOIL	
16					
17					
18					
19					
20					Measured 1.0' spoil in hole prior to sampling. SS 34-36' 4,3,2,2. 1.9' rec. 0-0.3' Grey sat. mass. fs SPOIL. SHC. 0.3-0.6' Grey-brown sat. mass. ms, little cs, ang. gvl SPOIL. SHC. 0.6-1.9' Grey wet mass. clay and silt. Few fine prominant orange mottle
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					SS 36-38'. 0,2,2,1. 0.3' rec. Grey sat. mass. ms, little cs, fs SPOIL.
31					
32					
33					SS 38-40'. 0,0,1,1. 2.1' rec. Grey sat. plastic clay and silt. Tan vfs laminae at 0.7 and 1.2'. Total depth 40'.
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-22A

Project: Pine Street Canal Site
Location: Burlington, Vt.
Job # 1-0870-2
Logged By: TRO/DMM
Date Drilled: 6/09/00
Driller: WPD
Drill Method: Envirocore/Casing

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 19.5 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.6 ft.
Slot Size: 0.010"

Total Pipe: 24.4 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 25.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 5.2 ft.
Surface Elevation: 104.28
T.O.C. Elevation: 103.88

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0					
1		Well Guard			See MW20B boring log (alias BO-75)
2		Cement			
3		Backfill			
4, 5					
6		Bentonite			
7, 8, 9, 10, 11					
12		Grout			
13, 14, 15, 16, 17, 18, 19					
20		Sand Pack			
21					
22		Screen			
23, 24		Medium Sand			
25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-22B

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: TRO
Date Drilled: 6/06/00
Driller: WPD
Drill Method: Env core Piston core

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 24.6 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.6 ft.
Slot Size: 0.010

Total Pipe: 29.5 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 35.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 6.0 ft.
Surface Elevation: 104.25
T.O.C. Elevation: 103.96

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					Alias BO-75 Core 0-2' 0.35' recovery (rec). Black moist coarse sand (cs), and gravel (gvl), little (lit) silt.
0		Well Guard			
1		Cement		0.8 ppm	2-4' 0.2' rec. Black moist cs some gvl, lit silt.
2				0.8 ppm	
3, 4, 5				0.5 ppm	4-6' 1.4' rec. 0-.2' Brown (br) moist fine sand (fs) & silt, Sharp Horizontal Contact (SHC). 0.2-1.4' Br moist clay some silt, lit gvl. Dark br bands in the clay @ 0.4-.45', and 0.85-1.3'. Shell fragment at 1.1'.
6				0.5 ppm	
7, 8, 9, 10				1.1 ppm	
11, 12		Grout			
13				1.6 ppm	6-8' 0.2' rec. Black saturated (sat) cs & gvl, slag to pebble size in liner.
14, 15				1.6 ppm	
16, 17, 18				1.4 ppm	8-10' Black sat. pebbles, trace of gravel.
19, 20, 21, 22		Bentonite			10-12' 0.45' rec. 0-.2' Br sat cs (spoil). 0.2-.24' Tan fs, SHC. .24-.25' Black peat humus. 0.25-.45' Gray sat. fs, some silt, trace cs.
23, 24, 25		Sand Pack			12-14' 0.55' rec. 0-.25' Gray wet silt, lit clay, trace fs, ms, SHC. 0.25-.55' Br sphagnum peat (appox. 45 degree angle).
26, 27		Screen		1.1 ppm	
28, 29		Fine Sand		1.1 ppm	14-16' 0.85' rec. 0-.85' Br wet sphagnum peat. Note: switched to piston core, due to heaving sands.
30, 31, 32, 33				1.1 ppm	
34, 35, 36, 37, 38, 39, 40					16-21' 2.75' rec. 0-.25' Br wet sphagnum peat. 0.25-1.5' Gray sat. medium sand (ms), & fs, lit well sorted cs. 1.5-1.7' Dark br sphagnum peat, SHC. 1.7-2.75' Gray sat mass well sorted ms & fs, lit cs.

(continued on Sheet 2)

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-22B

Project: Pine Street Canal Site
Location: Burlington, VT
Job # 1-0870-2
Logged By: TRO
Date Drilled: 6/06/00
Driller: WPD
Drill Method: Env core Piston core

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 24.6 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.6 ft.
Slot Size: 0.010

Total Pipe: 29.5 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 35.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 6.0 ft.
Surface Elevation: 104.25
T.O.C. Elevation: 103.96

▌ = Sampled Interval

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5					(continued from Sheet 1)
4					
3					21-26' 2.8' rec. 0-.15' Sat cs and gvl slag (spoil). 0.15-1.1' Gray ms some cs, trace gvl and wood chunks. 1.1-1.2' Br sat sphagnum peat. 1.2-1.25' Gray sat fs. 1.25-1.3' Br sat shagnum peat. 1.3-1.6' Gray sat ms, lit cs & fs, trace of fine roots.
2					
1					
0					
1					
2					
3					
4					
5					21-26' (cont.) 1.6-1.8' Gray sat well sorted fs. 1.8-2.3' Gray sat cs, some ms trace fs & wood chunks (twigs). 2.3-2.35' Br sat sphagnum peat. 2.35-2.4' Gray sat cs, lit fs. 2.4-2.45' Br sat wood chunks.
6					
7					
8					
9					
10					
11					
12					21-26' (cont.) 2.45-2.8' Gray sat ms, some fs, little wood chunks, grades to fs (gray sat).
13					
14					
15					
16					26-31' 4.1' rec. 0-.9' Gray sat ms, some cs, trace gvl & wood chunks @ .65-.75', .8-.85', SHC. 0.9-1.8' Gray sat fs & ms, some silt, lit wood chunks (1.0-1.1'), trace clay. 1.8-1.9' Gradational change fs to silt to clay.
17					
18					
19					
20					
21					
22					
23					
24					26-31' (cont.) 1.9-2.6' Gray sat mass clay trace fs. 2.6-3.2' Gray sat fs some silt, clay lense @ 2.65-2.7', 2.75-2.85'. 3.2-4.1' Gray sat plastic clay tr fs & silt. Note: No sample from 31-36' possible rock in barrel, set off for drive 30.5-35.5'.
25					
26					
27					
28					
29					
30				29.2	
31					
32					
33					30.5-35.5' 4.7' rec. 0-4.7' Gray sat mass clay and silt, lit fs, staining from mottles 2.5-3.1', 3.7-3.8', 4.2-4.3'. Fs lense 2.3-2.5', 3.0-3.1', 3.9-4.0'. Grouted both holes to the surface. Installed Monitoring Well MW-22B @ this location.
34					
35					
36					
37					
38					
39					
40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-23A

Project: Pine Street Canal Site
Location: Burlington, Vt.
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 6/09/00
Driller: AW Robtoy
Drill Method: Envirocore/auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 19.7 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.6 ft.
Slot Size: 0.010"

Total Pipe: 24.9 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 25.0 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 5.8 ft.
Surface Elevation: 103.91
T.O.C. Elevation: 103.61

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0					
1		Well Guard		3	See core log MW-23B for soil descriptions. Note, a slight odor and sheen were observed on the water in the augers, with a PID reading of 2 ppmV in the annulus during well installation.
1		Cement			
2		Bentonite			
3, 4, 5, 6					
6		▽			
7, 8, 9		Grout			PID headspace of soil on augers was 3 ppmv. Sheens were noted on the soils. The soils were containerized and sent off-site for disposal.
10, 11, 12, 13, 14, 15, 16		Bentonite			
17, 18, 19, 20, 21		Sand Pack			
22, 23, 24		Screen			TOS 83.91 BOS 79.31
25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40					

-24 E

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DRILLING LOG
WELL # J_MW-23B

Project: Pine Street Canal Site
Location: Burlington, Vt.
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 6/09/00
Driller: A.W. Robtoy
Drill Method: Envirocore/auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 26.6 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.6 ft.
Slot Size: 0.010"

Total Pipe: 31.5 ft.
Stick Up: -0.4 ft.
Total Hole Depth: 31.5 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 5.3 ft.
Surface Elevation: 103.44
T.O.C. Elevation: 103.09

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1, 0					
1		Well Guard, Cement, Backfill			Piston core 20-25'. 3.5' recovery. 0-0.3' grey saturated (sat.) loose fine sand. 0.3-0.6' Grey sat. medium and coarse sand. sharp horizontal contact (SHC). 0.6-0.7' Grey sat. coarse sand and gravel, trace wood chips. SHC.
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14		Bentonite			20-25' continued. 0.7-1.6' Gery massive sat. very fine sand, little wood fragments. SHC. 1.6-1.9' Grey horizontally laminated coarse and medium sand. SHC. 1.9-2.4' Grey sat. massive subround gravel and medium sand, some fine sand. SHC.
15, 16, 17, 18, 19		Grout			20-25' continued. 2.4-3.5' Grey sat. horizontally laminated very fine sand, little wood fragments.
20, 21, 22				1.6-2.2ppm, 3.3-4.2ppm	Piston core 25-30'. 2.6' recovery. 0-0.9' Grey sat. massive fine and medium sand. SHC. 0.9-1.2' Grey sat. massive subround gravel and fine sand, coarse sand. SHC. 1.2-1.5' Grey sat. coarse and medium sand. SHC.
23		Bentonite			
24, 25, 26, 27		Fine Sand, Sand Pack		3.3 ppmv, 2.8 ppmv	
28, 29, 30, 31		Screen		4.7 ppmv	25-30' continued. 1.5-1.7' Grey sat. fine sand, some pebbles, silt. SHC. 1.7-2.1' Grey sat. massive medium sand, some fine sand. 2.1-2.2' Grey sat. massive coarse sand, some fine gravel. SHC. 2.2-2.6' Grey sat. medium and fine sand.
32, 33, 34, 35, 36, 37, 38, 39, 40		TOS 76.49, BOS 71.89			Slight odor on augers from 16-30 feet. Soils collected, stored, and shipped off-site for disposal.

The Johnson Company, Inc.
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DRILLING LOG
WELL # J_MW-24A

Project: Pine Street Canal Site
Location: Burlington, Vt.
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 8/08/00
Driller: T. Osborne
Drill Method: Envirocore/Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 20.0 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.7 ft.
Slot Size: 0.010"

Total Pipe: 25.0 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 25.5 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 8.3 ft.
Surface Elevation: 103.51
T.O.C. Elevation: 103.21

▮ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					
0		Well Guard			Drove 12" steel casing to 19'. Installed well through casing. See MW-24B for soil descriptions.
1, 2, 3		Cement			
4, 5, 6, 7		Sand Pack			
8		▽			
9		Bentonite			
10, 11, 12, 13		Grout			
14, 15, 16, 17					
18		Bentonite			
19, 20, 21, 22		Sand Pack			
23, 24		Screen			
25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40					

The Johnson Company, Inc.
Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # J_MW-24B

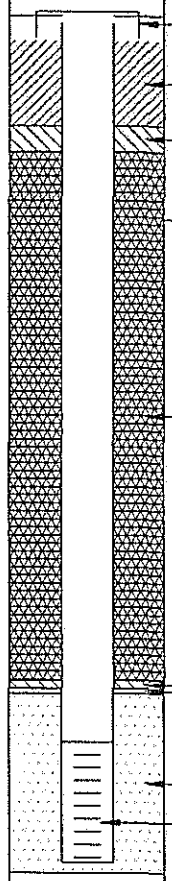
Project: Pine Street Canal Site
Location: Burlington, Vt.
Job # 1-0870-2
Logged By: D. Maynard
Date Drilled: 8/08/00
Driller: T. Osborne
Drill Method: Envirocore/Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 27.8 ft.
Screen Type: PVC
Screen Diameter: 2.0 in.
Screen Length: 4.7 ft.
Slot Size: 0.010"

Total Pipe: 32.8 ft.
Stick Up: -0.3 ft.
Total Hole Depth: 33.5 ft.
Well Guard Length: 1.0 ft.
Initial Water Level: 7.9 ft.
Surface Elevation: 103.37
T.O.C. Elevation: 103.07

▌ = Sampled Interval

Sheet 1 of 1

Depth (feet)	Well Construction	Notes	Geology	PID Reading	Description
5, 4, 3, 2, 1					Drive 12" steel casing to 20'. Core and auger through casing.
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40		Well Guard Cement Bentonite Grout Bentonite Fine Sand Sand Pack Screen		0.6 ppmv 0.7-0.8ppm 0.6-0.7ppm 0.7 ppmV 1.1 ppmV 0.7 ppmV	Piston core 19.5-24.5'. 4.0' recovery. 0-0.8'grey saturated (sat.) massive (mass.) medium and coarse sand (spoil heave in 12" casing). Sharp horizontal contact (SHC). 0.8-1.2' Grey sat. mass. coarse sand and gravel. SHC. 19.5-24.5' continued. 1.2-1.5' Grey sat. greval and coarse sand. SHC. 1.5-2.2' Grey sat. coarse sand and medium sand, some gravel. SHC. 2.2-4.0' Grey sat. mass. very fine sand (micaceous) with one wood chunk at the top. Core 24.5-29.5'. 4' recovery. Grey sat. mass. very fine sand (micaceous). 1/4" thick horizontal partings in lower 1.5'. 0.01' thick organic detritus laminations (bark, etc.) with SHC at 0.1 and 2.3'. Core 29.5-34.5'. 2.1' rec. 0-0.2' Grey sat. very fine sand. SHC. 0.2-0.6' Grey sat. medium and fine sand. 0.6-2.1' Grey sat. silt and fine sand, trace organics. 1/8" thread. Core 34.5-39.5'. 2.6' recovery. 0-0.2' Grey fine sand (spoil). 0.2-0.75' Brown/grey mosit dense alternating 0.01-0.02' thick layers of organic clay silt, trace organic fibers. SHC. 0.75-1.3' Dark brown moist horizontally laminated dense peat humus. SHC 34.5-39.5' continued. 1.3-2.6' Blue-grey wet moderately dense clay. 1/16" thread.

35.8